ABSTRACT

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In economic forecasting, it is important that the forecasts be based on data that is both reliable and up-to-date. The most reliable data typically come from conducting a census. These censuses produce estimates with a long lag between the reference year and the date of publication. However, we also have other sources of economic data that are less reliable but published more frequently. These higher frequency data should be a source of useful information for analyzing economic activity in the current, incomplete year.

The objective of this study is to use high frequency (monthly and quarterly) data to generate forecasts of the annual data from reliable sources used in an inter-industry forecasting model. The results will be used as starting values to improve the model's short-term forecast performance.

The distinguishing feature of this dissertation is that it studies the economic data at the sectoral level as opposed to other studies that only try to generate aggregate data. The aggregate data will be a by-product of these detailed estimates. Thus, we can forecast the trends of the aggregates and observe sectors that contribute to these trends.

In this dissertation, I study data on four main aspectts of the U.S. economy: 1) Personal consumption expenditures, 2) Investment in equipment and software, 3) Investment in structures, and 4) Gross output.

By historical simulations, I find that the performance of the forecasts depends heavily on the accuracy of the exogenous variables used in each forecast. The estimated detailed values are consistent with the macroeconomic data, used as regressors in the processes. Thus, generally, the results will be reliable as long as we have a good forecast of macroeconomic variables.

The performance of the first-period forecast also depends on where in the calendar year the last published data is. The closer to the end of the year, the better is the accuracy of the forecast.

GENERATING UP-TO-DATE STARTING VALUES FOR DETAILED FORECASTING MODELS

By

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Dedication

To Praphis and Suvit Sampattavanija, my mother and father. Their love, encouragement, and patient has been and will always be a guiding light for me.

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Chapter 1: Introduction

1.1 The Problem of the "Ragged End" of Historical Data for Long-term Modeling

In economic forecasting, it is important that the forecasts be based on data that is both reliable and up-to-date. Those two requirements, however, are often contradictory. For example, in a structural model of the U.S. economy with many industries, the most reliable data on the output of the industries comes from the Census of Manufacturing and other economic censuses. These censuses, however, are conducted only every five years and processing them requires around two years. Meanwhile, the Annual Survey of Manufactures produces sample-based estimates of output with a lag of about one years between the reference year and the date of publication. The National Income and Product Accounts (NIPA) appear in full annual detail every year in July for the previous year and, in reduced detail, every quarter for the previous quarter. Moreover, the Federal Reserve Board's indexes of industrial production appear every month for the previous month. As an example, if, in November of 2007, we are forecasting to 2020, the last really firm data we have for automobile output is the 2002 Census of Manufacturing, but we have data through 2005 from the Annual Survey of Manufactures, and the full annual NIPA up to 2006, quarterly NIPA for three quarters of 2007, and the industrial production indexes for the first nine or ten months of 2007. From a quarterly macroeconomic model estimated on data through the third quarter of 2007, we may also have quarterly forecasts for the fourth quarter of 2007 and all of 2008 for many series in the NIPA, including consumer spending on automobiles.

We may refer, for short, to this disparity in the end points of the various data series as the “ragged-end” phenomenon or problem. In view of this ragged end of the data, what values should our forecasts made in November 2007 show for 2006 and 2007? If we choose something other than what the structural model produced, how should the forecasts for 2008 and future years be affected by the difference?

This problem has great practical importance in applied forecasting. The model builder may well take the position that the structural model is meant to capture trends and long-term developments, not short-term fluctuations. The users of the model, however, inevitably look at the recent past and short-term future values. If what they see does not match their own experience or recent statistical data, they are quite prone to discount the model’s results or, indeed, to dismiss them altogether. Thus, the credibility of the long-term model depends heavily on a solution of this short-term problem.

This study develops a partial solution to this problem for one particular long-term structural model. The approach pursued is to use high-frequency – monthly or quarterly – data to produce estimates of current and near-term future values of the annual series used in the long-term model and thus eliminate, from the point of view of its builder, the ragged-end phenomenon. In the above example, we would produce “data” for series in the model up through the end of 2007, even though that year is not yet totally history. The equations of the long-term model would then be estimated through 2007 and forecast for 2008 and future years with possible adjustments for autocorrelated residuals. It would also be possible to use the forecast from the macroeconomic model to forecast the series of the structural model through 2008 and start the long-term forecast from that year as if it were already history. Naturally, one could forecast 2008 in both of these ways and then take an average as the starting point of the long-term forecast.

Ideally, all series used in the structural model should be extended in this way, so that the ragged-end problem completely disappears with a complete “flat-end” data set. In practice, the system of updating the series must be developed gradually. Until it is complete, the features of the structural model software for dealing with the ragged-end problem continue to be used. In effect, the model's equations are used to produce values for the series still missing from the flat-end data set.

Although simple in approach, to be effective this solution must include implementation of a computational procedure which quickly and almost automatically acquires the most recent data from the Internet (and other media), processes the data, extends the series, and re-estimates the equations of the structural model, including provision of adjustments for autocorrelated error terms.

1.2 The Scope of this Study

This study undertakes to develop such system in the context of the LIFT model developed by INFORUM at the University of Maryland. LIFT is a full-scale, multisectoral macroeconomic model. Sectoral input-output data build up macroeconomic or “mesoeconomic” forecasts. The database of the LIFT model includes numerous macroeconomic variables as well as input-output matrices. The model, as it stood as work began on this dissertation, has outputs and prices for 97 commodities, employment for 97 industries, personal consumption expenditure for 92 categories, and equipment investment for 55 categories. The value-added sectoring is comprised of 51 industries. Most equations in the model are estimated at an industry or product level, and the price and output solution by industry use the fundamental input-output identities. The LIFT model has been producing satisfactory long-term forecasts, but one of its weak spots has been in short-term forecasting. Prior to the present study, the LIFT database did not incorporate the most up-to-date (but perhaps unreliable) data available. Because of the ragged-end problem, the current year has been treated much as if it were a future year, with consequent discrepancies between the most recent statistical data and the estimates made by LIFT. The use of more accurate and up-to-date economic data to produce reasonable estimates of recent industry level data should improve the credibility of the model's results and the accuracy over the first year or two of forecast.

The procedures developed here use monthly or quarterly up-to-date data, such as the industrial production indexes, as indicators of the more basic (but not yet available) annual data for the previous year or two. The higher frequency data can also be used to forecast the basic data for the rest of the current, incomplete year and, towards the end of the year, for the following year.

The ideal of extending *all* series to obtain a complete flat-end annual data set has not been achieved. The flat-ended dataset does, however, now – as a result of the work described here -- include some of the most important series such as Personal consumption expenditures in 116 detailed categories, fixed investment in equipment and software, fixed investment in structures, and gross output of industries in full BEA 65 sector Input-

Output detail. Significant series still missing are exports, imports, inventory change, and government expenditures in detailed sectors.

1.3 Related Work

One of the problems in working with high-frequency data is that it is subject to revision, especially in the first several periods after the first release. Croushore and Stark (2001) have discussed this problem and some alternative estimation methods in their works. When analysis of revisions began, a predictable pattern was discovered for some series. These patterns have now largely been eliminated by the producers of the series. I will therefore ignore the revision problem in this work, though we still have to keep in mind that we cannot compare models directly without considering the data vintage. For example, in an analysis of forecasts of industrial production indexes (IP), Diebold and Rudebusch (1991) used a real-time data set constructed using both preliminary and partially revised data on the composite leading index (CLI), which is constructed using only data that were available at time t-h (where t is the time index and h is the forecast horizon). In the context of linear forecasting models, they find that the performance of partially revised CLI data deteriorates substantially relative to revised data when used to predict the industrial production indexes. A number of other papers also address issues related to the real-time forecasting. For example, Trivellato and Rettore (1986) discuss the decomposition of forecasting errors into, among other things, the forecast error associated with preliminary data errors. A small sample of other related references includes Boschen and Grossman (1982), Mariano and Tanizaki (1994) and Patterson (1995). Swanson and White (1995) find that using adaptive models, such as an artificial neural networks model, for forecasting macroeconomic variables in a real-time setting can be useful when the variable of interest is the spot-forward interest-rate differential.

There have been many attempts to incorporate high-frequency information into existing economic forecasting models. Zadrozny (1990) built a single model that relates data of all frequencies. His attempt to build such a comprehensive model was unsuccessful. Litterman (1984) and Corrado and Reifschneider (1986) find that updating forecasts of the current quarter based on incoming monthly data is helpful. However, it is not helpful in forecasting for much longer horizons.

Miller and Chin (1996) try to combine the forecasts of two vector autoregression (VAR) models, a quarterly model and monthly model, using weights that maximize forecasting accuracy. The method is based on studies of Corrado and Greene (1988), Corrado and Haltmaier (1988), Fuhrer and Haltmaier (1988), Howrey, Hymans and Donihue (1991), and Rathjens and Robins (1993). Using the test of Christiano (1989), the method improves quarterly forecasts in a statistical significant way.

The forecasting models used in these studies, however, are much, much simpler than LIFT and their data demands almost minuscule in comparison. Most of these previous papers looked at only one or two macro-variables while here we have hundreds. Moreover, the researchers could take their time to fine-tune each method used. To be useful in practical, real-time forecasting, our system must work completely in a day or two.

1.4 Steps in the Solution of the Ragged-end Problem

The work of the solution developed here can be divided into five steps.

1. Update all data banks to have the most recent data both for annual data and for higher frequency data.

2. Re-estimate and run the quarterly macroeconomic model, in our case, QUEST. This step includes examination of the exogenous assumptions.

3. Extend high-frequency data to the end of current year and perhaps one year beyond by using time-series analysis and interpolated monthly data from the quarterly macroeconomic model.

4. Use this data to predict the annual series used in LIFT. This step produces the flat-end data set.

5. Re-estimate LIFT equations using this data.

Start LIFT with the base year in the last or next to last year of the flat-end data set. The Inforum software in which LIFT runs will automatically compute errors in the equations in the base year and adjust future year's predictions by these errors, diminished each year in a specified proportion, called *rho*.

The work which will be documented here is primarily steps 3 and 4. Other parts of the process are documented elsewhere, step 1 in Inforum files, step 2 in *The Craft of Economic Modeling*, vol. 2, and steps 5 in the LIFT documentation.

In Step 3, we work on each variable at its original frequency. This step is to get forecast estimates of the as-yet unannounced or future values of the explanatory variable. For example, in October 2007, the Federal Reserve Board published the Industrial Production Index (IPI) through September 2007. Thus, in this first step, we have to calculate the value of the IPI from October 2007 (the current period) and the future values through the entire forecast period (e.g. until the end of 2008). Using time-series econometric techniques, more specifically, autoregressive moving average (ARMA) equation seems to be an appropriate way to begin work on the estimation.

Through experiments, I found that having a second-degree moving average error component in the regression equation could cause non-convergence problems in the nonlinear minimization technique used for the estimation because the algorithm falls into a flat part of the objective function. That experience suggested that automatic application of the procedure to a large number of series would prove infeasible. Although I have not yet encountered any problem in estimation with only a one-period moving-average error, I also did not find important improvement in the fit of the equation by using it. I will therefore actually use only autoregressive (AR) equations, though some of them will use variables in addition to the lagged values of the dependent variables.

1.5 Outline of the study and guide to quick reading

Chapter 2 examines a preliminary conceptual problem of how *real* output, consumption, and investment are to be measured at the LIFT industry level and aggregated into real GDP. The non-additive methods currently used in the official U.S. national accounts cause incessant problem for builders of models. This chapter shows that, with the official computer deflator replaced by an equally – if not more – plausible one, additive accounts would be very close to the non-additive ones. While this result is important in itself, further chapters do not depend on it.

Chapter 3 develops the flat-ended dataset for Personal consumption expenditures; Chapter 4, for equipment investment by purchasing industry; Chapter 5, for structure investment by purchasing industry and Chapter 6, for gross outputs of input-output industries.

Chapter 3 through Chapter 6 are all organized in the same way. First, the problem specific to each economic data is examined. Second, I discussed the availability and the reliability of the data used in the processes. Third, the outline of the approach is presented. Then, I study the regression results from the procedure. This section can be skipped for quick reading. Fourth, I test the performance of the procedures with two historical simulations, with different set of exogenous variables, published data and data generated by a macroeconomic model. These results are presented in both tabulated and graphical forms. The tabulated results are presented first. The graphical results can be skipped for quick reading. Finally, I use the equations to generate forecast up to 2008. The results are presented in both tables and graphs.

Chapter 2: Measuring Real Growth

In 1995, the Bureau of Economic Analysis (BEA), the makers of the U.S. National accounts, introduced a change in the way it makes the constant price, real national accounts. There are two elements of the change: (1) between adjacent years, the Fisher "ideal" index is used instead of the Laspeyres index, and (2) real growth over periods of more than two years is calculated by multiplying ("chaining") the growth ratios of the year-by-year growth. The resulting index, known as the chain-weighted index, may be appropriate for some purposes.. However, simple economic identities that hold in the nominal accounts are no longer valid in the chain-weighted real accounts. For example, real personal consumption expenditure is not equal to the sum of real expenditures on durables plus non-durables plus services. Moreover, real growth becomes path-dependent. The measure of real growth between year 1 and year N depends not only on prices and outputs in those two years but also on prices and outputs in all intervening years. If one's sole purpose is to make accounts, it perhaps does not matter that identities do not hold in real terms and that measures of growth are path-dependent; but, for building an economic model, these peculiarities can become a serious problem. For example, in an interindustry model, input-output theory requires that real industry output in any year should be the sum of sales to various intermediate uses in real terms in that year plus sales to several components of final demand, also in real terms for that year. If this simple identity is to be replaced by a complex formula involving square roots and prices and outputs in all years between the base year and the year in question, interindustry modeling becomes essentially impossible.

This study deals with the preparation of data for an interindustry model. It is therefore highly important that the data prepared in the ways described here be usable in such a model. In this chapter, therefore, I will explain why BEA moved away from fixed-weighted indexes, examine the problem in building economic models with chain-weighted national accounts, and offer some suggestions to get around the problems.

2.1 Hedonic Indexes[1]

In 1987, seemingly spurred by Robert Solow's remark “You can see the computer age everywhere but in the productivity statistics,”[2] the BEA looked for a method to include the increased power and lower cost of computers into productivity as measured in the NIPA. Before explaining what BEA did, however, it is worth noting that productivity increases from the *use* of computers were already fully included in the NIPA. In so far as computers made manufacturing, banking, transportation, or trade more efficient, their contribution to productivity was accounted for in the NIPA. The only question was the evaluation of computers in investment, consumption, export, and import. At that time, before computers were a common household item, it was mainly a matter of pricing of computers in investment. Today, of course, the computers are also an important consumer durable.

1 Some parts of the following background and suggestions are a summary of Clopper Almon's note, “Thoughts on Input-Output Models in National Accounting Systems with “Superlative” and Chain Weighted Indexes”, March 2005.

2 Solow, Robert M. “We'd Better Watch Out.” *New York Times Book Review*, July 12, 1987, p. 36.

The question was how to compare the “real” value of computers made in different years in making up a measure of investment “in constant prices.” BEA turned to the idea of a “hedonic” index of computer price, created with help from IBM, to solve this problem.

What is a hedonic index? The name is derived from Greek *hedonikos*, from *hedone*, pleasure. Thus, a hedonic index should measure the pleasure derived from the goods or services. In statistical practice, hedonics has a rather different meaning illustrated by the computer deflator. Traditional price indexes compare the cost of a typical market basket of goods in two different years. But in the case of computers, the same exact model specification is rarely sold for more than a year or two. Models go out of production often without a change in the maker's price. Thus, the market-basket approach would not work for computers. The “hedonic” approach used regression analysis to estimate what a particular computer model *would have* cost in a particular year had it been available in that year [Landefeld and Grimm, 2000].

In the study used for making the computer price index, the regression had the form

$$P = A M_1^{b1} M_2^{b2} u \quad ,$$

where P is the price of a certain computer, M_1 and M_2 are physical characteristics (processor speed and capacity of the disk drive) of that equipment, and u is an error terms. The coefficients A, $b1$, and $b2$ are estimated by the regression over a number of computers in a particular base year [See Triplett, 1986 and Cole *et al.*, 1986].

By applying the estimated coefficients to the physical characteristics of computers made in other years, we get estimates of what the prices of those machines would have been in the base year, had they been available at that time. We may call these estimates the "imputed" prices in the base year. By compared these imputed prices in the base year with the actual price in the forward year, BEA makes an index of the price between the two years. This is said to be the "hedonic" price index of computers. In BEA's implementation of it, it averaged a decline of 15.9 percent per year, continuously compounded, over the period 1980 – 2005.

The hedonic price index by itself has both pros and cons. Similar hedonic indexes have been employed to measure consumers' relative valuations of products that have multiple qualities (or characteristics), [See Nerlove, 1995]. For example, hedonic price indexes are commonly used in real estate assessment for tax purposes. The prices of properties that sell are regressed on characteristics such as square footage and number of baths. The result is then used to impute values to properties which have not sold.

Is such an index appropriate for compared computers in the national accounts? Consider compared the original IBM XT with a modern (2007) $1000 desktop. Processor speed has increased by a factor of roughly 400, disk space by a factor of 8000. If we give them equal weight in the above formula, we conclude that the modern machine gives about 1800 times as much "pleasure" as did the IBM XT. Now suppose that the original XT were still on the market and still selling for about $3000 while the only other microcomputer available was the modern machine selling for $5,400,000. Note that the price per unit of "pleasure" of the two machines would be equal. In this situation, I would imagine that the XT would still be as ubiquitous as it was in its heyday and the modern machine would be as rare as $5.4 million dollar machines were then. That is to say, PC users do not perceive the modern machine as giving anything like 1800 times as much pleasure or utility as did the XT.[3]

Is there an alternative way to compare them? There are several. One is to compare them by the costs of the materials and labor that went into producing them. This approach would lead to deflation of computer sales by a broad index of the cost of labor and materials; the deflator for non-computer Personal consumption expenditure would be one candidate. Or one could come from the consumer side, especially for home computers, and convert the computers into some composite commodity for which fairly reliable price indexes can be made, such as food. This approach leads to deflating computer sales by the same deflator as the composite commodity, perhaps food. Application of either of these approaches will lead to the conclusion that computer prices have actually risen at the same rate as the broad measure of inflation used.

Yet another possibility would be to argue that what one is actually buying is the wherewithal to be part of the modern world, to use a word processor or spreadsheet, communicate via email, and consult the Internet. The average price of units sold in various categories such as home desktops, home notebooks, office desktops, and so on, might then be used. Data for total "PC-standard" machines are shown in Table 2.1.

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3 The BEA deflator is not as extreme as this example. It says that a dollar's worth of computer in 2005 gave about 50 times as much pleasure as did a dollar's worth in 1981. Had the modern microcomputer been available in 1981 at $150.000 it would have been comparable in cost to mid-range minicomputers of that time, but actually it is much more powerful in terms of processor speed and disk storage than were those machines.

Table 2.1: U.S. and World-Wide Sales of PC-type Computers

Years	Million units		$ billion		$/unit		Annual rate of decline	
	USA	Worldwide	USA	Worldwide	USA	Worldwide	USA	Worldwide
1981-85	3.8	5.7	10.5	16.9	2763.2	2964.9		
1986-90	28.1	60.3	76.4	181.0	2718.9	3001.7	-0.32%	0.25%
1991-95	64.3	172.0	153.0	447.0	2379.5	2598.8	-2.50%	-2.68%
1966-00	162.0	444.0	335.0	1010.0	2067.9	2274.8	-2.62%	-2.49%
2001-06	267.0	855.0	424.0	1440.0	1588.0	1684.2	-4.64%	-5.19%

Source: Computer Industry Almanac, http://www.c-i-a.com/pr0806.htm

During the first ten years after 1981, there was negligible reduction in the price of the average unit. During the 1990's, the price of the average unit declined about 2.8 percent per year. In the new century, that rate has accelerated to about 4.4 percent in the USA and 5.0 percent worldwide. These numbers match subjective impressions that there has indeed been some decline in the 1990's in the cost of equipping oneself with an appropriately spiffy computer, and that the decline has accelerated a bit recently. But it is nowhere near the 16 percent per year average decline in the BEA deflator.

2.2 Runaway Deflators, Ideal and Chained Indexes, and Non-additivity

When it was used to “deflate” the value of computers in GDP, the BEA hedonic price index actually “inflated” the values of sales in years after the base of the deflator. This “inflation” soon led to a very high growth rate of calculated GDP. With the simple addition of the components of GDP in constant prices to get constant-price total GDP – the method used before introduction of the hedonic deflator – the rate of decline in the computer price gradually becomes the rate of growth of real GDP. Table 2.2 illustrates this phenomenon with data made up to show the problem -- and a solution -- in simple form.

In this table, GDP is made up of two products. The nominal yearly expenditures on Product 1 is shown in row 2; and that on product 2, in row 7. To keep the table very simple, both are constant at 100 billion dollars per year. The price indexes, shown in rows 3 and 8, however, are very different. They are both equal to 1.00 in year 4, but that of product 1, computers, falls at 25 percent per year while that of product 2, everything else, remains constant. These data imply that the real quantity of product 1 (row 4) has been growing at 25 percent per year, while that of product 2 (row 9) has been constant. Row 12 shows the simple sum of the two real quantities, and row 13 shows the annual growth ratio of this sum. In year 2, the growth rate is 8 percent; by year 9 it is up to 18 percent and by year 20, it is closing in on its 25 percent asymptotic growth rate.

Table 2.2: The Runaway Deflator Problem with Made-up Data

1	Year	1	2	3	4	**5**	6	7	8	9		20	21	22	23	24
	Product 1															
2	Nominal value	100.0	100.0	100.0	100.0	**100.0**	100.0	100.0	100.0	100.0	...	100.0	100.0	100.0	100.0	100.0
3	Price index	1.95	1.56	1.25	1.00	**0.80**	0.64	0.51	0.41	0.33	...	0.03	0.02	0.02	0.01	0.01
4	Real quantity	51.2	64.0	80.0	100.0	**125.0**	156.3	195.3	244.1	305.2	...	3552.7	4440.9	5551.1	6938.9	8673.6
5	Real growth ratio		1.25	1.25	1.25	**1.25**	1.25	1.25	1.25	1.25	...	1.25	1.25	1.25	1.25	1.25
6	Nominal share	0.50	0.50	0.50	0.50	**0.50**	0.50	0.50	0.50	0.50	...	0.50	0.50	0.50	0.50	0.50
	Product 2															
7	Nominal value	100.0	100.0	100.0	100.0	**100.0**	100.0	100.0	100.0	100.0	...	100.0	100.0	100.0	100.0	100.0
8	Price index	1.00	1.00	1.00	1.00	**1.00**	1.00	1.00	1.00	1.00	...	1.00	1.00	1.00	1.00	1.00
9	Real quantity	100.0	100.0	100.0	100.0	**100.0**	100.0	100.0	100.0	100.0	...	100.0	100.0	100.0	100.0	100.0
10	Real growth ratio		1.000	1.000	1.000	**1.000**	1.000	1.000	1.000	1.000	...	1.000	1.000	1.000	1.000	1.000
11	Nominal share	0.500	0.500	0.500	0.500	**0.500**	0.500	0.500	0.500	0.500	...	0.500	0.500	0.500	0.500	0.500
12	**Sum of real quantities**	151.2	164.0	180.0	200.0	**225.0**	256.3	295.3	344.1	405.2	...	3652.7	4540.9	5651.1	7038.9	8773.6
13	**Growth ratio of sum of real quantities**		1.085	1.098	1.111	**1.125**	1.139	1.152	1.165	1.177	...	1.242	1.243	1.244	1.246	1.246
14	**Nominal-share-weighted growth ratio**		1.125	1.125	1.125	**1.125**	1.125	1.125	1.125	1.125	...	1.125	1.125	1.125	1.125	1.125
15	**Chained real expenditure on combination**	140.5	158.0	177.8	200.0	**225.0**	253.1	284.8	320.4	360.4	...	1316.7	1481.2	1666.4	1874.7	2109.0

By period 23, *the rate of real growth is approximately the rate of decline of the computer deflator*, although in nominal terms computers remain only half of the total. The phenomenon could be described in headline language as “Runaway computer deflator steals GDP” or “Gresham's Law of Deflators.”[4] A more sedate name for it might be the outlier index dominance problem.

When BEA first introduced the hedonic computer deflator, it did so in the context of constant-price accounts in which, as in this example, growth in quantities were weighted by shares in a fixed base year and total real GDP was just the sum of its various components. At first, it had the desired effect of increasing GDP growth by a few tenths of a percent per year. But the outlier index dominance problem soon began to appear. Far from not showing up in the productivity statistics, computers began to dominate the productivity and growth statistics. The BEA statisticians were properly concerned. They might have then well questioned the appropriateness of the hedonic computer price index, but instead they turned to a generic, almost arithmetic solution to the problem.[5]

As can be seen in Table 2.2, the problem arises because the share of the component with the rapidly declining price index keeps getting larger in “real” terms, so its rate of growth in “real” terms keeps getting a heavier and heavier weight in the total. An obvious solution to this problem is to re-weight the rates of growth of each product

4 “Bad deflators drive out good.”

5 It should be noted that computer is not the only product deflated with the hedonic index. BEA now also uses hedonic index with other goods such as apparel and prepackaged software. With the exception of computers, these products do not lead to significant substitution bias. Landefeld and Grimm (2000) show that, for software prices, the contribution of software investment to real GDP growth is almost identical to its contribution to nominal GDP growth. The impact of prepackaged software hedonic price on the software deflator is offset by the price deflator of other software components such as custom software and own-account software.

each year by the shares in the nominal total. Line 14 in the table shows the resulting growth ratios, which, in this example, turn out to be a constant 1.125 each year. Line 15 shows the GDP of the base year of the prices, year 4, moved forward and backward by these year-to-year growth ratios. This process is called chaining and the result is called a chain-weighted index of real GDP.

Notice, in particular, that the growth rate of the chain-weighted aggregate is above the growth rate of the simple sum in the years prior to the year after[6] the base year of the prices, while it is below that rate in later years. In the simple-sum measure, the weight of the fast-growing item with the declining price is likely to be smaller than the current price share before the base year of the prices and larger after that year. This property, which is an empirical regularity rather than a mathematical certainty, shows up in virtually every real case we have seen. For GDP, it made it possible "to see the computer age ... in the productivity statistics" in the historical period before the base year of the prices yet avoid a runaway deflator problem in the future.

While chaining as shown in Table 2.2 is, by itself, a powerful antidote to outlier index dominance, BEA went one step further to limit the effects of the computer deflator. To get a better measure of year-to-year growth between adjacent years, it weighted the growth rates of the component products not only by their shares in the nominal values in the first year of a pair, as in Table 2.2, but also by the shares in the second year. The first of these growth measures is called the Laspeyres index while the second is called the Paasche index. They may multiplied together and the square root used as the "Fisher

6 The year after the base year is the year when prices in the base year are used as the base of the growth rate.

ideal" index[7]. In Table 2.2, there is no difference between the Paasche and Laspeyres index because the nominal shares are constant, but normally there will be a slight difference.

This description of the indexes in terms of weights on the growth rates of products is slightly different from the usual definition, so it is perhaps worthwhile to show their equivalence.

In the usual definitions, with $p^t{}_n$ and $q^t{}_n$ as price and quantity of n (i) products at time t, respectively, the definitions are: [See "A Guide to the National Income and Product Accounts of the United States", BEA]

the Laspeyres index: $$Q_t^L = \frac{\sum_{n=1}^{N} p_n^{t-1} q_n^t}{\sum_{i=1}^{N} p_i^{t-1} q_i^{t-1}},$$

the Paasche index: $$Q_t^P = \frac{\sum_{n=1}^{N} p_n^t q_n^t}{\sum_{i=1}^{N} p_i^t q_i^{t-1}},$$

To convert this definition to one using share weights, we can write

$$Q_1^L = \frac{\sum_{n=1}^{N} p_n^0 q_n^1}{\sum_{i=1}^{N} P_i^0 q_i^0} = \frac{\sum_{n=1}^{N} p_n^0 q_n^1 \frac{q_n^0}{q_n^0}}{\sum_{i=1}^{N} P_i^0 q_i^0} = \frac{\sum_{n=1}^{N} p_n^0 q_n^0 \frac{q_n^1}{q_n^0}}{\sum_{i=1}^{N} P_i^0 q_i^0},$$

7 Irving Fisher, *The Making of Index Numbers* (Boston, 1922)

$$Q_1^L = \sum_{n=1}^{N} S_n^0 \left(\frac{q_n^1}{q_n^0} \right), \quad where \quad S_n^0 = \frac{p_n^0 q_n^0}{\sum_{i=1}^{N} p_n^0 q_n^0}$$

Similar algebra converts the Paasche index to the definition using the weights of the more recent year.

The Fisher "Ideal" index multiplies the two together and takes the square root. This index is a special case of what Diewert has called exact and superlative indexes [Diewert, 1976].

the Fisher Ideal Index: $Q_t^F = \sqrt{Q_t^L \times Q_t^P}$

the chain-type quantity index for period *t* is $I_t^F = I_{t-1}^F \times Q_t^F$.

Again, a numerical example can help to illustrate the method. Table 2.3 compares the three indexes in the case of two goods, each of unitary demand elasticity, each having a price of 1 and a quantity of 1 unit sold in the first year, while in the second year the price of 1 falls to 0.5 and its purchased volume rises to 2, while the price of good 2 rises to 2 and its quantity falls to 0.5. The Laspeyres quantity index shows growth by a factor of 1.25 while the Paasche quantity index shows decline by a factor of 0.80. The Fisher Ideal index shows no growth at all. Obviously, the Fisher index is also an antidote to runaway deflators.

Table 2.3: The Ideal Index Controls Disparate Deflators

	year 1			year 2				
	p	q	p1q1	p	q	p2q2	p1q2	p2q1
good 1	1	1	1	0.5	2	1	2	0.5
good 2	1	1	1	2	0.5	1	0.5	2
			2			2	2.5	2.5
Laspeyers quantity index	1.25							
Paasche quantitty index	0.80							
Fisher	1.00							

So far, we have looked only at numerical illustrations. Let us now look at real data for the Personal consumption expenditure category Furniture and household equipment (which includes home computers). This category has five subcategories: (1) Furniture (2) Kitchen appliances, (3) China and table ware (4) Video and other electronics (including computers) and (5) Other durable house furnishings (such as rugs, clocks, tools). Figure 2.1 compares the chained ideal indexes of the category made from price indexes equal to 1.0 in 1991 (the lower line, marked with pluses) with the straight sum of the five components evaluated in prices of 1991 (the upper line marked with squares). Clearly, the chaining has moderated the effect of the hedonic index quite considerably. Figure 2.2 shows the same comparison but with the components evaluated in prices of 2000. As in the numerical illustration in Table 2.2, the chained index grows less rapidly than the simple sum after the base year but more rapidly before it.

Figure 2.1: Real PCE of Furniture and household equipment -- 1991

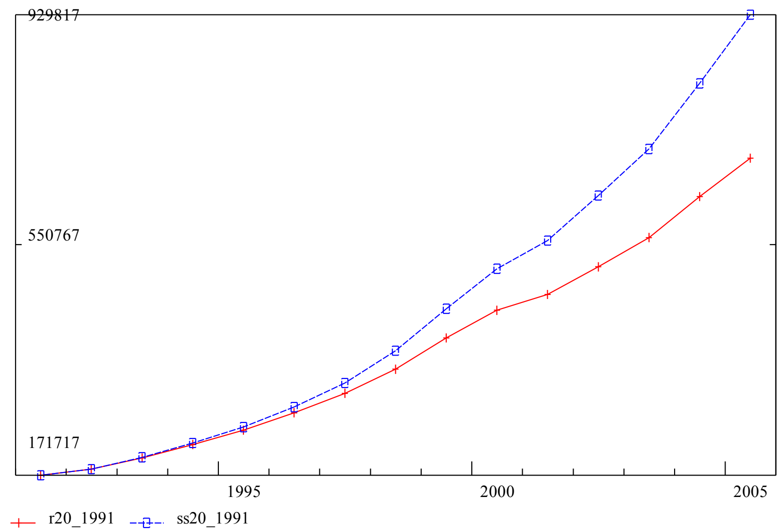
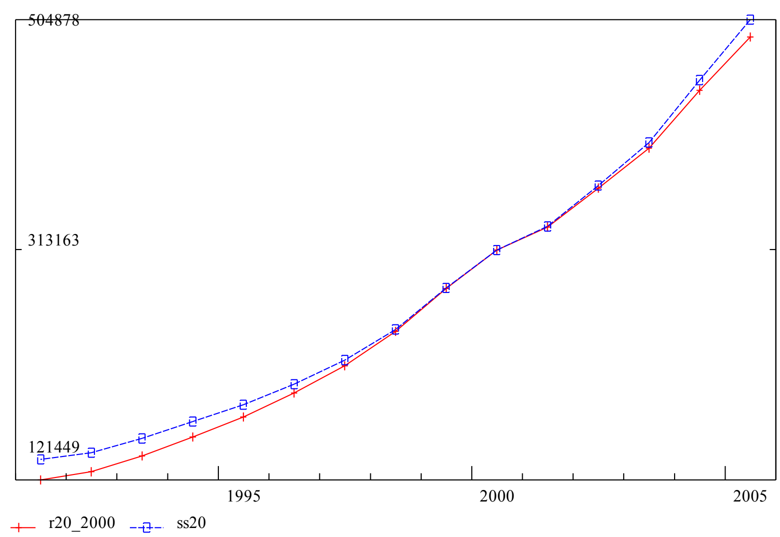


Figure 2.2: Real PCE of Furniture and household equipment -- 2000



To make this example, we have taken the indexes and prices of the sub-categories as data and combined them with the Fisher and chaining formula. It should be understood, however, that BEA works differently and in a way which cannot presently be replicated outside BEA. It maintains series on values and prices of thousands of products going into various components of GDP, and it publishes data at several levels of aggregation. For example, published data show, in increasing order of detail,

Gross domestic product (GDP)

Personal consumption expenditure (PCE)

Clothing

Men's shoes

The published real (constant-price) series for each of these categories is created directly from the most detailed data that BEA has. Thus, the published GDP series calculates the Fisher index directly from thousands of items and chains at the aggregate level. It makes no use of sub-aggregates. It will often not be the sum of its components. BEA warns the user of the accounts of this non-additivity by publishing a line in most constant-price tables called “Residual” defined as the difference between the whole and the sum of the parts. Indeed, no attention at all is paid, in calculating any real series to the values of its components above the finest level of detail available to BEA and in most cases not available outside. Thus, calculations of GDP pay no attention to the calculated real PCE; the calculated real PCE pays no attention to the calculation of real expenditures on Clothing, and so on. Given the nature of the Fisher formula and the chaining, *it is* *therefore not possible to calculate precisely what BEA will get for a particular aggregate from knowledge of all the published components of that aggregate.* Treating the finest level of published detail as if it were indeed the bottom level of data and applying the Fisher formula and chaining will not yield precisely the BEA version of the aggregate. There is, moreover, the problem that if one wants a real aggregate that BEA has not chosen to publish, for example, non-computer PCE, there is presently no way to calculate it precisely from the published detail.

Douglas Meade, who developed the chained ideal index functions for the G regression program, has made experimental calculations of published aggregates from published sub-aggregates and reported orally that the differences from the published aggregates are usually small and less than one gets by approximating the aggregate by addition of the all the pieces that compose it. While this is a consoling result, it would be nice not to have to rely on it. If BEA would release for each aggregate which it publishes a series on the value of the category each year in prices of the previous year, it would be possible to replicate the aggregates and perform other aggregations and get precisely the same results as BEA gets. Publication of such series is routine by some statistical offices.

2.3 Remedies for Non-additivity

We have seen that the breakdown of the national account identities in real aggregates – the Non-additivity problem -- is caused by two sources, (1) the Fisher index and (2) the chaining to create an index over several years. In general, a real aggregate value from the Fisher index will not equal to the sum of its parts. If B and C are two groups of products and A is the combination of the two groups, $A_{0,}$ B_0, and C_0 are their values in year 0 and A^F, B^F and C^F are their Fisher indexes between year 0 and year 1, then it is NOT in general true that

$$A_0\,A^F = B_0B^F + C_0C^F$$

There is, however, one instance when this equations holds, namely when all the prices of the goods in both B and C grow at the same rate, as shown below.

Let $p^n{}_t$ and $q^n{}_t$ represent vectors of prices and quantities of goods in group n at time t. $p^n{}_t$ is a row vector and $q^n{}_t$ a column vector, so that their product is defined. We consider two periods, t = 0 and 1, and two groups of goods, n = a and b. Then it is not generally true that value of group 1 in year 0 multiplied by the Fisher ideal index of that group between year 0 and year 1 *plus* the same thing for group 2 is equal to the Fisher ideal index of the combined group, that is

$$p_0^a q_0^a \sqrt{\frac{p_0^a q_1^a}{p_0^a q_0^a} \times \frac{p_1^a q_1^a}{p_1^a q_0^a}} + p_0^b q_0^b \sqrt{\frac{p_0^b q_1^b}{p_0^b q_0^b} \times \frac{p_1^b q_1^b}{p_1^b q_0^b}} \neq \left(p_0^a q_0^a + p_0^b q_0^b\right)\sqrt{\frac{p_0^a q_1^a + p_0^b q_1^b}{p_0^a q_0^a + p_0^b q_0^b} \times \frac{p_1^a q_1^a + p_1^b q_1^b}{p_1^a q_0^a + p_1^b q_0^b}}$$

If, however, $p_1^a = \lambda\, p_0^a$ and $p_1^b = \lambda\, p_0^b$ for the same scalar λ then the left hand side is just the quantities of year 1 evaluated at the prices of year 0:

$$\begin{aligned}
p_0^a q_0^a \sqrt{\frac{p_0^a q_1^a}{p_0^a q_0^a} \times \frac{p_1^a q_1^a}{p_1^a q_0^a}} + p_0^b q_0^b \sqrt{\frac{p_0^b q_1^b}{p_0^b q_0^b} \times \frac{p_1^b q_1^b}{p_1^b q_0^b}} &= p_0^a q_0^a \sqrt{\frac{p_0^a q_1^a}{p_0^a q_0^a} \times \frac{\lambda p_0^a q_1^a}{\lambda p_0^a q_0^a}} + p_0^b q_0^b \sqrt{\frac{p_0^b q_1^b}{p_0^b q_0^b} \times \frac{\lambda p_0^b q_1^b}{\lambda p_0^b q_0^b}} \\
&= p_0^a q_0^a \sqrt{\left(\frac{p_0^a q_1^a}{p_0^a q_0^a}\right)^2} + p_0^b q_0^b \sqrt{\left(\frac{p_0^b q_1^b}{p_0^b q_0^b}\right)^2} \\
&= p_0^a q_0^a \left(\frac{p_0^a q_1^a}{p_0^a q_0^a}\right) + p_0^b q_0^b \left(\frac{p_0^b q_1^b}{p_0^b q_0^b}\right) \\
&= p_0^a q_1^a + p_0^b q_1^b
\end{aligned}$$

The right-hand side reduces to the same thing:

$$
\begin{aligned}
\left(p_0^a q_0^a + p_0^b q_0^b\right)\sqrt{\frac{p_0^a q_1^a + p_0^b q_1^b}{p_0^a q_0^a + p_0^b q_0^b} \times \frac{p_1^a q_1^a + p_1^b q_1^b}{p_1^a q_0^a + p_1^b q_0^b}} &= \left(p_0^a q_0^a + p_0^b q_0^b\right)\sqrt{\frac{p_0^a q_1^a + p_0^b q_1^b}{p_0^a q_0^a + p_0^b q_0^b} \times \frac{\lambda p_0^a q_1^a + \lambda p_0^b q_1^b}{\lambda p_0^a q_0^a + \lambda p_0^b q_0^b}} \\
&= \left(p_0^a q_0^a + p_0^b q_0^b\right)\sqrt{\left(\frac{p_0^a q_1^a + p_0^b q_1^b}{p_0^a q_0^a + p_0^b q_0^b}\right)^2} \\
&= \left(p_0^a q_0^a + p_0^b q_0^b\right)\left(\frac{p_0^a q_1^a + p_0^b q_1^b}{p_0^a q_0^a + p_0^b q_0^b}\right) \\
&= p_0^a q_1^a + p_0^b q_1^b
\end{aligned}
$$

In view of this fact, we should expect the chain-weighted real national accounts to have approximate additivity when all prices are growing more or less proportionally. It is only when there is an outlier likes the computer hedonic index that non-additivity becomes a major problem.

To summarize, two separate problems have been identified above. One is the question of what the appropriate computer price deflator should be. The other is the breakdown of the economic identities in the real national accounts with the use of chain-weighted Fisher indexes.

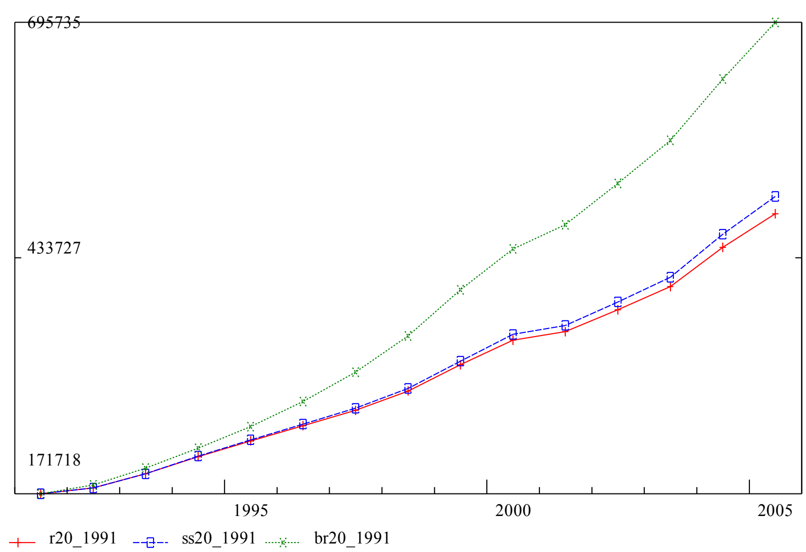
2.4 Suggested Remedies

We have seen that the BEA computer deflator is both somewhat implausible and fully capable of running away with real GDP if not controlled by chained ideal indexes. I have explored various alternatives such as using the food deflator for computers. Perhaps the most plausible one, however, is the average price of IBM-standard computers, presented in Table 2.1. It, however, is declining while nearly all other deflators are rising. Will it also "steal" real GDP and require non-additive formula to control it? To answer this question, I returned to the group of products studied above, the PCE category Furniture and household equipment. The lower two lines in Figure 2.3 show the aggregate for this group of products but with Computers and software deflated by average price deflator developed in Table 2.1. The lowest line (marked by the pluses) is the chained index; the line just above it (marked by squares) is the simple summation of the five components. The top line (marked by X's) is the BEA index rebased to 1991. The third line shows the BEA total for this category, rebased to 1991. Clearly, the substitution of the deflator with only moderate decline yields accounts in which it is not necessary to resort to chaining of ideal indexes to avoid a runaway deflator stealing the GDP. In fact, the use of these devices makes little difference over a fifteen-year horizon.

It should be stressed that the alternative computer deflator, which is declining, is substantially different from the price indexes of the other components of this aggregate, which are rising. Even so, the difference is not large enough for chaining to give an aggregate noticeably different from simple addition of the sub-components. The BEA computer deflator, however, is so far out of line with the other price indexes that even with chaining of ideal indexes, it produces a total category index which runs away from the other two indexes of the same thing.

Since this category of Personal consumption expenditure is more influenced by the computer deflator than any other, it seems reasonable to conclude at this point that replacement of the BEA computer deflator by an alternative that shows prices declining but at more moderate rates would give us improved national accounts in which there would be little difference between simple summation of components and chaining of ideal indexes. There would then be no reason not to make the aggregates by summation. Modeling could then be based on the additive accounts which have every claim to represent the economy as accurately or more accurately than those produced by BEA, supposing that BEA persists in its current methods, which seems likely. In that case, the model could also include adjustment factors by which the major BEA aggregates could be modified to match the corresponding aggregates in the additive accounts.

Figure 2.3: Real PCE of Furniture and household equipment



Encouraged by these results, I have used this computer deflator to produce a complete set of NIPA created by (1) applying the alternative deflator to computers wherever they appear in final demand and (2) otherwise accepting BEA series at the finest level publicly available, and (3) aggregating by simple addition. This set of accounts is available as a data bank for the G program. Table 2.4 and Figure 2.4, Figure 2.5, Figure 2.6 compare some of the aggregate series with the official BEA accounts.

Table 2.4: Comparison of Real GDP components between Chain-weighted and Fixed-weighted methods

		1997			2000 (Base year)			2004		
		chained	straight summation	percent difference	chained	straight summation	percent difference	chained	straight summation	percent difference
1	Personal consumption expenditures	5,860,591	5,895,356	0.59%	6,739,383	6,739,383	0.00%	7,547,953	7,576,582	0.38%
2	Durable goods	671,962	673,471	0.22%	863,327	863,327	0.00%	1,052,923	1,062,050	0.87%
3	Nondurable goods	1,725,338	1,731,646	0.37%	1,947,220	1,947,220	0.00%	2,179,183	2,185,735	0.30%
4	Services	3,468,177	3,490,239	0.64%	3,928,836	3,928,836	0.00%	4,323,863	4,328,797	0.11%
5	Fixed investment	1,372,050	1,373,829	0.13%	1,678,979	1,678,979	0.00%	1,683,147	1,677,618	-0.33%
6	Nonresidential Structures	279,030	280,074	0.37%	313,185	313,185	0.00%	249,004	245,099	-1.57%
7	Nonresidential Equipment and software	705,435	705,294	-0.02%	918,891	918,891	0.00%	872,118	873,380	0.14%
8	Residential Structures	383,778	382,337	-0.38%	439,544	439,544	0.00%	551,269	550,150	-0.20%
9	Residential Equipment	6,124	6,124	0.00%	7,359	7,359	0.00%	8,989	8,989	0.00%
10	Net exports of goods and services	-96,490	-124,601	29.13%	-379,600	-379,600	0.00%	-585,494	-577,032	-1.45%
11	Exports	952,624	953,566	0.10%	1,096,300	1,096,300	0.00%	1,122,346	1,126,540	0.37%
12	Goods	673,312	673,366	0.01%	784,400	784,400	0.00%	786,356	790,440	0.52%
13	Services	279,196	280,200	0.36%	311,900	311,900	0.00%	335,804	336,100	0.09%
14	Imports	1,069,014	1,078,167	0.86%	1,475,900	1,475,900	0.00%	1,698,614	1,703,573	0.29%
15	Goods	893,250	901,970	0.98%	1,243,600	1,243,600	0.00%	1,439,325	1,442,772	0.24%
16	Services	175,563	176,200	0.36%	232,300	232,300	0.00%	260,269	260,800	0.20%
17	Government consumption expenditures and gross investment	1,601,626	1,601,751	0.01%	1,721,500	1,721,500	0.00%	1,932,120	1,932,505	0.02%
18	Federal	568,934	569,426	0.09%	578,700	578,700	0.00%	715,428	715,903	0.07%
19	National defense	373,305	373,595	0.08%	370,300	370,300	0.00%	475,180	475,838	0.14%
20	Nondefense	195,594	195,831	0.12%	208,400	208,400	0.00%	240,066	240,065	0.00%
21	State and local	1,032,133	1,032,325	0.02%	1,142,800	1,142,800	0.00%	1,216,766	1,215,602	-0.10%

All numbers are in Million of 2000 dollars

From Table 2.4, with a sensible computer deflator, it appears that there is essentially no difference between chained-weighted Fisher aggregates and straight-addition aggregates. Thus, simple additive accounts would serve us well by using a sensible computer deflator.

In Figure 2.4, 2.5, and 2.6, each picture shows three lines: 1) chained-weighted aggregate (represented by + line), 2) straight-summation aggregate (represented by box (□) line), and 3) the actual published series (represented by x line). The first two lines are calculated with the sensible computer deflator as shown in Table 2.4.

All three figures exhibit an interesting result. With the computer deflator generated from a hedonic index, BEA published numbers grows at a much faster rate than the other two lines, which used a more sensible computer deflator. Using the sensible deflator, chained and straight-summation aggregates generate nearly identical rate of growth noticeable trend, chained aggregates grow faster before the base year and slower after the base year.

Figure 2.4: Real PCE of Durables

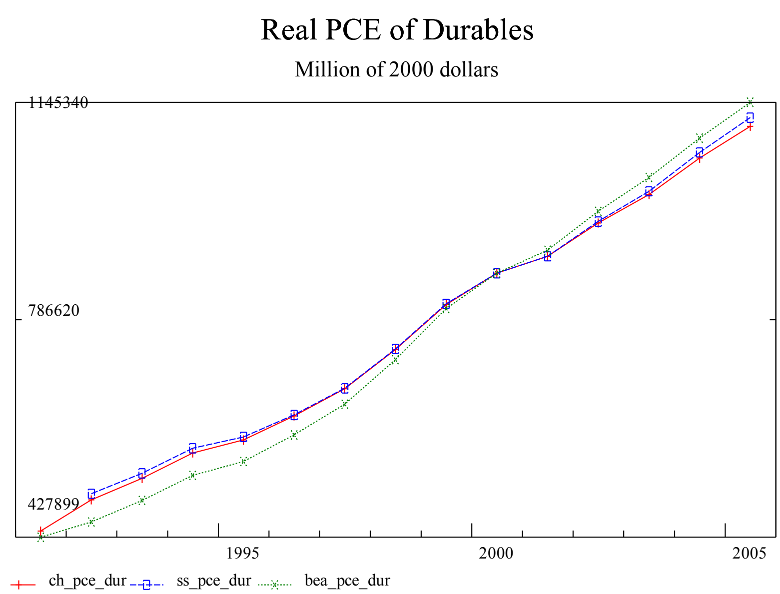


Figure 2.5: Real Nonresidential investment in Equipment and software

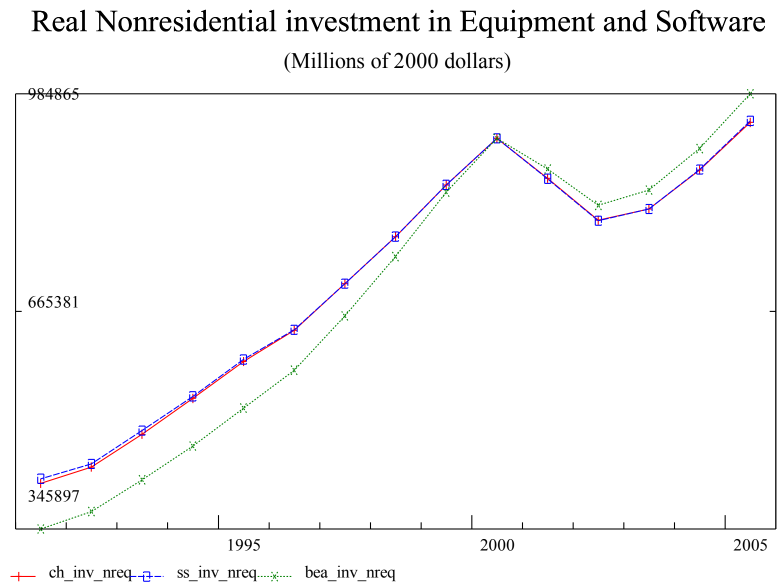
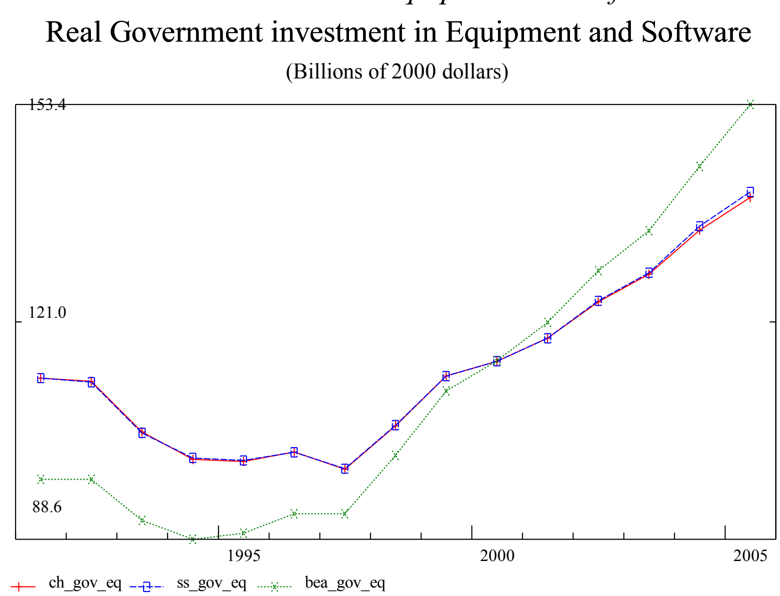


Figure 2.6: Real Government investment in Equipment and software



Chapter 3. Personal Consumption Expenditure

Personal consumption expenditure (PCE) constitutes roughly 70 percent of U.S. final demand or Gross domestic product (GDP), as may be seen in Table 3.1.

Table 3.1: Nominal Gross Domestic Product [Billions of dollars]

	2000	2001	2002	2003	2004	2005
Gross domestic product	9817.0	10128.0	10469.6	10960.8	11712.5	12455.8
Personal consumption expenditures	6739.4	7055.0	7350.7	7703.6	8211.5	8742.4
Share of PCE (PCE/GDP) , percent	**68.65%**	**69.66%**	**70.21%**	**70.28%**	**70.11%**	**70.19%**

Source: Bureau of Economic Analysis, December 21, 2006

Through the input-output relations, personal consumption affects virtually all industries, even those, such as heavy industrial chemicals, whose products never reach households in recognizable form. Moreover, since growth of output of industries selling directly or indirectly to consumers influences investment by those industries, makers of machinery and other investment goods feel the movements in PCE. These pervasive effects make it also a useful barometer for inflationary pressures. Good forecasting of PCE is, therefore, the foundation of good forecasting of the economy.

Fortunately, the Bureau of Economic Analysis (BEA) gives us a substantial statistical basis for the study of PCE by reporting these expenditures in a rather fine classification. The "underlying detail" tables released on the BEA website[8] report PCE in 339 lines. Some of these are subtotals; but there are 233 lines of primary data. Names such as "Pork", "Poultry", "New domestic autos", "Tires and tubes", or "Dentists" give

8 http://www.bea.gov/national/nipaweb/nipa_underlying/DownSS2.asp

some idea of the level of detail. The largest primary data line is the imputed space rental value of "Owner-occupied stationary homes." The distant second is "Non-profit hospitals." These data are available with an annual, quarterly, or monthly frequency and are released each month with a lag of about a month. Annual PCE information for a year is first released at the end of March of the following year as preliminary data. It reaches a more mature state with the annual NIPA released at the end of July, but it continues to be revised for the next two years and then revised again with the next benchmark revision.

Forecasting PCE is facilitated by a fact that might at first seem to be difficulty: there are hundreds of millions of consumers. Unlike government spending and some components of investment, the decisions of a few individuals cannot swing the whole PCE. That makes PCE well-suited to prediction by statistical methods. There can be, however, breaks in trends and hard-to-explain shifts is long-stable ratios, such as the drop in the personal savings rate in the 1990's.

This chapter first explains with some care, in section 1, what precisely PCE is. Section 2 then examines recent broad trends of the U.S. personal consumption expenditure, Section 3 outlines the techniques that will be employed for short-term prediction of PCE, Section 4 discusses the estimated equations, Section 5 discusses historical simulations and Section 6 shows a forecast up to 2008.

3.1. What are Personal consumption expenditures?

The name "Personal consumption expenditures" is deceptively simple. One is apt to say, "I am a person, and I know what my expenditures are, so I know what PCE is." But it is not that simple. Here is the official BEA description:

> *Personal consumption expenditures (PCE) measures goods and services purchased by U.S. residents. PCE consists mainly of purchases of new goods and of services by individuals from private business. In addition, PCE includes purchases of new goods and of services by nonprofit institutions (including compensation of employees), net purchases of used goods by individuals and nonprofit institutions, and purchases abroad of goods and services by U.S. residents. PCE also includes purchases of certain goods and services provided by general government and government enterprises, such as tuition payments for higher education, charges for medical care, and charges for water and other sanitary services. Finally, PCE includes imputed purchases that keep PCE invariant to changes in the way that certain activities are carried out—for example, whether housing is rented or owned, whether financial services are explicitly charged, or whether employees are paid in cash or in kind.*

Some of the differences between PCE and what an ordinary, "natural" person thinks of as expenditures should be emphasized. Here are four of them.

1. A home-owner thinks of his expenditures on housing as composed of his mortgage payments, his real estate taxes, and his outlays on painting, plumbing, and general maintenance. None of these are included in PCE. Instead, the home owner is considered to rent his house from a (fictitious) owner-occupied-house-renting industry. The home-owner's expenses just mentioned are treated as inputs to this industry and so appear in the intermediate portion of the input-output table. In so far as this industry makes a profit, that profit is considered as rental income to persons, so that personal savings is not affected by this treatment. Maintenance expenditures, however, may fluctuate considerably whereas the imputed rent is very stable. Thus, this treatment may reduce the volatility of PCE.

2. The father of a student at a private school or university sees the tuition he pays as one of his major expenditures. That tuition, however, does not show up as such in PCE. What shows up is the school's total expenditures, some paid for by tuition, some by endowment or gifts, some by grants. A private school, hospital, church, or charity is just as much a "person" as is the father.

3. Many households consider that they have an expenditure on interest on mortgage or credit-card debt. But none of it appears as such in PCE. As already explained, the mortgage interest is covered by imputed rent of owner-occupied housing and is paid by the owner-occupied housing industry. The credit-card interest is not part of PCE at all because it is not part of GDP, which is evaluated at the cash price of goods bought. Rather, the interest on credit-card and installment debt and non-mortgage borrowing is part of difference between Personal disposable

income and PCE. (The other items in this difference are Personal savings and Net transfers to foreigners.)

4. Few if any households know or care how much they spend on "Services furnished without payment by financial intermediaries except life insurance carriers," yet the PCE accounts say that they spend about as much on this arcane item as on gasoline and oil for their cars. These "expenditures" are derived as the difference between what banks and other financial intermediaries (except life insurance companies) earn on investments of depositors' funds less the interest they pay to the depositors. The same amount is added to imputed interest income of persons, so savings is not affected by the item.

Table 3.2: Content of PCE

	Category of expenditure
1	Purchases of new goods and of services by individuals from business and government and purchases of the services of paid workers
2	Purchases of goods and services by nonprofit institutions from business, individuals, and government.
3	Net Purchases of used goods by individuals and nonprofit institutions from business and from government.
4	Purchases of goods and services abroad by U.S. Residents.
5	Purchases imputed to keep PCE invariant to whether - Housing and institutional structures and equipment are rented or owned. - Employees are paid in cash or in kind. - Farm products are sold or consumed on farms. - Saving, lending, and borrowing are direct or are intermediated. - Financial service charges are explicit or implicit.

Source:
BEA, PERSONAL CONSUMPTION EXPENDITURES, METHODOLOGY PAPERS: U.S. Natonal Income and Product Accounts.

With these and a few lesser deviations, however, PCE does broadly match consumers' idea of household expenditure.

Each PCE category, that is, each of the over 220 lines of primary data mentioned above, is classified into one of three broad groups:

1. *Durable goods* are physical commodities that can be stored or inventoried and that have an average life of at least 3 years;

2. *Nondurable goods* are all other physical commodities that can be stored or inventoried; and

3. *Services* are commodities that cannot be stored and meant to be consumed at the place and time of purchase.

When a product has characteristics of more than one of these classifications (for example, restaurant meals), or where source data do not provide detail on type of product (for example, foreign travel), the product is classified by its dominant characteristic.

Consequently, the following products are included in Nondurable goods: restaurant meals; expenditures abroad by U.S. residents except for travel (e.g. expenditures of U.S. military and embassy personnel abroad); replacement parts whose installation cost is minimal; dealers' margins on used equipment; and household appliances, such as televisions, even when they are included in the price of a new home.

The following products are included in Services: Food that is included in airline transportation and hospital charges; natural gas and electricity; goods and services that are included in current operating expense of nonprofit institutions e.g., office supplies; foreign travel by U.S. residents; expenditures in the United States by foreigners; repair services; defense research and development; and exports and imports of specific goods, mainly military equipment purchased and sold by the U.S. government.

The BEA's benchmark input-output tables are used to create the numbers for PCE and its components during a comprehensive revision, which occurs every five years. The last comprehensive revision was released in 2003 for the year 1997. For these years, PCE is derived by a commodity flow analysis. That is, the production of a commodity is determined, imports are added and exports subtracted, and the result then divided among various uses, of which PCE is one. For non-benchmark years, nominal PCE is not estimated by starting with production data as in the benchmark year but by moving the PCE number found in the benchmark by interpolation and extrapolation indicators such as retail sales of the appropriate product. The same process is performed for quarterly and monthly PCE estimates in the non-benchmark years. The process is carried out at the level of thousands of products. The 220 series of the "underlying data" release are thus aggregates of series established at much finer detail.

3.2. Broad trends in the structure of PCE

The long-term patterns in the growth of consumption across different goods and services reflect interaction of many economic factors that affect consumer decision-making. Increasing wealth, changing demographics, technological progress, new products, and changing consumers' preferences and lifestyles are important.

Increasing real incomes, accumulation of assets, and willingness to take on more debt increase spending on discretionary products more than spending on basic necessities. Technological innovations increase the variety of goods and services such as cellular phones and Internet service. These new products affect spending on old products by way of the consumer's budget constraint.

Table 3.3 shows U.S. PCE by broad category for selected years between 1959 (the beginning of the series of comparable data) and 2005. The top half of the table shows the data in current prices; the bottom half, chained indexes scaled to equal the current-price value in 2000. We shall refer to the series in current prices as “nominal” and to the chained indexes as “real”.

Table 3.3: Nominal and Real Personal consumption expenditures between 1959-2005, by Major categories

Nominal PCE, [Billion of dollars]

	1959	1960	1970	1980	1990	1995	2000	2003	2004	2005
Personal consumption expenditures	317.6	331.7	648.5	1757.1	3839.9	4975.8	6739.4	7703.6	8211.5	8742.4
Durable goods	42.7	43.3	85.0	214.2	474.2	611.6	863.3	942.7	986.3	1033.1
Motor vehicles and parts	18.9	19.7	35.5	87.0	212.8	266.7	386.5	431.7	437.9	448.2
Furniture and household equipment	18.1	18.0	35.7	86.7	171.6	228.6	312.9	331.5	356.5	377.2
Other	5.7	5.7	13.7	40.5	89.8	116.3	163.9	179.4	191.8	207.7
Nondurable goods	148.5	152.8	272.0	696.1	1249.9	1485.1	1947.2	2190.2	2345.2	2539.3
Food	80.6	82.3	143.8	356.0	636.8	740.9	925.2	1046.0	1114.8	1201.4
Clothing and shoes	26.4	27.0	47.8	107.3	204.1	241.7	297.7	310.9	325.1	341.8
Gasoline, fuel oil, and other energy goods	15.3	15.8	26.3	102.1	124.1	133.3	191.5	209.6	248.8	302.1
Gasoline and oil	11.3	12.0	21.9	86.7	111.2	120.2	175.7	192.7	230.4	280.2
Fuel oil and coal	4.0	3.8	4.4	15.4	12.9	13.1	15.8	16.9	18.4	21.9
Other	26.1	27.7	54.1	130.6	285.0	369.2	532.9	623.7	656.5	694.0
Services	126.5	135.6	291.5	846.9	2115.9	2879.1	3928.8	4570.8	4880.1	5170.0
Housing	45.0	48.2	94.1	256.2	597.9	764.4	1006.5	1161.8	1236.1	1304.1
Household operation	18.7	20.3	37.8	113.7	227.3	298.7	390.1	429.4	450.0	483.0
Electricity and gas	7.6	8.3	15.3	57.5	101.0	122.2	143.3	167.3	176.6	199.8
Other household operation	11.1	12.0	22.4	56.2	126.2	176.5	246.8	262.1	273.5	283.2
Transportation	10.6	11.2	24.0	65.2	147.7	207.7	291.3	297.3	307.8	320.4
Medical care	16.4	17.7	51.7	184.4	556.0	797.9	1026.8	1300.5	1395.7	1493.4
Recreation	6.4	6.9	15.1	43.6	125.9	187.9	268.3	317.7	341.6	360.6
Other	29.4	31.3	68.8	183.8	461.0	622.5	945.9	1064.0	1148.9	1208.4

Real PCE, [Billion of 2000 dollars]

	1959	1960	1970	1980	1990	1995	2000	2003	2004	2005
Personal consumption expenditures	1554.4	1597.2	2452.0	3374.0	4770.2	5433.5	6739.4	7295.3	7577.1	7841.2
Durable goods	93.5	95.3	169.5	257.2	453.5	552.6	863.3	1020.6	1085.7	1145.4
Motor vehicles and parts	60.5	64.2	102.9	144.1	256.1	272.3	386.5	442.1	450.3	452.9
Furniture and household equipment	21.8	21.6	40.3	64.8	119.9	173.3	312.9	397.8	446.0	490.6
Other	17.1	17.0	35.1	57.6	92.7	111.2	163.9	183.2	195.6	212.6
Nondurable goods	652.3	661.8	923.7	1151.5	1484.0	1638.7	1947.2	2103.0	2179.2	2276.8
Food	404.0	407.1	541.6	635.8	784.4	827.1	925.2	977.7	1011.0	1065.7
Clothing and shoes	53.7	54.2	74.2	118.3	188.2	227.4	297.7	334.2	350.9	372.7
Gasoline, fuel oil, and other energy goods	90.0	91.2	130.4	137.1	158.5	173.0	191.5	198.5	200.5	199.5
Gasoline and oil	60.8	62.8	100.0	114.8	141.9	154.4	175.7	183.2	185.9	185.9
Fuel oil and coal	36.3	34.7	32.6	22.6	16.8	18.7	15.8	15.4	14.7	13.7
Other	125.3	131.0	210.3	278.2	361.0	414.1	532.9	593.2	618.5	643.9
Services	816.9	853.5	1376.6	2000.6	2851.7	3259.9	3928.8	4178.9	4323.9	4436.7
Housing	242.4	255.6	410.9	613.1	802.1	887.6	1006.5	1051.9	1091.6	1122.6
Household operation	86.9	91.3	142.8	207.1	266.4	312.8	390.1	398.8	409.3	418.0
Electricity and gas	40.3	42.6	72.6	102.6	117.4	130.2	143.3	147.5	149.9	153.8
Other household operation	45.4	47.6	69.7	104.1	149.4	183.1	246.8	251.2	259.6	264.1
Transportation	68.7	70.9	108.6	139.5	195.7	231.8	291.3	280.6	284.0	284.4
Medical care	169.5	176.2	329.2	541.7	797.6	906.4	1026.8	1180.7	1217.3	1260.9
Recreation	32.4	33.9	52.6	91.4	170.6	219.2	268.3	290.8	304.8	313.1
Other	199.9	206.7	318.9	402.2	621.9	704.4	945.9	975.3	1016.0	1036.1

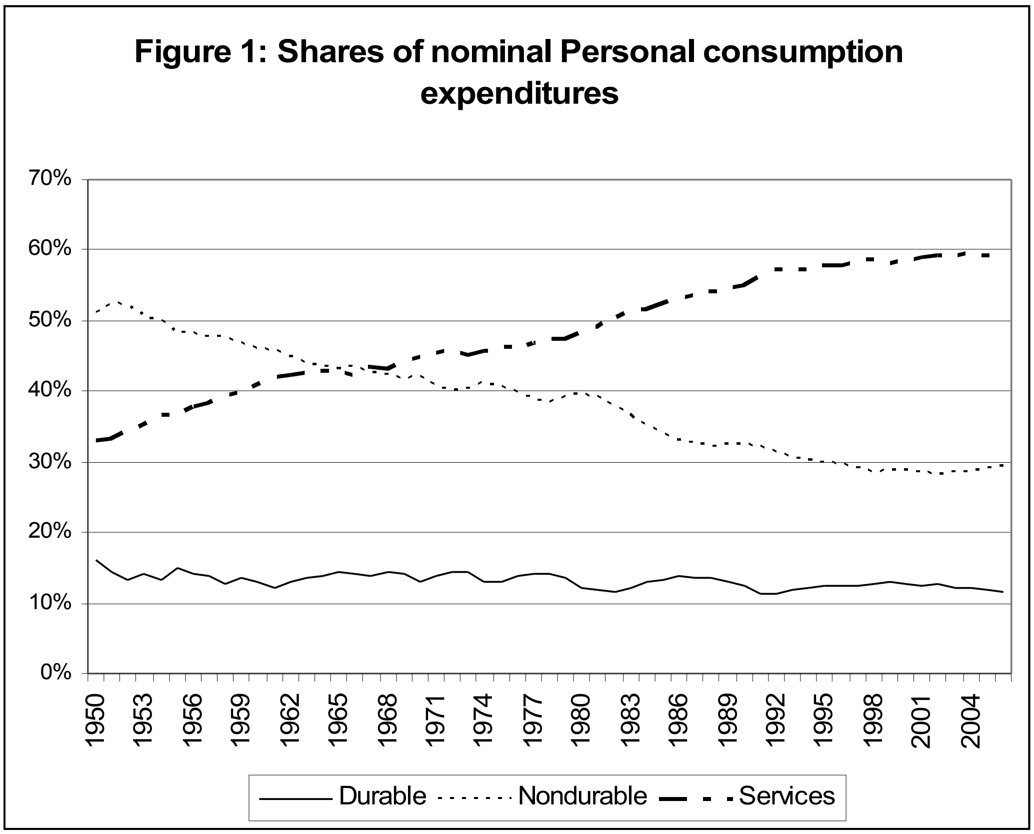
Source: BEA, NIPA April 12, 2007

On average, real PCE grew 3.7 percent per year between 1959 and 2005, which was slightly faster then the total domestic demand growth rate of 3.56% during the same period.

The PCE share of nominal GDP increased from around 62% in 1959 to 70% in 2005 as shown in Table 3.3. This share increased steadily since World War II. During

1942-1945, the share of PCE in nominal GDP fell to about 52%, the lowest number since the beginning of data in 1929. The highest share ever recorded for PCE was 83% in 1932 when investment had collapsed and defense spending was minimal.

Figure 3.1: Personal consumption expenditures by Major types of product



Services' share of nominal consumer spending increased from 40 percent in 1959 to 59% in 2005, as shown in Figure 3.1. Medicare services, financial services, recreational services, and education and research services were the main contributors to this growth. According to Moran and McCully (2001), the increased share of services reflected the changes in public programs, demographics, average income and the increased of variety of choices available to the U.S. population. For example, payments by health insurance programs and government transfer programs such as Medicare and Medicaid, and the aging of the U.S. population contributed to the increased share of medical care services. Also, the increased share of recreation services partly corresponded to the increased wealth that supported consumption of new types of services such as cable television and the Internet.

Nondurable goods' share of PCE decreased from 47 percent in 1959 to 29 percent in 2005. This decrease in share was common to most sub-categories of non-durables except prescription drugs, whose share rose as a result of changes in health insurance, Medicaid, and the aging of the population. Some of the decreases reflected falls in prices of products with inelastic demand. Such was, especially the case of clothing and shoes, where inexpensive imports became increasingly available.

Durable goods' share of PCE decreased from 13.4 percent in 1959 to 11.8 percent in 2005. This decline came mostly in new cars and household appliances, which have both seen the declining relative prices over this period.

It should be noted that the decreased shares of durable and nondurable PCE were not due to declining real consumption but to the relative price declines just mentioned and to the more rapid growth in services. In fact, as may be seen in Table 3.3, real PCE on both durables and nondurables increased between 1959 and 2005.

3.3. *Data for short-term forecasting of PCE*

The dependent variables

We have already mentioned that PCE data is available in 233 primary series. Some of these, however, come from the same input-output industries in the LIFT model or are so specific or small that little is gained by keeping them separate. From the 233 categories, I selected 116 categories covering the whole of consumption. Some of them are the primary, most detailed series; some of them are aggregates made by BEA. They can also be simply aggregated, without splits, into the 13 groups shown in Table 3.4 and called by BEA "Major types of products." Headings for these 13 groups are shown in bold, italic type in Appendix 3.1. The 116 categories include 24 durable products, 41 nondurable products, and 51 services, Appendix 3.2. the large number of services categories reflects the recent trend of U.S. consumer spending to this area.

Table 3.4: Personal consumption expenditures by Major types of product

	Personal consumption expenditures
	Durable goods
1	Motor vehicles and parts
2	Furniture and household equipment
3	Other
	Nondurable goods
4	Food
5	Clothing and shoes
6	Gasoline, fuel oil, and other energy goods
7	Other
	Services
8	Housing
9	Household operation
10	Transportation
11	Medical care
12	Recreation
13	Other

Source: BEA

Our dependent variables are the current-price values of the 116 categories and the price indexes of these same 116 categories.

Explanatory variables

An important source of explanatory variables is the quarterly econometric model QUEST built and maintained by Inforum. For this project, it has been expanded to include all 13 of BEA's series on PCE by Major types of products as shown in Table 3.4. QUEST's forecast of GDP, Personal disposable income, and the rate of inflation in food prices are also available.

For some products, "Refiner Acquisition Cost of Crude Oil, Composite" proved useful. The data comes from the Energy Information Administration[9] (EIA). This data is published monthly with a delay of approximately three months, e.g. the December 2006 n umber was published in March 2007.

A final exogenous variable is the Dow-Jones index of the prices of the stocks of industrial companies.

Equations estimated

For each of the 116 categories, two equations are estimated, one for price and one for nominal value. The results from the two equations are used to create a real value series for that category. This work is done with monthly data at the 116-category detail. We can calculate the aggregates in nominal values by simply adding up the pieces. Also,

9 http://www.eia.doe.gov/emeu/mer/prices.html, Table 9.1

we can calculate the annual series by taking the annual average of both nominal values and prices from the monthly series. The G program provides functions to do this easily.

The real aggregates both at the monthly and at the annual frequencies were calculated from the nominal series and the price index by using the chain-weighted Fisher index as described in Chapter 2. The main reason for forecasting the nominal series and the price series separately instead of just forecasting the real series is to be able to calculate the chain-weighted Fisher indexes of the aggregates.

We must note, however, that the estimated monthly real PCE aggregates are made with a formula different from the one used by the BEA. BEA adjusts the monthly series so that the annual average values of each series are equal to the annual series's values. This practice is also employed in the real accounts. In the case of the real accounts with chain-weighted Fisher indexes, the formula to achieve this adjustment is not disclosed. However, we know for certain that the formula is not as simple as an arithmetic average.

Time-series analysis is used on all equations. Time series analysis has proven useful in generating short-term (less than two to three years) forecast of economic variables. However, it often fails to yield a good long-term forecast.

All equations for both nominal values and prices have the following structure:

$$Y_t^n = \alpha + \beta \cdot \varphi^n(L) Y_t^n + \gamma \cdot X_t^n + \varepsilon_t \qquad [1]$$

where,

Y_t^n = Price or nominal value of PCE category *n* at time *t*

$\varphi^n(L)$ = Polynomial of lag operators of PCE category *n*

X_t^n = exogenous explanatory variables

ε_t = error terms at time *t*

α, β, γ = regression coefficients

This form represents a time-series analysis model called the autoregressive moving average with exogenous variables (ARMAX) model. We use additional exogenous variables to help guide movements of the forecasts. The exogenous variables in most of the equations are macroeconomic variables such as GDP and crude oil price, and the appropriate one of the 13 series on PCE by major type of product.

In most cases, we use the PCE aggregates of which the dependent variable is a component. For example, for New autos, we use PCE of motor vehicles as one of its exogenous variables. However, there are some categories where we use the aggregates from another groups; *e.g.* the equation for Automobile insurance services used the PCE of motor vehicles instead of the PCE of services as an exogenous variable.

There is one major difference between the price and the nominal value equations. In the price equations, there is no price of the major PCE category among the exogenous variables. All price equations are estimated with lagged dependent variables, consumer price indexes, or predetermined explanatory variables such as oil price. The main reason is matter of practicality. The macroeconomic model, QUEST, which we used to provide forecast for the exogenous variables does not forecast the price of each major PCE category. In fact, the model uses a uniform deflator across all variables. Also, I had tested two different sets of price equations, one with major PCE prices and one without them. There was no significant difference between them.

All regression results are shown in the appendix.

Approach to the problem

Here are the necessary steps for preparing the short-term forecast of PCE categories each time the interindustry model, LIFT, is being updated.

1. Prepare data banks for the G regression program with all the necessary data. They are: (1) the Underlying PCE tables from BEA, nominal, real and price index series in annual, quarterly, and monthly frequency, (2) monthly crude oil price data from the EIA, (3) the quarterly national accounts and a few other series in the QUIP databank which are used for the QUEST model[10].

2. Re-estimate the forecasting equations: There are two sets of equations, one for nominal PCE series and one for the price indexes of PCE categories. During this step, we have two options. 1) Just re-estimate the regression equations or 2) Revise the structure of the equations and estimate the new ones. For example, the latter option is appropriate when the current equations produce an implausible forecast. In general, we only need to re-estimate the current equations with the updated data.

10 QUIP databank is the databank used in QUEST model. It contains most of the Quarterly NIPA tables and many macroeconomics variables including financial sector data.

3. Creating with BUILD[11] a model consisting solely of the equations estimated in step 2. Strictly speaking, we could avoid this step by putting into the command file for estimating the equations commands to rename the series with the forecasts automatically created by G. Building and running the model, however, requires less manual work and a produces a data bank containing only the historical and forecast series. Once this model is built, we run a historical simulation with it, that is, a "forecast" over the historical period with actual values of all exogenous variables. This is simply testing the accuracy of the equations as if we had perfect foresight for the exogenous variables.

4. Generating the exogenous variables for the forecast period. Update and run the QUEST model to obtain quarterly forecasts of a number of exogenous variables such as PCE by major type. These quarterly forecasts are then interpolated to monthly forecasts by G's @qtom() function.

5. Forecasting the detailed PCE series with the model from Step 3.

3.4 Discussions of interesting detailed PCE equations' estimation results

In this section, I select some consumption categories to discuss the performance of the approach and to highlight some interesting observations. This section can be skipped without loss of understanding to the subsequent sections. Appendix 3.3 shows

11 BUILD is a executable program developed by INFORUM. BUILD creates C++ code of the model which will be compiled and ready for the user as an executable program. Go to www.inforum.umd.edu for more details.

all regression results of both nominal PCE and the price index in 116 consumption categories.

The equations being discussed are estimated with historical data between January 1994 and June 2007. Regression results of both nominal PCE and its price index are presented for each product categories being discussed. The fitted graphs are also included. Please note that these equations will be re-estimated for each forecast if there is updated data for any series used in these equations.

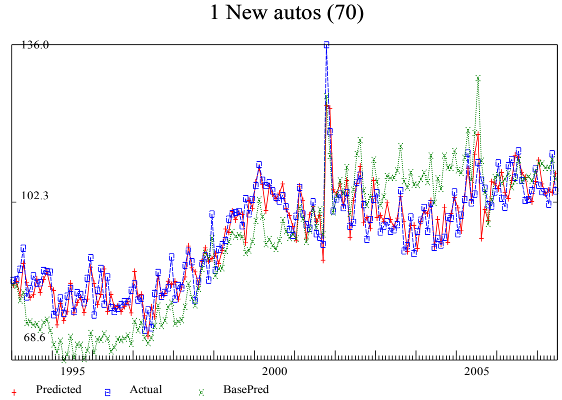
New autos

```
:                               1 New autos (70)
  SEE   =       3.77 RSQ   = 0.8669 RHO =  -0.28 Obser  =  162 from 1994.001
  SEE+1 =       3.62 RBSQ  = 0.8652 DurH = -3.79 DoFree =  159 to   2007.006
  MAPE  =       3.06
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce1                  - - - - - - - - - - - - - - - - -     95.19 - - -
  1 pce1[1]                 0.91716   172.1   0.92    2.71      95.07
  2 cdmv                    0.25604    63.0   1.00    2.15     371.63  1.719
  3 cdmv[1]                -0.23550    46.8  -0.92    1.00     370.50 -1.592

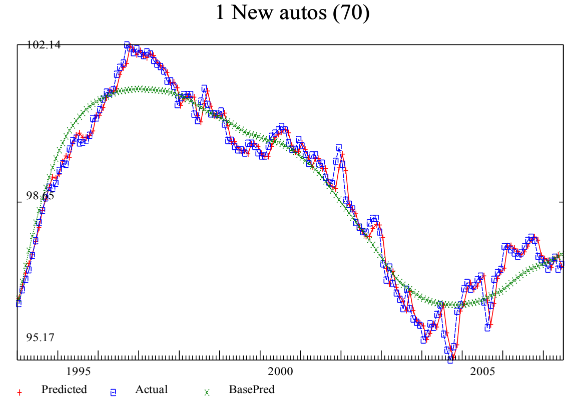
:                               1 New autos (70)
  SEE   =       0.22 RSQ   = 0.9856 RHO =   0.21 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9854 DurH =  2.75 DoFree =  158 to   2007.006
  MAPE  =       0.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp1                  - - - - - - - - - - - - - - - - -     98.89 - - -
  1 intercept               3.06750     1.5   0.03   69.58       1.00
  2 cqp1[1]                 0.95401   518.0   0.95    1.21      98.89  0.958
  3 time                   -0.16709     5.3  -0.01    1.08       7.79 -0.347
  4 gdpi                    2.68918     3.8   0.03    1.00       1.04  0.295
```

The regression results for the nominal PCE of new autos (*pce1*) and the price index of new autos (*cqp1*) are shown above. The fitted graphs of both the nominal value and the price index are included below.

Nominal



Price index



The nominal PCE equation has three regressors: 1) one month lagged nominal PCE of new autos, 2) current period PCE of Motor vehicles, and 3) one month lagged PCE of Motor vehicles. Please note that this equation does not contain a constant (intercept). The equation fit well throughout the estimation period with an adjusted R-square of 0.8652 and good MAPE[12]. This result is expected from the use of lagged dependent variable. All three regressors contribute significantly to the explanation of the nominal PCE of new autos, as shown by values of Mexval[13], during the fitted period. PCE of Motor vehicles' high explanatory value is expected as nominal PCE of new autos accounts for about a quarter of nominal PCE of Motor vehicles and parts. As shown in the fitted graph, BasePred (x), though shows some deviation from the actual value, moves together with the actual value and does pick up the volatility quite well such as the big jump at the end of 2001. This shows that the PCE of Motor vehicles and parts helps in

12 MAPE = Mean Absolute Percentage Error, $MAPE = \frac{100 * \sum_{t=1}^{T} \left| \frac{r_t}{y_t} \right|}{T}$.

13 Mexval = Marginal explanatory value, The percentage increase in Standard Error of Estimate if the variable is left out of the regression. An alternative to the t-statistics.

predicting the movement of the PCE of new autos. *Note: BasePred uses the actual lagged value only in the base period and uses the predicted value of lagged dependent variable in other periods.*

The price index equation has three regressors and one constant. The regressors are 1) one month lagged price index of the PCE of new autos, 2) time trend, and 3) nominal GDP index in 2000 (GDP/GDP[2000]). The lagged dependent variable is the main contributor to the explanatory power of the equation. The equation shows a very good fit to the actual price index during the forecast period as expected from the use of lagged dependent variable. The time trend and the GDP index help in guiding the movement as shown in the fitted plot of BasePred.

Overall, our approach provide satisfactory results in estimating the nominal PCE of new autos and its price index.

Computers and peripherals

In the last two decades, we have seen the increase in private consumption of computers and peripherals. The nominal PCE of computers and peripherals increases from less than one billion dollars in the early 1980s to 46.9 billion dollars in 2006. During the same period, we also observed the fall in price of computers sold to consumers.

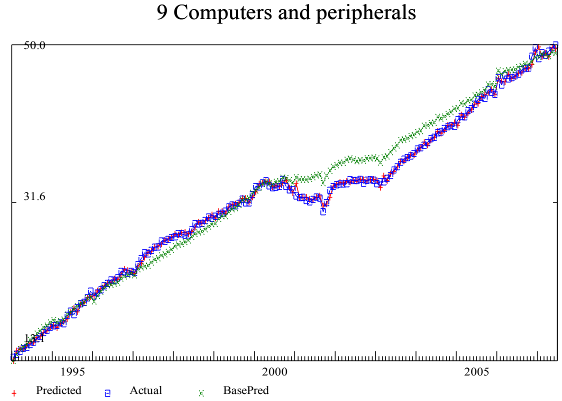
As earlier discussed in Chapter 2, the falling price and the expansion of investment and consumption in computer product affected the way real value is calculated. In this analysis, the price index being estimated is the price index published by the BEA.

```
:                           9 Computers and peripherals
  SEE   =       0.34 RSQ   = 0.9987 RHO =  -0.23 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9987 DurH = -2.91 DoFree =  159 to   2007.006
  MAPE  =       0.81
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce9                 - - - - - - - - - - - - - - - - -     31.93 - - -
  1 pce9[1]                0.98606   855.1   0.98    1.80      31.70
  2 cdfur                  0.10535    31.7   1.01    1.69     306.14  0.666
  3 cdfur[1]              -0.10360    30.1  -0.99    1.00     304.81 -0.655

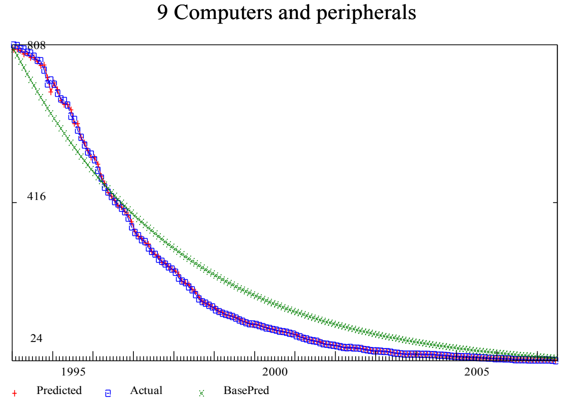
:                           9 Computers and peripherals
  SEE   =       4.94 RSQ   = 0.9996 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       4.93 RBSQ  = 0.9996 DurH = -1.44 DoFree =  160 to   2007.006
  MAPE  =       1.06
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp9                 - - - - - - - - - - - - - - - - -    209.02 - - -
  1 cqp9[1]                1.31230    72.7   1.34    1.13     213.87
  2 cqp9[2]               -0.32579     6.2  -0.34    1.00     218.76 -0.337
```

The nominal PCE equation contains three regressors without constant terms: 1) one month lagged nominal PCE of computers and peripherals, 2) current period nominal PCE of Furniture and household equipment, and 3) one month lagged nominal PCE of Furniture and household equipment. The equation provides a very good fit with adjusted R-square of 0.9987. The fitted plot confirms the regression result with BasePred shows that the nominal PCE of Furniture and household equipment helps move the series quite well.

Nominal



Price Index



The price index equation has two regressors without constant terms: 1) one month lagged price index of the PCE and 2) two month lagged price index of the PCE. The estimated values have reasonable mexvals and reasonable signs. The result fits well with the actual series during the estimated period as shown by both the R-square and the fitted plot.

Software

Software purchase generally follows the purchase of computers. It is not surprising to observe the increase in nominal PCE of software in the last two decades. The price of software has been falling but not as rapidly as the price of computers, especially since 1998.

```
:                                  10 Software
  SEE   =       0.11 RSQ   = 0.9987 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.11 RBSQ  = 0.9987 DurH = -2.71 DoFree =  158 to   2007.006
  MAPE  =       0.86
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce10                - - - - - - - - - - - - - - - - -      9.74 - - -
  1 intercept              -0.68115     3.0  -0.07  789.92      1.00
  2 pce10[1]                0.88163   117.9   0.88    1.73      9.67  0.881
  3 cdfur                   0.03262    30.1   1.03    1.37    306.14  0.634
  4 cdfur[1]               -0.02655    16.9  -0.83    1.00    304.81 -0.516

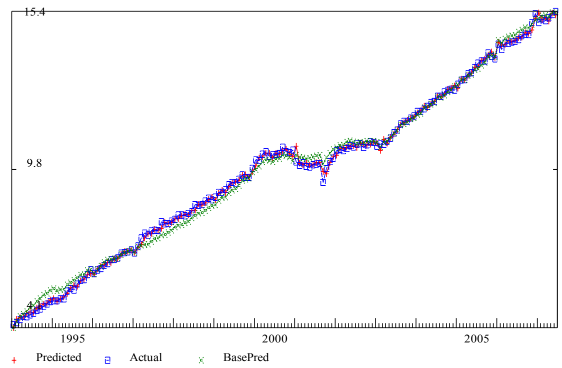
:                                  10 Software
  SEE   =       2.49 RSQ   = 0.9993 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       2.48 RBSQ  = 0.9992 DurH = -1.68 DoFree =  160 to   2007.006
  MAPE  =       1.10
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp10                - - - - - - - - - - - - - - - - -    134.75 - - -
  1 cqp10[1]                1.33541    74.8   1.36    1.14    136.73
  2 cqp10[2]               -0.34628     6.9  -0.36    1.00    138.74 -0.361
```

The equation for the nominal PCE has three regressors and an intercept. The results show that all three regressors have good Mexvals and reasonable signs. The equation also provides a very good close fit as shown by the adjusted R-square (0.9987) and the fitted plot over the test period. Shown in the fitted plot, the BasePred fits extremely well with the actual series which gives us confidence in this equation for the purpose of forecasting.

The price index results show good fit with very high adjusted R-square and very good MAPE. The coefficients of each regressors have reasonable signs and significant Mexvals. Although the BasePred does not fit to the actual series as well as the nominal equation, BasePred plot tracks the trend of the price index fairly well.

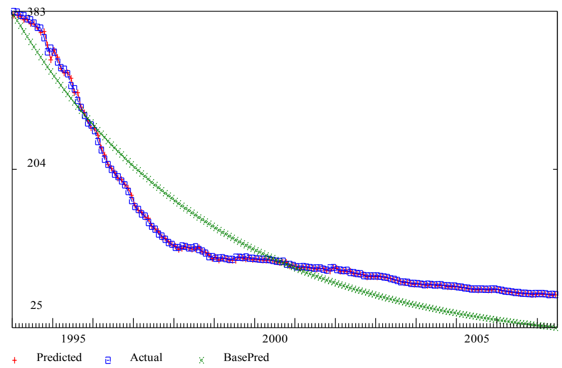
Nominal

10 Software



Price index

10 Software



Pleasure aircraft

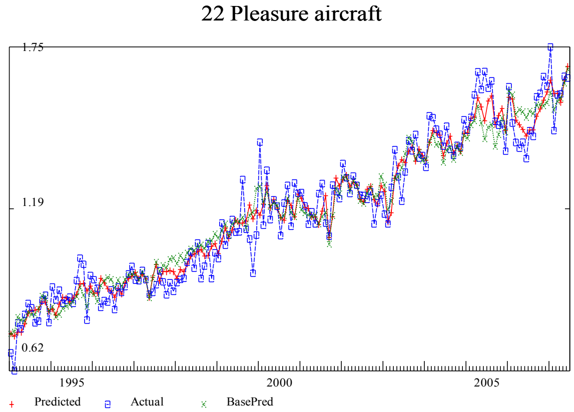
Pleasure aircraft is a luxury item which its consumption typically fluctuate with the economy. It is interesting to see the effectiveness of our approach in forecasting this type of products.

```
:                            22 Pleasure aircraft
  SEE    =       0.06 RSQ    = 0.9417 RHO =    0.08 Obser   =  162 from 1994.001
  SEE+1  =       0.06 RBSQ   = 0.9406 DurH =   3.49 DoFree  =  158 to   2007.006
  MAPE   =       4.20
    Variable name            Reg-Coef   Mexval  Elas    NorRes      Mean    Beta
  0 pce22                  - - - - - - - - - - - - - - - - -        1.18 - - -
  1 pce22[1]                 0.25150      4.2   0.25     2.03       1.17
  2 pce22[2]                 0.28120      4.4   0.28     1.66       1.17  0.279
  3 cdoth                    0.01710     16.7   2.33     1.20     160.33  2.165
  4 cdoth[2]                -0.01376      9.5  -1.86     1.00     158.87 -1.738

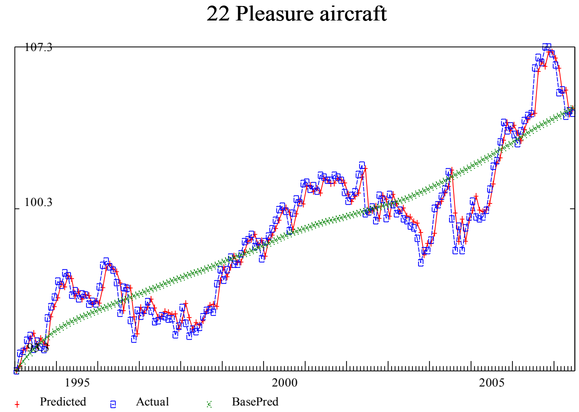
:                            22 Pleasure aircraft
  SEE    =       0.61 RSQ    = 0.9648 RHO =    0.02 Obser   =  162 from 1994.001
  SEE+1  =       0.61 RBSQ   = 0.9644 DurH =   0.31 DoFree  =  159 to   2007.006
  MAPE   =       0.46
    Variable name            Reg-Coef   Mexval  Elas    NorRes      Mean    Beta
  0 cqp22                  - - - - - - - - - - - - - - - - -       99.20 - - -
  1 intercept                7.98910      2.7   0.08    28.44       1.00
  2 cqp22[1]                 0.90658    148.4   0.91     1.04      99.12  0.909
  3 gdpi                     1.29332      2.1   0.01     1.00       1.04  0.082
```

For pleasure aircraft, the nominal PCE equation has 4 regressors: 1) one-month lagged nominal PCE of pleasure aircraft, 2) two-month lagged nominal PCE of pleasure aircraft, 3) current period nominal PCE of other durable goods, and 4) one-month lagged nominal PCE of other durable goods. The equation fits well throughout the test period with R-square of 0.9417. All regressors have reasonable Mexvals and correct signs. BasePred shows a nice fit to the actual series over the test period.

Nominal



Price index



The price index equation has two regressors and a constant. The regressors are one-month lagged price index of PCE of pleasure aircraft and the GDP index. The lagged dependent variable is the main contributor in explaining the price index over the test period. The BasePred shows that the equation captures increasing trend in the price index over time but fails to capture the volatility of the price index.

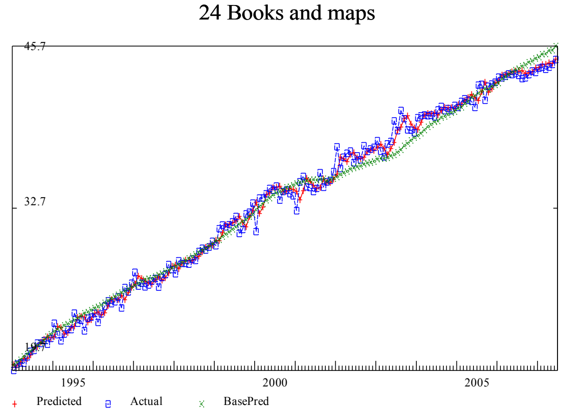
Books and maps

```
:                                24 Books and maps
  SEE   =       0.63 RSQ   = 0.9926 RHO =  -0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.63 RBSQ  = 0.9925 DurH = -2.58 DoFree =  159 to   2007.006
  MAPE  =       1.44
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce24                 - - - - - - - - - - - - - - - - -     33.22 - - -
  1 pce24[1]                0.49170    11.7   0.49    1.27      33.06
  2 pce24[2]                0.35913     7.4   0.36    1.06      32.91  0.361
  3 cdoth[1]                0.03219     2.8   0.15    1.00     159.60  0.145

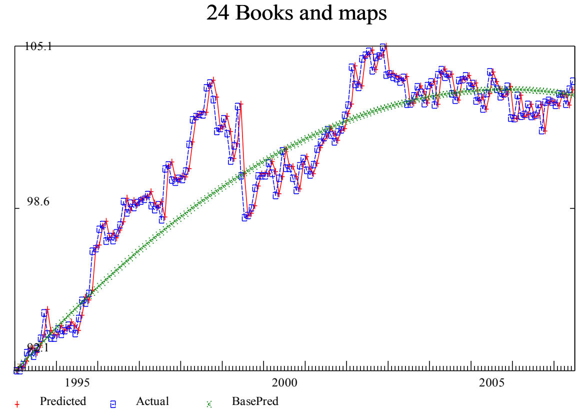
:                                24 Books and maps
  SEE   =       0.63 RSQ   = 0.9660 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.63 RBSQ  = 0.9658 DurH = -0.80 DoFree =  160 to   2007.006
  MAPE  =       0.45
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp24                 - - - - - - - - - - - - - - - - -    100.46 - - -
  1 cqp24[1]                1.00183  6663.5   1.00    1.01     100.39
  2 time                   -0.01465     0.4  -0.00    1.00       7.79 -0.017
```

All three regressors in the nominal PCE equation of books and maps have good Mexvals. The equation provides a good fit with adjusted R-square of 0.9926 and MAPE of 1.44 percent. The fitted plots show a very good fit in both the predicted value and the BasePred, which track the actual series quite well.

Nominal



Price index



The price index result shows a good fit with adjusted R-square of 0.996 and MAPE of 0.45 percent. The coefficients of each regressors have reasonable signs. The BasePred plot shows that the equation tracks the long-term trend of the price index quite well but fails to capture any volatility during the test period.

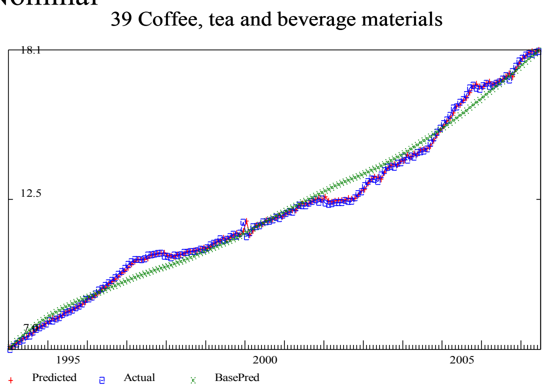
Coffee, tea and beverage materials

```
:                     39 Coffee, tea and beverage materials
  SEE   =       0.10 RSQ   = 0.9989 RHO =  -0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.09 RBSQ  = 0.9989 DurH = -1.03 DoFree =  159 to   2007.006
  MAPE  =       0.56
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce39                - - - - - - - - - - - - - - - - -     12.14 - - -
  1 intercept              -0.18382     2.2  -0.02  932.11      1.00
  2 pce39[1]                0.94007   336.1   0.93    1.08     12.07  0.937
  3 cnfood                  0.00102     4.0   0.08    1.00    954.45  0.063

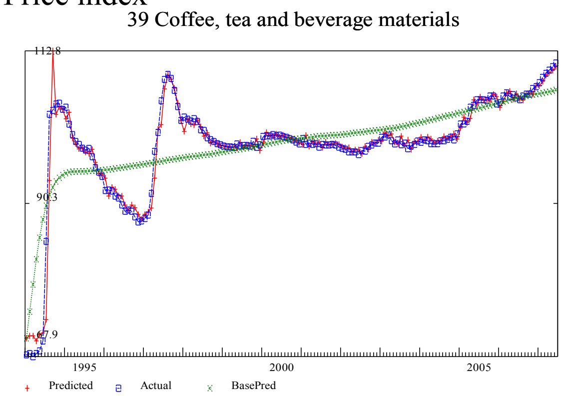
:                     39 Coffee, tea and beverage materials
  SEE   =       1.64 RSQ   = 0.9544 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       1.63 RBSQ  = 0.9535 DurH =  1.33 DoFree =  158 to   2007.006
  MAPE  =       0.85
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp39                - - - - - - - - - - - - - - - - -     98.99 - - -
  1 intercept               7.73683     6.8   0.08   21.92      1.00
  2 cqp39[1]                1.45147   103.5   1.45    1.50     98.73  1.513
  3 cqp39[2]               -0.54702    21.8  -0.54    1.03     98.46 -0.594
  4 gdpi                    1.75147     1.6   0.02    1.00      1.04  0.047
```

The result shows that the nominal PCE of coffee, tea and beverage materials can be estimated quite accurately during the test period with the one-month lagged dependent variable and the current period nominal PCE of food. The closeness of fit statistics are quite good with an adjusted R-square of 0.9989 and MAPE of 0.56 percent. The BasePred plot shows good behavior in tracking the trend of the nominal PCE during the test period.

Nominal



Price index



The price index of PCE of coffee, tea and beverage materials had two big spikes in the mid 1990s caused by concerns about frost in Brazil, the biggest coffee producer at the time. The BasePred plot shows that the equation cannot track these volatility (as they were caused by natural cause) in a long-term forecast. On the other hand, the predicted value tracks the actual series quite well with the help of the lagged dependent variables. Overall, the regressors of the price index equation have reasonable Mexvals and signs. The result seems to fit the actual series well during the test period with high adjusted R-square and low MAPE.

Women's and children's clothing and accessories

```
:        50 Women's and children's clothing and accessories except shoes
  SEE   =       0.34 RSQ   = 0.9997 RHO =  -0.29 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9997 DurH = -3.75 DoFree =  159 to   2007.006
  MAPE  =       0.17
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce50                - - - - - - - - - - - - - - - - -    154.72 - - -
  1 pce50[1]               0.94225   306.0   0.94   34.29    154.30
  2 cncloth                0.52801   483.7   1.00   10.80    293.63  1.032
  3 cncloth[1]            -0.49765   228.6  -0.94    1.00    292.79 -0.969

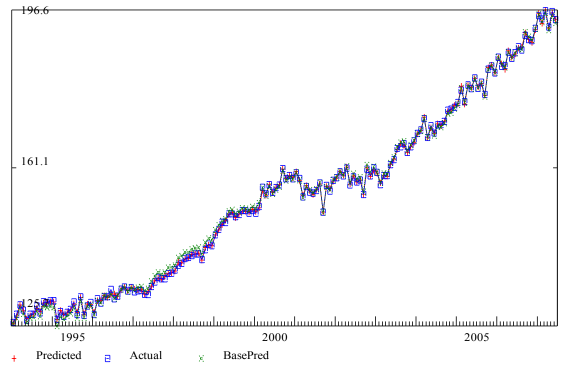
:        50 Women's and children's clothing and accessories except shoes
  SEE   =       0.70 RSQ   = 0.9903 RHO =  -0.11 Obser  =  162 from 1994.001
  SEE+1 =       0.69 RBSQ  = 0.9902 DurH = -1.43 DoFree =  159 to   2007.006
  MAPE  =       0.53
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp50                - - - - - - - - - - - - - - - - -     99.77 - - -
  1 cqp50[1]               0.99784  6966.3   1.00    1.01     99.93
  2 crude                  0.01123     0.6   0.00    1.01     28.35  0.024
  3 crude[11]             -0.01038     0.4  -0.00    1.00     25.51 -0.019
```

The equation for the nominal PCE shows very good fit with high adjusted R-square and very low MAPE. The coefficients of each regressors have good signs. All regressors have high Mexvals. The fitted plots show that both predicted value and BasePred fit very well to the actual series.

The price index equation has very good fit with the actual seires as shown by the adjusted R-square and MAPE. Almost all of the explanation is explained by the lagged dependent variable. The inclusion of crude oil price provides the necessary movement to the forecast as seen by the BasePred plot.

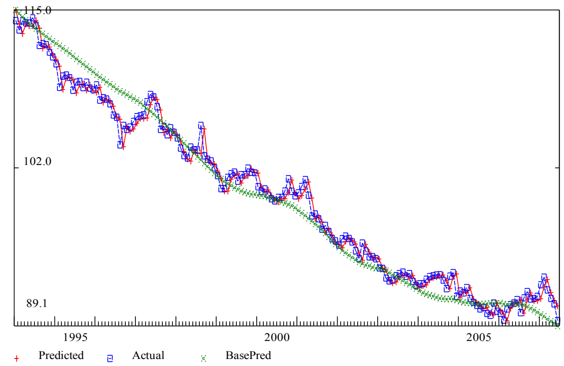
Nominal

0 Women's and children's clothing and accessories except shoe



Price index

0 Women's and children's clothing and accessories except shoe



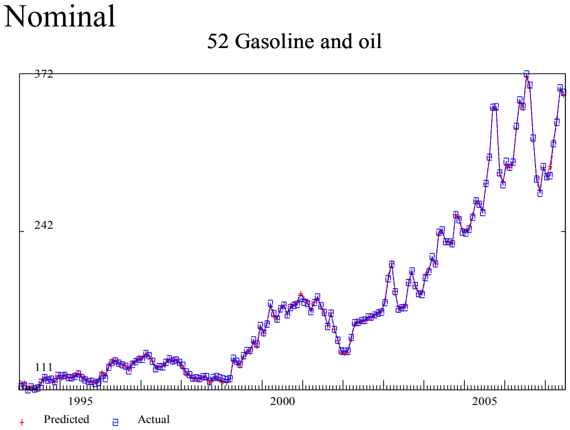
Gas and Oil

```
:                               52 Gasoline and oil
  SEE    =        1.38 RSQ    = 0.9996 RHO =    0.51 Obser   =  162 from 1994.001
  SEE+1  =        1.20 RBSQ   = 0.9996 DW  =    0.99 DoFree =  160 to   2007.006
  MAPE   =        0.61
    Variable name              Reg-Coef  Mexval  Elas    NorRes     Mean    Beta
  0 pce52                    - - - - - - - - - - - - - - - - -     182.08 - - -
  1 intercept                  -6.29561    84.9  -0.03 2452.52       1.00
  2 cngas                       0.95223  4852.3   1.03    1.00     197.83  1.000
```

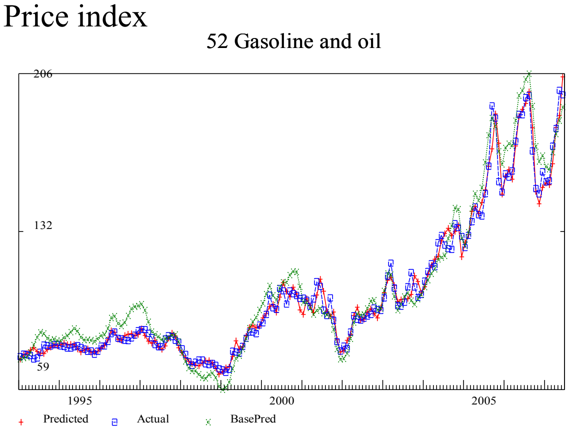
```
:                               52 Gasoline and oil
  SEE    =        4.12 RSQ    = 0.9848 RHO =    0.07 Obser   =  162 from 1994.001
  SEE+1  =        4.11 RBSQ   = 0.9846 DurH =   0.83 DoFree =  159 to   2007.006
  MAPE   =        2.60
    Variable name              Reg-Coef  Mexval  Elas    NorRes     Mean    Beta
  0 cqp52                    - - - - - - - - - - - - - - - - -     103.34 - - -
  1 cqp52[1]                    0.99859  2467.8   0.99    2.36     102.59
  2 oildf                       1.51676    27.4   0.00    1.42       0.32  0.100
  3 oildf[1]                    1.25764    19.2   0.00    1.00       0.29  0.083
```

The nominal PCE equation of Gasoline and oil has only the nominal PCE of Gasoline, fuel oil, and other energy goods. There is no lagged dependent variable. The Mexvals of the nominal PCE of Gasoline, fuel oil, and other energy goods is very high because the nominal PCE of Gasoline and oil contribute around 90 percent to the nominal PCE of Gasoline, fuel oil, and other energy goods throughout the test period. The closeness of fit statistics, both adjusted R-square and MAPE, are very good. The fitted plot shows excellent fit as well.

Nominal



Price index



The price equation has 3 regressors and no constant. The first differences of crude oil price, both current period and one-month lagged, are quite good in capturing the volatility of the price index as shown by the fitted plot of BasePred. In general, all coefficients have reasonable Mexvals and the closeness of fit statistics are quite good.

Housing

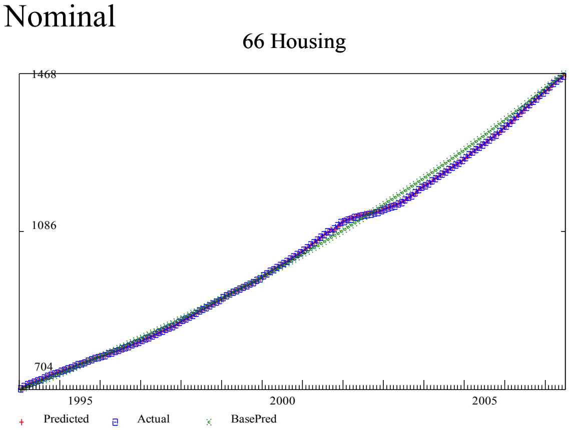
The PCE of housing is the only detailed PCE in this analysis that is equal exactly to the major aggregate PCE of housing. Thus, we use only the lagged dependent variables in both the nominal PCE and the price index equations without the intercept.

```
:                                  66 Housing
  SEE    =        1.57 RSQ   = 0.9999 RHO =   0.20 Obser  =  162 from 1994.001
  SEE+1 =        1.54 RBSQ  = 0.9999 DurH =  2.60 DoFree =  161 to   2007.006
  MAPE  =        0.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce66                 - - - - - - - - - - - - - - - - -   1034.87 - - -
  1 pce66[1]                 1.00457 67319.6   1.00    1.00   1030.18

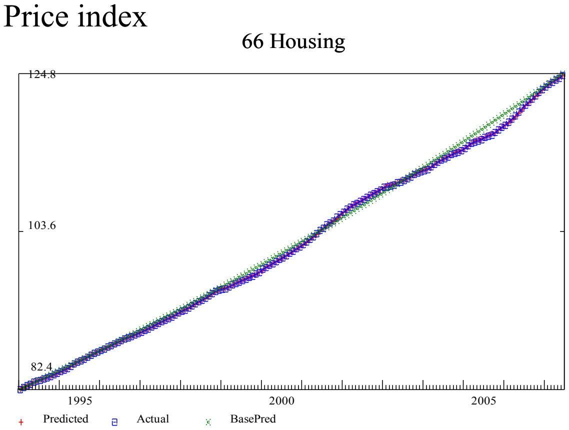
:                                  66 Housing
  SEE    =        0.09 RSQ   = 0.9999 RHO =   0.33 Obser  =  162 from 1994.001
  SEE+1 =        0.08 RBSQ  = 0.9999 DurH =  4.18 DoFree =  161 to   2007.006
  MAPE  =        0.07
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp66                 - - - - - - - - - - - - - - - - -    101.82 - - -
  1 cqp66[1]                 1.00258 119334.6   1.00    1.00    101.56
```

Both equations show very good closeness of fit statistics with very high explanatory value. The fitted plots show very good fit from both predicted value and BasePred plots.

Nominal



Price index



Cell phone, local phone and long distance phone

The nominal PCE equations of Cell phone, local phone and long distance phone (three separate detailed categories) are estimated together using “stack”[14] command in G. In the last decade, Cell phone has become almost a primary way of communication to many consumers. Most cell phone providers offer long distance services at no extra charge. Together with the conveniences and the lower price of the cell phone, some consumers no longer have a long distance phone service. Some consumers do not even have a normal local phone. Thus, the increasing consumption of cell phone should be taken into account when we estimate the consumption of local phone and long distance phone. As shown in the following results, the nominal consumption of Cellular phone (*pce70*) is one of regressors used in estimating the nominal consumption of both Local phone (*pce71*) and Long distance phone (*pce72*).

14 “stack” works in the same way as the seemingly unrelated regression (SUR). However, “stack” pays no attention to contemporaneous covariances. The point of “stack” is only to impose soft constraints across regressions. It can be used without any constraint if we have equations that should be estimated at the same time such as the Cell phone, local phone and long distance phone equations.

```
:                          70 Cellular phone
Regression number 1, pce70
  SEE   =       0.26 RSQ   = 0.9998 RHO =   0.30 Obser  =  486 from 1994.001
  SEE+1 =       0.25 RBSQ  = 0.9998 DurH =  3.77 DoFree =  478 to   2007.006
  MAPE  =       0.67 SEESUR =       1.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce70                 - - - - - - - - - - - - - - - - -     33.89 - - -
  1 intercept               -1.57216     0.8  -0.05    1.25      1.00
  2 pce70[1]                 0.97867   404.5   0.97    1.00     33.49  0.973
  3 gdp                      0.00027     1.0   0.08    1.00   9935.29  0.028

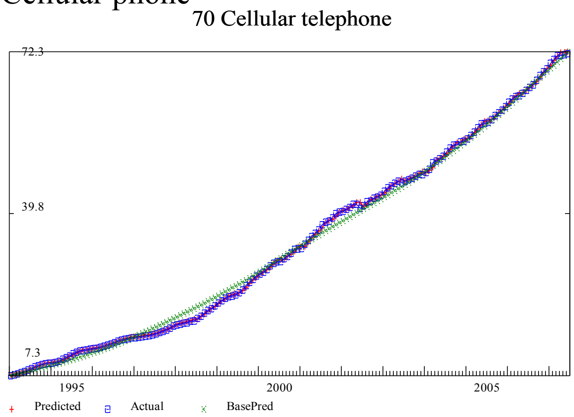
:                          71 Local phone
Regression number 2, pce71
  SEE   =       0.34 RSQ   = 0.9969 RHO =   0.15 Obser  =  486 from 1994.001
  SEE+1 =       0.34 RBSQ  = 0.9969 DurH =  1.92 DoFree =  478 to   2007.006
  MAPE  =       0.53 SEESUR =       1.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  4 pce71                 - - - - - - - - - - - - - - - - -     45.75 - - -
  1 pce71[1]                 1.00646  3016.6   1.00    1.00     45.65
  2 pce70[1]                -0.00590     1.2  -0.00    1.00     33.49 -0.018

:                          72 Long distance telephone
Regression number 3, pce72
  SEE   =       0.58 RSQ   = 0.9957 RHO =   0.08 Obser  =  486 from 1994.001
  SEE+1 =       0.58 RBSQ  = 0.9956 DurH =  1.01 DoFree =  478 to   2007.006
  MAPE  =       1.20 SEESUR =       1.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  7 pce72                 - - - - - - - - - - - - - - - - -     37.36 - - -
  1 pce72[1]                 0.96332   325.2   0.97    1.05     37.44
  2 csho                     0.00745     1.5   0.08    1.04    391.48  0.059
  3 pce70[1]                -0.04859     1.9  -0.04    1.00     33.49 -0.106
```

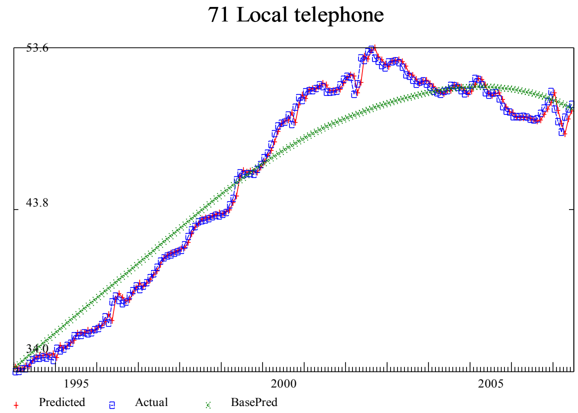
The regressions' results are very satisfactory. We have very good fit for the PCE of cellular phone. The coefficients of one month lagged PCE of cellular phone in the equations of both local telephone and the long distance telephone have negative signs as expected. The BasePred plots show that the equation can capture the long-term trend, but not the short-term volatility, of these three PCE categories.

Plots of the nominal PCE

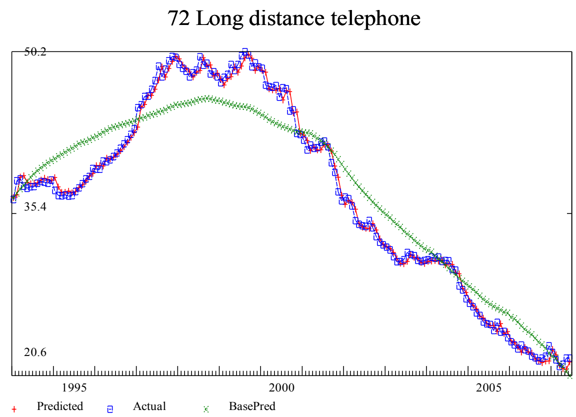
Cellular phone



Local Phone



Long distance phone



```
:                               70 Cellular telephone
  SEE   =        0.57 RSQ   = 0.9996 RHO =  -0.03 Obser  =  162 from 1994.001
  SEE+1 =        0.57 RBSQ  = 0.9995 DurH = -0.82 DoFree =  158 to   2007.006
  MAPE  =        0.39
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp70                 - - - - - - - - - - - - - - - - -    111.06 - - -
  1 intercept               -0.72664     0.2  -0.01 2254.50      1.00
  2 cqp70[1]                 1.54662   110.0   1.55    1.49    111.52  1.558
  3 cqp70[2]                -0.54687    19.2  -0.55    1.01    111.99 -0.555
  4 gdpi                     0.52499     0.3   0.00    1.00      1.04  0.004

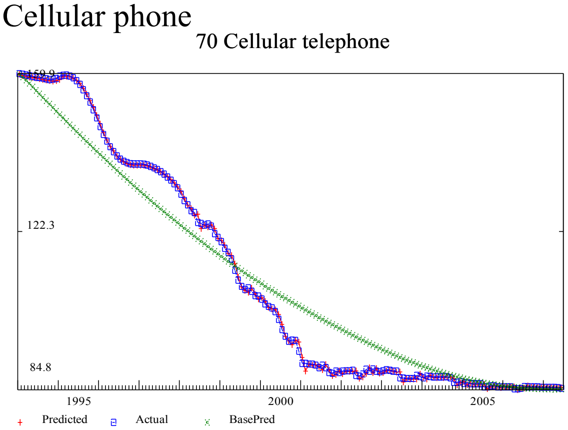
:                                71 Local telephone
  SEE   =        0.55 RSQ   = 0.9979 RHO =  -0.10 Obser  =  162 from 1994.001
  SEE+1 =        0.55 RBSQ  = 0.9979 DurH = -1.26 DoFree =  161 to   2007.006
  MAPE  =        0.33
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp71                 - - - - - - - - - - - - - - - - -    104.11 - - -
  1 cqp71[1]                 1.00221 19024.3   1.00    1.00    103.88

:                            72 Long distance telephone
  SEE   =        1.08 RSQ   = 0.9945 RHO =  -0.01 Obser  =  162 from 1994.001
  SEE+1 =        1.08 RBSQ  = 0.9944 DurH = -1.89 DoFree =  159 to   2007.006
  MAPE  =        0.81
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp72                 - - - - - - - - - - - - - - - - -     95.26 - - -
  1 cqp72[1]                 0.90901    36.5   0.91    1.05     95.43
  2 cqp72[2]                 0.28984     2.4   0.29    1.04     95.60  0.288
  3 cqp72[3]                -0.20043     2.0  -0.20    1.00     95.78 -0.198
```

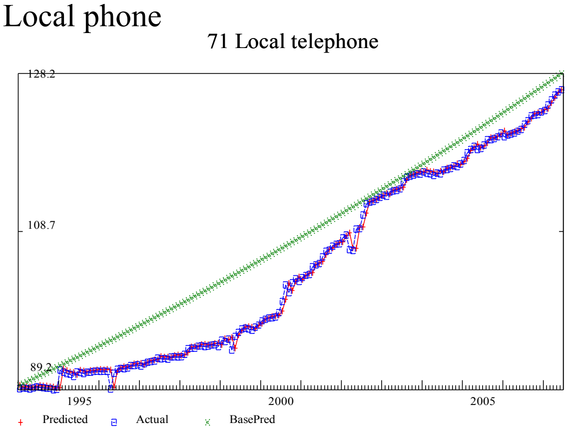
The price index equations of the three telephone categories show pretty good fit by the closeness of fit statistics. Each regressor has reasonable Mexvals. However, the fitted plots reveal that, with the exception of cellular telephones' price index equation, the other price index equations do not have much explanation into the movement of the price indexes as shown by the plot of BasePred. Thus, we should be cautious in using these equations in forecasting.

Plots of the price index

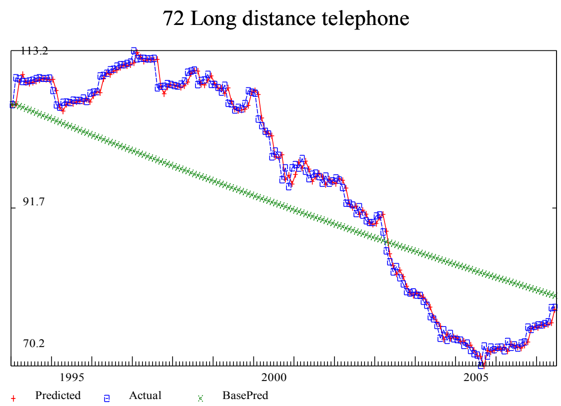
Cellular phone



Local phone



Long distance phone



Airlines

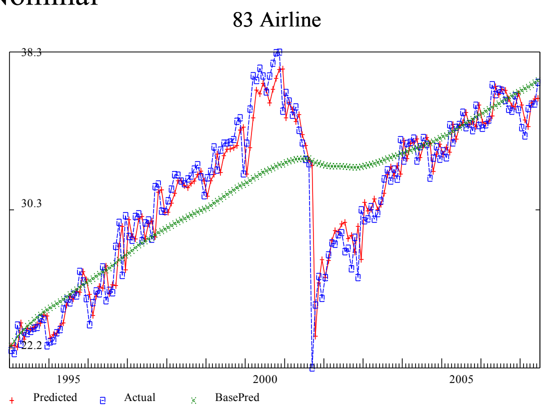
The equation for the nominal PCE of Airline services has one-month lagged dependent variable and the nominal PCE of transportation service as its regressors. Both regressors plus the intercept have reasonable Mexvals. The adjusted R-square is quite good (0.9058). The MAPE is slightly high (2.67 percent). The fitted plot shows that Airline services affected the most from the brief recession in 2000 and the terrorist attack in September 2001. However, the consumption looks to be back to its long-term trend by 2003 as the BasePred shown pretty good fit since then.

```
:                                 83 Airline
  SEE   =       1.25 RSQ   = 0.9070 RHO =  -0.17 Obser  =  162 from 1994.001
  SEE+1 =       1.24 RBSQ  = 0.9058 DurH = -2.58 DoFree =  159 to   2007.006
  MAPE  =       2.67
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce83                - - - - - - - - - - - - - - - - -     31.08 - - -
  1 intercept               1.80871     1.8   0.06   10.75      1.00
  2 pce83[1]                0.84033    88.7   0.84    1.06     31.00  0.845
  3 cstr                    0.01169     2.9   0.10    1.00    275.95  0.128

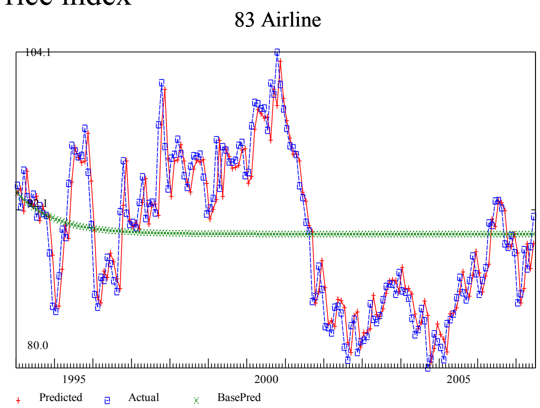
:                                 83 Airline
  SEE   =       2.03 RSQ   = 0.8733 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       2.03 RBSQ  = 0.8717 DurH =  4.03 DoFree =  159 to   2007.006
  MAPE  =       1.70
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp83                - - - - - - - - - - - - - - - - -     90.33 - - -
  1 intercept               6.59431     2.0   0.07    7.90      1.00
  2 cqp83[1]                1.02277    43.6   1.02    1.01     90.35  1.024
  3 cqp83[2]               -0.09587     0.5  -0.10    1.00     90.40 -0.096
```

The price index plot shows the same story as the nominal value. There was a steep decline in price between 2000 and 2001. The price index also starts increasing again since 2005 as should be expected from the increasing oil price. However, an experiment in estimating the equation with crude oil price was unsuccessful. In general, the price index of the airline service is difficult to estimate. It is affected by many factors such as the overall economy, natural causes (such as weather), etc. Nevertheless, this price index equation should provide a decent short-term forecast in normal circumstance.

Nominal



Price index



Health insurance

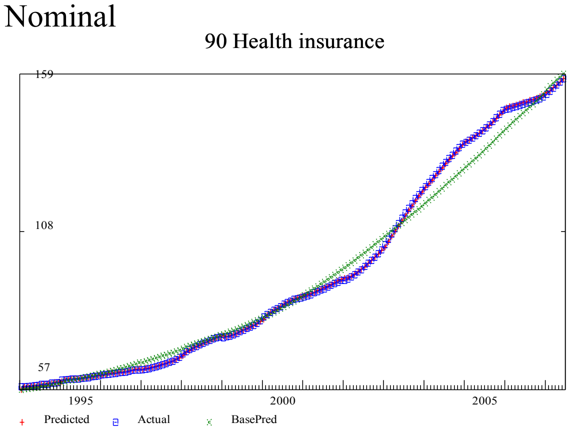
The equation for the nominal PCE of health insurance service has three regressors plus an intercept. Most of the explanatory power of the equation is provided by the one-month lagged dependent variable. The equation has a very god fit over the test period with adjust R-square of 0.9999 and MAPE of 0.28 percent. The fitted plot shows an excellent fit for the predicted value and a relatively good fit for the BasePred.

```
:                              90 Health insurance
  SEE   =        0.35 RSQ   = 0.9999 RHO =   0.80 Obser  =  162 from 1994.001
  SEE+1 =        0.22 RBSQ  = 0.9999 DurH = 10.21 DoFree =  158 to   2007.006
  MAPE  =        0.28
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce90                 - - - - - - - - - - - - - - - - -    94.43 - - -
  1 intercept              -1.08819     4.9  -0.01 8209.40      1.00
  2 pce90[1]                0.97680   906.7   0.97    1.19     93.81  0.969
  3 csmc                    0.03343     3.0   0.40    1.05   1118.22  0.295
  4 csmc[1]                -0.03011     2.4  -0.35    1.00   1112.34 -0.264

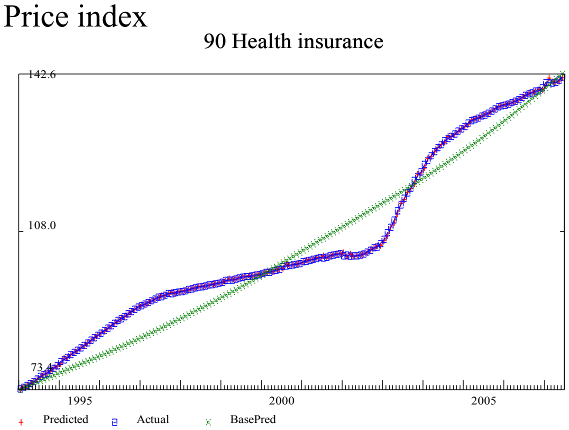
:                              90 Health insurance
  SEE   =        0.24 RSQ   = 0.9998 RHO =  -0.25 Obser  =  162 from 1994.001
  SEE+1 =        0.23 RBSQ  = 0.9998 DurH = -4.36 DoFree =  159 to   2007.006
  MAPE  =        0.16
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp90                 - - - - - - - - - - - - - - - - -   105.40 - - -
  1 cqp90[1]                1.76739   187.7   1.76    2.37    104.97
  2 cqp90[2]               -0.76974    52.6  -0.76    1.00    104.55 -0.766
  3 gdpi                    0.33077     0.2   0.00    1.00      1.04  0.004
```

The price index equations has three regressors and no intercept. The lagged dependent variables provide most of the explanation with very good Mexvals. The adjusted R-square is 0.9998 and the MAPE is 0.16 percent. The fitted plot shows that the equation can explain the long-term trend but fails to capture the short-term fluctuation of the price index as seen by the BasePred plot.

Nominal



Price index



Brokerage charges and investment counseling

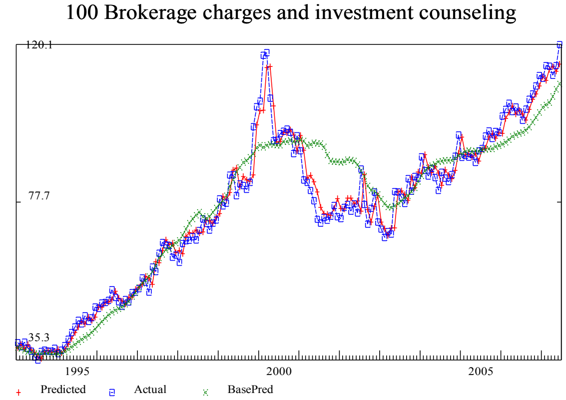
```
:                100 Brokerage charges and investment counseling
  SEE   =       3.51 RSQ   = 0.9736 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       3.50 RBSQ  = 0.9733 DurH =  0.89 DoFree =  159 to   2007.006
  MAPE  =       3.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce100                - - - - - - - - - - - - - - - - -     75.55 - - -
  1 intercept               0.78405     0.2   0.01   37.86      1.00
  2 pce100[1]               0.83978    90.8   0.83    1.09     75.05  0.836
  3 djia                    0.00134     4.6   0.16    1.00   8771.94  0.157

:                100 Brokerage charges and investment counseling
  SEE   =       2.79 RSQ   = 0.9893 RHO =  -0.16 Obser  =  162 from 1994.001
  SEE+1 =       2.73 RBSQ  = 0.9891 DurH = -2.15 DoFree =  158 to   2007.006
  MAPE  =       1.33
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp100                - - - - - - - - - - - - - - - - -    114.96 - - -
  1 intercept               6.25085     0.8   0.05   93.48      1.00
  2 cqp100[1]               0.95325   234.1   0.96    1.03    115.37  0.962
  3 time                   -0.44230     1.0  -0.03    1.03      7.79 -0.064
  4 crude                   0.07707     1.4   0.02    1.00     28.35  0.043
```

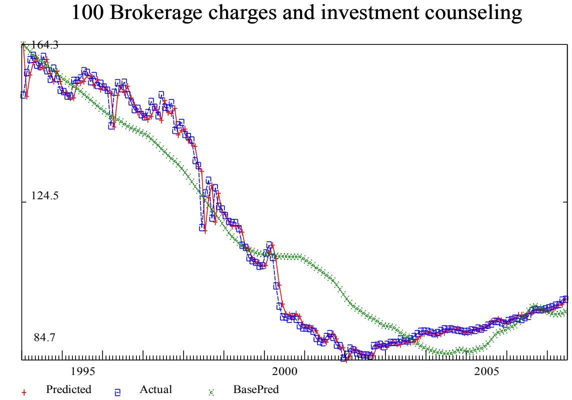
The equation for the nominal PCE of Brokerage charges and investment counseling has a good fit during the test period. The adjusted R-square is 0.9733 while the MAPE is 3.29 percent. The Dow Jones Industrial index helps the equation in tracking the actual series quite well as shown by the BasePred plot.

The price index equation also has a good closeness of fit statistics with an adjust R-square of 0.9891 and a MAPE of 1.33 percent. Most of the explanatory power of the equation is provided by the lagged dependent variable. The time trend and the crude oil price help guiding the predicted value quite well as seen in the BasePred plot.

Nominal



Price index



3.5 Historical Simulations

The following discussions are grouped by the BEA Major aggregates, *i.e.* durable, nondurables, services, and the 13 major types, which are published monthly by the BEA. I compared the historical simulations with the annual PCE numbers published by the BEA.

In this section, "The first simulation" refers to the historical simulation with actual exogenous variables and "The second simulation" refers to the historical simulation with exogenous variables generated from QUEST and other ad hoc assumptions.

Unless stated otherwise, each picture shows three lines: 1) historical simulation using actual exogenous variables (represented by + line), 2) historical simulation with exogenous variables generated using QUEST and other simple methods (represented by box (□) line), and 3) the actual published series (represented by x line). Table 3.6 shows the results of these two historical simulations of PCE at the major product categories and their percentage difference from the BEA data. Table 3.5 shows assumptions of all exogenous variables used in the second historical simulation.

Table 3.5: Assumptions of exogenous variables used in the Second Historical Simulation

Predetermined explanatory variables used in historical simulation

		2005Q1	2005Q2	2005Q3	2005Q4	2006Q1	2006Q2	2006Q3	2006Q4
cdmv	Nominal PCE of motor vehivcles	474.30	479.94	475.23	461.36	477.78	468.83	483.52	487.92
cdfur	Nominal PCE of furnitures	369.85	372.61	373.53	382.67	384.42	391.34	393.49	398.22
cdoth	Nominal PCE of other durables	198.18	200.49	202.42	206.66	206.45	208.71	209.31	211.75
cnfood	Nominal PCE of food	1,152.76	1,161.61	1,169.64	1,188.96	1,191.88	1,208.31	1,216.47	1,233.24
cncloth	Nominal PCE of clothing and shoes	333.32	336.74	338.48	343.33	342.94	346.68	348.38	352.78
cngas	Nominal PCE of gas and oil	270.53	279.80	304.58	323.13	338.87	351.11	359.36	369.08
cnoth	Nominal PCE of other nondurables	679.62	686.11	692.84	703.81	705.63	714.18	719.66	729.54
cshous	Nominal PCE of housing	1,267.93	1,276.32	1,280.66	1,301.06	1,300.51	1,317.27	1,323.73	1,339.03
csho	Nominal PCE of household operatio	459.83	463.62	463.66	473.28	476.20	482.49	486.77	492.63
cstr	Nominal PCE of transportation	314.84	317.35	319.29	324.91	324.18	326.39	326.05	327.44
csmc	Nominal PCE of medical services	1,448.02	1,466.35	1,484.00	1,511.69	1,522.73	1,542.15	1,558.62	1,582.26
csrec	Nominal PCE of recreational service	350.36	353.67	353.68	360.39	360.08	366.32	367.02	371.31
csoth	Nominal PCE of other services	1,189.00	1,201.34	1,204.45	1,225.90	1,225.48	1,245.04	1,248.96	1,264.17
ddj	djia - djia(-1)	317.97	267.83	231.12	260.29	201.73	227.24	222.18	252.88
oildf	croil - croil(-1)	5.86	-5.33	1.62	0.45	3.84	3.17	5.13	2.27
gdp	GDP in Billion dollars	12,126.70	12,241.62	12,328.63	12,494.10	12,591.72	12,727.95	12,844.82	12,995.03
djia	Dow Jones Industrial Index	10,730.81	10,998.64	11,229.76	11,490.04	11,691.78	11,919.02	12,141.20	12,394.09
gdpi	GDP deflator (2000Q1 = 1)	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.35
croil	Crude Oil Price	34.61	29.28	30.90	31.35	35.19	38.36	43.49	45.75

* all nominal PCE are in Billion dollars

As shown in Table 3.6, our approach can generate a very reasonable results when given accurate exogenous variables, especially with the forecast of one-year ahead. The errors grow slightly with the two-year ahead forecast. In one-year ahead forecast, we miss the published real total PCE by 0.38% given accurate exogenous variable and by 0.58% using predicted exogenous variables. In general, the approach errors are less than 2%, for the one-year ahead forecast of real PCE, which is very good. Some categories with major shift during the forecast period, such as Gasoline, fuel oil and other energy goods, exhibit higher errors with the second simulation.

It appears that the accuracy of the forecast depends on the quality of the exogenous variables and how further the forecast period from the last known published data.

The rest of this section (3.5) discusses these results in detail with plots of each aggregates. It can be skipped.

Table 3.6: Results from Historical Simulations

Nominal in Billion dollars

Results from Historical Simulations

		2005			2006		
		BEA	actual exog	predicted exog	BEA	actual exog	predicted exog
apce	Personal consumption expenditures	8,742.35	8,750.59	8,703.84	9,270.81	9,286.61	9,169.77
md	Durable goods	1,033.07	1,038.39	1,047.87	1,071.25	1,082.30	1,082.22
dmv	Motor vehicles and parts	448.22	450.90	469.83	445.30	451.93	479.26
dfur	Furniture and household equipment	377.20	377.70	375.09	404.91	406.04	392.73
doth	Other durable	207.66	209.79	202.96	221.04	224.33	210.23
nd	Nondurable goods	2,539.29	2,543.52	2,509.00	2,715.99	2,732.61	2,668.11
nfood	Food	1,201.39	1,203.62	1,183.59	1,281.66	1,292.86	1,240.17
ncloth	Clothing and shoes	341.81	342.46	338.57	358.58	360.24	349.13
ngas	Gasoline, fuel oil, and other energy goods	302.14	301.16	293.40	338.66	337.45	352.37
noth	Other nondurable	693.96	696.27	693.44	737.09	742.06	726.44
sv	Services	5,169.98	5,168.67	5,146.97	5,483.57	5,471.70	5,419.44
sho	Housing	1,304.07	1,305.15	1,305.15	1,382.24	1,375.31	1,375.31
shoop	Household operation	483.00	471.45	457.77	505.80	479.57	460.12
str	Transportation	320.43	321.63	321.05	337.05	338.52	335.51
smc	Medical care	1,493.41	1,498.04	1,495.21	1,589.13	1,611.96	1,601.46
srec	Recreation	360.63	362.00	357.25	379.48	382.30	370.49
soth	Other Services	1,208.45	1,210.40	1,210.53	1,289.87	1,284.03	1,276.55

Deviation from the BEA data as of April 2007 in percent

		2005		2006	
		actual exog	predicted exog	actual exog	predicted exog
apce	Personal consumption expenditures	0.09	-0.44	0.17	-1.09
md	Durable goods	0.52	1.43	1.03	1.02
dmv	Motor vehicles and parts	0.60	4.82	1.49	7.63
dfur	Furniture and household equipment	0.13	-0.56	0.28	-3.01
doth	Other durable	1.03	-2.27	1.49	-4.89
nd	Nondurable goods	0.17	-1.19	0.61	-1.76
nfood	Food	0.19	-1.48	0.87	-3.24
ncloth	Clothing and shoes	0.19	-0.95	0.46	-2.64
ngas	Gasoline, fuel oil, and other energy goods	-0.32	-2.89	-0.36	4.05
noth	Other nondurable	0.33	-0.07	0.67	-1.45
sv	Services	-0.03	-0.45	-0.22	-1.17
sho	Housing	0.08	0.08	-0.50	-0.50
shoop	Household operation	-2.39	-5.22	-5.19	-9.03
str	Transportation	0.38	0.19	0.44	-0.46
smc	Medical care	0.31	0.12	1.44	0.78
srec	Recreation	0.38	-0.94	0.74	-2.37
soth	Other Services	0.16	0.17	-0.45	-1.03

Table 3.6 (cont.)

Chained Real 2000 dollar

Results from Historical Simulations

		2005 BEA	2005 actual exog	2005 predicted exog	2006 BEA	2006 actual exog	2006 predicted exog
apce	Personal consumption expenditures	7,841.17	7,871.17	7,886.90	8,092.54	8,123.11	8,167.46
md	Durable goods	1,145.34	1,161.62	1,172.78	1,203.99	1,234.71	1,237.08
dmv	Motor vehicles and parts	452.90	457.31	477.38	448.01	454.76	482.96
dfur	Furniture and household equipment	490.60	499.62	496.25	551.37	570.44	554.11
doth	Other durable	212.57	216.14	208.99	224.49	231.84	218.22
nd	Nondurable goods	2,276.78	2,286.27	2,275.78	2,363.05	2,391.06	2,370.57
nfood	Food	1,065.70	1,068.68	1,049.81	1,111.41	1,123.01	1,075.36
ncloth	Clothing and shoes	372.72	378.99	376.70	392.68	405.07	394.75
ngas	Gasoline, fuel oil, and other energy goods	199.53	198.78	209.03	197.89	197.67	233.32
noth	Other nondurable	643.90	646.18	643.88	671.44	678.13	666.95
sv	Services	4,436.65	4,443.60	4,459.80	4,549.55	4,528.90	4,588.10
sho	Housing	1,122.60	1,111.55	1,116.35	1,148.68	1,122.75	1,140.53
shoop	Household operation	417.98	411.06	409.22	416.21	398.68	409.24
str	Transportation	284.41	289.56	289.80	288.41	296.06	295.58
smc	Medical care	1,260.92	1,271.88	1,277.03	1,304.32	1,322.40	1,332.79
srec	Recreation	313.14	313.09	310.08	319.86	320.09	313.55
soth	Other Services	1,036.18	1,045.01	1,055.64	1,070.33	1,067.27	1,094.01

Deviation from the BEA data as of April 2007
in percent

		2005 actual exog	2005 predicted exog	2006 actual exog	2006 predicted exog
apce	Personal consumption expenditures	0.38	0.58	0.38	0.93
md	Durable goods	1.42	2.40	2.55	2.75
dmv	Motor vehicles and parts	0.97	5.41	1.51	7.80
dfur	Furniture and household equipment	1.84	1.15	3.46	0.50
doth	Other durable	1.68	-1.69	3.27	-2.79
nd	Nondurable goods	0.42	-0.04	1.19	0.32
nfood	Food	0.28	-1.49	1.04	-3.24
ncloth	Clothing and shoes	1.68	1.07	3.15	0.53
ngas	Gasoline, fuel oil, and other energy goods	-0.38	4.76	-0.11	17.91
noth	Other nondurable	0.35	0.00	1.00	-0.67
sv	Services	0.16	0.52	-0.45	0.85
sho	Housing	-0.98	-0.56	-2.26	-0.71
shoop	Household operation	-1.66	-2.10	-4.21	-1.67
str	Transportation	1.81	1.89	2.65	2.49
smc	Medical care	0.87	1.28	1.39	2.18
srec	Recreation	-0.02	-0.98	0.07	-1.97
soth	Other Services	0.85	1.88	-0.29	2.21

Table 3.6 (cont.)

Chained Price Index (2000=1)

Results from Historical Simulations

		2005 BEA	2005 actual exog	2005 predicted exog	2006 BEA	2006 actual exog	2006 predicted exog
apce	Personal consumption expenditures	1.115	1.112	1.104	1.146	1.143	1.123
md	Durable goods	0.902	0.894	0.893	0.890	0.876	0.875
dmv	Motor vehicles and parts	0.990	0.986	0.984	0.994	0.994	0.992
dfur	Furniture and household equipment	0.769	0.756	0.755	0.734	0.711	0.708
doth	Other durable	0.977	0.971	0.971	0.985	0.967	0.963
nd	Nondurable goods	1.115	1.113	1.102	1.149	1.143	1.125
nfood	Food	1.127	1.126	1.127	1.153	1.151	1.153
ncloth	Clothing and shoes	0.917	0.904	0.899	0.913	0.889	0.884
ngas	Gasoline, fuel oil, and other energy goods	1.514	1.515	1.404	1.711	1.707	1.510
noth	Other nondurable	1.078	1.077	1.077	1.098	1.094	1.089
sv	Services	1.165	1.163	1.154	1.205	1.208	1.181
sho	Housing	1.162	1.174	1.169	1.203	1.225	1.206
shoop	Household operation	1.156	1.148	1.120	1.215	1.204	1.125
str	Transportation	1.127	1.111	1.108	1.169	1.143	1.135
smc	Medical care	1.184	1.178	1.171	1.218	1.219	1.202
srec	Recreation	1.152	1.156	1.152	1.186	1.194	1.182
soth	Other Services	1.166	1.158	1.147	1.205	1.203	1.167

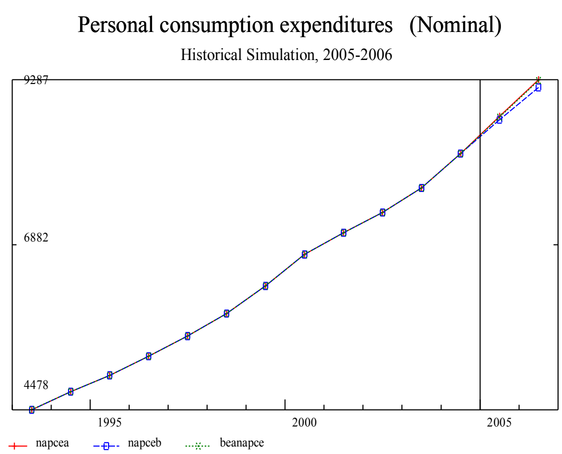
Deviation from the BEA data as of April 2007 in percent

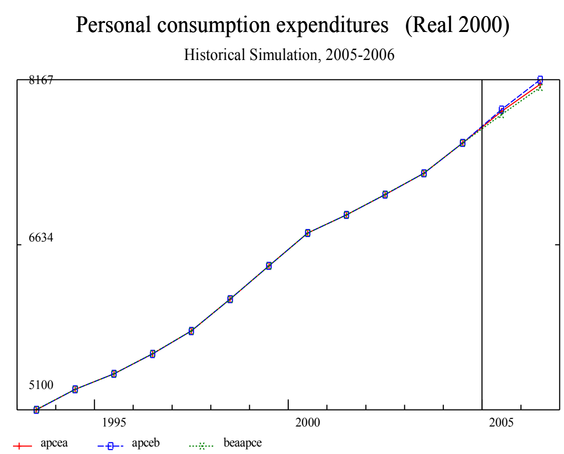
		2005 actual exog	2005 predicted exog	2006 actual exog	2006 predicted exog
apce	Personal consumption expenditures	-0.29	-1.02	-0.20	-2.00
md	Durable goods	-0.92	-0.96	-1.50	-1.70
dmv	Motor vehicles and parts	-0.37	-0.55	-0.02	-0.16
dfur	Furniture and household equipment	-1.73	-1.74	-3.13	-3.54
doth	Other durable	-0.65	-0.60	-1.74	-2.17
nd	Nondurable goods	-0.25	-1.15	-0.57	-2.08
nfood	Food	-0.09	0.01	-0.17	0.01
ncloth	Clothing and shoes	-1.47	-1.99	-2.61	-3.15
ngas	Gasoline, fuel oil, and other energy goods	0.05	-7.31	-0.25	-11.75
noth	Other nondurable	-0.03	-0.08	-0.32	-0.79
sv	Services	-0.17	-0.95	0.25	-1.99
sho	Housing	1.08	0.64	1.80	0.21
shoop	Household operation	-0.67	-3.12	-0.94	-7.41
str	Transportation	-1.41	-1.67	-2.16	-2.87
smc	Medical care	-0.55	-1.14	0.05	-1.37
srec	Recreation	0.39	0.04	0.67	-0.41
soth	Other Services	-0.68	-1.67	-0.17	-3.17

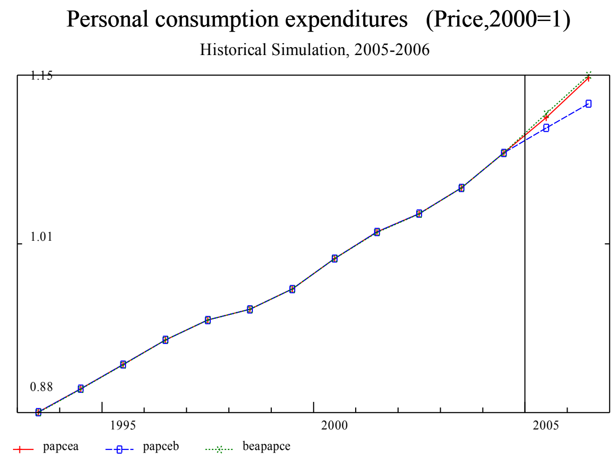
Total annual PCE

At the most aggregate level (total PCE), the PCE equations gave quite a good forecast in both historical simulations. Historical simulation with actual exogenous variables produced very close to the published total PCE in nominal value while the simulation with QUEST gave lower estimate of nominal total PCE. The second simulation number was lower than the published number by 0.44 percent.

This result is expected as it basically shows that the lagged dependent variables generate very good forecast in the short-term. Also, the error of each detailed estimates were averaged out when we annualized the estimates and, then, aggregated them up to the total PCE.







The first simulation of the price index gave excellent results while the second simulation only continued the trend and failed to predict the acceleration of inflation which occurred during the simulation period.

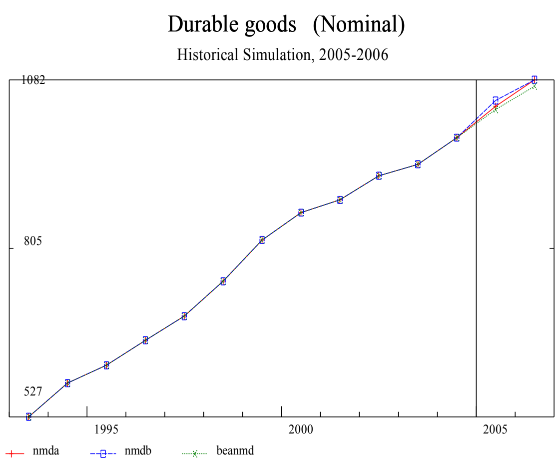
The comparison of the Chained 2000 real PCE[15] compounds the error from both nominal and price equations. Nevertheless, this result is reasonable considering the estimates of nominal values and prices. The first simulation gave a very good estimate of nominal PCE while giving a lower price level. Thus, the real PCE from the first simulation should be higher than the published data. In the same way, the lower estimates of nominal value and price index from the second simulation means that the real PCE estimate should yield a higher value than the published real PCE.

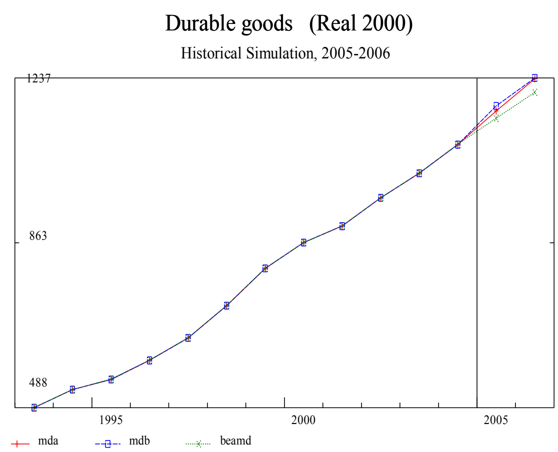
15 All the real values estimated in this chapter are generated from the chained-weighted Fisher index and not from the direct identity [Nominal = price x Real]. As discussed in the previous chapter, since we did not estimate PCEs at the same details as the BEA did, these products (price indexes and real aggregates) from the chain-weighted Fisher index generally will not be equal to the BEA published numbers even when we have no error in all of our estimates.

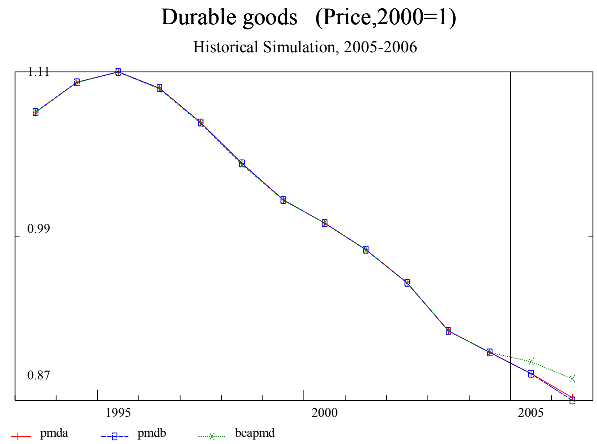
Durable goods

Both the first and the second simulations gave acceptable estimates of nominal PCE of durable goods. As expected. The first simulation provides a better estimate of nominal durable PCE than the second simulation.

BEA published nominal PCE of durable goods of 1,033.1 billion dollars and 1,071.3 billion of dollars in 2005 and 2006, respectively. The estimates from the first simulation are surprisingly close to the published numbers. The second simulation number was higher than the published data by 1.43 percent in 2005 and coming closer to the published number in 2006 with an error of 1.02 percent.







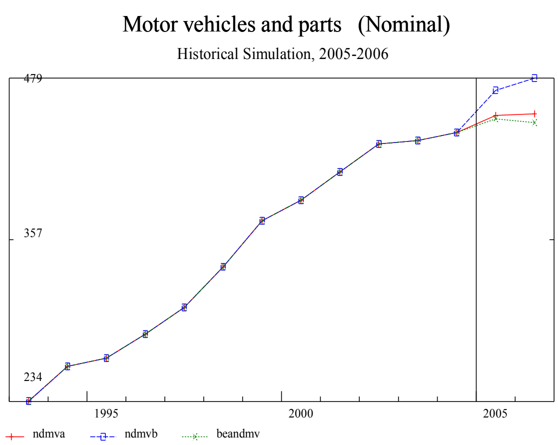
The chained price of durable PCE estimates from both simulations were very close to each other with the first simulation providing slightly better performance. However, both simulations estimated that the price of durables would fall faster than it did. In August 2007, BEA revised these price index numbers downward in both 2005 and 2006. However, our estimates are still lower than the revised numbers.

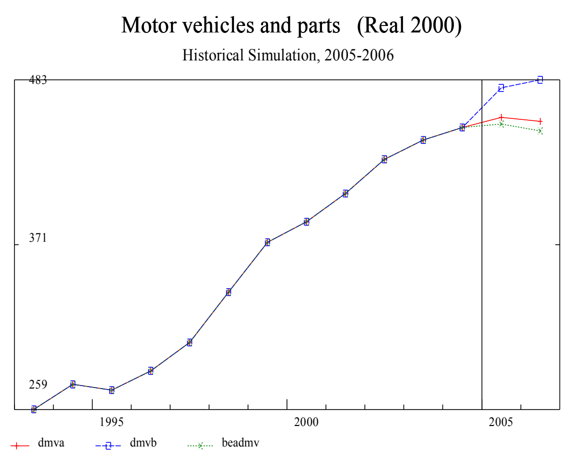
It may seem like a big misses from the above graph. However, it should be noted that the actual values show a break in the trend.

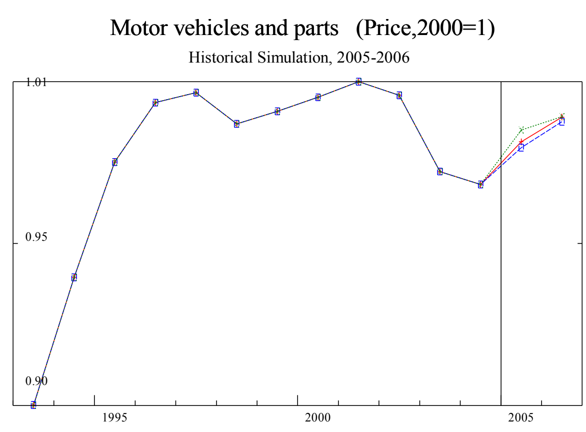
As a result of the low estimates of the price index, both simulations gave estimates of chained 2000 real durable PCE higher than the published data. In 2006, the second simulation estimate missed the published real durable PCE by 2.75 percent. The high estimates in real value are the compound effect of over-estimated the nominal value and under-estimated price index.

Motor vehicles and parts

The published nominal PCEs of Motor vehicles and parts in 2005 and 2006 were 448.2 billion dollars and 445.3 billion dollars, respectively. The historical simulation with actual exogenous variables gave pretty good estimates, especially in 2005. The nominal PCE estimates of motor vehicles and parts from the first simulation were higher than the published number by 0.60 percent and 1.49 percent in 2005 and 2006, respectively. On the other hand, the estimates from the second simulation were higher than the published number by 4.82 percent in 2005 and 7.63 percent in 2006.







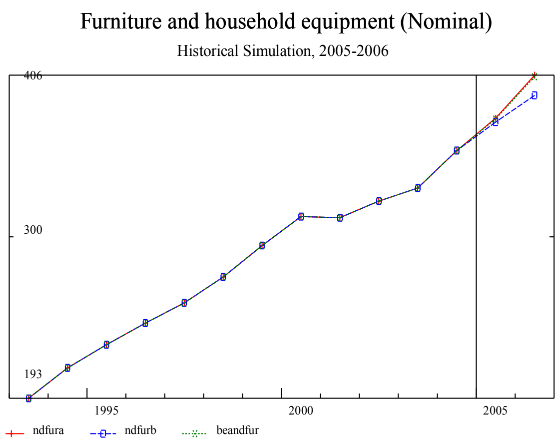
The difference in performance of the two historical estimations holds for the estimates of chained 2000 real PCE of motor vehicles and parts. On the real side, the second simulation gave an estimate that higher than the published number by 7.80 percent in 2006 while the first simulation missed the published number by 1.51 percent in the same period. The cause of lower accuracy on the real estimates of the second simulation compare to its nominal estimate is evident from observing the estimates of the price index. Both simulations predicted lower price index than the published data with the second simulation provided, relatively, a less accurate one. These underestimations of the price index exacerbate the accuracy of the real numbers.

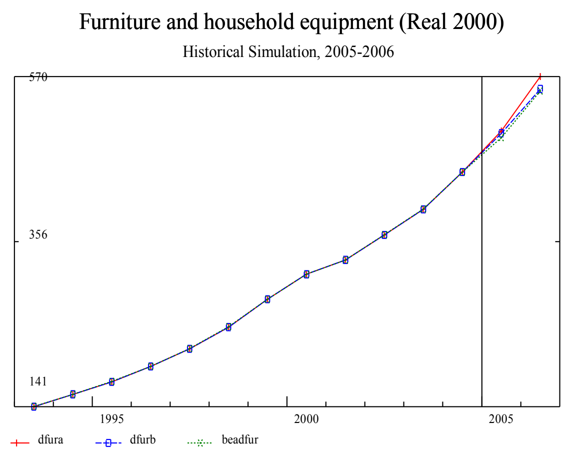
This result exhibits that the accuracy of the exogenous inputs in the equations is important. We see that, with the accurate exogenous macroeconomic variables, as in the first simulation, we achieve a better forecast than using the less accurate exogenous variables data. This means that, at least for this aggregate, the equation for the nominal estimation performs very well and its performance depends on the quality of its inputs.

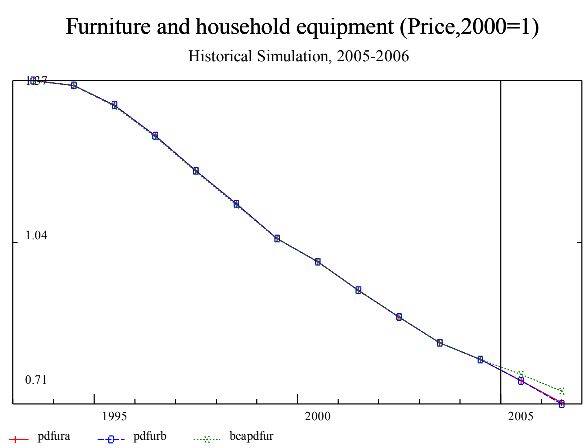
Furniture and household equipment

In 2005 and 2006, BEA published nominal PCE of furniture and household equipment of 377.2 billion dollars and 404.9 billion dollars, respectively. The results show that our equations estimate the nominal consumption of furniture and equipment very well when given proper exogenous inputs, as in the first simulation. The first simulation provided estimates that were lower than the published nominal numbers by 0.13 percent and 0.28 percent in 2005 and 2006, respectively. While the second simulation gave a pretty comparable performance to the first simulation in 2005 (an error of -0.56 percent), its performance dropped sharply to an error of -3.01 percent in 2006.

Both simulations gave almost identical performance on the estimations of the price indexes. Both missed the published price index by around -3.2 percent with the first simulation having a small advantage (-3.13% vs. -3.54%).







With the underestimated price indexes, the second simulation, exceptionally, gave a better forecast accuracy than the first simulation in estimating the chain 2000 real PCE of furniture and equipment. The second simulation estimates of the real value were higher than the published numbers by 1.15 percent in 2005 and 0.5 percent in 2006. In the meantime, the first simulation overestimated the real values by 1.84 percent and 3.46 percent in 2005 and 2006, respectively.

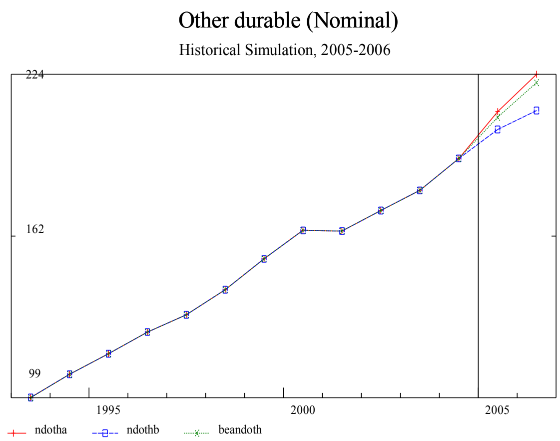
The personal consumption of furniture and equipment has become more important in the recent years. In 2005 and 2006, furniture and equipment contributed around 67 percent and 85 percent, respectively, to the change in real PCE of durable goods[16]. One factor of this increasing contribution is the deceasing trend of the price of furniture and equipment. This declining price is mostly a product of the falling computer price as computers are a component of this category.

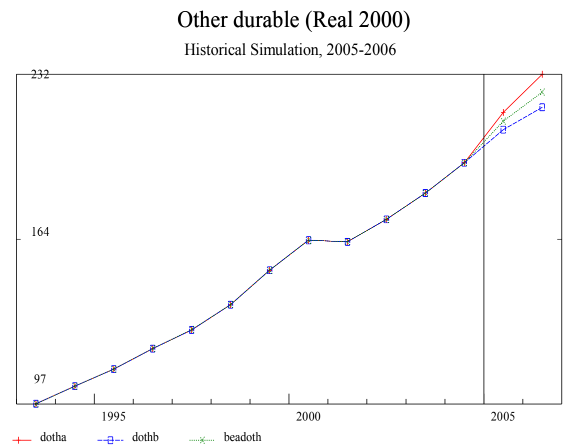
As this category has become more important, the good performance from our equations in forecasting both nominal and real values of these products is significant for the accuracy of a economic model.

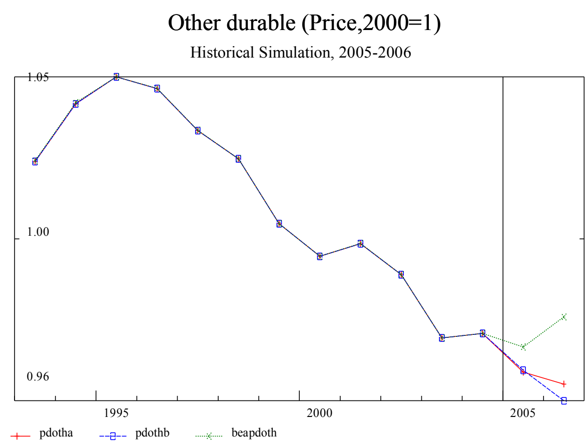
Other durable goods

The equations' performance from the historical simulation with actual exogenous inputs is very good in nominal value forecast of other durable PCE. In 2005, the first simulation overestimated the nominal PCE of other durable by 1.03 percent. In the same year, the second simulation underestimated the nominal PCE of other durable by 2.27 percent. In 2006, the first simulation underestimated by 1.49 percent and the second simulation by -4.89 percent. Again, the discrepancy of the performance between the two simulations is coming from the difference in the value of the exogenous inputs.

16 SOURCE: BEA, Survey of Current Business, March 2007: Table 2.3.2 page D-19.





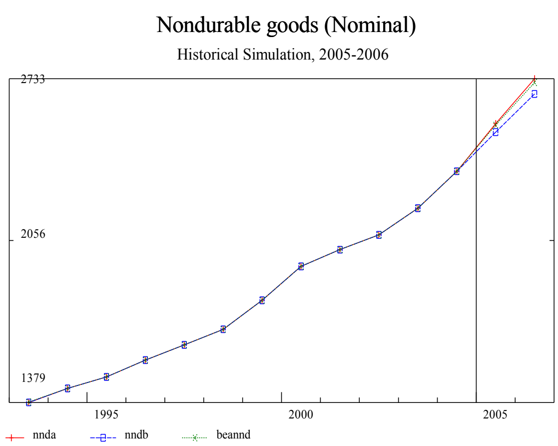


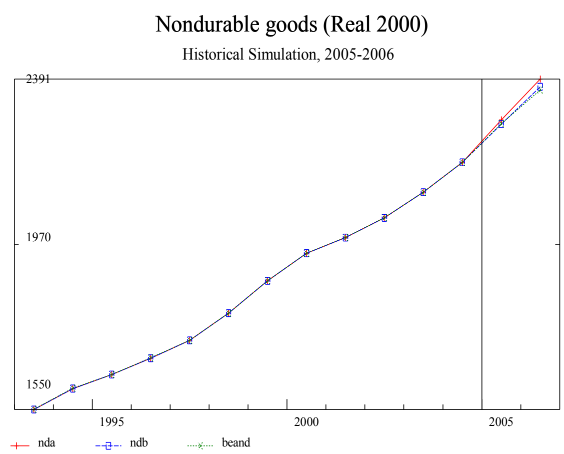
The price index estimations, however, did not fare as well. Both estimations missed the published price index by around one and two percent in 2005 and 2006, respectively. The likely reason for these significant errors is the price is following the decreasing trend of the last decade (1995-2003). In fact, the price of durable PCE reversed its downward trend and showed a positive growth since 2004. As the price equations are heavily depended on the lagged dependent variables, the forecasts' numbers are to be expected as they follow the past trend of the price level.

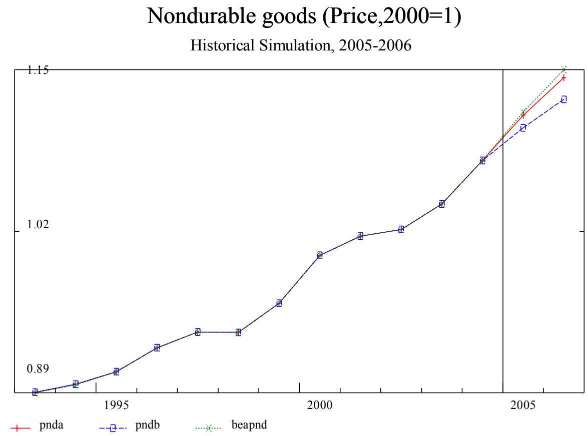
For the real value, the first simulation over-estimated by 1.68 percent and 3.27 percent in 2005 and 2006, respectively; and the second simulation under-estimated the real number by 1.69 percent in 2005 and 2.79 percent in 2006.

Nondurable goods

The first historical simulation overestimated nominal PCE of Nondurables by 0.17 percent and 0.61 percent in 2005 and 2006, respectively. The second simulation underestimated the nominal PCE by 1.19 percent and 1.76 percent in 2005 and 2006, respectively. This, again, shows the importance of the exogenous inputs' quality, especially in the equations used in estimating the nominal consumption.





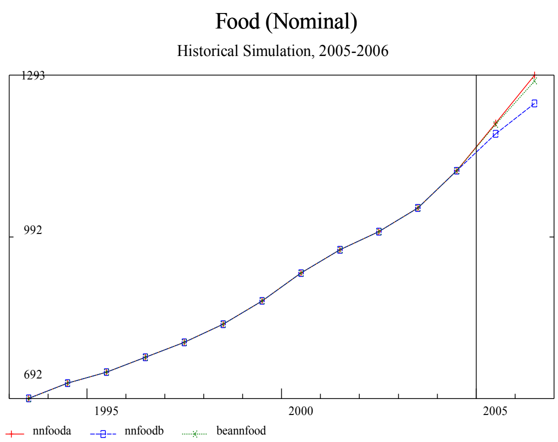


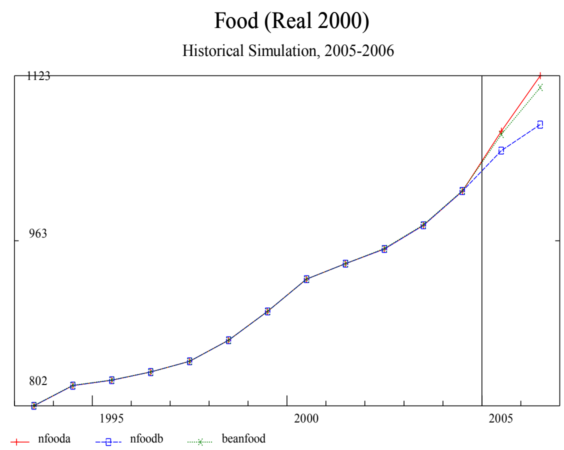
Both simulations underestimated the price index with better estimates from the first simulation. Both alternatives missed the published price index by around 1 percent in 2005 and 2 percent in 2006.

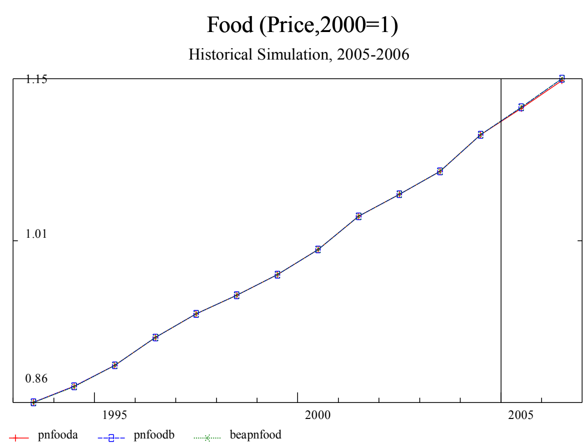
The Historical simulation with actual exogenous inputs over-estimated the real 2000 consumption by 0.42 percent and 1.19 percent in 2005 and 2006 respectively. The second simulation underestimated the real 2000 PCE by 0.04 percent in 2005 and overestimated it by 0.32 percent in 2006.

Food

For the PCE of food, the equations gave good forecasts when the exogenous variables were entered into the model with the actual values. We can observe from the graphs shown below that the movements of all three graphs have the same patterns as we saw in the graphs from the PCE of nondurable goods. This similarity is expected as food PCE accounts for most of nondurable PCE in both nominal value and real value. In 2005 and 2006, BEA estimated the food-consumption contribution to percent change in real PCE of Nondurables at around 60 percent.







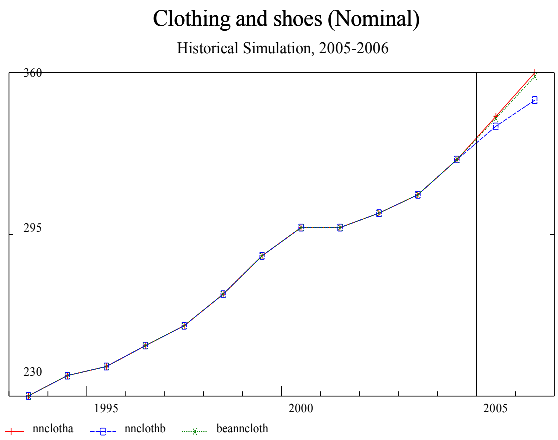
In nominal value, the first simulation produced very good forecast of the food PCE with errors of 0.19 percent in 2005 and 0.87 percent in 2006. On the other hand, the second simulation did not fare as well as the first simulation. The second simulation numbers were lower than the published numbers by 1.48 percent and 3.24 percent in 2005 and 2006, respectively.

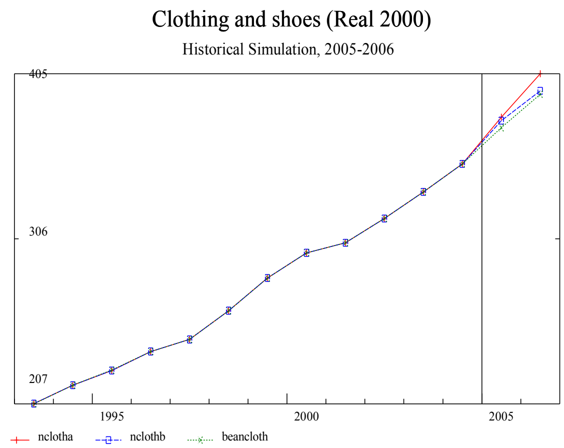
Meanwhile, the price equations produced excellent forecasts with both simulations. Both simulations missed the published price index of the food PCE by less than 0.2 percent in both 2005 and 2006. This should not be a surprise as the price index has been increasing quite steadily overtime with very little volatility.

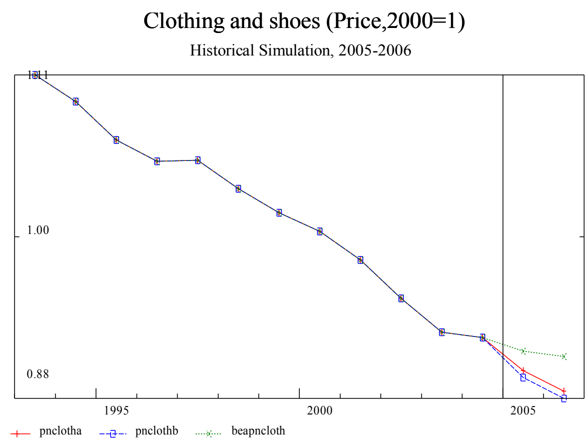
The estimated chained 2000 real food PCEs reflected the accuracy of the nominal and the price equations. For the real food PCE, the first simulation produced errors of 0.28 percent in 2005 and 1.04 percent in 2006 while the second simulation gave errors of -1.49 percent and -3.24 percent in 2005 and 2006, respectively.

Clothing and shoes

The equations' performance from the historical simulation with actual exogenous variables is very good in nominal forecast of the PCE of clothing and shoes. In 2005, the first simulation estimated the nominal PCE of clothing and shoes of 342.46 billion dollars which is higher than the published number by 0.19 percent. The error became 0.46 percent in 2006. In 2005, the second simulation estimated the nominal PCE of clothing and shoes of 338.57 billion dollars or an underestimation of 0.95 percent. In 2006, the error from the second simulation grew larger to -2.64 percent.







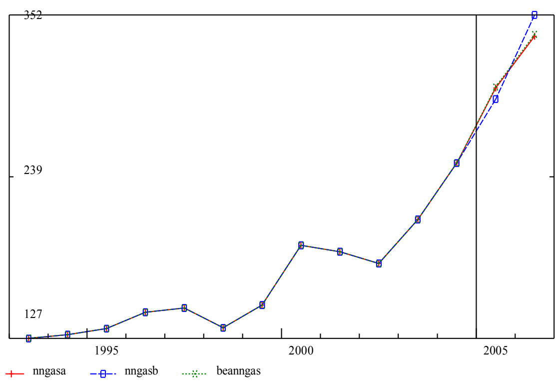
On the real side, both historical simulations overestimated the chained 2000 real PCE of clothing and shoes. The first simulation gave estimates that higher than the published real PCE of clothing and shoes by 1.68 percent in 2005 and 3.15 percent in 2006. The second simulation produced numbers that higher than the published values by 1.07 percent and 0.53 percent in 2005 and 2006, respectively. In the graph above, we observe that the second simulation performed better than the first simulation in 2006.

The relatively better performance of the second simulation came from the relative performance between the two simulations in forecasting the price index of the PCE of clothing and shoes in 2005 and 2006. For price index, the second simulation gave additional error of around 0.5 percent more than the first simulation. The first simulation missed the published price index by -1.47 percent in 2005 and -2.61 percent in 2006. The second simulation missed the published price index by -1.99 percent and -3.15 percent in 2005 and 2006, respectively.

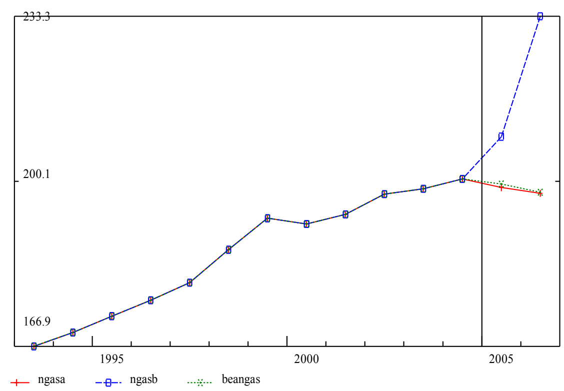
Gasoline, fuel oil, and other energy goods

Since 2003, price of gasoline and energy has been rising steadily. This recent trend affects performance of our equation significantly, especially in the price equations, which affect the real value.

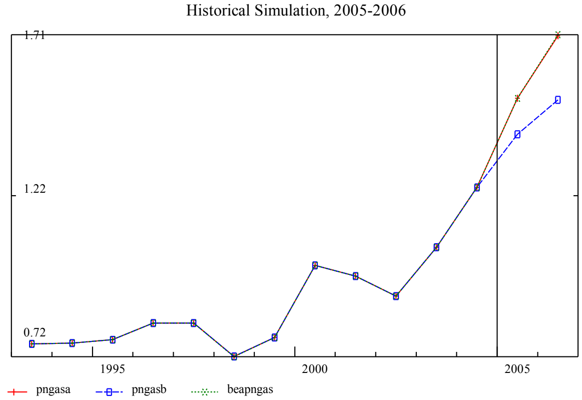
Gasoline, fuel oil, and other energy goods (Nominal)
Historical Simulation, 2005-2006



Gasoline, fuel oil, and other energy goods (Real 2000)
Historical Simulation, 2005-2006



Gasoline, fuel oil, and other energy goods (Price,2000=1)
Historical Simulation, 2005-2006

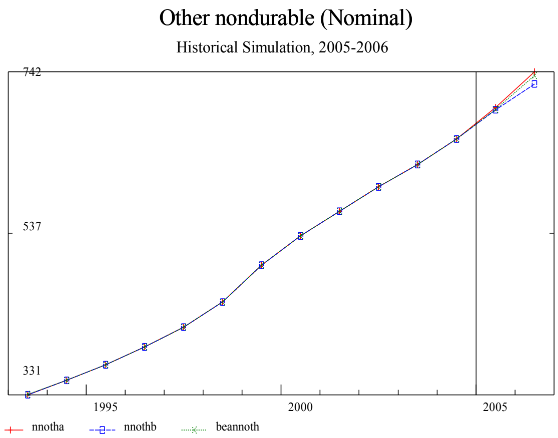


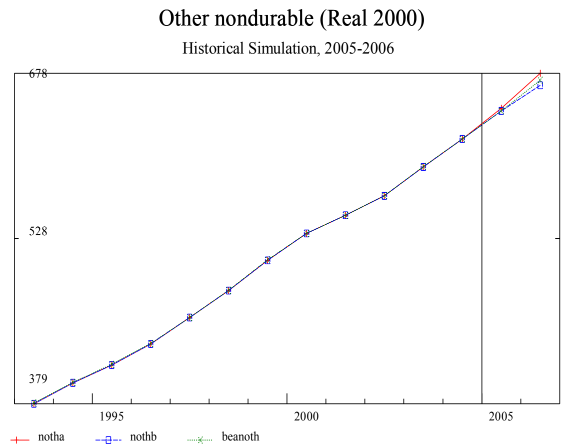
The nominal forecasts show decent performance considering the shift in the price movement. Both simulations predicted that the nominal PCE of gasoline, fuel oil, and other energy goods to keep rising, however, at a rate slightly slower than the published data. The first simulation missed the published nominal values by -0.32 percent in 2005 and -0.36 percent in 2006. The second simulation also underestimated the nominal consumption by 2.89 percent and 4.05 percent in 2005 and 2006, respectively.

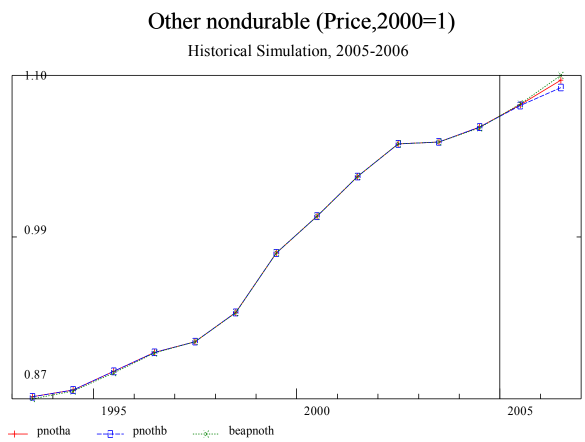
The second simulation estimated the increasing in price index of the gasoline, fuel oil, and other energy goods but not as fast as the actual growth rate. In fact, the second simulation missed it by a pretty wide margin. In 2005, the first simulation estimated the price index of 151.5 while the second simulation estimated the same price index of 140.4. The second simulation underestimated the price index by 7.31 percent in 2005. This means that, by themselves, the price equations are very accurate when we have better input information.

The poor performance of the second simulation in predicting the price index affected the forecasting performance of the chained 2000 real value, especially the 2006 forecast. In 2005, the errors were -0.38 percent with the first simulation and 4.76 percent with the second simulation. However, in 2006, the errors are -0.11 percent and 17.91 percent with the first simulation and the second simulation, respectively.

Other nondurable goods







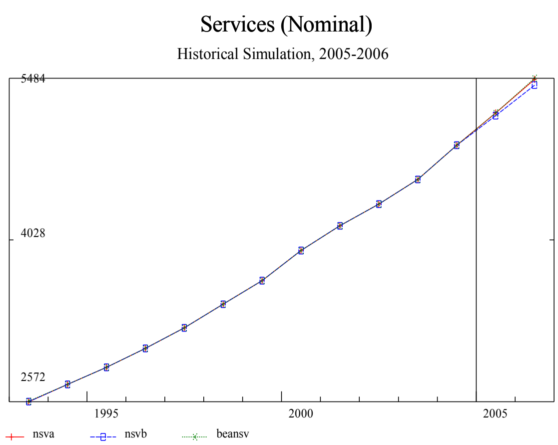
Both simulations performed very well in forecasting the PCE of other nondurable goods in all three components; *i.e.* nominal value, real value, and price index. The published nominal PCE of other nondurable goods were 693.96 billion dollars in 2005 and 737.09 billion dollars in 2006. Both simulations provide estimates that have around one percent errors in both 2005 and 2006.

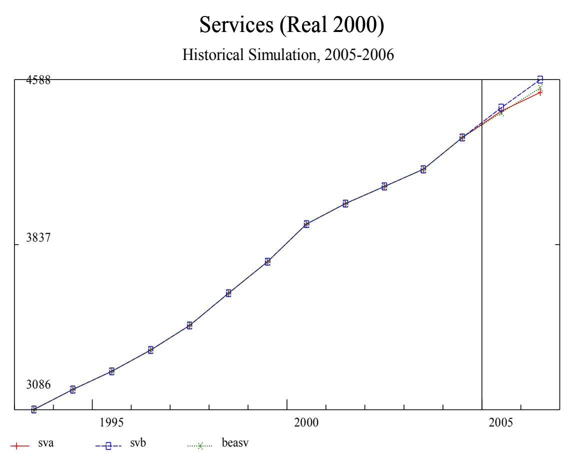
The first simulation overestimated the real PCE of other nondurables by 0.35 percent in 2005 and 1.0 percent in 2006 while the second simulation missed the published real numbers by less than 0.00 percent and -0.67 percent in 2005 and 2006, respectively.

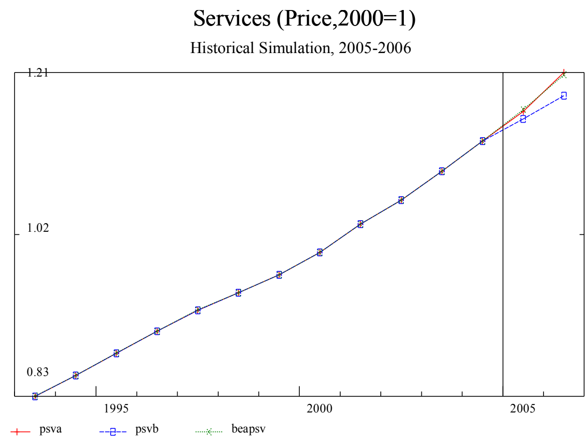
The published price indexes of the PCE of other nondurable goods were 107.77 in 2005 and 109.78 in 2006 [2000=100]. Both simulations underestimated the price index by less than 0.8 percent in both 2005 and 2006. The first simulation perform slightly better than the second simulation in forecasting the price index, *i.e.* the first simulation missed the published number by 0.32 percent, in 2006, compared to 0.79 percent by the second simulation.

Services

Overall, our equations perform very well in forecasting the PCE of services. This excellent performance was due to the good performance in forecasting the three main contributors to the PCE of services: Housing, Medical services, and Other services. This result helped the performance of the equations in producing a good estimate of the total PCE, as discussed earlier, because PCE of services has become the main component of the U.S. PCE. BEA reported that PCE of services contributed to around 50 percent of the real growth rate of the total PCE in 2005 and 2006.







The historical simulation with actual exogenous inputs underestimated the nominal PCE of services by only 0.03 percent in 2005 and 0.22 percent in 2006. The historical simulation with QUEST misses the nominal PCE of services by -0.45 percent and -1.17 percent in 2005 and 2006, respectively.

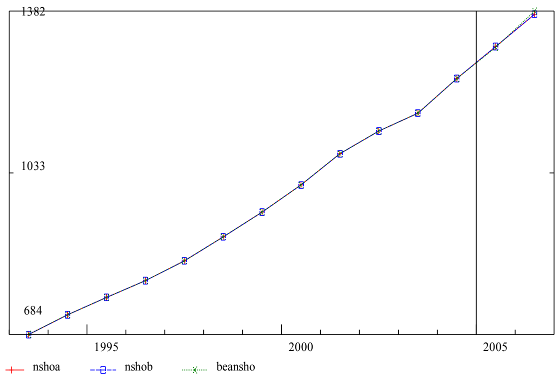
For the price index, both simulations underestimated the chained 2000 price index of the PCE of services by less than one percent in 2005. The first simulation missed the published figures by -0.17 percent in 2005 and 0.25 percent in 2006. The second simulation provided estimates with errors of -0.95 percent in 2005 and -1.99 percent in 2006.

Housing

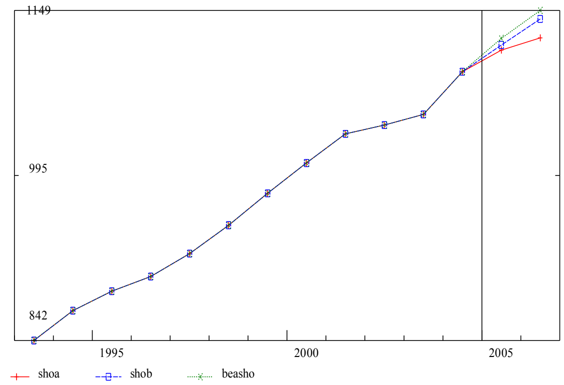
PCE of housing is a special aggregate. In this study, this aggregate does not have any sub-category by the definition of PCE, See Appendix 3.2. This means that the nominal value and the price index of this category are estimated by only two equations; one for the nominal value and one for the price index.

As shown below, the equations provided excellent estimates for nominal value of the PCE of housing in both simulations. As stated earlier, this excellent forecast resulted in the better performance at the more aggregate level as PCE of housing contribution to the real growth of the PCE of services were around 25 percent in 2005 and 2006. In fact, it was the second biggest contributor in 2005 and the third biggest contributor in 2006.

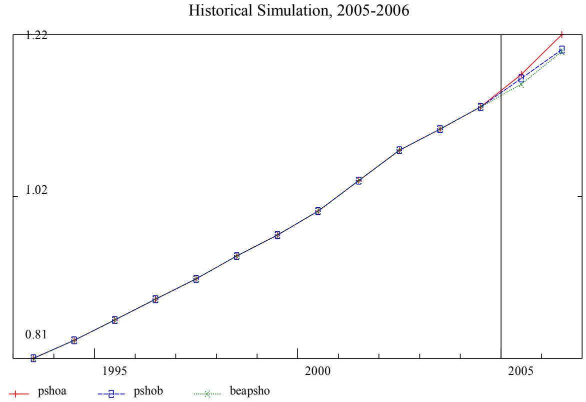
Housing (Nominal)
Historical Simulation, 2005-2006



Housing (Real 2000)
Historical Simulation, 2005-2006



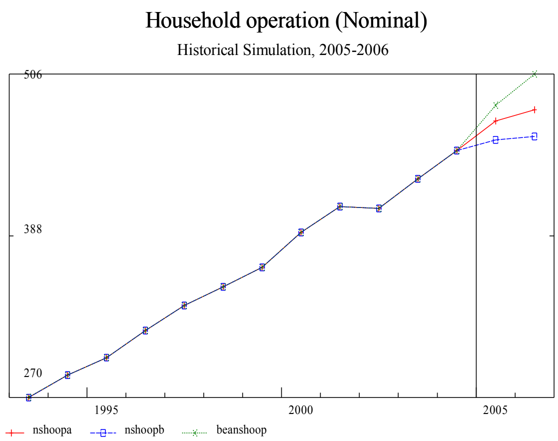
Housing (Price,2000=1)
Historical Simulation, 2005-2006

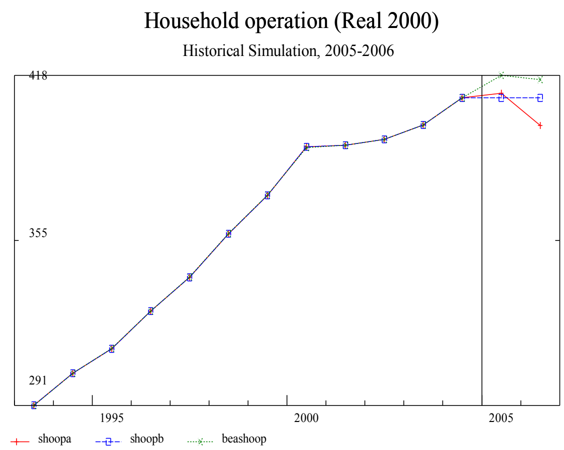


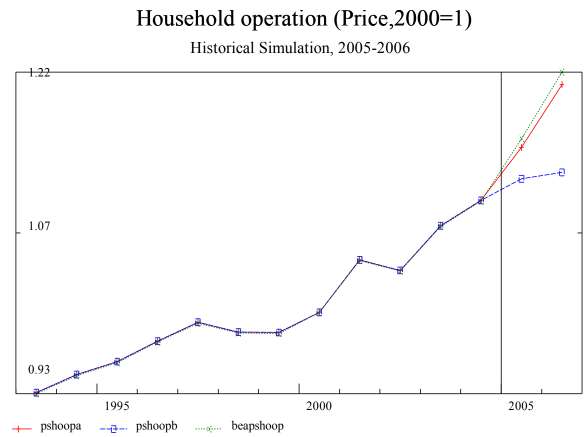
The first simulation missed the nominal PCE of housing by 0.08 percent and -0.5 percent in 2005 and 2006, respectively. It underestimated the chained 2000 real PCE of housing by 0.98 percent in 2005 and 2.26 percent in 2006. On the chained 2000 price index, the first simulation missed the published numbers by 1.08 percent and -1.8 percent in 2005 and 2006, respectively.

The second simulation missed the nominal PCE of housing by 0.08 percent and -0.50 percent in 2005 and 2006, respectively. The real 2000 estimates of the second simulation also underestimated the published chained 2000 real PCE of housing by 0.56 percent in 2005 and 0.71 percent in 2006. The second simulation also gave small errors of 0.64 percent in 2005 and 0.21percent in 2006 when estimating the chained 2000 price index of PCE of housing.

Household Operation







The first simulation underestimated the nominal PCE of household operation by 2.39 percent in 2005 and 5.19 percent in 2006. The second simulation also underestimated the nominal PCE by 5.22 percent and 9.03 percent in 2005 and 2006, respectively.

The first simulation underestimated the chained 2000 price index of PCE of household operation by 0.67 percent in 2005 and 0.94 percent in 2006. The estimates of the price index form the second simulation were lower than the published data by 3.12 percent and 7.41 percent in 2005 and 2006, respectively.

Things look better on the real side, at least with the historical simulation with actual exogenous variables. The first simulation gave the real 2000 PCE of household operation with error of -1.66 percent and -4.21 percent in 2005 and 2006, respectively. On the other hand, the second simulation underestimated the real 2000 PCE of household operation by 2.1 percent in 2005 and 1.67 percent in 2006.

PCE of household operation is the only component of services PCE that our equations did not provide relatively good results, though the actual numbers were not as bad as the above graphs suggested. I believe that the increasing energy price contributes greatly to this result. PCE of electricity and gas contributed around 40 percent of nominal PCE of household operation in 2005 and 2006. The PCE of electricity and gas also contributed more than 50 percent to the real growth rate of PCE of household operation. The rapidly increasing energy price since 2003 means that, by 2005, the utility companies started transfer the increasing cost to the consumer as the price of PCE of electricity and gas increasing sharply in 2005 and 2006. As seen in the previous aggregates, our equations seem to have trouble in providing a good estimate when there is a sudden shift in energy cost and energy price affected the consumption behavior on that category.

However, as the PCE of household operation contributes less than ten percent to the real growth rate of PCE of services. This result had little effect to the performance of our equations in estimating the PCE of services.

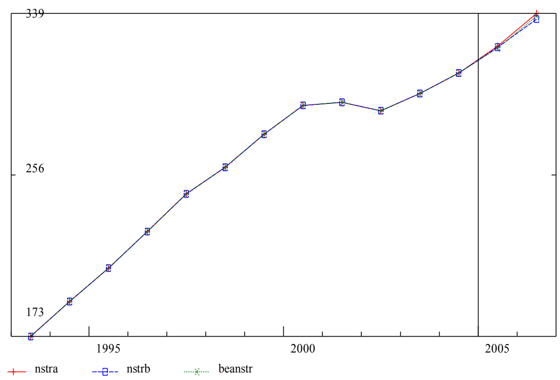
Transportation

Both historical simulations accurately estimated nominal PCE of transportation in 2005 and 2006. In fact, both simulations missed the published nominal values by less than 0.5 percent in both 2005 and 2006.

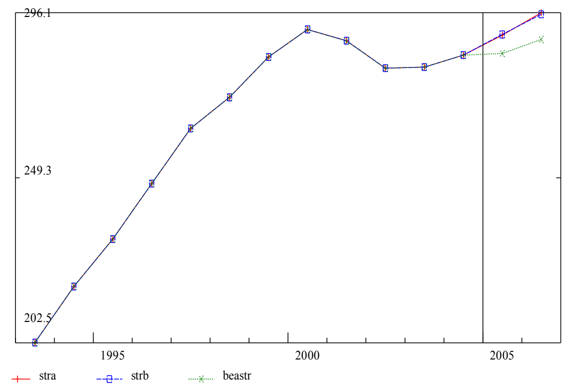
The price equations did not fare as well as the nominal equations in estimating the price index of the PCE of transportation. As discussed in the PCE of household transportation, the rising energy price, especially the crude oil price, since 2003 is likely the main reason for these results as both simulations underestimated the price index in

2005 and 2006. The first simulation underestimated the price index by 1.41 percent in 2005 and 2.16 percent in 2006 while the second simulation underestimated the price index by 1.67 percent in 2005 and 2.87 percent in 2006.

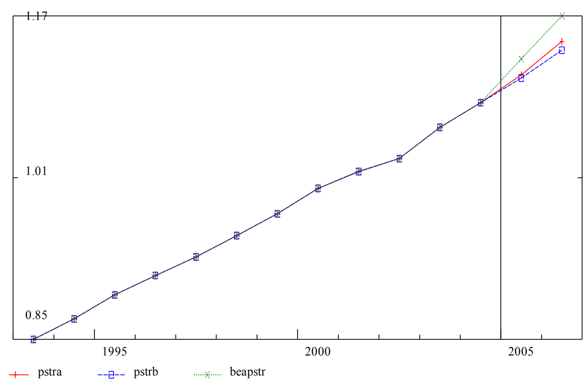
Transportation (Nominal)
Historical Simulation, 2005-2006



Transportation (Real 2000)
Historical Simulation, 2005-2006



Transportation (Price,2000=1)
Historical Simulation, 2005-2006

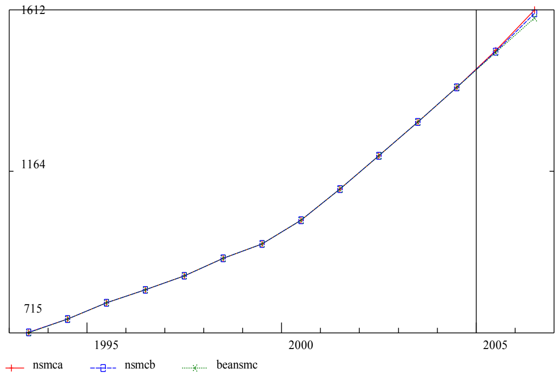


As a consequence of underestimating the price index of PCE of transportation, both simulations overestimated the chained 2000 real PCE of transportation in 2005 and 2006. The first simulation missed the published real numbers by 1.81 percent and 2.65 percent in 2005 and 2006, respectively. The second simulation also overestimated the real transportation PCE by 1.89 percent in 2005 and 2.49 percent in 2006.

Medical Care

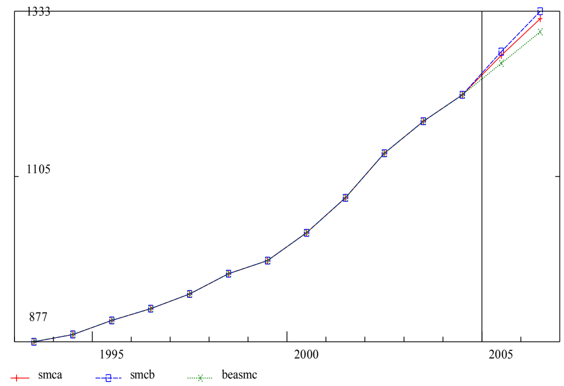
Medical care (Nominal)

Historical Simulation, 2005-2006



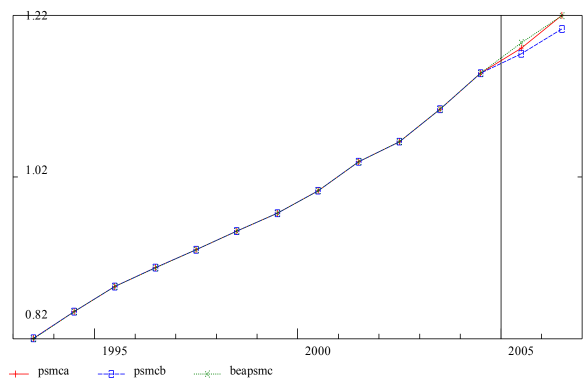
Medical care (Real 2000)

Historical Simulation, 2005-2006



Medical care (Price,2000=1)

Historical Simulation, 2005-2006



In the last 3 decades, medical care has been one of the main contributors to the growth of the services PCE. The good performance of both simulations, shown in the above graphs, helps in providing the good estimates of the PCE of services.

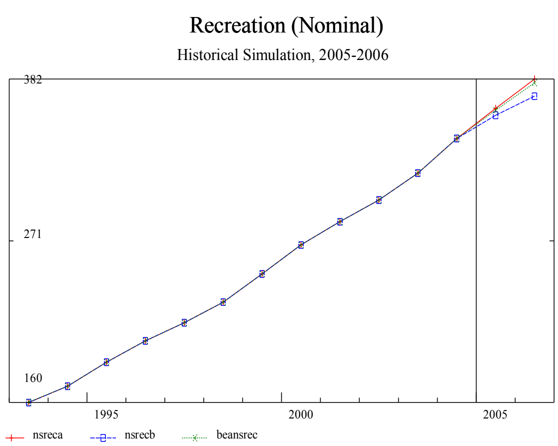
The historical simulation with actual exogenous variables overestimated the nominal medical care PCE by 0.31 percent and 1.44 percent in 2005 and 2006, respectively. The second simulation estimated the nominal PCE of medical care with the error of 0.12 percent in 2005 and 0.78 percent in 2006.

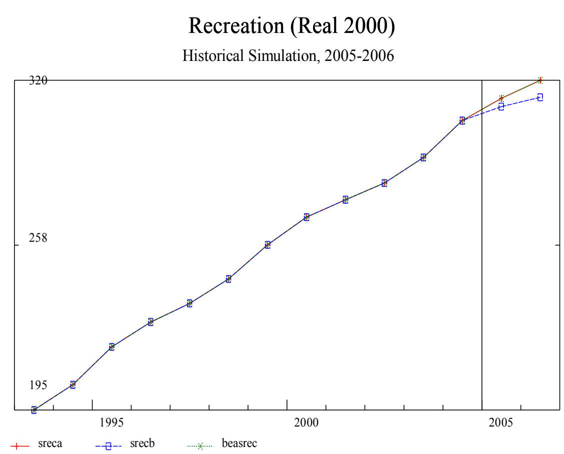
Both simulations provided excellent estimates of the price index of medical care PCE. The first simulation missed the published numbers by -0.55 percent and 0.05 percent in 2005 and 2006, respectively. The second simulation also missed the published medical care PCE by -1.14 percent in 2005 and -1.37 percent in 2006.

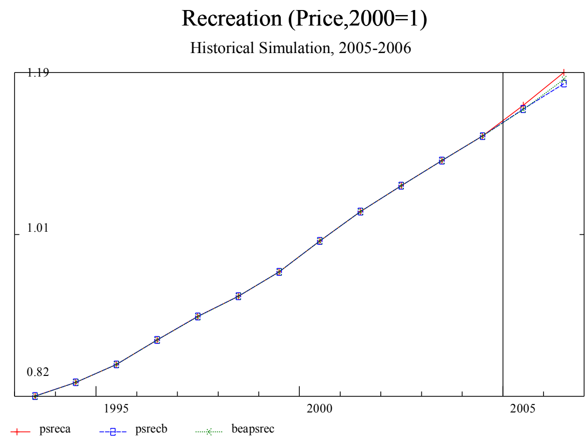
The first simulation overestimated the published numbers by 0.87 percent in 2005 and 1.39 percent in 2006. The second simulation also overestimated the published numbers by 1.28 percent in 2005 and 2.18 percent in 2006.

Recreation

Both simulations performed relatively well in forecasting the PCE of recreation in all three components; *i.e.* nominal value, real value, and price index. Both simulations provide estimates that have around one percent or less error in both 2005 and 2006, except the 2006 second simulation that gave an error of -2.37 percent.







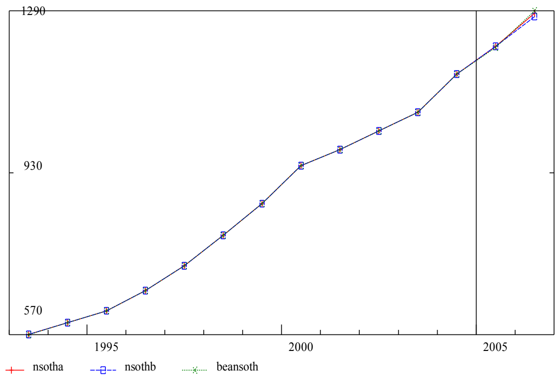
The first simulation underestimated the real PCE of recreation by 0.02 percent in 2005 and overestimated it by 0.07 percent in 2006 while the second simulation missed the published real numbers by -0.98 percent and -1.97 percent in 2005 and 2006, respectively.

The published price indexes of the PCE of recreation were 115.17 in 2005 and 118.64 in 2006 [2000=100]. Both simulations underestimated the price index by less than one percent in both 2005 and 2006. The second simulation performed slightly better than the first simulation in forecasting the price index, *i.e.* the first simulation missed the published number by 0.67 percent, in 2006, compared to -0.41 percent by the second simulation.

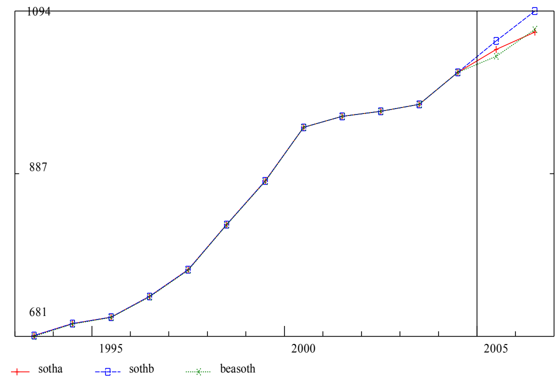
Other services

As shown below, the equations provided excellent estimates for nominal value of the PCE of housing in both simulations. As stated earlier, this excellent forecast resulted in the better performance at the more aggregate level as PCE of other services contribution to the real growth of the PCE of services were around 20 percent in 2005 and 30 percent in 2006. In fact, it was the third biggest contributor to the real growth of services PCE in 2005 and the second biggest contributor in 2006.

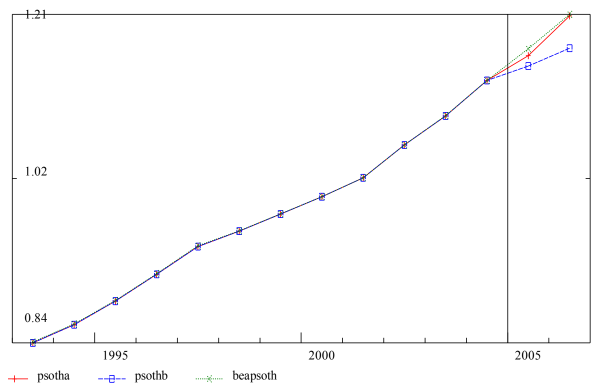
Other Services (Nominal)
Historical Simulation, 2005-2006



Other Services (Real 2000)
Historical Simulation, 2005-2006



Other Services (Price,2000=1)
Historical Simulation, 2005-2006



The first simulation missed the nominal PCE of other services by 0.16 percent and –0.45 percent in 2005 and 2006, respectively. It missed the chained 2000 real PCE of other services by 0.85 percent in 2005 and -0.29 percent in 2006. On the chained 2000 price index, the first simulation missed the published numbers by -0.68 percent and -0.17 percent in 2005 and 2006, respectively.

The second simulation missed the nominal PCE of other services by 0.17 percent and –1.03 percent in 2005 and 2006, respectively. The real 2000 estimates of the second simulation also missed the published chained 2000 real PCE of services by 1.88 percent in 2005 and 2.21 percent in 2006. The second simulation also gave small errors of -1.67 percent in 2005 and -3.17 percent in 2006 when estimating the chained 2000 price index of PCE of other services.

3.6 Short-term forecast of Personal consumption expenditures

In this section, the short-term forecasts of the U.S. Detailed Personal consumption expenditures are estimated using the equations estimated with the approach described earlier in this chapter.

All equations, both nominal PCE and the price indexes, are fitted with data between January 1994 and June 2007. We forecast the detailed PCE from July 2007 to December 2008. The estimation is done at the monthly frequency. Then, the monthly estimated series are annualized and are presented in this discussion. The 116 annualized detailed forecasts, nominal, real and price index, are shown in Appendix 3.4 and Appendix 3.5. The discussion will cover generally at the more aggregate level of PCE which should give a better view of the general consumption.

The values and the plots of the estimated major PCE aggregates are shown in Table 3.8 and Figure 3.2 .

3.6.1 Forecast assumptions

All exogenous variables used in the forecast are generated by QUEST except crude oil price and the Dow Jones Industrial Index. Both the crude oil price and the Dow

Jones Industrial Index reflect the author's expectation of these two indicators. The problem in the sub-prime credit market has been included as an exogenous input (through the interest rate) in the QUEST model. All exogenous variable assumptions are shown in Table 3.7.

Table 3.7: Exogenous variables' assumption between July 2007 and December 2008

	2007					
	Jul	Aug	Sep	Oct	Nov	Dec
cdmv	436.19	438.34	440.59	443.43	445.49	447.28
cdfur	411.57	410.30	409.54	409.91	409.73	409.61
cdoth	221.66	222.45	223.15	223.79	224.34	224.82
cnfood	1336.11	1342.21	1347.94	1353.41	1358.32	1362.77
cncloth	370.13	370.90	371.57	372.02	372.56	373.09
cngas	362.99	358.68	355.11	352.17	350.18	349.03
cnoth	766.57	770.97	775.20	779.31	783.14	786.76
cshous	1468.72	1476.28	1484.12	1493.17	1500.86	1508.12
csho	528.42	531.27	533.95	536.47	538.80	540.94
cstr	358.67	360.49	362.30	364.28	365.93	367.44
csmc	1697.00	1709.08	1720.95	1733.15	1744.16	1754.54
csrec	401.90	403.88	406.06	408.69	411.04	413.38
csoth	1388.97	1398.18	1406.89	1415.37	1422.90	1429.75
gdp	13865.55	13914.79	13965.36	14018.73	14070.79	14123.08
djia	13362.38	13464.63	13592.24	13837.98	13946.58	14010.87
ddj	-46.24	102.26	127.61	245.74	108.60	64.29
crude	65.87	70.19	76.02	89.07	93.63	95.41
oildf	0.80	4.32	5.83	13.05	4.56	1.78
gdpi	1.45	1.45	1.46	1.46	1.47	1.47

	2008											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
cdmv	448.90	450.03	450.78	449.99	450.88	452.26	454.61	456.66	458.88	461.26	463.80	466.50
cdfur	409.70	409.59	409.42	409.10	408.90	408.73	408.59	408.48	408.40	408.36	408.35	408.37
cdoth	225.17	225.52	225.83	225.74	226.22	226.92	228.12	229.05	229.98	230.92	231.86	232.80
cnfood	1366.59	1370.25	1373.58	1375.13	1378.87	1383.36	1389.42	1394.78	1400.27	1405.89	1411.64	1417.52
cncloth	373.73	374.13	374.40	374.10	374.48	375.07	376.13	376.99	377.90	378.84	379.84	380.87
cngas	345.13	348.33	355.07	376.94	382.02	381.93	370.90	364.78	357.81	349.99	341.32	331.80
cnoth	790.06	793.31	796.43	798.60	802.03	805.93	810.78	815.23	819.79	824.44	829.20	834.04
cshous	1515.09	1521.38	1527.15	1530.53	1536.62	1543.55	1552.12	1560.18	1568.51	1577.13	1586.01	1595.17
csho	542.83	544.67	546.38	547.40	549.28	551.47	554.29	556.83	559.43	562.08	564.79	567.55
cstr	368.79	370.02	371.12	371.62	372.79	374.16	375.96	377.60	379.28	381.02	382.80	384.63
csmc	1764.23	1773.39	1781.95	1787.87	1796.79	1806.66	1818.33	1829.45	1840.89	1852.63	1864.69	1877.05
csrec	415.85	418.06	420.16	421.69	423.90	426.33	429.19	431.93	434.75	437.64	440.60	443.64
csoth	1435.31	1441.22	1446.89	1450.81	1457.12	1464.30	1473.46	1481.58	1489.75	1497.98	1506.27	1514.61
gdp	14175.56	14228.21	14281.08	14332.56	14386.98	14442.81	14502.08	14559.09	14615.96	14672.63	14729.14	14785.46
djia	13980.67	13994.00	14000.66	13991.78	13991.77	13991.78	13991.78	13991.77	13991.78	13991.78	13991.78	13991.77
ddj	-30.20	13.32	6.66	-8.88	-0.02	0.02	0.00	-0.02	0.02	-0.01	0.00	-0.01
crude	90.49	89.66	89.00	89.02	88.30	87.35	84.86	84.47	84.86	86.02	87.96	90.68
oildf	-4.92	-0.83	-0.66	0.02	-0.72	-0.94	-2.49	-0.39	0.39	1.16	1.94	2.71
gdpi	1.48	1.49	1.49	1.50	1.50	1.51	1.51	1.52	1.53	1.53	1.54	1.54

3.6.2 Outlook with plots and aggregates (annual series)

In 2007, the U.S. Economy has experienced rising energy costs which could impact personal consumption expenditures. Total PCE has been increasing with a real growth rate of more than three percent since 2004. This real growth rate is expected to fall to 2.45 percent and 1.65 percent in 2007 and 2008, respectively. Table 3.9 shows the growth rate of the major PCE aggregates. This slower growth in real PCE compared to the nominal PCE is easily seen from the growth rate of the price index. Since 2004, the price index of total PCE is growing at an average rate of 2.5% to 3.0% while it had been growing at around two percent before 2004. In 2007 and 2008, the forecasted price indexes are 1.18 and 1.22, respectively. This means that the price index grows by 3.01% and 3.32% in 2007 and 2008, respectively. We can see that the increasing energy price affects the real consumption as its cut into the disposable income that consumers have left for other purchases (besides Gas and Utilities).

Table 3.8: Major aggregates of annual PCE Forecast 2007 and 2008

		1995	2000	2005	2006	2007	2008
Forecast 2007 and 2008 Nominal							
apce	Personal consumption expenditures	4975.788	6739.376	8707.818	9224.508	9724.809	10223.716
md	Durable goods	611.600	863.325	1023.879	1048.921	1077.681	1104.922
dmv	Motor vehicles and parts	266.690	386.518	444.932	434.203	444.884	465.527
dfur	Furniture and household equipment	228.626	312.907	378.225	404.125	412.966	412.282
doth	Other durable	116.285	163.901	200.722	210.593	219.831	227.113
nd	Nondurable goods	1485.065	1947.216	2516.179	2688.034	2826.917	2951.951
nfood	Food	740.851	925.164	1183.824	1259.279	1336.284	1398.740
ncloth	Clothing and shoes	241.722	297.712	341.747	357.232	370.966	377.217
ngas	Gasoline, fuel oil, and other energy goods	133.287	191.482	301.832	340.135	351.300	358.961
noth	Other nondurable	369.205	532.858	688.776	731.388	768.367	817.034
sv	Services	2879.123	3928.836	5167.760	5487.552	5820.209	6166.842
sho	Housing	764.386	1006.456	1298.688	1381.341	1465.163	1547.478
shoop	Household operation	298.746	390.110	481.019	501.616	523.591	538.327
str	Transportation	207.673	291.253	324.242	340.598	356.855	372.245
smc	Medical care	797.852	1026.813	1492.622	1587.734	1691.609	1809.859
srec	Recreation	187.921	268.265	358.811	380.985	402.980	429.763
soth	Other Services	622.546	945.940	1212.379	1295.279	1380.012	1469.170
Forecast 2007 and 2008 Price, [2000=1]							
apce	Personal consumption expenditures	0.92	1.00	1.12	1.15	1.18	1.22
md	Durable goods	1.11	1.00	0.90	0.89	0.87	0.85
dmv	Motor vehicles and parts	0.98	1.00	0.99	0.99	0.99	0.99
dfur	Furniture and household equipment	1.32	1.00	0.77	0.73	0.70	0.66
doth	Other durable	1.05	1.00	0.98	0.98	1.00	1.00
nd	Nondurable goods	0.91	1.00	1.12	1.15	1.20	1.25
nfood	Food	0.90	1.00	1.13	1.15	1.19	1.23
ncloth	Clothing and shoes	1.06	1.00	0.92	0.91	0.90	0.91
ngas	Gasoline, fuel oil, and other energy goods	0.77	1.00	1.51	1.71	2.07	2.57
noth	Other nondurable	0.89	1.00	1.08	1.10	1.11	1.12
sv	Services	0.88	1.00	1.17	1.21	1.25	1.30
sho	Housing	0.86	1.00	1.16	1.20	1.25	1.29
shoop	Household operation	0.96	1.00	1.16	1.22	1.26	1.33
str	Transportation	0.90	1.00	1.13	1.17	1.19	1.23
smc	Medical care	0.88	1.00	1.19	1.22	1.27	1.31
srec	Recreation	0.86	1.00	1.15	1.19	1.21	1.25
soth	Other Services	0.88	1.00	1.17	1.21	1.25	1.31
Forecast 2007 and 2008 Real 2000							
apce	Personal consumption expenditures	5432.392	6739.265	7803.607	8043.521	8240.232	8376.342
md	Durable goods	551.933	863.331	1137.756	1180.891	1235.720	1295.207
dmv	Motor vehicles and parts	272.249	386.520	451.253	437.305	451.409	469.216
dfur	Furniture and household equipment	172.787	312.915	492.589	551.358	589.716	629.163
doth	Other durable	111.182	163.897	205.522	213.903	220.779	227.734
nd	Nondurable goods	1638.130	1947.129	2255.337	2336.950	2365.485	2358.433
nfood	Food	827.063	925.154	1049.892	1091.715	1119.176	1139.516
ncloth	Clothing and shoes	227.387	297.727	372.630	391.111	410.166	416.218
ngas	Gasoline, fuel oil, and other energy goods	172.956	191.465	199.400	198.552	174.543	139.757
noth	Other nondurable	413.699	532.784	638.806	665.647	692.157	729.557
sv	Services	3260.278	3928.805	4427.085	4545.299	4665.241	4760.254
sho	Housing	887.505	1006.385	1118.238	1148.264	1174.386	1202.516
shoop	Household operation	312.829	390.134	416.449	412.862	416.740	404.911
str	Transportation	231.763	291.260	287.804	291.197	299.083	302.942
smc	Medical care	906.384	1026.744	1258.130	1300.267	1337.132	1380.720
srec	Recreation	219.152	268.238	311.551	321.267	333.644	344.179
soth	Other Services	704.919	946.043	1033.674	1069.875	1102.748	1123.635

The forecast shows a decrease in spending in real nondurable goods consumption in 2008. Analysing the component of nondurables goods shows that this decrease in nondurable goods real consumption is largely a result of the rapid decline in real consumption of Gasoline, fuel oil, and other energy goods.

The real consumption of Gasoline, fuel oil, and other energy goods has a growth rate of -12.09% in 2007 and -19.93%in 2008. Typically, the growth rate of the nominal PCE of Gasoline, fuel oil, and other energy goods is very close to the growth rate of its price index. The reason is that this product categories is largely a necessary goods. The price elasticity of this category is very inelastic. The forecast of nominal PCE of Gasoline, fuel oil, and other energy goods also has a positive growth rate (2.18% in 2008) that is much slower than the growth rate of its price index (24.35% in 2008). This discrepancy between the growth rate of nominal PCE and its price index is out of line according to the recent trend. This finding may show a flaw in a set of equations that estimate the nominal PCE of products in this category. These equations do not take the rising price into account and they should be adjusted in the next update of the model.

Table 3.9: Growth rates of U.S. PCE 2000 - 2008

		2000	2001	2002	2003	2004	2005	2006	2007	2008
Forecast 2007 and 2008 Nominal										
apce	Personal consumption expenditures	7.27%	4.68%	4.19%	4.80%	6.39%	6.25%	5.93%	5.42%	5.13%
md	Durable goods	5.59%	2.36%	4.55%	2.03%	4.37%	4.07%	2.45%	2.74%	2.53%
dmv	Motor vehicles and parts	4.24%	5.53%	5.24%	0.57%	1.19%	1.85%	-2.41%	2.46%	4.64%
dfur	Furniture and household equipment	6.48%	-0.26%	3.53%	2.60%	7.30%	6.33%	6.85%	2.19%	-0.17%
doth	Other durable	7.14%	-0.11%	4.80%	4.58%	6.60%	4.93%	4.92%	4.39%	3.31%
nd	Nondurable goods	7.89%	3.59%	3.10%	5.32%	7.01%	7.36%	6.83%	5.17%	4.42%
nfood	Food	5.96%	4.62%	3.51%	4.40%	6.42%	6.35%	6.37%	6.12%	4.67%
ncloth	Clothing and shoes	3.98%	0.00%	1.95%	2.45%	4.52%	5.16%	4.53%	3.84%	1.69%
ngas	Gasoline, fuel oil, and other energy	27.84%	-2.31%	-4.43%	17.25%	19.12%	20.88%	12.69%	3.28%	2.18%
noth	Other nondurable	7.52%	5.92%	5.50%	4.74%	5.17%	5.01%	6.19%	5.06%	6.33%
sv	Services	7.34%	5.74%	4.64%	5.14%	6.51%	6.15%	6.19%	6.06%	5.96%
sho	Housing	6.12%	6.68%	4.60%	3.45%	5.59%	5.86%	6.36%	6.07%	5.62%
shoop	Household operation	6.94%	4.85%	-0.33%	5.32%	4.56%	7.14%	4.28%	4.38%	2.81%
str	Transportation	5.37%	0.54%	-1.51%	3.08%	3.66%	5.21%	5.04%	4.77%	4.31%
smc	Medical care	6.83%	8.47%	8.29%	7.82%	7.30%	6.96%	6.37%	6.54%	6.99%
srec	Recreation	7.91%	5.92%	5.25%	6.24%	7.59%	4.97%	6.18%	5.77%	6.65%
soth	Other Services	9.90%	3.68%	4.28%	4.04%	7.81%	5.69%	6.84%	6.54%	6.46%
Forecast 2007 and 2008 Price, [2000=1]										
apce	Personal consumption expenditures	2.48%	2.10%	1.42%	1.99%	2.65%	2.95%	2.77%	3.01%	3.32%
md	Durable goods	-1.63%	-1.87%	-2.42%	-3.54%	-1.83%	-0.74%	-1.30%	-1.81%	-2.17%
dmv	Motor vehicles and parts	0.44%	0.51%	-0.44%	-2.40%	-0.78%	1.75%	0.71%	-0.74%	0.67%
dfur	Furniture and household equipment	-4.53%	-5.90%	-5.79%	-6.01%	-4.16%	-3.84%	-4.56%	-4.45%	-6.40%
doth	Other durable	-0.84%	0.32%	-0.79%	-1.62%	0.12%	-0.39%	0.81%	1.13%	0.16%
nd	Nondurable goods	3.97%	1.53%	0.56%	2.02%	3.35%	3.66%	3.08%	4.26%	4.39%
nfood	Food	2.34%	2.94%	1.95%	1.95%	3.08%	2.23%	2.30%	3.51%	2.80%
ncloth	Clothing and shoes	-1.27%	-1.99%	-2.70%	-2.46%	-0.39%	-1.02%	-0.42%	-0.97%	0.20%
ngas	Gasoline, fuel oil, and other energy	28.63%	-3.27%	-6.39%	16.60%	17.57%	22.05%	13.03%	20.71%	24.35%
noth	Other nondurable	2.61%	2.76%	2.20%	0.12%	0.96%	1.57%	1.91%	1.04%	0.87%
sv	Services	2.67%	3.26%	2.68%	3.17%	3.24%	3.36%	3.43%	3.34%	3.84%
sho	Housing	3.18%	3.87%	3.76%	2.48%	2.49%	2.59%	3.58%	3.71%	3.15%
shoop	Household operation	1.83%	4.69%	-0.90%	3.88%	2.04%	5.12%	5.21%	3.40%	5.81%
str	Transportation	2.53%	1.64%	1.27%	2.93%	2.23%	4.02%	3.82%	2.01%	2.98%
smc	Medical care	2.90%	3.59%	2.44%	3.79%	4.15%	3.42%	2.93%	3.60%	3.61%
srec	Recreation	3.71%	3.36%	2.89%	2.72%	2.58%	2.76%	2.97%	1.85%	3.38%
soth	Other Services	1.99%	2.12%	3.61%	3.11%	3.93%	3.44%	3.22%	3.38%	4.48%
Forecast 2007 and 2008 Real 2000										
apce	Personal consumption expenditures	4.66%	2.54%	2.73%	2.76%	3.64%	3.21%	3.07%	2.45%	1.65%
md	*Durable goods*	*7.31%*	*4.33%*	*7.12%*	*5.81%*	*6.28%*	*4.86%*	*3.79%*	*4.64%*	*4.81%*
dmv	Motor vehicles and parts	3.78%	5.00%	5.70%	3.06%	1.96%	0.10%	-3.09%	3.23%	3.94%
dfur	Furniture and household equipment	11.46%	6.05%	9.82%	9.24%	11.87%	10.60%	11.93%	6.96%	6.69%
doth	Other durable	8.05%	-0.45%	5.64%	6.31%	6.48%	5.33%	4.08%	3.21%	3.15%
nd	*Nondurable goods*	*3.76%*	*2.04%*	*2.53%*	*3.24%*	*3.54%*	*3.58%*	*3.62%*	*1.22%*	*-0.30%*
nfood	Food	3.54%	1.63%	1.53%	2.41%	3.25%	4.01%	3.98%	2.52%	1.82%
ncloth	Clothing and shoes	5.33%	2.03%	4.77%	5.02%	4.92%	6.25%	4.96%	4.87%	1.48%
ngas	Gasoline, fuel oil, and other energy	-0.63%	1.13%	1.95%	0.58%	1.32%	-0.88%	-0.43%	-12.09%	-19.93%
noth	Other nondurable	4.78%	3.07%	3.26%	4.60%	4.17%	3.39%	4.20%	3.98%	5.40%
sv	*Services*	*4.53%*	*2.40%*	*1.92%*	*1.91%*	*3.16%*	*2.70%*	*2.67%*	*2.64%*	*2.04%*
sho	Housing	2.85%	2.71%	0.82%	0.93%	3.03%	3.18%	2.69%	2.27%	2.40%
shoop	Household operation	4.92%	0.21%	0.58%	1.41%	2.46%	1.93%	-0.86%	0.94%	-2.84%
str	Transportation	2.77%	-1.12%	-2.70%	0.13%	1.41%	1.14%	1.18%	2.71%	1.29%
smc	Medical care	3.82%	4.71%	5.71%	3.89%	3.02%	3.43%	3.35%	2.84%	3.26%
srec	Recreation	4.06%	2.48%	2.29%	3.42%	4.88%	2.15%	3.12%	3.85%	3.16%
soth	Other Services	7.73%	1.51%	0.65%	0.90%	3.73%	2.18%	3.50%	3.07%	1.89%

The other components of nondurable PCE behave as expected. We can see the income effect in the real consumption of food and clothing. The real PCE of food slows down from the real growth rate of 3.98% in 2006 to 2.52% and 1.82% in 2007 and 2008, respectively. The real growth rate of PCE of Clothing and shoes is 4.87% in 2007 and 1.48% in 2008 compared to the real growth rate of 6.25 % in 2005 and 4.96% in 2006.

The forecasted real growth rates of both durable goods and services are not much different from the growth rate in 2005 and 2006. Real PCE of durable goods is predicted to grow by 4.64% in 2007 and 4.81% in 2008. In 2005 and 2006, the growth rate of real PCE of durables was 4.86% and 3.89%, respectively. Real PCE of Services is predicted to grow by 2.64% in 2007 and 2.04% in 2008 compared to the growth rate of 2.70% and 2.67% in 2005 and 2006, respectively.

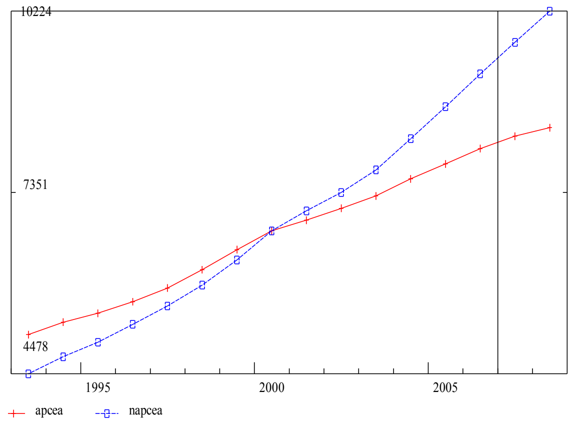
At the more detailed level, we find that the growth in the real PCE of durables is being forecast differently from the trend in the recent years. Since 2004, the real PCE of Furnitures and household equipment was growing at the rapid rate of more than 10 percent each year. The model forecasts the growth rate of real PCE of Furnitures and household equipment at around six percent in 2007 and 2008. Coincidently, 2001, when we had just experienced a brief recession, is the last time we have the growth rate of around 6 percent. On the other hand, the real PCE of Motor vehicles and parts, which grew between 2% and -3 percent between 2004 and 2006, is predicted to grow by 3.23% in 2007 and 3.94% in 2008. This rate of growth is a little lower than the average growth rate of 4.18% between 1994 and 2006 for the real PCE of Motor vehicles and parts. With the computer product as a part of Furnitures and household equipment, it is difficult to analyze the contribution to the real growth rate because of the hedonic price index and the chained index used in calculating the growth rate. However, It is save to say that the model predicts the slower than recent trend in the growth rates for most components of the real PCE of durables.

Forecasts of the growth rates of all the components of real PCE of Services look to be in line with the recent trends.

Figure 3.2: Major aggregates of annual PCE Forecast Plots

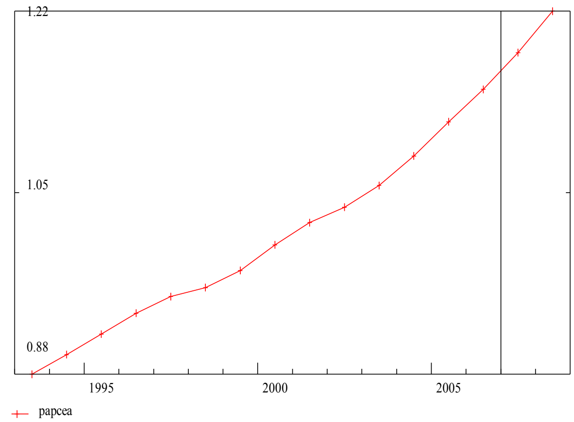
Personal consumption expenditures (Real (2000) and nomina

Forecast, 2007-2008



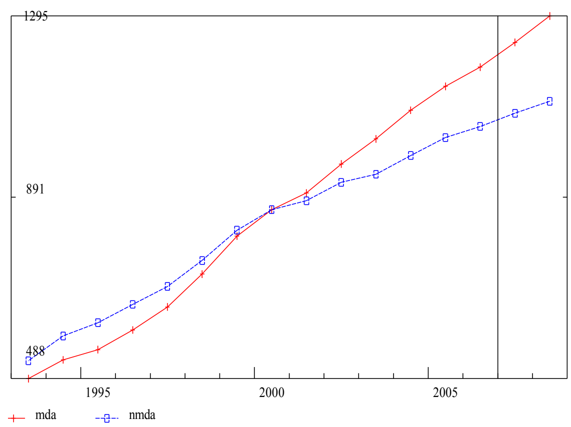
Personal consumption expenditures (price index, 2000=1)

Forecast, 2007-2008



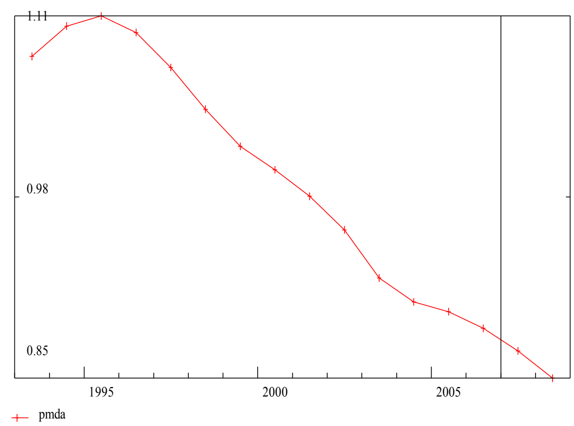
Durable goods (Real (2000) and nominal)

Forecast, 2007-2008



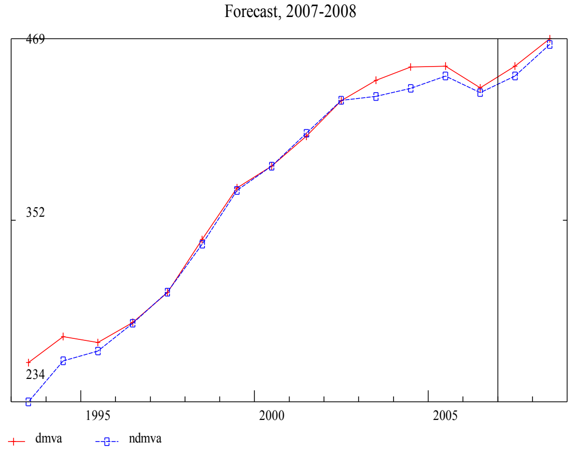
Durable goods (price index, 2000=1)

Forecast, 2007-2008



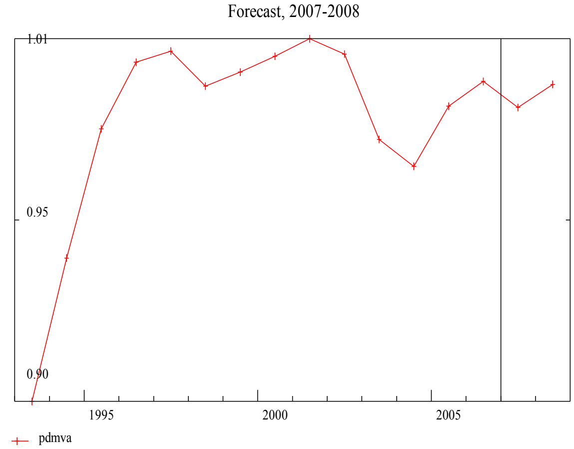
Motor vehicles and parts (Real (2000) and nominal)

Forecast, 2007-2008



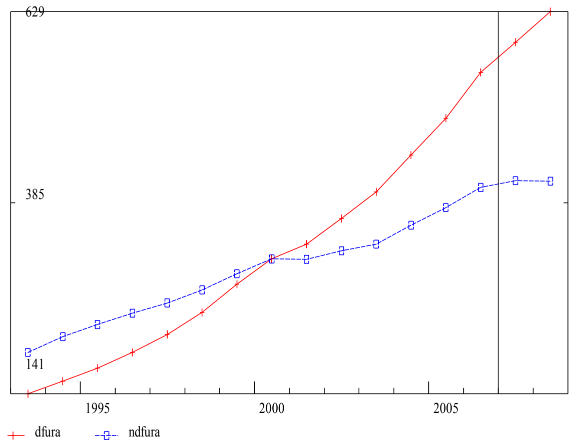
Motor vehicles and parts (price index, 2000=1)

Forecast, 2007-2008



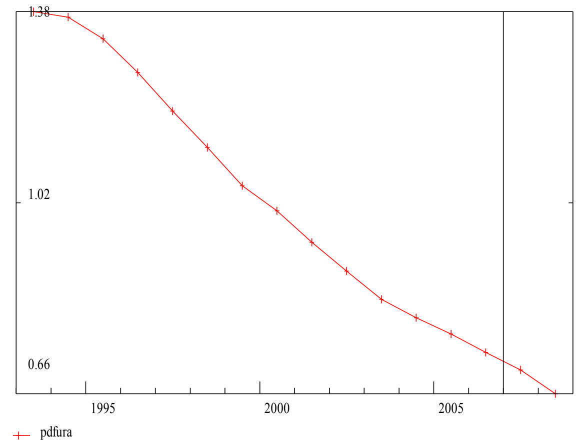
Furniture and household equipment (Real (2000) and nominal

Forecast, 2007-2008



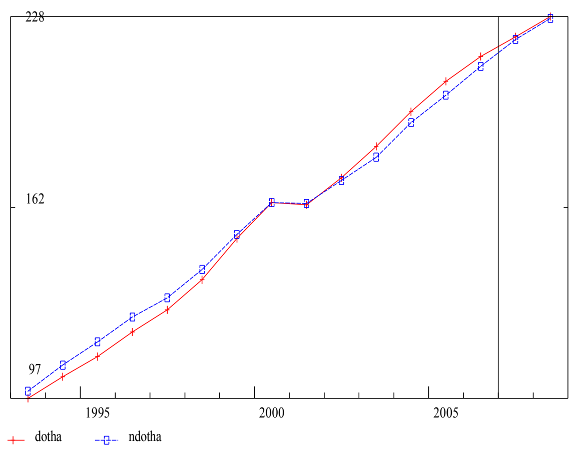
Furniture and household equipment (price index, 2000=1)

Forecast, 2007-2008



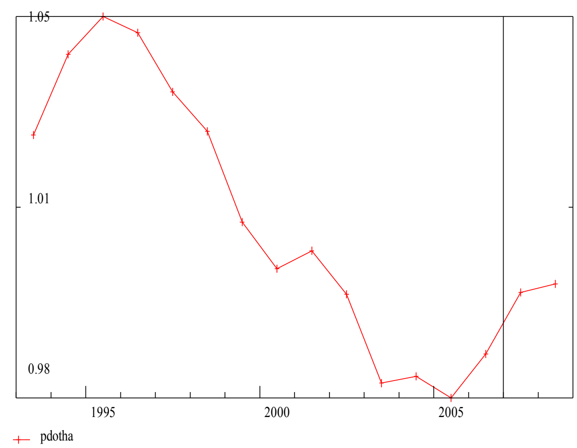
Other durable (Real (2000) and nominal)

Forecast, 2007-2008



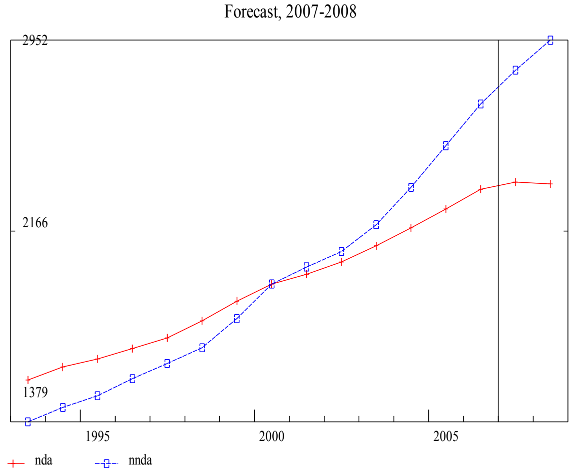
Other durable (price index, 2000=1)

Forecast, 2007-2008



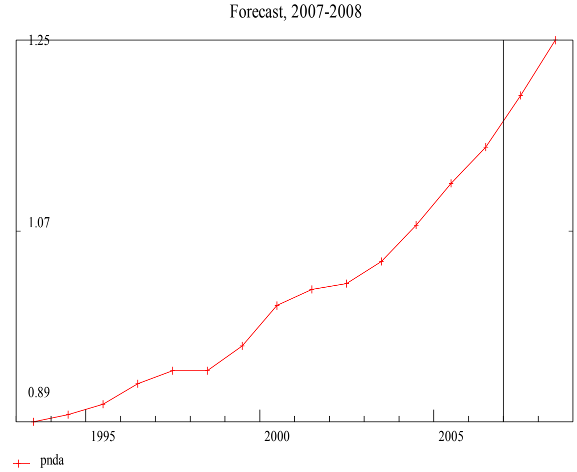
Nondurable goods (Real (2000) and nominal)

Forecast, 2007-2008



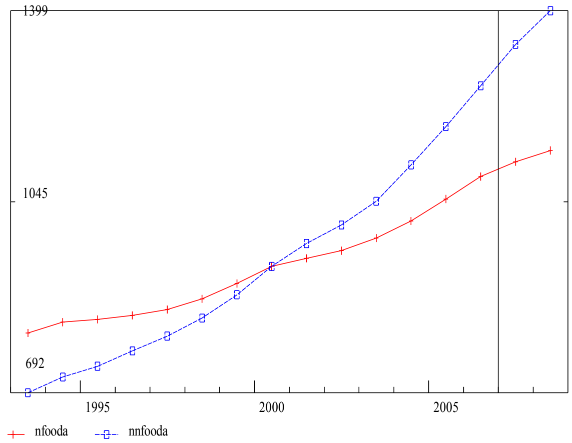
Nondurable goods (price index, 2000=1)

Forecast, 2007-2008



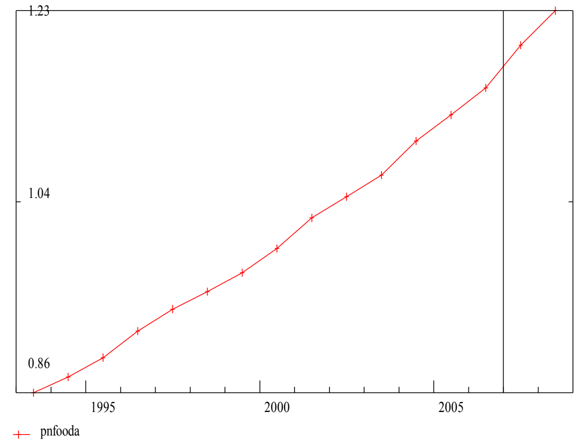
Food (Real (2000) and nominal)

Forecast, 2007-2008



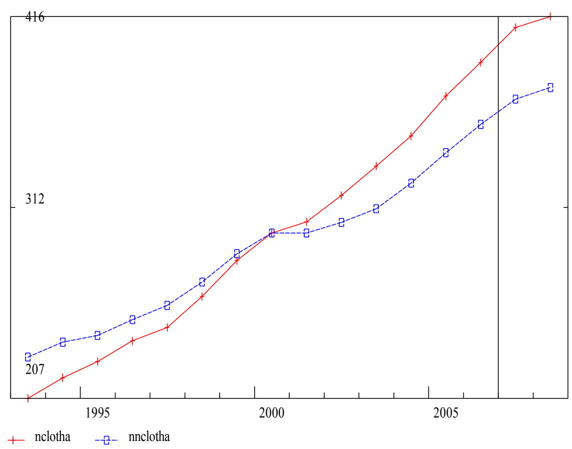
Food (price index, 2000=1)

Forecast, 2007-2008



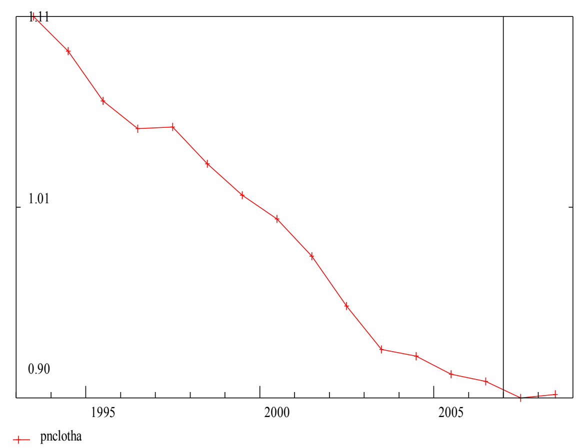
Clothing and shoes (Real (2000) and nominal)

Forecast, 2007-2008



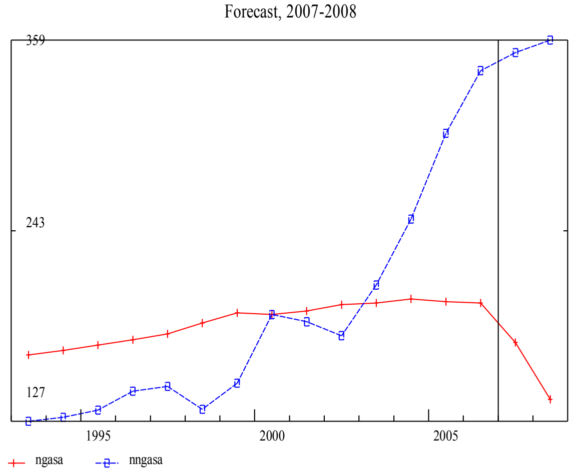
Clothing and shoes (price index, 2000=1)

Forecast, 2007-2008



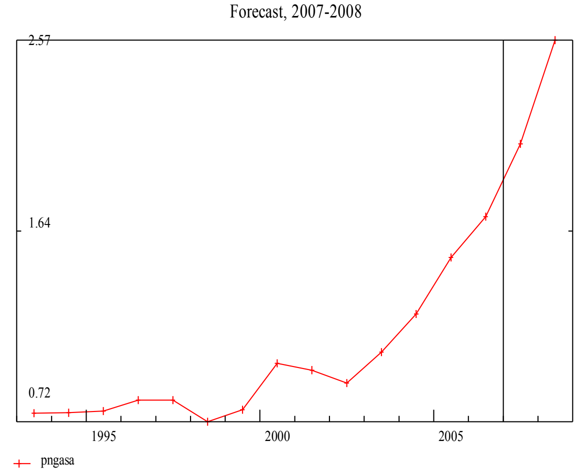
Gasoline, and other energy goods (Real (2000) and nominal)

Forecast, 2007-2008



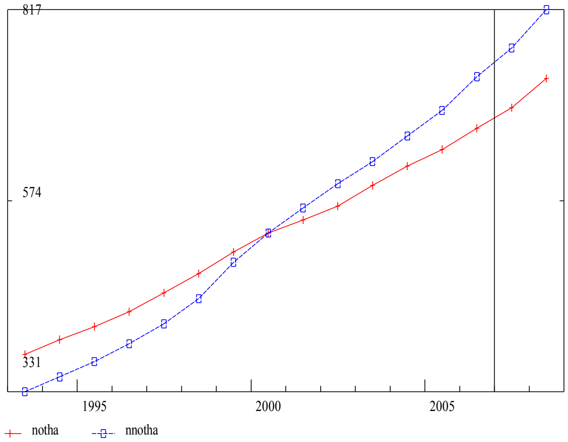
Gasoline, and other energy goods (price index, 2000=1)

Forecast, 2007-2008



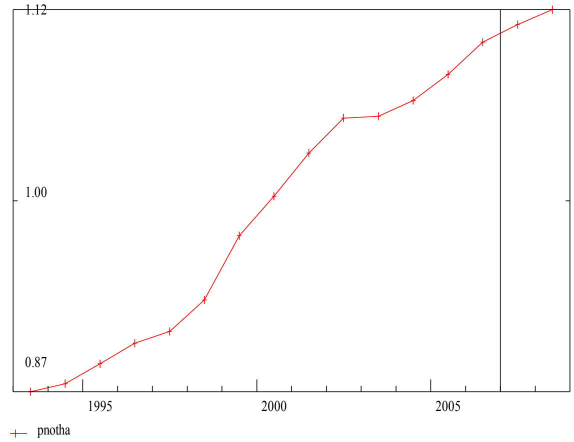
Other nondurable (Real (2000) and nominal)

Forecast, 2007-2008



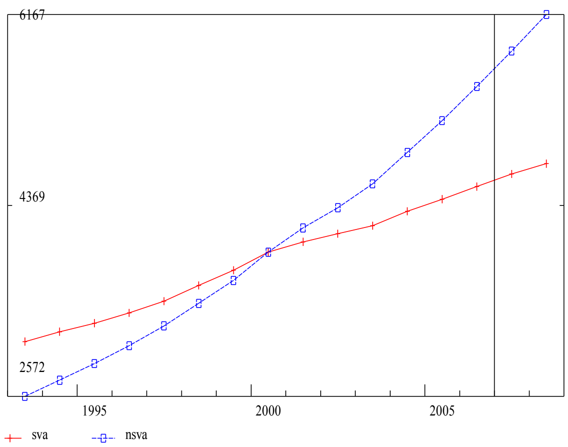
Other nondurable (price index, 2000=1)

Forecast, 2007-2008



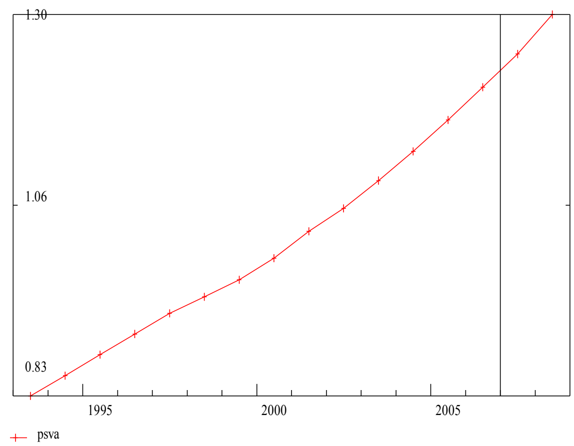
Services (Real (2000) and nominal)

Forecast, 2007-2008



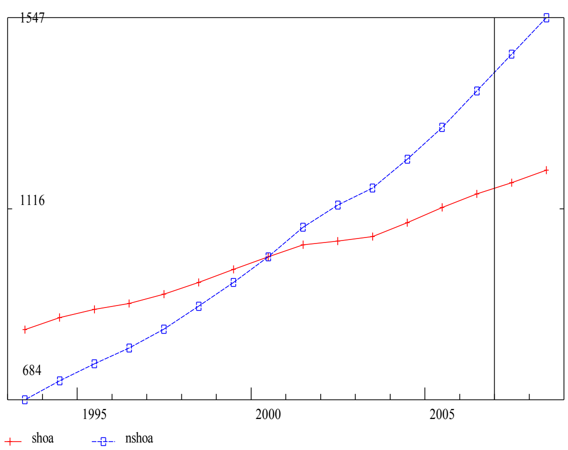
Services (price index, 2000=1)

Forecast, 2007-2008



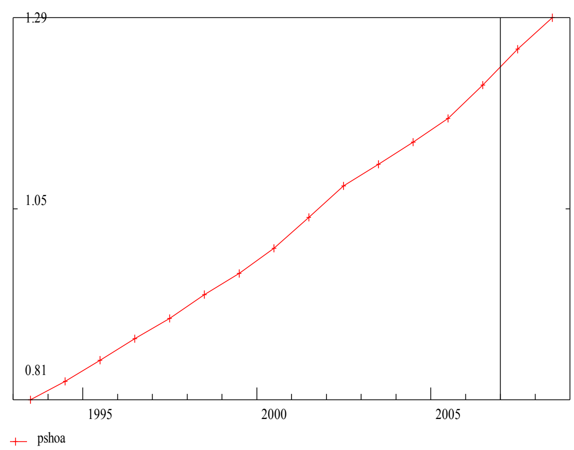
Housing (Real (2000) and nominal)

Forecast, 2007-2008



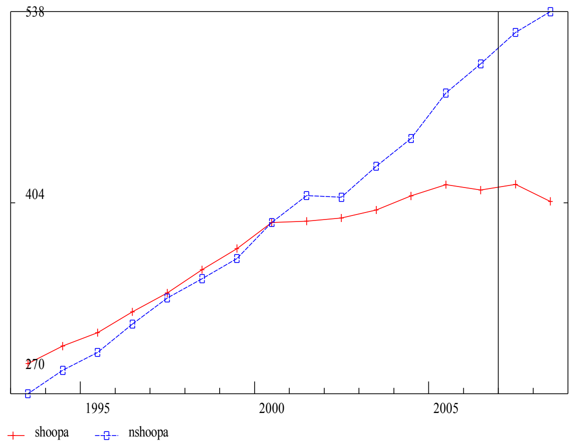
Housing (price index, 2000=1)

Forecast, 2007-2008



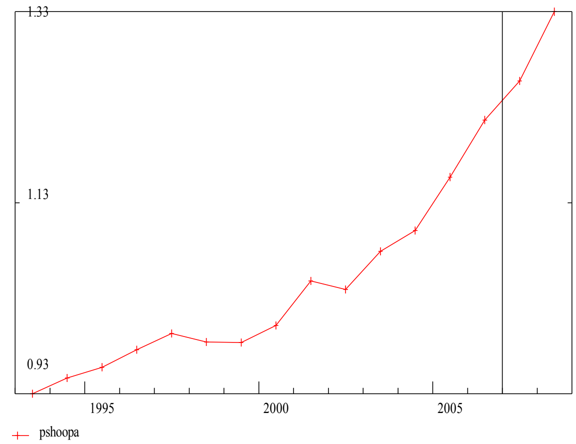
Household operation (Real (2000) and nominal)

Forecast, 2007-2008



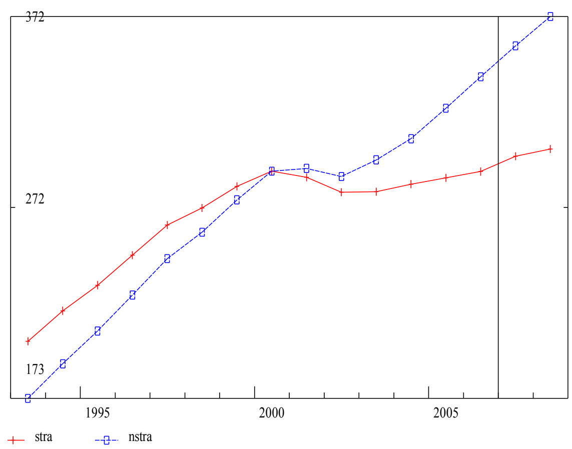
Household operation (price index, 2000=1)

Forecast, 2007-2008



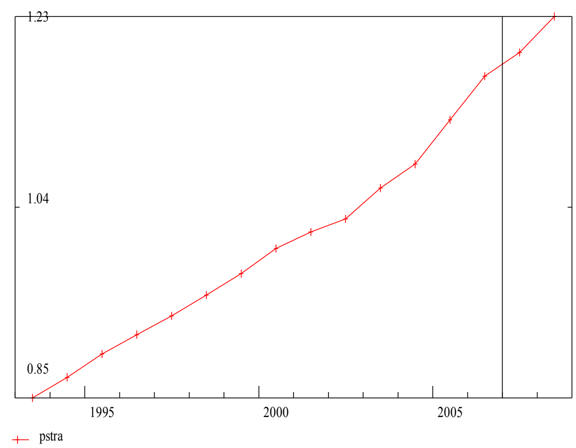
Transportation (Real (2000) and nominal)

Forecast, 2007-2008



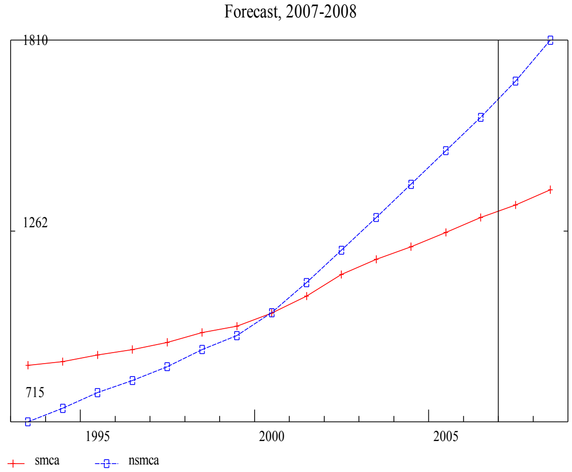
Transportation (price index, 2000=1)

Forecast, 2007-2008



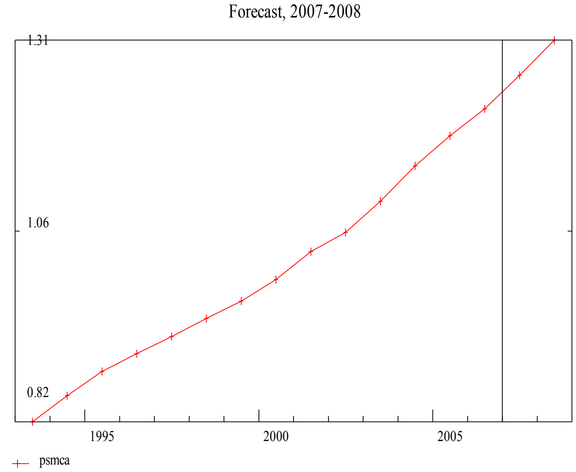
Medical care (Real (2000) and nominal)

Forecast, 2007-2008



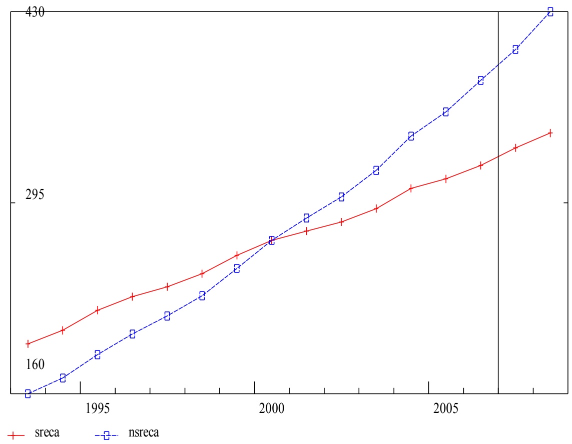
Medical care (price index, 2000=1)

Forecast, 2007-2008



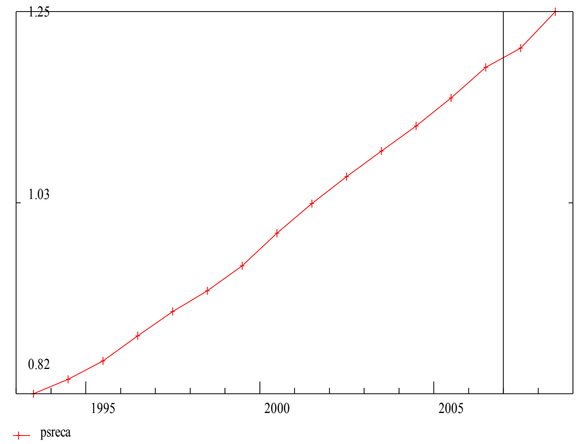
Recreation (Real (2000) and nominal)

Forecast, 2007-2008



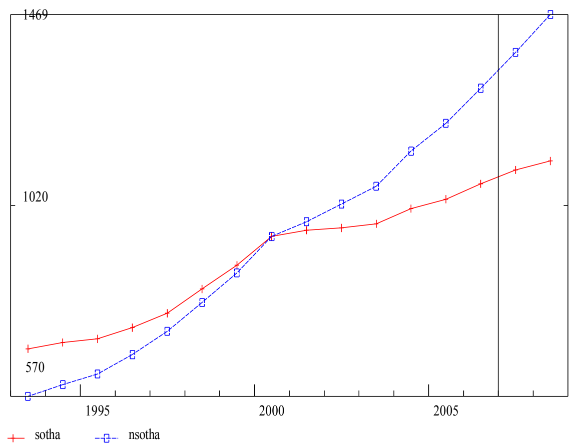
Recreation (price index, 2000=1)

Forecast, 2007-2008



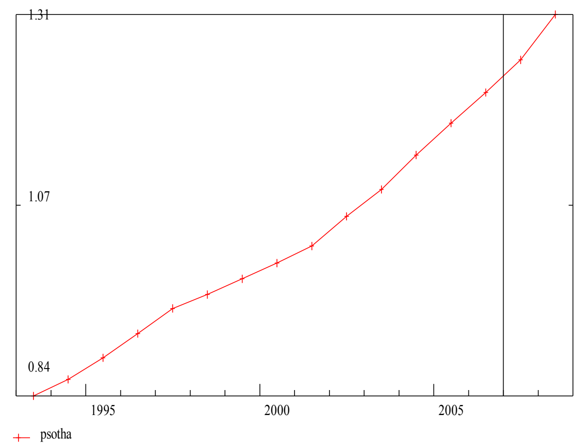
Other Services (Real (2000) and nominal)

Forecast, 2007-2008



Other Services (price index, 2000=1)

Forecast, 2007-2008



Chapter 4: Private fixed Investment in Equipment and Software

Investment is the both the engine of growth and the consequence of growth. For an economy to grow, it must have investment, especially in equipment. De Long and Summers found that *"the cross nation pattern of equipment prices, quantities, and growth is consistent with the belief that countries with rapid growth have favorable supply conditions for machinery and equipment."* [De Long and Summers, 1991]

Gross private fixed investment in equipment and software accounts for about half of fixed investment. The other half, Investment in structures, has very different data and will be treated in the next chapter. Investment in Equipment and software has fluctuated over the last quarter century from a low of 6.7 percent of GDP in 1992Q1 to a high of 9.4 percent of GDP in 2000Q2. Although the magnitude is small relative to that of PCE, the amplitude of the swings is large. Virtually every recession has had its origin in a fall in a fixed investment. Accurate short-term forecasting of this volatile component of GDP is therefore necessary for getting the the general short-term outlook correct.

4.1 Data for Private Fixed Investment in Equipment and Software

Given this importance for short-term forecasting, the paucity of high-frequency data on equipment is surprising. I have found no monthly data, and the quarterly NIPA give only seven series:

Computers and peripherals

Software (excluding software embedded in machines or bundled in computers)

Other information processing equipment (Communication equipment, Medical instruments, Non-medical equipment and instruments, Photocopy and related equipment, and Office and accounting equipment)

Industrial equipment (Metalworking machinery, Special industrial machinery (i.e. machinery used in specific industries such as paper making machines or textile machines); General industrial machinery (i.e. machines used generally such as pumps, compressors, fans, blowers and material handling equipment); Electrical generation, transmission, and distribution equipment; Engines and turbines; and Fabricated metal products.)

Transportation equipment (Automobiles, trucks, buses, truck trailers, railroad equipment, aircraft, ships and boats)

Other equipment (Furniture and fixtures, Agricultural machinery, Construction machinery, Mining and oilfield machinery, Service industry machinery, and other equipment not elsewhere classified.)

Residential equipment: equipment that is owned by landlords and rented to tenants (Washer and dryer, stove and oven, etc.)

Figure 4.1: Components of Equipment Investment

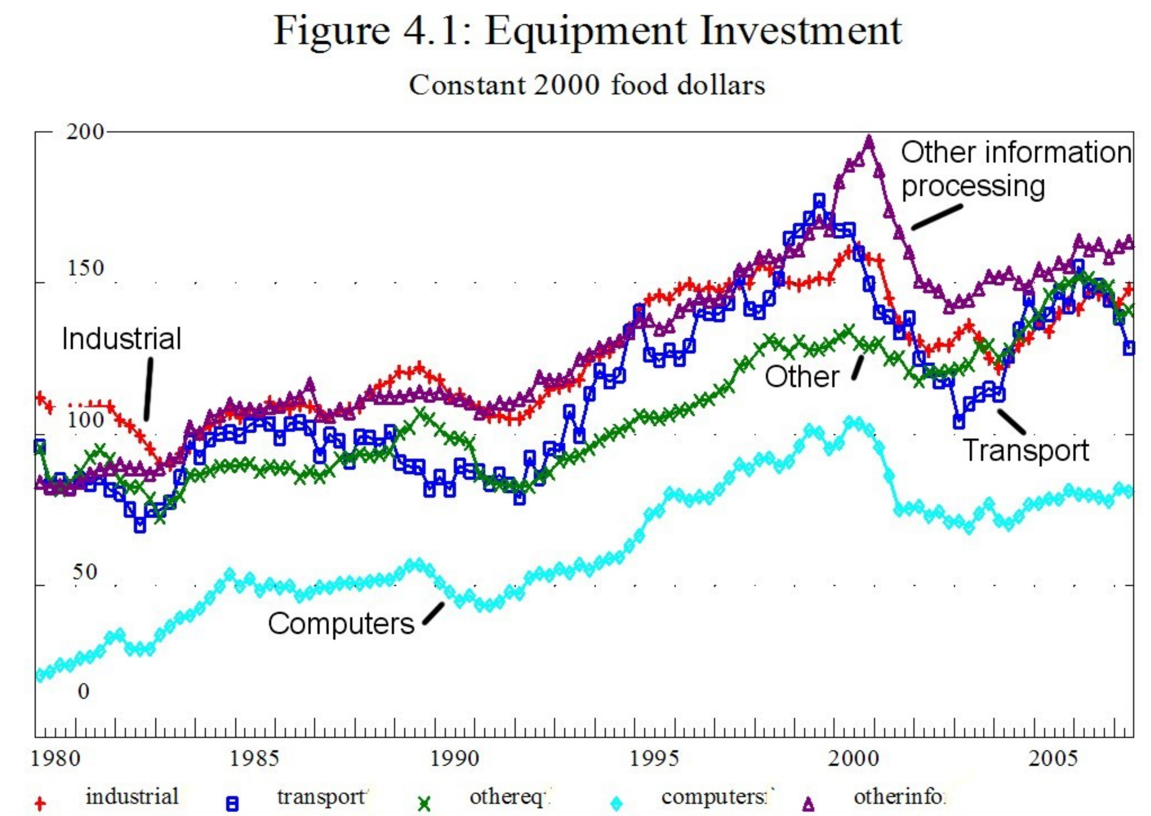


Figure 4.1 graphs these series, except software, in constant dollars of the year 2000. To avoid the problematic computer deflator, they have all been deflated by the deflator for food, which adjusts for general inflation without claiming to measure prices for particular types of equipment. Thus, in Figure 4.1, the relative sizes of the different series in any year are the same as those of the series in current prices. The graph presents a very different picture from the PCE graphs, which were mostly extremely smooth. In Equipment investment, ups and downs are common. In the collapse of investment after 2000, investment in Transportation equipment fell some 40 percent; investment in Computers and peripherals took a 30 percent hit; and no component survived unscathed.

It is noteworthy that Computers rose rapidly from 1980 to 1985 as the IBM PC caught on in business, but that from 1985 to 2007 investment in Computers roughly paralleled investment in other capital goods with no growth from 1985 to 1995, then a boom to 2000, and then a bust to 2002. Since 2002, Computers have edged up slightly, while other components have recovered more strongly.

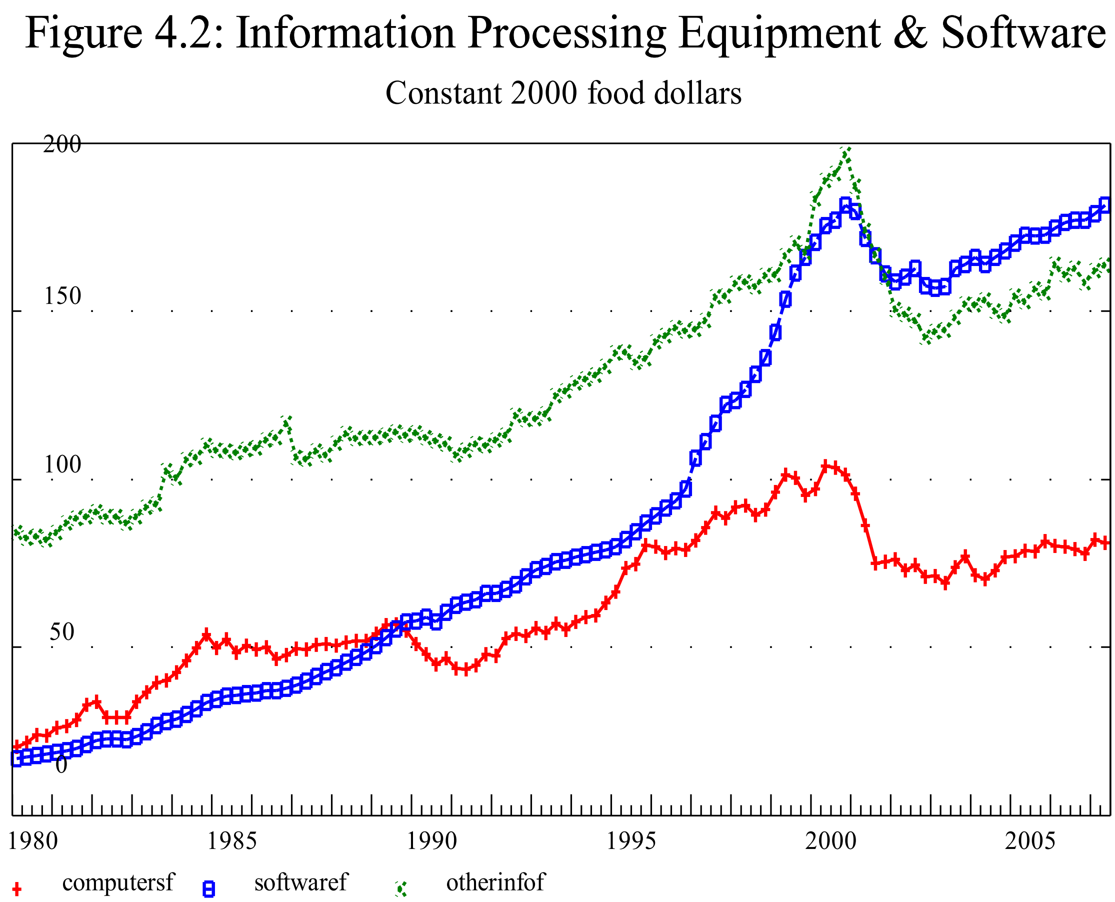
Table 4.1: Quarterly Data on Equipment Investment. From NIPA Table 5.3.5 Quarterly

	2006 1	2006 2	2006 3	2006 4	2007 1	2007 2	2007 3
Equipment and software	**991.7**	**991.1**	**999.1**	**988.7**	**991.8**	**1,004.5**	**1,016.4**
Information processing equipment and software	479.1	479.0	484.9	480.5	497.6	507.7	511.4
Computers and peripheral equipment	91.7	91.7	91.6	90.4	96.6	96.6	95.2
Software \2\	199.9	202.6	204.9	205.9	210.5	216.1	220.0
Other \3\	187.5	184.7	188.4	184.3	190.5	195.0	196.2
Industrial equipment	161.5	168.5	169.2	167.5	168.1	176.0	180.4
Transportation equipment	177.6	169.5	172.4	168.0	162.9	153.3	154.0
Other equipment \4\	173.5	174.0	172.6	172.7	163.2	167.5	170.5

There are several reasons for this volatility of investment. Investment for expansion depends on the *changes* in the level of output of an industry rather than on its level. For example, if an industry's output went from 100 in year 1 to 103 in year 2 to 109 in year 3, the *level* of output would have increased rather smoothly, but the *change* in output in year 3 would be twice what it was in year 2. Besides investment for expansion, there is investment for replacement. But it is deferrable as businesses often can "make do" with existing facilities, especially in periods of slack demand. Waves of optimism and pessimism can lead to substantial additions of capital facilities during expansions, only to be followed by overcapacity and deep cutbacks in investment outlays during recessions, as occurred in the years 2000 to 2002.

In the 1997 comprehensive revision of the NIPA, BEA decided to consider business acquisition of software, whether by purchase or by in-house development, as investment. This decision gave a nice boost to GDP, because expenditures on software had previously been considered an intermediate product and did not count in GDP. Figure 4.2 shows the course of investment in software in comparison to investment in Computers and peripherals and in Other information processing equipment, which includes communication equipment, nonmedical instruments, medical equipment and instruments, photocopy and related equipment, and office and accounting equipment. Clearly, this newcomer to investment was the star performer in the 1990's.

Figure 4.2: Components of Information Processing Equipment and software



When we turn to annual data, we find much more information. BEA actually produces two sets of it. The first is in the NIPA themselves and is illustrated in Table 4.2. Excluding the addenda at the bottom of the table, there are 36 lines of data, of which 27 are primary and the other are subtotals or totals. Line 1 and line 37 in this table give us Fixed investment in equipment and software as it appears in the NIPA.

Table 4.2: Private fixed investment in equipment and software.

From NIPA Table 5.5.5

Line		2000	2002	2003	2004	2005	2006
1	**Private fixed investment in equipment and software**	**926.2**	**794.7**	**808.0**	**864.7**	**946.5**	**1,002.2**
2	**Nonresidential equipment and software**	**918.9**	**787.1**	**800.2**	**856.3**	**937.5**	**992.6**
3	Information processing equipment and software	467.6	399.4	406.7	429.6	457.4	480.9
4	Computers, software, and communication	401.7	329.4	331.0	348.3	369.0	388.5
5	Computers and peripheral equipment	101.4	77.2	77.8	80.3	89.0	91.3
6	Software \1\	176.2	167.6	171.4	183.0	193.8	203.3
7	Communication equipment \2\	124.1	84.5	81.8	85.0	86.2	93.9
8	Medical equipment and instruments	34.4	42.2	46.0	50.7	56.3	59.1
9	Nonmedical instruments	17.8	18.2	19.0	20.9	22.5	23.8
10	Photocopy and related equipment	9.6	4.6	4.6	3.6	3.5	3.4
11	Office and accounting equipment	4.1	4.9	6.0	6.1	6.1	6.0
12	Industrial equipment	159.2	135.7	140.7	139.7	156.1	166.7
13	Fabricated metal products	12.4	11.4	11.9	12.5	14.0	14.9
14	Engines and turbines	7.1	11.6	10.2	4.7	5.5	6.0
15	Metalworking machinery	30.0	23.1	22.6	23.3	25.7	27.7
16	Special industry machinery, n.e.c.	36.4	25.8	29.1	28.2	30.3	31.4
17	General industrial, including materials handling, equipment	48.6	43.6	48.6	51.3	59.4	63.9
18	Electrical transmission, distribution, and industrial apparatus	24.7	20.2	18.3	19.7	21.1	22.7
19	Transportation equipment	160.8	126.3	118.3	142.9	159.5	171.9
20	Trucks, buses, and truck trailers	81.8	61.0	61.9	83.4	99.4	111.0
21	Light trucks (including utility vehicles)	50.8	37.5	40.8	53.7	63.0	69.6
22	Other trucks, buses, and truck trailers	31.0	23.6	21.1	29.7	36.3	41.4
23	Autos	36.5	32.9	29.5	31.2	34.8	39.2
24	Aircraft	32.6	25.6	19.9	20.3	16.0	13.1
25	Ships and boats	3.4	3.5	4.0	4.6	4.8	4.1
26	Railroad equipment	6.5	3.3	3.0	3.4	4.5	4.5
27	Other equipment	134.6	128.4	137.6	149.6	169.8	180.0
28	Furniture and fixtures	36.3	30.3	31.8	34.0	38.0	41.3
29	Agricultural machinery	13.7	17.1	18.4	20.5	22.5	21.7
30	Construction machinery	23.2	18.4	19.7	23.1	29.7	31.5
31	Mining and oilfield machinery	5.3	3.8	4.6	5.6	7.8	10.1
32	Service industry machinery	17.5	16.9	16.5	17.0	18.7	21.3
33	Electrical equipment, n.e.c.	4.6	5.6	5.8	7.1	6.9	7.8
34	Other	33.9	36.3	40.7	42.4	46.2	46.5
35	Less: Sale of equipment scrap, excluding autos	3.4	2.6	3.1	5.7	5.2	6.8
36	**Residential equipment**	**7.4**	**7.6**	**7.9**	**8.4**	**9.0**	**9.6**
	Addenda:						
37	Private fixed investment in equipment and software	926.2	794.7	808.0	864.7	946.5	1,002.2
38	Less: Dealers' margin on used equipment	10.3	10.1	10.0	10.7	11.4	11.6
39	Net purchases of used equipment from government	0.5	0.5	0.6	0.6	0.6	0.7
40	Plus: Net sales of used equipment	80.3	77.2	70.9	69.2	71.2	72.6
41	Net exports of used equipment	0.0	1.9	1.2	1.3	3.2	1.7
42	Sale of equipment scrap	3.5	2.8	3.2	5.4	5.4	7.0
43	Equals: Private fixed investment in new equipment and software	999.2	866.0	872.8	929.3	1,014.2	1,071.3

There is, however, a serious problem in the use of these data for models such as LIFT. The models will almost certainly have investment functions for the purchasers of equipment rather than by types of equipment bought. For example, there will be an equation for investment by the automobile industry, not an equation for the purchases of machine tools by all industries. There is, of course, good reason to model investment by purchaser rather than by type of equipment bought, namely, investment decisions are made by the purchaser, not by the seller, of equipment. Models with sectoral detail on output can use the industry's sales in the equation that determines its investment. Investment by type of equipment is then determined by multiplying the vector of investment by purchasing industry by a matrix – called a capital flow coefficient matrix -- showing the shares of each type of equipment in the spending of each purchaser. The airlines column of this matrix, for example, will show a large share going aircraft and a small share, if any, going to agricultural machinery.

Fortunately, BEA produces another set of accounts known as the Fixed Asset Accounts (FAA) which are separate from but related to the NIPA. The objective of the FAA is to create series on the capital stocks by industry, but on the way to this objective they produce series on equipment purchases by buying industry. In fact, the FAA include a complete equipment capital flow matrix showing the sales of each type of equipment to each industry. The FAA series on equipment investment by purchaser are made by distributing NIPA investment by type to likely buying industries. In making this distribution, BEA may use various sources of information on investment by purchaser such as the Annual Survey of Manufactures and the economic censuses. The results, Equipment and software investment classified by purchasing industry, is shown in Table 4.3 for selected recent years. Of the 78 lines in the table, 63 are primary and the others are subtotals and totals. It also must be noted that the residential equipment investment presented in Table 4.2 is purchased only by the Real estate industry (line 56) in Table 4.3.

Our task in this chapter, put briefly, is to produce up-to-date estimates of these 63 series for the current year and one ahead. These estimates are, as usual, needed in current and constant prices.

The FAA, it may be noted, appear at about the same time as the annual NIPA, that is, in late July or early August of the year following the year which they describe. They include, for each year, the capital flow matrix in current prices[17]. It can be converted to constant prices using whatever price index one likes on each row and then summing the columns. Because, as the model runs, the capital flow matrix will be used in the other direction, that is, to convert investment classified by purchaser to investment classified by product purchased, we will make the series on constant-price investment by purchaser by simple addition of the components, not by Fisher chained indexes.

17 The BEA name of the file is detailedness_inv1.xls. To get to it from the BEA main website, www.bea.gov, click "Fixed Assets", then under "Fixed assets" to the right of "Interactive tables" click "Fixed assets tables." Then to the right of "Download a spreadsheet of" click "Detailed fixed assets tables." On the screen where that brings you look for " 2. Nonresidential detailed estimates" . Under it find "5. Investment, historical cost" To the far right click on "XLS" and download the file. The last tab, called "Datasets" has all of the series in one sheet.

A super-attentive reader may have noticed that there are small differences in total equipment investment in the NIPA and in the FAA. There are three conceptual differences and one main source of statistical difference. The conceptual differences are (1) The NIPA total investment includes dealers' margins on used equipment; the FAA do not. (2) The NIPA subtract from total spending the value of scrapped equipment; the FAA do not. (3) There is a difference in the valuation of used cars. The statistical difference is mainly that the makers of the FAA don't always go back and revise their estimates when the makers of the NIPA revise historical data. The FAA give a detailed, product-by-product account of these differences. They are summarized for recent years in Table 4.4.

Although the FAA capital flow matrix provides important input for the construction of the capital flow coefficient matrix needed for the interindustry model, it does not yield that matrix by simply dividing each column by its total to get a matrix with columns summing to 1.0. The problem is that the interindustry model needs a matrix in producer prices; the FAA capital flow matrix is in purchaser prices. The margins for transportation and trade must be stripped off the sales of equipment and but into the trade and transportation rows. That step, however, is beyond the scope of this study and will be left for the model builder.

Table 4.3: Equipment Investment by Purchaser, from the Fixed Assets Accounts

Line		2000	2002	2004	2005	2006
1	**Private fixed assets**	**929.7**	**794.9**	**855.3**	**938.0**	**994.9**
2	**Agriculture, forestry, fishing, and hunting**	**22.4**	**25.7**	**29.9**	**32.1**	**32.3**
3	Farms \1\	20.8	23.7	27.3	28.6	28.6
4	Forestry, fishing, and related activities	1.6	2.0	2.7	3.6	3.6
5	**Mining**	**15.9**	**11.5**	**18.6**	**24.0**	**26.9**
6	Oil and gas extraction	6.1	3.1	5.9	5.4	5.9
7	Mining, except oil and gas	5.2	4.5	7.8	10.2	11.4
8	Support activites for mining	4.6	3.9	4.9	8.4	9.6
9	**Utilities**	**35.0**	**37.6**	**30.9**	**34.5**	**36.7**
10	**Construction**	**31.7**	**31.1**	**33.9**	**38.4**	**41.3**
11	**Manufacturing**	**169.8**	**142.0**	**129.2**	**148.1**	**157.4**
12	Durable goods	109.5	86.5	76.8	88.2	93.8
13	Wood products	2.6	2.2	2.3	2.6	2.8
14	Nonmetallic mineral products	5.1	4.5	4.1	4.6	4.9
15	Primary metals	5.4	4.7	4.3	4.9	5.2
16	Fabricated metal products	9.6	8.2	7.3	7.9	8.5
17	Machinery	18.6	15.4	14.2	16.2	17.2
18	Computer and electronic products	37.5	21.8	19.2	25.0	26.5
19	Electrical equipment, appliances, and components	3.9	2.9	2.6	2.2	2.3
20	Motor vehicles, bodies and trailers, and parts	13.0	11.7	10.7	11.0	11.7
21	Other transportation equipment	7.9	9.5	6.6	7.9	8.4
22	Furniture and related products	1.8	1.9	1.4	1.5	1.6
23	Miscellaneous manufacturing	4.0	3.8	4.1	4.4	4.7
24	Nondurable goods	60.3	55.4	52.4	60.0	63.7
25	Food and beverage and tobacco products	11.9	11.4	10.9	12.0	12.8
26	Textile mills and textile product mills	2.4	1.8	1.2	1.3	1.3
27	Apparel and leather and allied products	1.3	0.8	0.6	0.7	0.7
28	Paper products	7.7	6.4	5.5	5.9	6.3
29	Printing and related support activities	4.8	4.1	4.4	4.7	5.0
30	Petroleum and coal products	5.2	5.4	7.0	11.1	11.8
31	Chemical products	18.8	18.3	16.4	17.3	18.4
32	Plastics and rubber products	8.1	7.3	6.5	6.9	7.4
33	**Wholesale trade**	**56.8**	**45.5**	**54.8**	**70.5**	**75.5**
34	**Retail trade**	**31.7**	**28.0**	**35.5**	**35.2**	**37.5**
35	**Transportation and warehousing**	**64.3**	**48.9**	**45.7**	**48.6**	**52.7**
36	Air transportation	31.7	24.4	17.2	12.3	13.2
37	Railroad transportation	1.4	1.0	1.3	1.4	1.5
38	Water transportation	3.9	4.9	5.3	5.1	5.1
39	Truck transportation	10.5	8.3	10.3	17.6	19.6
40	Transit and ground passenger transportation	3.7	1.9	2.9	3.4	3.7
41	Pipeline transportation	2.8	1.7	2.1	2.4	2.6
42	Other transportation and support activites \2\	9.2	4.8	4.5	4.5	4.8
43	Warehousing and storage	1.1	1.9	2.1	2.1	2.2
44	**Information**	**121.7**	**63.3**	**64.2**	**65.8**	**70.7**
45	Publishing industries (includes software)	7.4	5.4	6.3	6.0	6.4
46	Motion picture and sound recording industries	0.7	0.6	0.7	0.9	1.0
47	Broadcasting and telecommunications	107.4	50.7	49.4	51.3	55.3
48	Information and data processing services	6.3	6.6	7.7	7.5	7.9
49	**Finance and insurance**	**100.8**	**80.6**	**91.9**	**90.0**	**93.3**
50	Federal Reserve banks	2.2	1.8	2.2	1.3	1.4
51	Credit intermediation and related activities	64.7	53.0	57.3	58.9	60.9
52	Securities, commodity contracts, and investments	13.5	9.2	10.9	10.7	11.2
53	Insurance carriers and related activities	18.0	15.6	19.5	17.3	18.0
54	Funds, trusts, and other financial vehicles	2.3	1.0	2.0	1.7	1.7

Table 4.3 continued

55	**Real estate and rental and leasing**	**92.1**	**69.0**	**76.2**	**89.1**	**94.4**
56	Real estate	13.6	20.6	17.3	18.2	19.3
57	Rental and leasing services and lessors of intangible assets \3\	78.6	48.3	58.9	70.9	75.1
58	**Professional, scientific, and technical services**	**59.1**	**59.9**	**71.0**	**81.0**	**85.2**
59	Legal services	2.7	2.7	3.0	3.1	3.2
60	Computer systems design and related services	19.5	15.6	20.1	17.7	18.6
61	Miscellaneous professional, scientific, and technical services \4\	36.9	41.6	47.8	60.2	63.3
62	**Management of companies and enterprises \5**	**15.5**	**24.2**	**24.0**	**21.8**	**22.9**
63	**Administrative and waste management services**	**21.3**	**20.6**	**25.6**	**25.7**	**27.2**
64	Administrative and support services	19.2	18.0	22.8	22.5	23.8
65	Waste management and remediation services	2.1	2.6	2.9	3.2	3.5
66	**Educational services**	**6.9**	**8.7**	**10.0**	**9.1**	**9.6**
67	**Health care and social assistance**	**49.4**	**62.7**	**75.0**	**80.8**	**85.0**
68	Ambulatory health care services	18.0	24.0	29.8	33.0	34.8
69	Hospitals	28.3	35.0	41.1	43.8	46.1
70	Nursing and residential care facilities	1.9	2.2	2.7	2.7	2.8
71	Social assistance	1.2	1.5	1.3	1.2	1.3
72	**Arts, entertainment, and recreation**	**7.7**	**8.1**	**8.0**	**7.9**	**8.1**
73	Performing arts, spectator sports, museums, and related activities	2.2	2.6	2.6	2.3	2.4
74	Amusements, gambling, and recreation industries	5.6	5.5	5.4	5.6	5.8
75	**Accommodation and food services**	**18.0**	**19.7**	**22.4**	**27.0**	**29.2**
76	Accommodation	3.1	4.4	5.1	5.3	5.6
77	Food services and drinking places	14.8	15.4	17.4	21.6	23.6
78	**Other services, except government**	**9.4**	**7.8**	**8.5**	**8.4**	**8.9**

1. NAICS crop and animal production.
2. Consists of scenic and sightseeing transportation; tranportation support activities; and couriers and messengers.
3. Intangible assets include patents, trademarks, and franchise agreements, but not copyrights.
4. Consists of accounting, tax preparation, bookkeeping, and payroll services; architectural, engineering, and related services; specialized design services; management, scientific, and technical consulting services; scientific research and development services; advertising and related services; and other professional, scientific, and technical services.
5. Consists of bank and other holding companies.

Note. Estimates in this table are based on the 1997 North American Industry Classification System (NAICS).

Table 4.4: Reconciliation of Equipment Investment in NIPA and FAA

Line		2002	2003	2004	2005	2006
1	**NIPA Private fixed investment in equipment and software**	**794.7**	**808.0**	**864.7**	**946.5**	**1002.2**
2	Plus: Sale of equipment scrap, excluding autos	2.6	3.1	5.7	5.2	6.8
4	Less: Dealers' margin on used equipment	10.1	10.0	10.7	11.4	11.6
5	Plus Intersectoral automobile valuation adjustment	-3.5	-5.6	-4.4	-2.2	-2.2
6	Plus: NIPA revisions since FAA was revised	11.2	7.4	0.0	-0.1	-0.3
7	**FAA Private fixed investment in equipment and software**	794.9	802.9	855.3	938.0	994.9

4.2 Approach to the problem

As already indicated, our problem is short-range forecasting of the 63 primary series on investment in Table 4.3. We need forecasts for both current-price values and constant price values. Our approach is in seven steps.

Step 1. Make quarterly forecasts of both current price values and the price indexes of the seven series for which we have quarterly data in the NIPA. These forecast will be made with inputs from QUEST in ways already familiar from Chapter 3. They will be in quarterly frequency to make use of the fact that we often have three or even four quarters of a year before the FAA data appear. Convert these quarterly forecasts to annual forecasts.

Step 2. Make preliminary annual forecasts for two years ahead for each of the 63 primary series which are the target of our work. These equations may use as explanatory variables one or more of the seven series forecast in Step 1 or their sum. They may also use their own lagged values.

Step 3. Aggregate the rows of the FAA capital flow matrix to match these seven rows and convert to a capital coefficient matrix. (This step might be done with either the matrix of the most recent year or with a (perhaps weighted) average of the last two or three years.

Step 4. Multiply the coefficients of the matrix made in Step 3 by the forecast of the corresponding investment series made in Step 2.

Step 5. Scale each of the seven rows calculated in Step 4 to sum to the total for the corresponding series forecast in Step 1.

Step 6. Sum the columns of the matrix found in step 6 to give the current price annual forecast for each of the 63 series.

Step 7. Convert each row of the matrix found in Step 5 to constant prices using the price indexes found for each of the seven series in Step 1. Sum the columns to get the forecasts of the 63 industries in constant prices.

4.3 NIPA Investment in Equipment and Software by Asset Types Equations

In this section, I discuss the equation results estimated in Step 1. These equations (both the nominal values and the price indexes) was estimated during the period from 1970Q1 to 2007Q3. The estimation results of are presented in Table 4.5 and Table 4.6. Figure 4.3 shows the plots of the regressions' predicted values and the historical series.

Before discussing each equation, there is an interesting result from Table 4.5 and Table 4.6. In most of these equations, I use regressors with their current period and their one-period lagged value or with two consecutive lagged values. This is an approximation of using the first difference of the regressors. Thus, we would expect the signs of the coefficients to be different between the two regressors. For example, in Table 4.5, the coefficient of current period nonresidential investment in equipment and software (*vfnre*) is positive while the coefficient of its lagged value is negative. This result is expected.

Computer and peripheral equipment

The nominal equation of computer and peripheral equipment consists of intercept, one-quarter lagged dependent variable, two-quarter lagged dependent variable, and the current period NIPA nominal private fixed investment of nonresidential equipment and software (*vfnre*). The equations shows good fit both in test statistics (adjusted R-square and MAPE) and in fitted plot (with BasePred). All regressors except intercept have good Mexvals and reasonable signs within the test period. The intercept is left in this equation as previous estimation with different test period shows that the intercept has explanatory power.

The price index equation is straight forward with two lagged dependent variables (one- and two-quarter lagged) without an intercept. Both regressors have respectable Mexvals. The closeness of fit statistics are good with adjusted R-square of 0.9993 and MAPE of 1.46 percent. The fitted plot is very good in both the predicted value and BasePred.

Software

The nominal equation of Software fixed investment has two regressors and an intercept. The regressors are the one-quarter lagged dependent variable and *vfnre*. All regressors have good Mexvals and appropriate signs. The adjusted R-square is 0.9993 while the MAPE is 6.94 percent. The fitted plot shows a very good fit with BasePred plot moving within a good proximity of the actual series.

The price index equation has two lagged dependent variables as regressors, *qvenp2(t-1)* and *qvenp2(t-1)*, without an intercept. Both regressors has good Mexvals and providing very good fit as shown by the closeness of fit statistics. However, the fitted plot shows that this equation cannot capture the volatility during the test period as seen in the BasePred plot. This is a problem when using only time-series analysis for forecasting economic indicators. Nevertheless, it should be good for our purpose of short-term forecasting.

Other Information processing equipment and software

The nominal equation for the investment of other information processing equipment and software has the same format as the computer equipment's equation. All regressors, including intercept, have decent Mexvals and appropriate signs. The adjusted R-square is 0.9977 and the MAPE is 3.2 percent. The fitted plot shows that the equation has good fit and should be a good equation for both short-term and long-term forecasts.

The price index equation has two lagged dependent variables, price index of *vfnre*, and intercept as its regressors. All regressors exhibits good Mexvals and reasonable signs. The closeness of fit statistics are very good. The BasePred plot shows that *pvfnre* helps explain the movement of the price index quite well.

Industrial equipment

The nominal equation for investment in Industrial equipment has the following regressors: 1) intercept, 2) one-quarter lagged dependent variable, 3) two-quarter lagged dependent variable, and 4) *vfnre*. All regressors have good Mexvals. The MAPE is 2.05 percent and the adjusted R-square is 0.9972. The predicted value fits well with the historical series (as expected) and the BasePred plot shows a decent fit.

The price index equation consists of three regressors without an intercept. The regressors are one-quarter, two-quarter, and three-quarter lagged dependent variables. All three regressors has respectable Mexvals with most of the explanatory power comes from the first lag. The closeness of fit statistics is very good with MAPE of 0.38 percent. However, the BasePred plot shows that having a short-term forecast rely on the estimation over this test period might not be appropriate. It seems that estimating the equation on the more recent time period might yield a better BasePred plot and a more reliable short-term forecast.

Transportation equipment

The nominal equation for investment in transportation equipment has a one-quarter lagged dependent variable, current quarter *vfnre*, and one-quarter lagged *vfnre* as its regressors. All three regressors have good Mexvals and expected signs. The adjusted R-square is 0.9934 and the MAPE is 3.49 percent. The fitted plots show very good fit by both the predicted value and the BasePred.

The price index equation has one-quarter lagged dependent variable, current quarter price index of *vfnre*, and one-quarter lagged price index of *vfnre* as its regressors. All three regressors contribute to the explanation of the price index over the test period. We have good closeness of fit statistics. The fitted plots show a good fit from predicted value and BasePred. The BasePred plot also shows a tendency of over-predicting the series over the test period.

Other nonresidential equipment

For investment in other nonresidential equipment, its nominal equation has one-quarter lagged dependent variable, current quarter *vfnre*, and one-quarter lagged *vfnre* as its regressors. All three regressors have good Mexvals and appropriate signs. The adjusted R-square is 0.9981 and the MAPE is 2.04 percent. The fitted plots show very good fit from both the predicted value and the BasePred.

The price index equation has one-quarter lagged dependent variable, current quarter price index of *vfnre*, and one-quarter lagged price index of *vfnre* as regressors. All coefficients have good signs and all regressors have reasonable Mexvals. The closeness of fit statistics are very good with adjusted R-square of 0.9999 and the MAPE of 0.27 percent. The fitted plots also show very good fit.

Residential equipment

The nominal residential equipment investment equation has intercept, one-quarter lagged dependent variable, and the nominal value of private fixed residential investment. The last regressors composes of residential investment in both structures and equipment and software. All three regressors have good Mexvals and appropriate signs. The estimation shows good closeness of fit statistics for the test period with a MAPE of 1.62 percent. The fitted plots are good. The BasePred helps guiding the forecast with the long-term trend.

The price index equation consists of an intercept, one-quarter lagged dependent variable and two-quarter lagged dependent variable. The three regressors have good Mexvals and reasonable signs. The adjusted R-square is 0.9987 and the MAPE is 0.51 percent. The predicted value plot is very good. The BasePred plot cannot capture the exact movement of the actual series but seems to move well along the long-term trend.

Table 4.5: Estimation Results for Nominal values of Quarterly NIPA Fixed Investment in Equipment and Software

```
:                            Nonresidential Computer
  SEE   =     2262.40 RSQ   = 0.9953 RHO =   0.03 Obser  =  151 from 1970.100
  SEE+1 =     2261.83 RBSQ  = 0.9952 DurH =  1.28 DoFree =  147 to   2007.300
  MAPE  =        5.83
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenn1               - - - - - - - - - - - - - - - - -  43297.57 - - -
  1 intercept            -561.84853     0.6  -0.01  212.98      1.00
  2 qvenn1[1]               1.15557    54.4   1.14    1.15  42684.86  1.152
  3 qvenn1[2]              -0.27895     4.2  -0.27    1.08  42062.42 -0.277
  4 vfnre                  13.79061     3.9   0.14    1.00    454.46  0.123

:                            Nonresidential software
  SEE   =     1833.01 RSQ   = 0.9993 RHO =   0.58 Obser  =  151 from 1970.100
  SEE+1 =     1491.03 RBSQ  = 0.9993 DurH =  7.22 DoFree =  148 to   2007.300
  MAPE  =        6.94
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenn2               - - - - - - - - - - - - - - - - -  67258.89 - - -
  1 intercept           -1914.04781     6.6  -0.03 1438.86      1.00
  2 qvenn2[1]               0.95532   788.7   0.93    1.30  65815.40  0.943
  3 vfnre                  13.85916    14.2   0.09    1.00    454.46  0.059

:              Other Information processing equipment and software
  SEE   =     2729.94 RSQ   = 0.9978 RHO =   0.05 Obser  =  151 from 1970.100
  SEE+1 =     2726.96 RBSQ  = 0.9977 DurH =  1.33 DoFree =  147 to   2007.300
  MAPE  =        3.20
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvennoit             - - - - - - - - - - - - - - - - -  91706.32 - - -
  1 intercept            1131.00142     2.4   0.01  448.03      1.00
  2 qvennoit[1]             0.93412    36.6   0.92    1.33  90481.58  0.930
  3 qvennoit[2]            -0.14794     1.4  -0.14    1.28  89261.84 -0.147
  4 vfnre                  42.37975    13.0   0.21    1.00    454.46  0.216

:                      Nonresidential industrial equipment
  SEE   =     2453.52 RSQ   = 0.9973 RHO =  -0.03 Obser  =  151 from 1970.100
  SEE+1 =     2452.10 RBSQ  = 0.9972 DurH = -1.31 DoFree =  147 to   2007.300
  MAPE  =        2.05
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvennin              - - - - - - - - - - - - - - - - -  90332.58 - - -
  1 intercept            1755.34201     2.7   0.02  365.38      1.00
  2 qvennin[1]              1.26682    65.2   1.25    1.17  89267.11  1.261
  3 qvennin[2]             -0.33603     6.2  -0.33    1.05  88230.56 -0.333
  4 vfnre                  11.30934     2.4   0.06    1.00    454.46  0.071

:                    Nonresidential Transportation equipment
  SEE   =     3859.05 RSQ   = 0.9935 RHO =   0.06 Obser  =  151 from 1970.100
  SEE+1 =     3852.86 RBSQ  = 0.9934 DurH =  0.81 DoFree =  148 to   2007.300
  MAPE  =        3.49
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenntr              - - - - - - - - - - - - - - - - -  83589.17 - - -
  1 qvenntr[1]              0.87343   135.7   0.86    1.89  82689.14
  2 vfnre                 334.71098    37.3   1.82    1.83    454.46  2.060
  3 vfnre[1]             -314.86316    35.4  -1.69    1.00    448.18 -1.925

:                       Nonresidential other equipment
  SEE   =     2004.77 RSQ   = 0.9981 RHO =   0.03 Obser  =  151 from 1970.100
  SEE+1 =     2004.02 RBSQ  = 0.9981 DurH =  0.36 DoFree =  148 to   2007.300
  MAPE  =        2.04
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvennot              - - - - - - - - - - - - - - - - -  81287.93 - - -
  1 qvennot[1]              0.98759   367.3   0.97    1.52  80205.83
  2 vfnre                 130.64964    23.4   0.73    1.51    454.46  0.843
  3 vfnre[1]             -128.02004    23.1  -0.71    1.00    448.18 -0.821

:                             Residential equipment
  SEE   =       85.94 RSQ   = 0.9987 RHO =   0.12 Obser  =  151 from 1970.100
  SEE+1 =       85.37 RBSQ  = 0.9987 DurH =  1.44 DoFree =  148 to   2007.300
  MAPE  =        1.62
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvennr               - - - - - - - - - - - - - - - - -   5168.83 - - -
  1 intercept              90.22767     6.7   0.02  762.49      1.00
  2 qvennr[1]               0.97497   987.1   0.96    1.11   5111.62  0.973
  3 vfr                     0.34559     5.1   0.02    1.00    274.64  0.029
```

Table 4.6: Estimation Results for Price indexes of Quarterly NIPA Fixed Investment in Equipment and Software

```
:                            Nonresidential Computer
  SEE   =      124.93 RSQ   = 0.9993 RHO =   0.30 Obser  =  151 from 1970.100
  SEE+1 =      122.02 RBSQ  = 0.9993 DurH =  5.02 DoFree =  149 to   2007.300
  MAPE  =        1.46
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenp1               - - - - - - - - - - - - - - - - -   3059.84 - - -
  1 qvenp1[1]              1.61040   146.7   1.68    1.84   3197.79
  2 qvenp1[2]             -0.62754    35.7  -0.68    1.00   3338.21 -0.684

:                            Nonresidential software
  SEE   =        0.71 RSQ   = 0.9981 RHO =  -0.04 Obser  =  151 from 1970.100
  SEE+1 =        0.71 RBSQ  = 0.9981 DurH = -0.64 DoFree =  149 to   2007.300
  MAPE  =        0.46
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenp2               - - - - - - - - - - - - - - - - -    117.18 - - -
  1 qvenp2[1]              1.70314   160.9   1.71    1.99    117.35
  2 qvenp2[2]             -0.70361    41.2  -0.71    1.00    117.52 -0.696

:              Other Information processing equipment and software
  SEE   =        0.43 RSQ   = 0.9994 RHO =   0.01 Obser  =  151 from 1970.100
  SEE+1 =        0.43 RBSQ  = 0.9994 DurH =  0.11 DoFree =  147 to   2007.300
  MAPE  =        0.34
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenpoit             - - - - - - - - - - - - - - - - -     94.42 - - -
  1 intercept              0.74421     4.4   0.01 1734.69      1.00
  2 qvenpoit[1]            1.46215    96.4   1.46    2.67     94.18  1.485
  3 qvenpoit[2]           -0.51683    19.9  -0.51    1.19     93.94 -0.533
  4 pvfnre                 0.04604     9.0   0.05    1.00     98.17  0.049

:                      Nonresidential industrial equipment
  SEE   =        0.35 RSQ   = 0.9998 RHO =  -0.04 Obser  =  151 from 1970.100
  SEE+1 =        0.35 RBSQ  = 0.9998 DurH = -2.30 DoFree =  148 to   2007.300
  MAPE  =        0.38
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenpin              - - - - - - - - - - - - - - - - -     73.66 - - -
  1 qvenpin[1]             1.55175    89.8   1.54    2.57     73.06
  2 qvenpin[2]            -0.26571     1.1  -0.26    1.09     72.45 -0.267
  3 qvenpin[3]            -0.28493     4.2  -0.28    1.00     71.85 -0.287

:                    Nonresidential Transportation equipment
  SEE   =        0.78 RSQ   = 0.9991 RHO =   0.14 Obser  =  151 from 1970.100
  SEE+1 =        0.77 RBSQ  = 0.9991 DurH =  1.78 DoFree =  148 to   2007.300
  MAPE  =        0.62
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenptr              - - - - - - - - - - - - - - - - -     77.22 - - -
  1 qvenptr[1]             1.00557  1891.6   1.00    1.46     76.68
  2 pvfnre                 0.58371    14.6   0.74    1.30     98.17  0.434
  3 pvfnre[1]             -0.58392    14.0  -0.74    1.00     97.91 -0.441

:                        Nonresidential other equipment
  SEE   =        0.22 RSQ   = 0.9999 RHO =   0.47 Obser  =  151 from 1970.100
  SEE+1 =        0.19 RBSQ  = 0.9999 DurH =  5.73 DoFree =  148 to   2007.300
  MAPE  =        0.27
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenpot              - - - - - - - - - - - - - - - - -     74.13 - - -
  1 qvenpot[1]             1.00576  7775.0   1.00    5.18     73.52
  2 pvfnre                 0.47393    90.0   0.63    3.50     98.17  0.327
  3 pvfnre[1]             -0.47326    87.0  -0.63    1.00     97.91 -0.332

:                             Residential equipment
  SEE   =        0.58 RSQ   = 0.9988 RHO =  -0.11 Obser  =  151 from 1970.100
  SEE+1 =        0.58 RBSQ  = 0.9987 DurH = -2.79 DoFree =  148 to   2007.300
  MAPE  =        0.51
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvenpr               - - - - - - - - - - - - - - - - -     88.27 - - -
  1 intercept              0.90197     3.6   0.01  806.82      1.00
  2 qvenpr[1]              1.44846    91.6   1.44    1.27     87.95  1.467
  3 qvenpr[2]             -0.45676    12.8  -0.45    1.00     87.63 -0.468
```

Figure 4.3: Plots of NIPA Fixed Investment in Equipment and Software Estimation Results

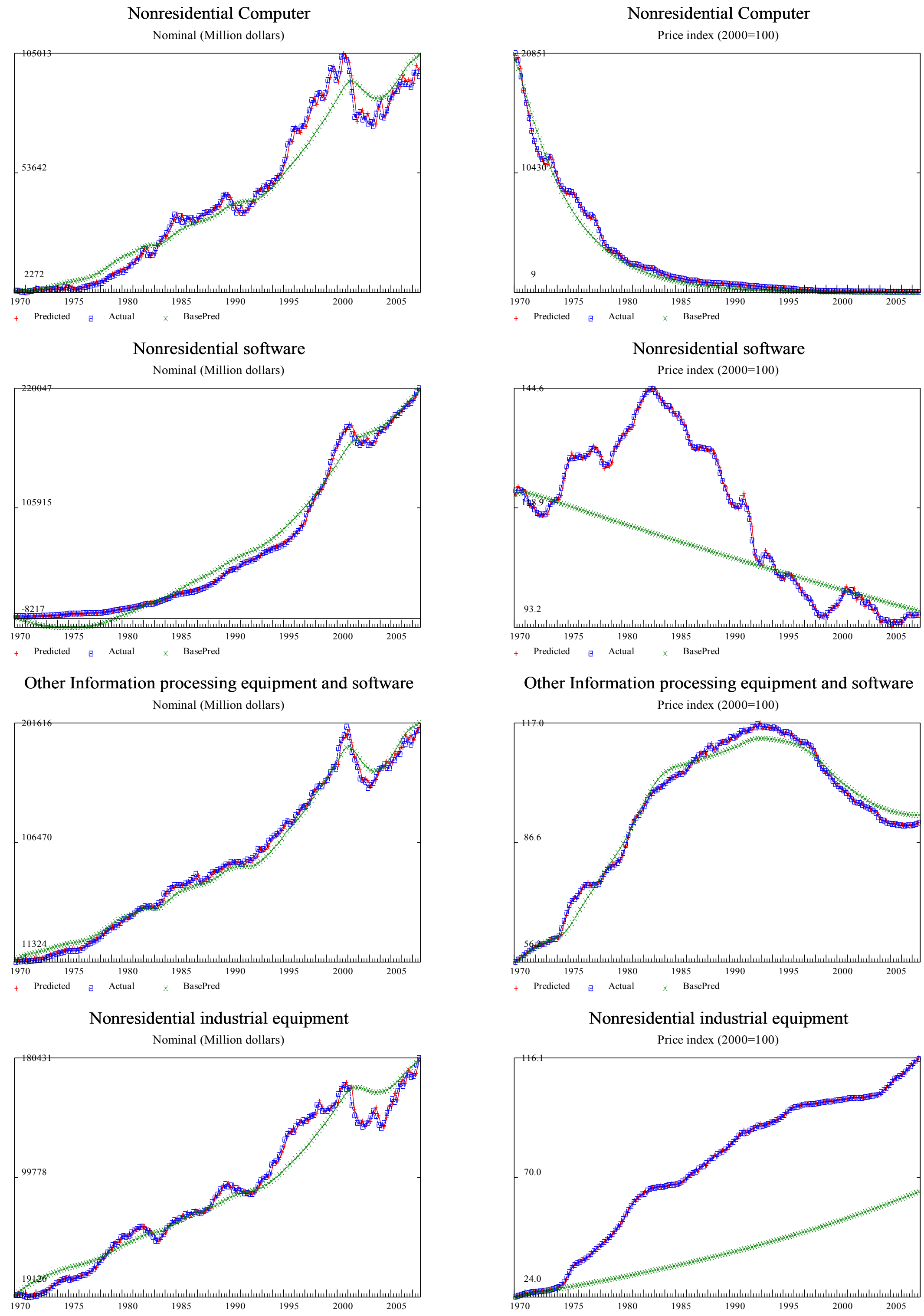
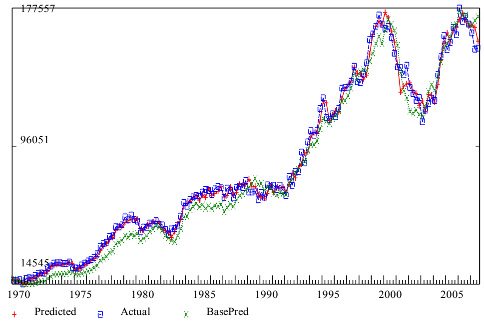
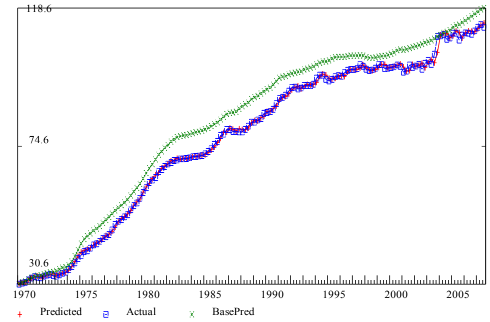


Figure 4.3 (cont.)

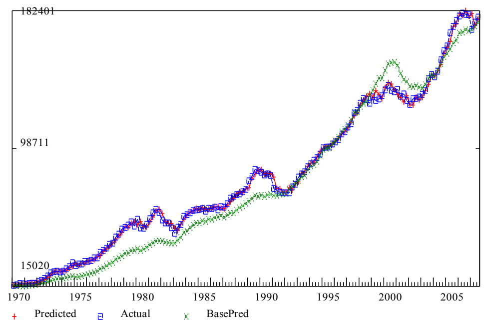
Nonresidential Transportation equipment
Nominal (Million dollars)



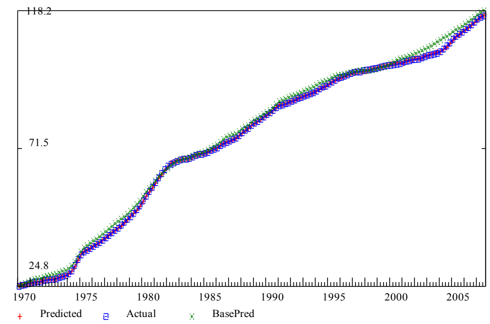
Nonresidential Transportation equipment
Price index (2000=100)



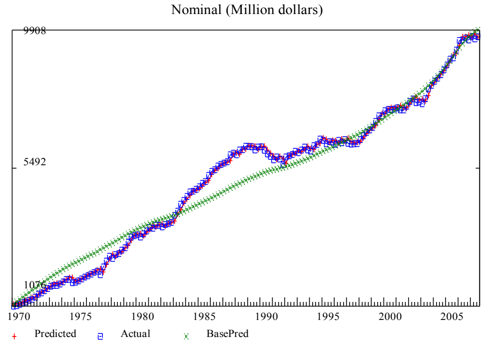
Nonresidential other equipment
Nominal (Million dollars)



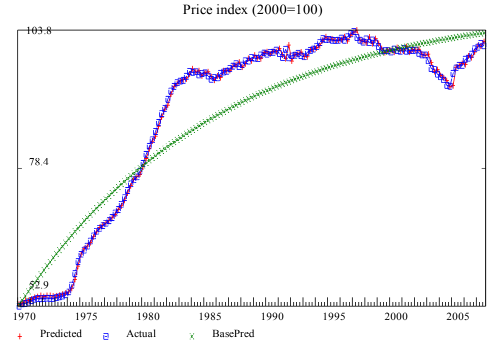
Nonresidential other equipment
Price index (2000=100)



Residential equipment
Nominal (Million dollars)



Residential equipment
Price index (2000=100)



4.4 FAA Investment in Equipment and Software by Purchasing Industries Equations

This section discusses the purchasing industries' equation estimated as described in Step 2 for 13 industries selected from the total of 63 industries. All equations were estimated with historical data from 1975 to 2006. All regression results are shown in Appendix 4.1. The fitted plots of all 63 industries are shown in Figure 4.4.

Farms

```
:                                     Farms
  SEE   =     1716.01 RSQ   = 0.9213 RHO =   0.29 Obser  =   32 from 1975.000
  SEE+1 =     1651.39 RBSQ  = 0.9158 DurH =  2.68 DoFree =   29 to   2006.000
  MAPE  =       10.00
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein1                - - - - - - - - - - - - - - - - -  16385.84 - - -
  1 intercept            1297.25037     3.2   0.08   12.70      1.00
  2 vein1[1]                0.67477    34.1   0.65    1.21  15756.44  0.646
  3 vennot                  0.05031    10.0   0.27    1.00  88589.03  0.331
```

The equation shows a good fit with the adjusted R-square of 0.9213. The MAPE of 10 percent is quite decent as the investment is generally volatile. From experiments, the farms' investment in equipment and software can be explained by the investment in other nonresidential equipment (*vennot*). The fitted plots show that the equation tracks the general trend over the test period quite well as exhibits by the BasePred. However, the predicted value plot shows observable lagged in movement from the actual series.

Oil and gas extraction

```
:                             Oil and gas extraction
  SEE   =    1285.42 RSQ   = 0.5967 RHO =   0.05 Obser  =   32 from 1975.000
  SEE+1 =    1284.10 RBSQ  = 0.5688 DurH =  0.35 DoFree =   29 to   2006.000
  MAPE  =      21.68
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein3                - - - - - - - - - - - - - - - - -   4719.94 - - -
  1 vein3[1]               0.75240    70.2   0.73    1.27   4565.69
  2 venn1                 -0.06457     7.8  -0.66    1.22  48312.88 -0.978
  3 venntr                 0.04787    10.6   0.93    1.00  91518.56  1.032
```

The equation shows decent closeness of fit statistics considering the volatility over the test period. We found that the equipment investment by oil and gas extraction industry related can be explained to some degree by the investment in computer (*venn1*) and investment in transportation equipment *(venntr)*. The BasePred plot shows that the exogenous regressors can explained the trend of the series but cannot capture the magnitude of the volatility. We also observed an pronounced lagged in predicted value, especially when there were significant volatility.

Construction

```
:                                   Construction
  SEE   =    2060.42 RSQ   = 0.9711 RHO =   0.24 Obser  =   32 from 1975.000
  SEE+1 =    2006.49 RBSQ  = 0.9680 DurH =  3.61 DoFree =   28 to   2006.000
  MAPE  =      16.57
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein7                - - - - - - - - - - - - - - - - -  15947.72 - - -
  1 vein7[1]               0.53009    17.1   0.49    1.52  14812.38
  2 venn2                  0.12943    17.4   0.60    1.48  73834.41  0.715
  3 vennoit               -0.23962    15.0  -1.52    1.39 101376.84 -1.019
  4 vennin                 0.23283    17.9   1.44    1.00  98784.19  0.779
```

This equation works pretty well. The adjusted R-square is 0.9680 with a MAPE of 16.57 percent. The investment in equipment and software by construction industry can be explained by investment in software (*venn2*), other information processing equipment (*vennoit*), and industrial equipment (*vennin*). The BasePred tracks the trend over the test period remarkably well as shown in the fitted plot.

Primary metals

```
:                                 Primary metals
  SEE   =      608.36 RSQ   = 0.5813 RHO =   0.03 Obser  =   32 from 1975.000
  SEE+1 =      608.16 RBSQ  = 0.5524 DurH =  0.25 DoFree =   29 to   2006.000
  MAPE  =        9.33
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein10                - - - - - - - - - - - - - - - - -   4843.59 - - -
  1 intercept             1489.65143    11.4   0.31    2.39      1.00
  2 vein10[1]                0.62269    28.4   0.61    1.04   4778.50  0.652
  3 vennin                   0.00383     2.1   0.08    1.00  98784.19  0.165
```

The equipment investment by primary metals industry exhibit significant volatility over the test period. Considering the volatility, the equation fits the data quite well with the MAPE of 9.33 percent. We found that investment in industrial equipment can partially explain the trend of this industry equipment investment pattern but not the year-to-year volatility as exhibits by the BasePred plot.

Machinery

```
:                                    Machinery
  SEE   =      892.00 RSQ   = 0.9741 RHO =   0.00 Obser  =   32 from 1975.000
  SEE+1 =      892.06 RBSQ  = 0.9714 DurH =  0.03 DoFree =   28 to   2006.000
  MAPE  =        8.42
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein12                - - - - - - - - - - - - - - - - -   8896.09 - - -
  1 vein12[1]                1.12009    68.7   1.06    2.15   8419.97
  2 vein12[2]               -0.54419    22.3  -0.49    1.69   7962.81 -0.531
  3 venn2                    0.01785     9.7   0.15    1.58  73834.41  0.216
  4 vennin                   0.02546    25.7   0.28    1.00  98784.19  0.186
```

The equipment investment by machinery industry can be explained by investment in industrial equipment and software. This shows that, during the test period, the industry not only invested in industrial equipment (as it should) but also rely more heavily on computer controlled processes, both in design and manufacturing processes, as observed by the significant investment in software. The equation has a very good fit as shown by the closeness of fit statistics and the fitted plot. BasePred plots show promising forecasting power of this equation.

Computer and electronics products

```
:                        Computer and electronic products
  SEE   =    2285.66 RSQ   = 0.9513 RHO =   0.31 Obser  =   32 from 1975.000
  SEE+1 =    2190.37 RBSQ  = 0.9461 DurH =  2.16 DoFree =   28 to   2006.000
  MAPE  =      16.69
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein13                - - - - - - - - - - - - - - - - -  16035.47 - - -
  1 intercept             -7115.13817    22.2  -0.44   20.54      1.00
  2 vein13[1]                 0.58715    46.6   0.56    1.94  15296.00  0.591
  3 vennin                    0.18203    38.3   1.12    1.29  98784.19  0.713
  4 venn2                    -0.05163    13.4  -0.24    1.00  73834.41 -0.334
```

With the same pattern as the machinery industry, the investment by computer and electronic products industry can be partially explained by the investment in software and industrial equipment. The manufacturing process of this industry is heavily dependent on the precision tools and machine. We observed a negative sign with the coefficient of the investment in software. I believe the reason behind this negative effect is that, during the test period, the economy has become more information oriented which shows in the needs of better software while the computer industry, which is capital intensive, has been investing at a slower rate. The relative growth is shown here as a negative coefficient.

Overall, the equation performs well over the test period in both the closeness of fit statistics and the fitted plots.

Food, beverage and tobacco products

```
:                     Food, beverage, and tobacco products
  SEE   =      466.24 RSQ   = 0.9767 RHO =   0.18 Obser  =   32 from 1975.000
  SEE+1 =      460.07 RBSQ  = 0.9751 DurH =  1.11 DoFree =   29 to   2006.000
  MAPE  =        4.34
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein19               - - - - - - - - - - - - - - - - -   8880.84 - - -
  1 vein19[1]              0.88258   130.5   0.85    1.53   8557.38
  2 vennoit               -0.03038    23.0  -0.35    1.45 101376.84 -0.513
  3 vennin                 0.04452    20.6   0.50    1.00  98784.19  0.591
```

The equation for investment in equipment and software by food, beverage, and tobacco industry performs very well with an adjusted R-square of 0.9751 and a MAPE of 4.34 percent. The investment in other information processing equipment and industrial equipment helps explains the general movement of the investment very well as shown by the BasePred plot.

Petroleum and coal

```
:                          Petroleum and coal products
  SEE   =      888.98 RSQ   = 0.8402 RHO =   0.13 Obser  =   32 from 1975.000
  SEE+1 =      883.78 RBSQ  = 0.8231 DurH =  1.36 DoFree =   28 to   2006.000
  MAPE  =       11.72
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein24               - - - - - - - - - - - - - - - - -   5010.59 - - -
  1 intercept            -2171.01368     7.6  -0.43    6.26      1.00
  2 vein24[1]              0.77371    40.1   0.72    1.24   4694.50  0.672
  3 vennin                 0.08162    10.9   1.61    1.20  98784.19  1.490
  4 venn1                 -0.09341     9.7  -0.90    1.00  48312.88 -1.287
```

The equipment and software investment by petroleum and coal industry can be explained by the investment in industrial equipment and computer and peripheral. The equation fit the data quite well with a MAPE of 11.72 percent. The fitted plot shows that the equation moves the forecast quite well when the movement is small as shown by the BasePred plot. When there was a big year-to-year movement, the predicted value plot exhibits an observable lag.

Air transportation

```
:                               Air transportation
  SEE   =     2200.78 RSQ   = 0.9432 RHO =  -0.02 Obser  =   32 from 1975.000
  SEE+1 =     2200.08 RBSQ  = 0.9348 DurH = -0.15 DoFree =   27 to   2006.000
  MAPE  =       20.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein29                - - - - - - - - - - - - - - - - -  11594.88 - - -
  1 intercept             -612.95837     0.5  -0.05   17.60      1.00
  2 vein29[1]                0.56285    43.3   0.55    2.02  11231.75  0.572
  3 venntr                   0.06378     2.8   0.50    1.81  91518.56  0.301
  4 venntr[1]                0.17218    15.1   1.29    1.67  86968.16  0.794
  5 vennot                  -0.16848    29.4  -1.29    1.00  88589.03 -0.735
```

We found that the equipment investment by air transportation industry can be explained by investment in transportation equipment and other nonresidential equipment. We can observed the effect from the timing of investment decision as the investment in air transportation equipment, *i.e.* airplanes, is generally a lengthy process. We observed higher coefficient value in the one-year lagged investment in transportation equipment and higher Mexval than the coefficient and Mexval of the current period investment in transportation equipment. Considering the exogenous shock to the industry in the early 2000s, our equation performs remarkably well with adjusted R-square of 0.9348 and well fitted plots of both the predicted value and the BasePred.

Information and data processing services

```
:                    Information and data processing services
  SEE   =      268.32 RSQ   = 0.9893 RHO =   0.31 Obser  =   32 from 1975.000
  SEE+1 =      255.43 RBSQ  = 0.9886 DurH =  2.08 DoFree =   29 to   2006.000
  MAPE  =       12.76
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein40                - - - - - - - - - - - - - - - - -   2662.88 - - -
  1 vein40[1]                0.60085    51.6   0.55    1.91   2420.69
  2 venn2                    0.01816    25.1   0.50    1.03  73834.41  0.469
  3 vennoit                 -0.00148     1.4  -0.06    1.00 101376.84 -0.029
```

The equation shows a very good fit with an adjusted R-square of 0.9886. The investment in Software and other information processing equipment are found to be good predictors of this industry's investment in equipment and software. The fitted plot shows that the equation tracks the historical series very well over the test period and should provide a reliable forecast as suggested by the BasePred plot

Real estate

```
:                                   Real estate
  SEE   =    1385.17 RSQ   = 0.9078 RHO =   0.16 Obser  =   32 from 1975.000
  SEE+1 =    1367.59 RBSQ  = 0.9014 DW  =   1.68 DoFree =   29 to   2006.000
  MAPE  =       8.68
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein46               - - - - - - - - - - - - - - - - -  10930.16 - - -
  1 intercept           -1972.04229     8.5  -0.18   10.85      1.00
  2 vennr                  2.61965    62.0   1.35    1.04   5634.66  1.125
  3 vennot                -0.02098     2.2  -0.17    1.00  88589.03 -0.185
```

It is no surprise that the investment in residential equipment is the main predictor of equipment investment by real estate industry because, as mentioned earlier, the investment of residential equipment is all counted as a part of equipment investment by real estate industry by the BEA. The equation exhibits good fit in both the closeness of fit statistics and the fitted plot. From the fitted plot, I believe the very high investment by the industry in 2002 was caused by the September 11 2001 terrorist attack.

Educational services

```
:                           Educational services
  SEE   =      374.97 RSQ   = 0.9849 RHO =  -0.10 Obser  =   32 from 1975.000
  SEE+1 =      373.04 RBSQ  = 0.9833 DurH = 999.00 DoFree =   28 to   2006.000
  MAPE  =        6.49
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein54               - - - - - - - - - - - - - - - - -   3604.91 - - -
  1 vein54[1]              0.62725    16.1   0.58    1.35   3326.31
  2 venn2                  0.01720     5.8   0.35    1.06  73834.41  0.378
  3 vennoit               -0.00416     0.3  -0.12    1.02 101376.84 -0.070
  4 vennot                 0.00742     0.8   0.18    1.00  88589.03  0.098
```

The equation shows very good fit with an adjusted R-square of 0.9833 and a MAPE of 6.49 percent. The investment in software, other information processing equipment and other nonresidential equipment are found to partially explain the equipment investment of this industry with the investment in software provide the most explanatory power among the three asset types. The BasePred plot shows a good forecasting power of the equation while the predicted value plot shows obvious lag when there were a significant year-to-year movement.

Hospitals

```
:                                   Hospitals
  SEE   =      795.01 RSQ   = 0.9962 RHO =  -0.02 Obser  =   32 from 1975.000
  SEE+1 =      794.67 RBSQ  = 0.9958 DurH = -0.09 DoFree =   28 to   2006.000
  MAPE  =        4.62
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein56               - - - - - - - - - - - - - - - - -  16833.94 - - -
  1 intercept            725.06416     2.7   0.04  263.19      1.00
  2 vein56[1]              0.97361   227.2   0.89    1.11  15467.16  0.907
  3 venn2                  0.02232     4.5   0.10    1.01  73834.41  0.116
  4 vennoit               -0.00590     0.5  -0.04    1.00 101376.84 -0.024
```

The equipment investment by hospitals industry can be explained very well with its lagged value plus investment in software and other information processing software. The estimated equation has very good closeness of fit statistics. The adjusted R-square is

0.9958 and the MAPE is 4.62 percent. The fitted plot shows very close fit by both the predicted value and the BasePred.

Figure 4.4: Plots of FAA by Purchasing Industries Estimation Results

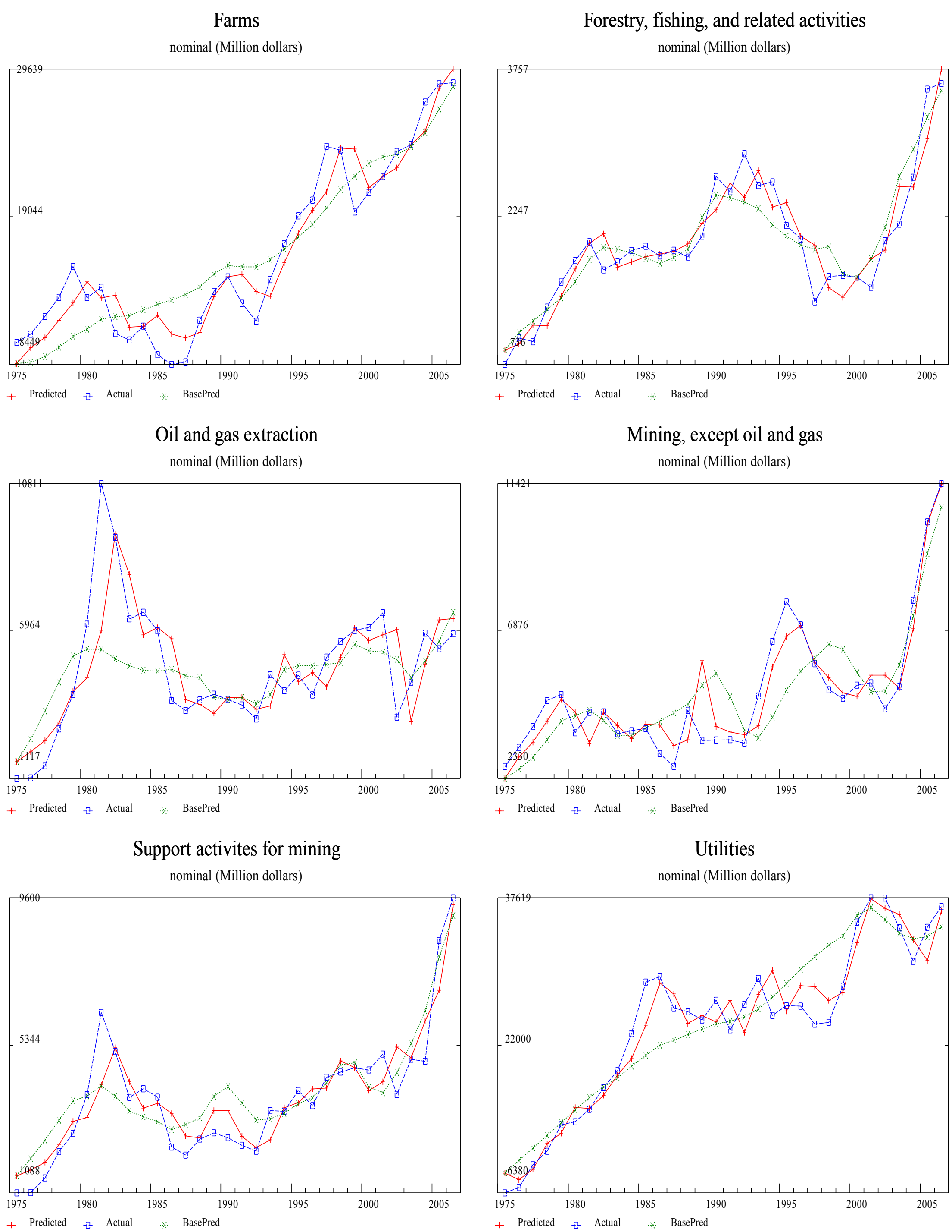


Figure 4.4 (cont.)

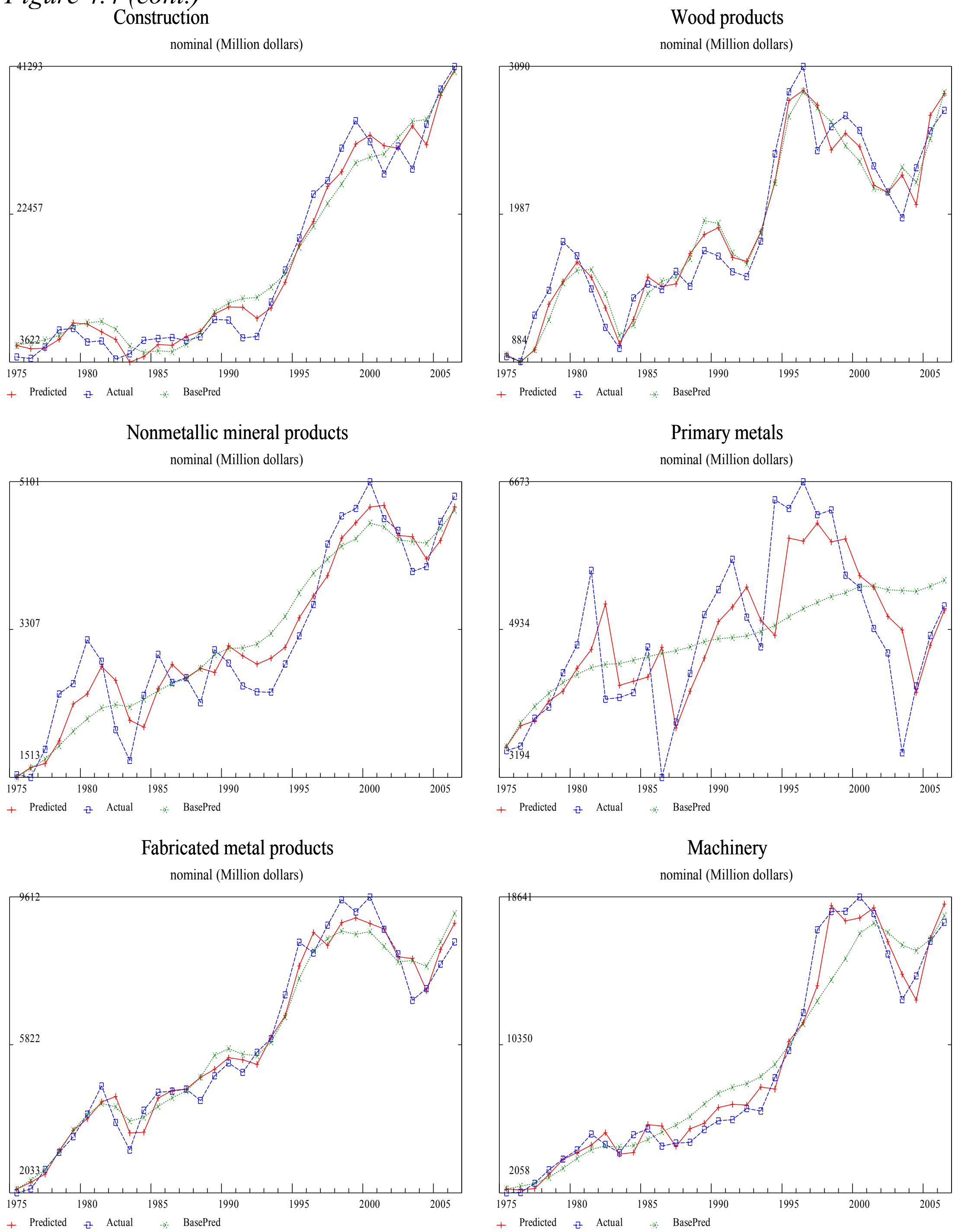


Figure 4.4 (cont.)

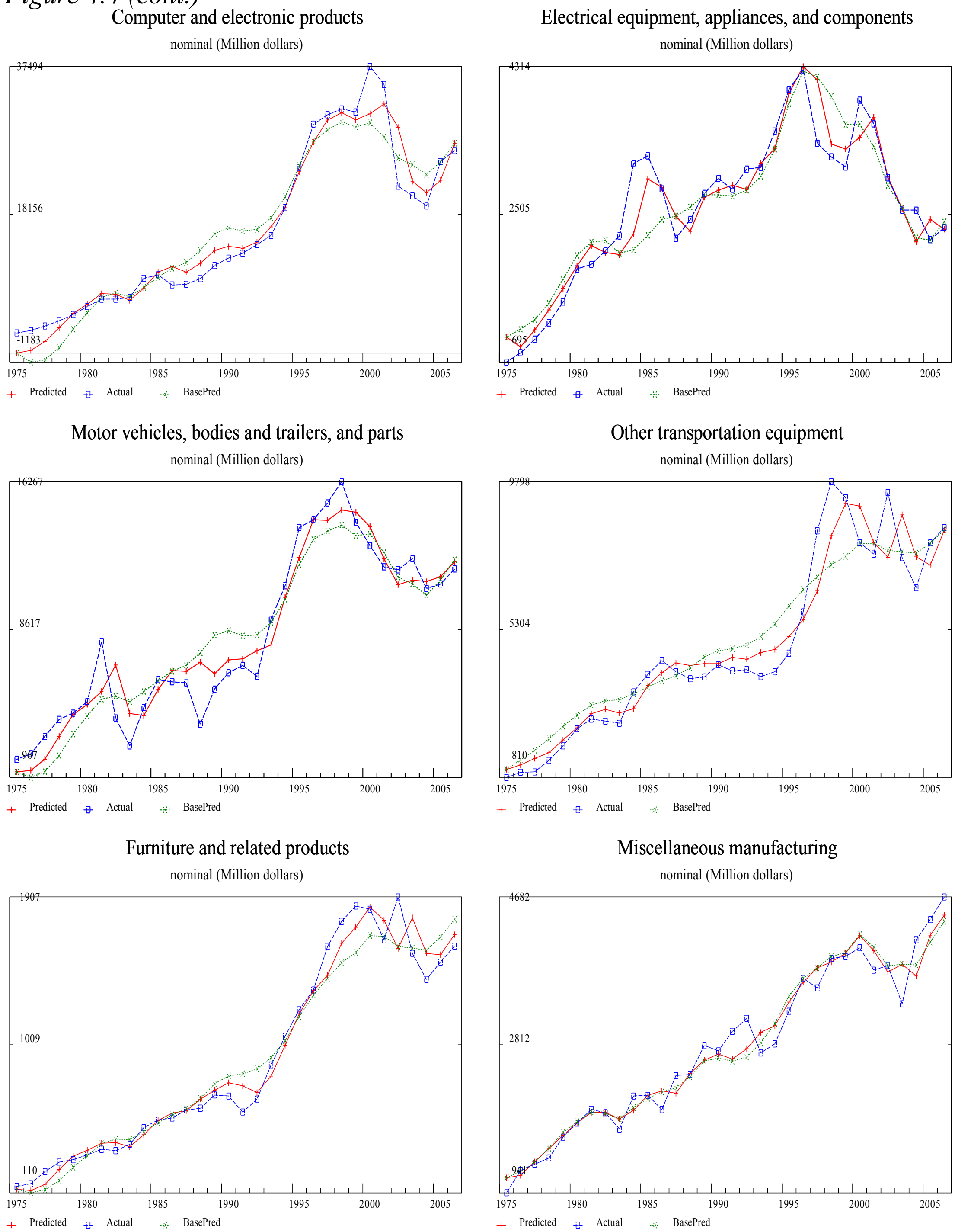


Figure 4.4 (cont.)

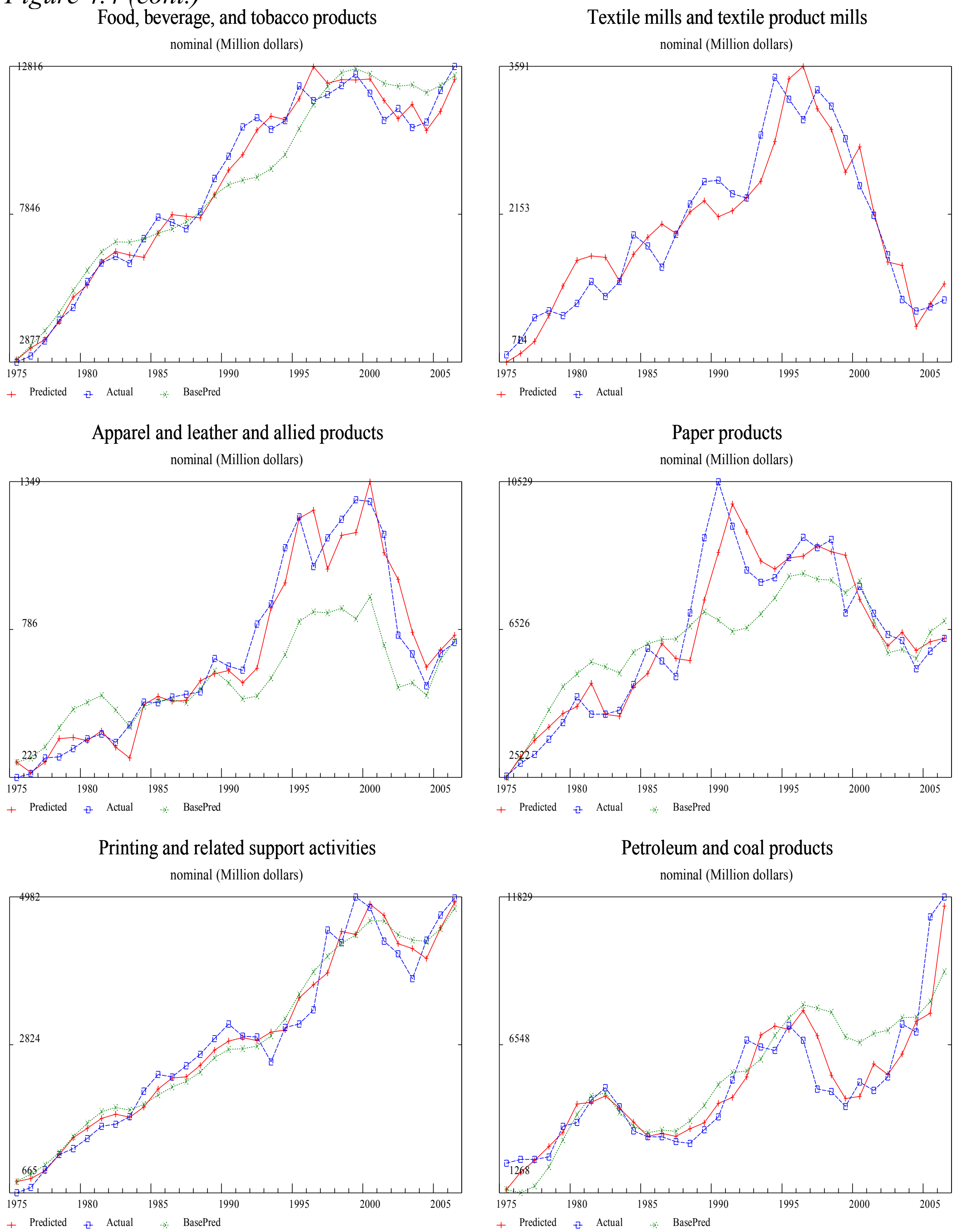


Figure 4.4 (cont.)

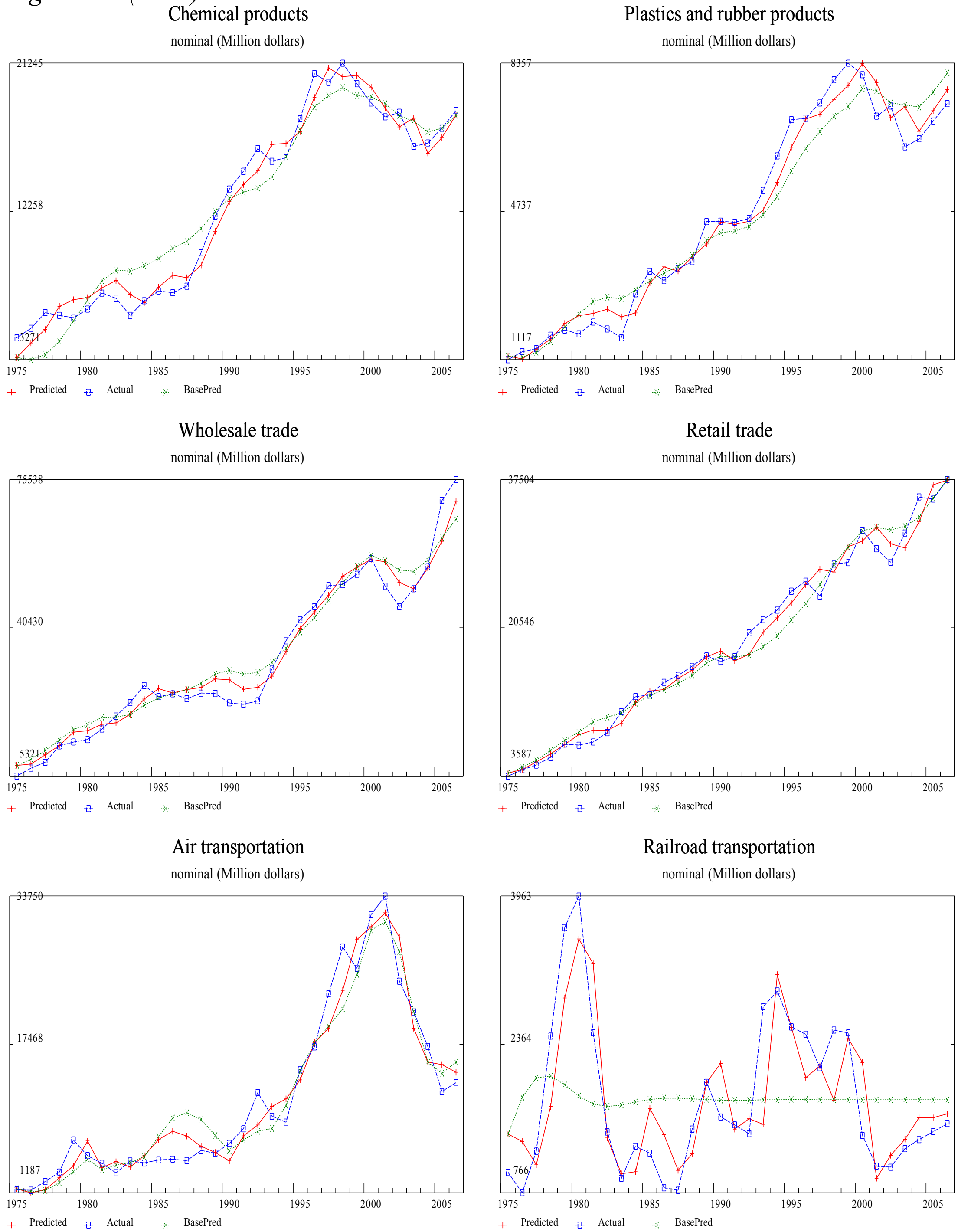


Figure 4.4 (cont.)

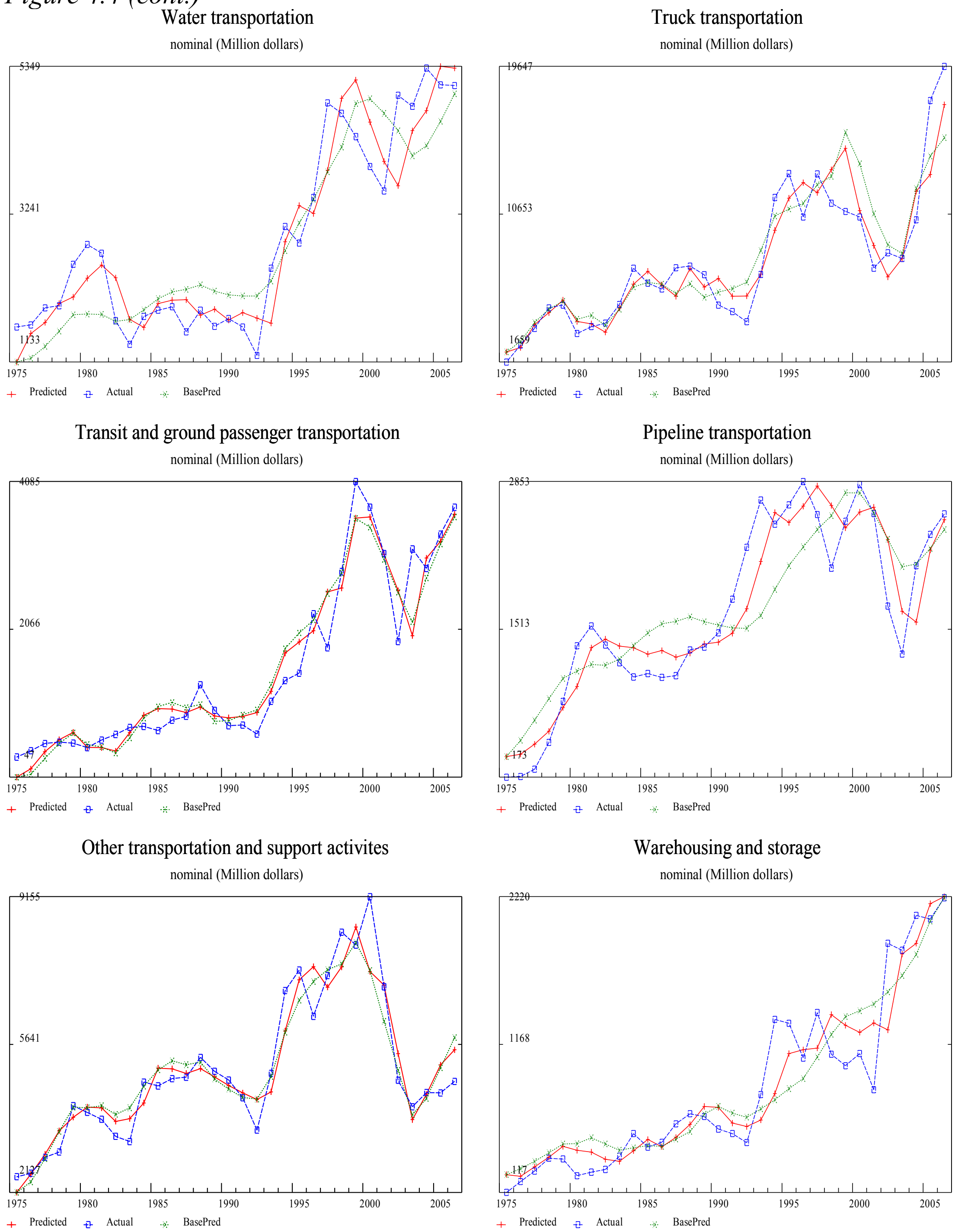


Figure 4.4 (cont.)

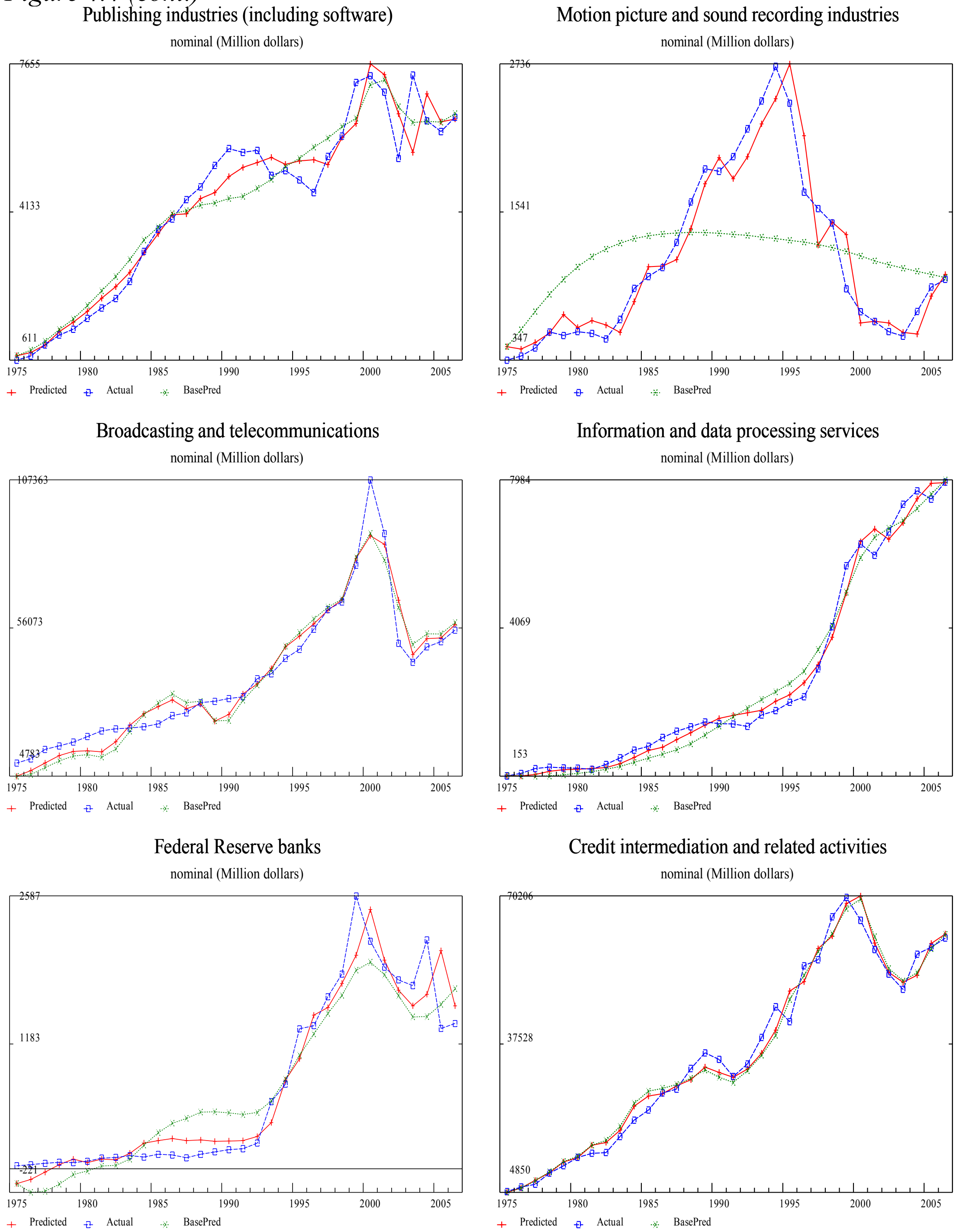
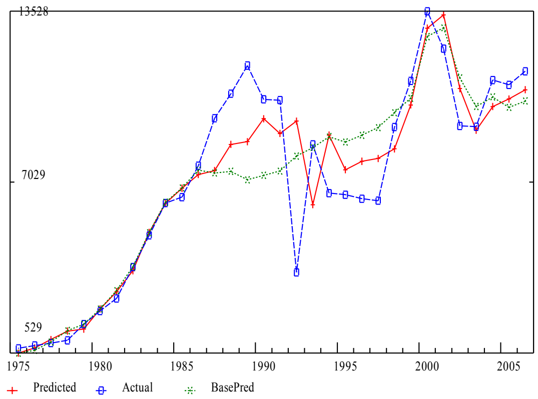


Figure 4.4 (cont.)

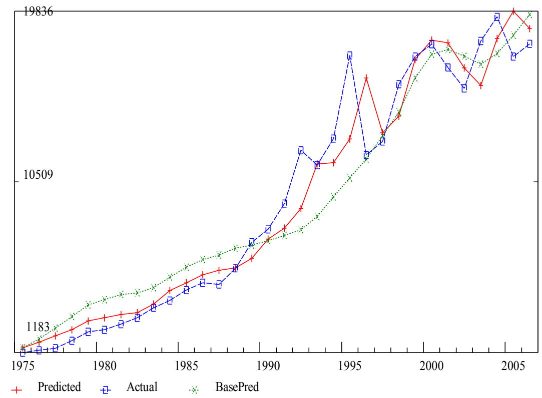
Securities, commodity contracts, and investments

nominal (Million dollars)



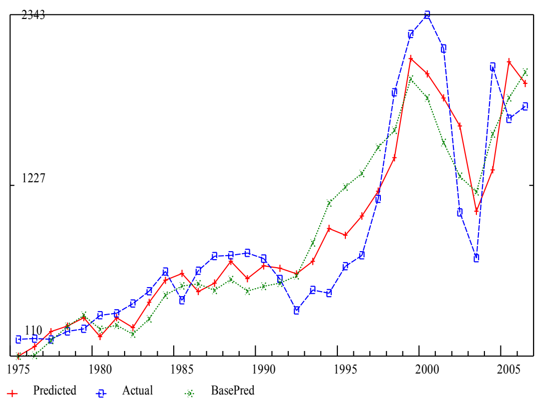
Insurance carriers and related activities

nominal (Million dollars)



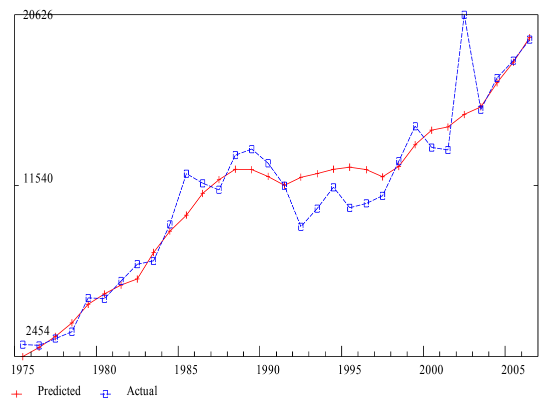
Funds, trusts, and other financial vehicles

nominal (Million dollars)



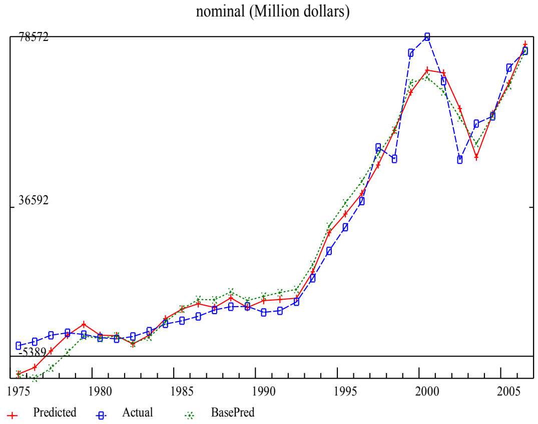
Real estate

nominal (Million dollars)



Rental and leasing services and lessors of intangible assets

nominal (Million dollars)



Legal services

nominal (Million dollars)

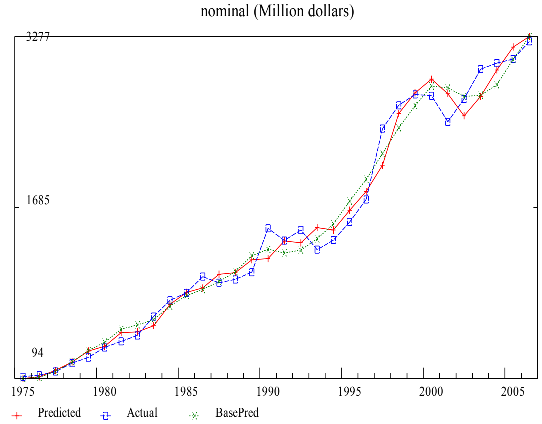


Figure 4.4 (cont.)

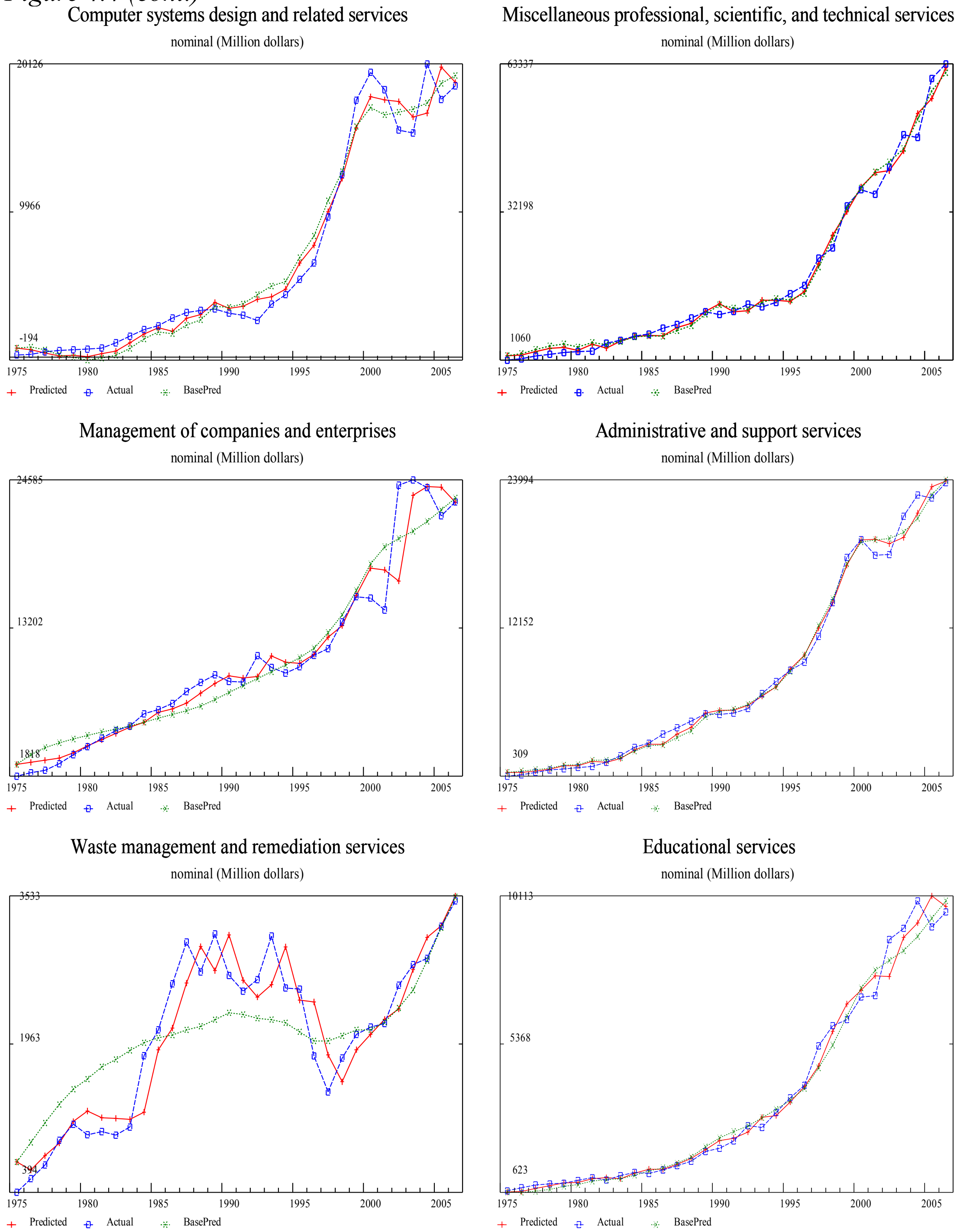


Figure 4.4 (cont.)

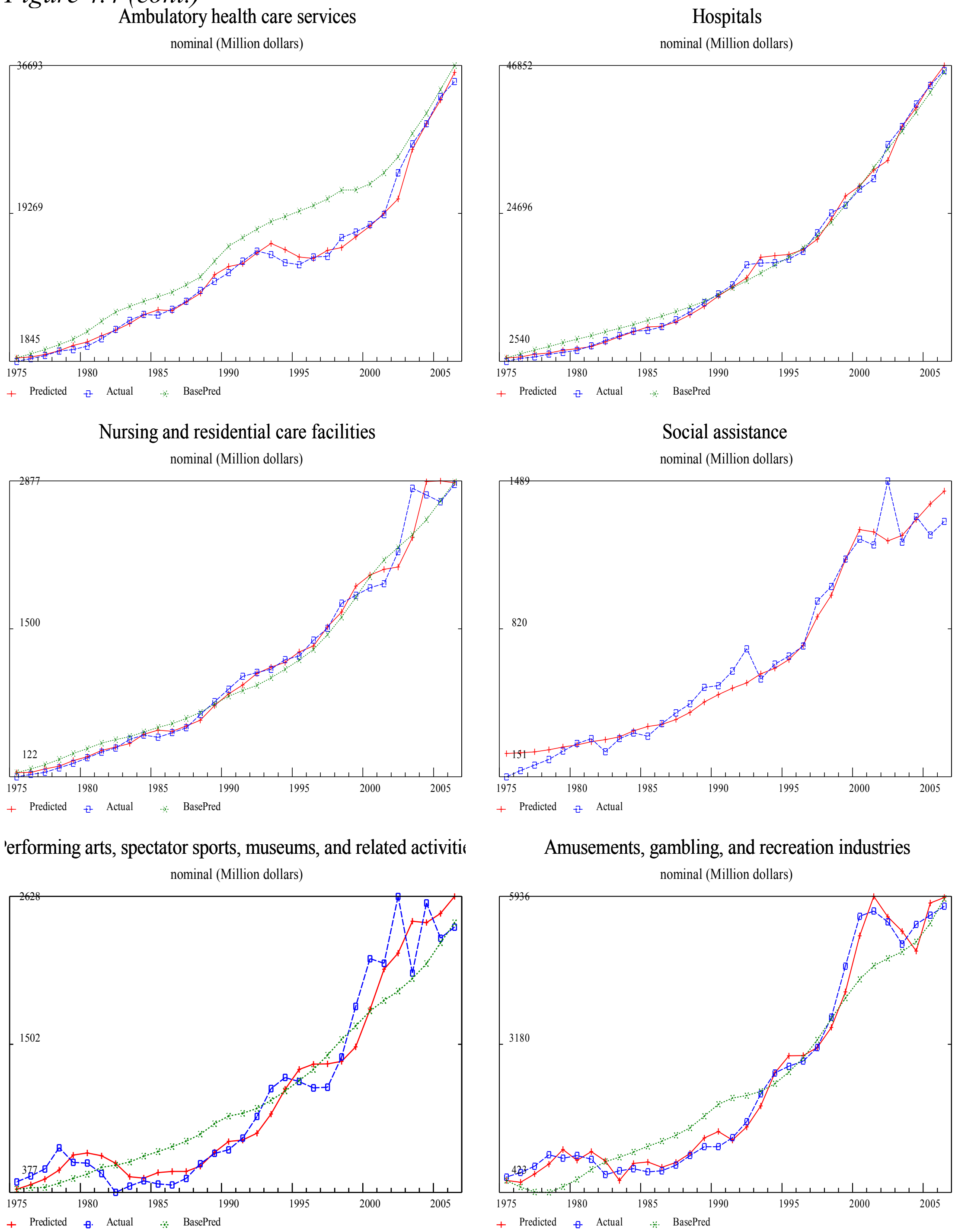
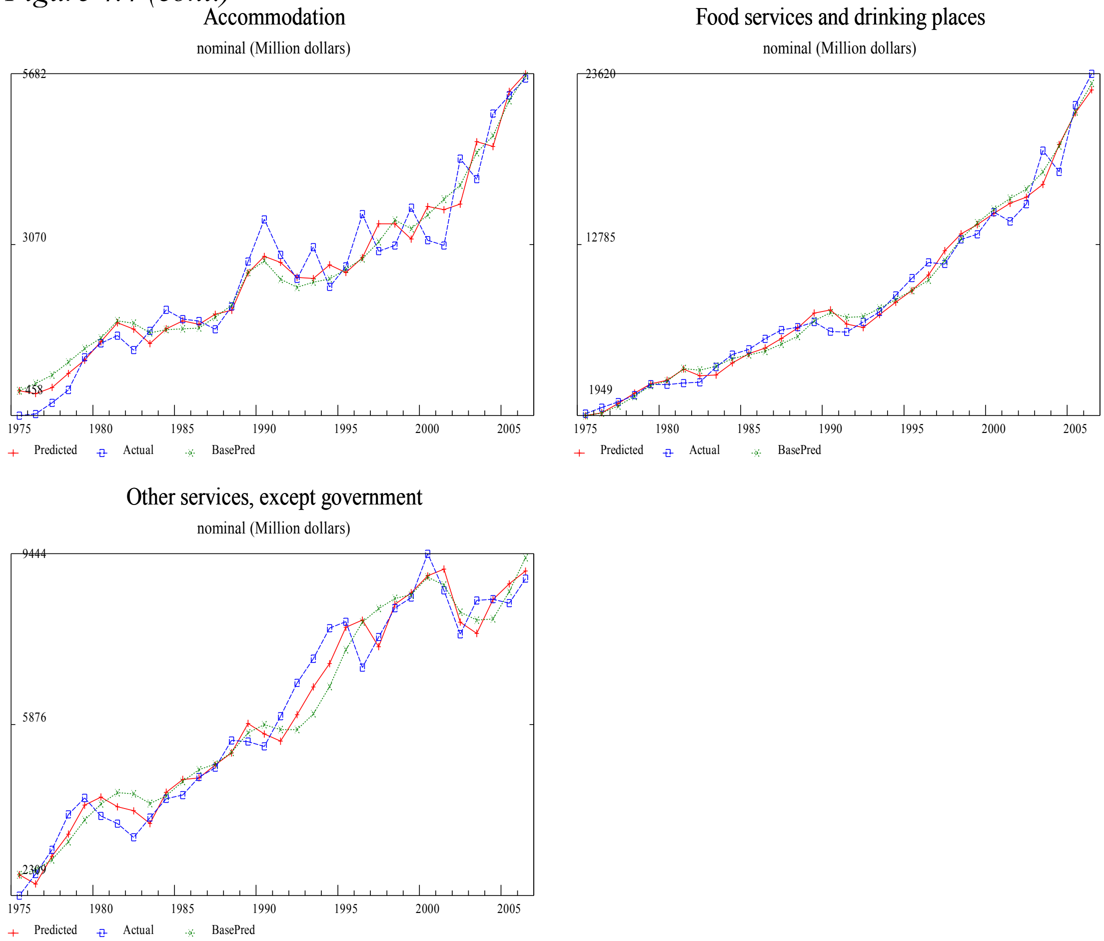


Figure 4.4 (cont.)



4.5 Historical Simulations

Using the earlier described approach, I produced two historical simulations to test the method's performance. Using the same idea as described in Chapter 3, two historical forecasts, one with all actual exogenous variables and one with exogenous variables generated by QUEST, are generated for 2005 and 2006. The assumptions of exogenous variables used in the historical simulation with QUEST (the second simulation) is shown in Table 4.7.

"The first simulation" refers to the historical simulation with actual exogenous variables and "The second simulation" refers to the historical simulation with exogenous variables generated from QUEST and other ad hoc assumptions.

Table 4.7: Assumptions of exogenous variables used in the Second Historical Simulation

		2005Q1	2005Q2	2005Q3	2005Q4
vfnre	Nominal value of Nonresidential Equipment and Software fixed investment	1027.41	1027.78	1037.52	1046.97
pvfnre	Price index of Nonresidential Equipment and Software fixed investment	94.76	94.83	94.24	94.29
vfr	Nominal value of Residential investment	686.01	700.45	720.79	729.85
		2006Q1	2006Q2	2006Q3	2006Q4
vfnre	Nominal value of Nonresidential Equipment and Software fixed investment	1044.79	1049.36	1058.59	1073.27
pvfnre	Price index of Nonresidential Equipment and Software fixed investment	94.43	94.38	94.47	94.67
vfr	Nominal value of Residential investment	732.88	743.59	750.72	761.58
All nominal values are in Billions of dollars					
Percentage difference from the actual value		2005Q1	2005Q2	2005Q3	2005Q4
vfnre	Nominal value of Nonresidential Equipment and Software fixed investment	12.94%	10.88%	8.88%	9.00%
pvfnre	Price index of Nonresidential Equipment and Software fixed investment	0.00%	0.00%	0.00%	0.01%
vfr	Nominal value of Residential investment	-5.72%	-7.45%	-8.26%	-9.11%
		2006Q1	2006Q2	2006Q3	2006Q4
vfnre	Nominal value of Nonresidential Equipment and Software fixed investment	5.35%	5.88%	5.95%	8.55%
pvfnre	Price index of Nonresidential Equipment and Software fixed investment	0.01%	0.00%	0.00%	0.00%
vfr	Nominal value of Residential investment	-9.45%	-5.66%	0.62%	6.47%

We can compare numbers in Table 4.7 with the actual number from the BEA[18]. First, please note that the price index of nonresidential equipment and software fixed investment inputs are actually the published BEA numbers because QUEST does not provided the price indexes required.

Our assumption for nominal fixed investment in nonresidential equipment is approximately 10% higher than the actual BEA numbers. At the same time, QUEST's numbers for the nominal residential fixed investment are generally lower than the BEA values, especially in 2005. QUEST predicted that the residential fixed investment would expand steadily in both 2005 and 2006. What actually happened is that residential fixed

18 http://www.bea.gov/national/nipaweb/SelectTable.asp

investment expanded rapidly in 2005 and started to slow down in 2006. Historically, only about one to two percent of total residential fixed investment is residential fixed investment in equipment. This underestimation of the residential fixed investment should have minimal effect on the performance of the second simulation.

Table 4.8 and Table 4.9 show the differences between each historical simulation and the published numbers. We can also observe how these differences in exogenous inputs affect the performance of the equations. Figure 4.5 graphically presents these differences by major industry groups.

Table 4.8: Historical Simulations' Results in Major Investment Industries, Nominal

	1st Sim		2nd Sim	
Percentage difference from the published value	**2005**	**2006**	**2005**	**2006**
Total Private fixed assets	1.47%	1.43%	8.72%	8.04%
Agriculture, forestry, fishing, and hunting	4.16%	7.79%	5.98%	6.17%
Mining	2.06%	3.44%	11.72%	6.01%
Utilities	-6.94%	-8.65%	-5.20%	-2.63%
Construction	3.46%	2.06%	-1.02%	-6.46%
Manufacturing	-1.77%	-0.04%	-3.53%	-0.15%
Durable goods	-0.34%	2.75%	-1.54%	4.15%
Nondurable goods	-3.87%	-4.15%	-6.46%	-6.47%
Wholesale trade	-9.46%	-9.69%	-2.76%	-4.48%
Retail trade	8.20%	4.99%	10.85%	8.08%
Transportation and warehousing	2.83%	2.12%	28.73%	26.92%
Information	2.05%	2.09%	28.16%	30.80%
Finance and insurance	8.31%	7.01%	22.21%	22.95%
Real estate and rental and leasing	1.76%	5.58%	25.16%	18.06%
Professional, scientific, and technical services	0.31%	-1.82%	1.75%	0.98%
Management of companies and enterprises\5\	11.66%	6.35%	11.33%	8.25%
Administrative and waste management services	7.02%	3.65%	8.02%	5.90%
Educational services	11.52%	8.12%	11.44%	9.51%
Health care and social assistance	-0.09%	1.11%	-2.70%	-0.68%
Arts, entertainment, and recreation	10.23%	14.04%	12.21%	14.76%
Accommodation and food services	2.13%	-0.62%	4.36%	-1.65%
Other services, except government	8.44%	7.20%	9.14%	9.29%

From the 63 detailed industries' results shown in Table 4.9, I aggregated the results into 19 industry groups as shown in Table 4.8. I will discuss only the nominal values in this section as BEA does not publish real values or price indexes of Fixed Assets.

Table 4.9: Historical Simulations' Results in Detailed Investment Industries, Nominal

	1st Sim		2nd Sim	
Percentage difference from the published value	**2005**	**2006**	**2005**	**2006**
Farms	5.99%	9.17%	9.35%	9.40%
Forestry, fishing, and related activities	-10.58%	-3.21%	-21.21%	-19.46%
Oil and gas extraction	24.49%	26.52%	56.49%	44.73%
Mining, except oil and gas	3.76%	2.66%	9.21%	5.15%
Support activites for mining	-14.44%	-9.73%	-13.97%	-16.62%
Utilities	-6.94%	-8.65%	-5.20%	-2.63%
Construction	3.46%	2.06%	-1.02%	-6.46%
Wood products	9.19%	9.85%	1.80%	0.87%
Nonmetallic mineral products	-1.83%	-2.84%	-2.14%	-1.04%
Primary metals	1.61%	0.38%	0.98%	1.23%
Fabricated metal products	8.90%	11.24%	6.08%	9.77%
Machinery	3.81%	8.70%	3.27%	11.28%
Computer and electronic products	-9.43%	-2.06%	-10.23%	0.03%
Electrical equipment, appliances, and components	18.75%	11.98%	12.77%	12.90%
Motor vehicles, bodies and trailers, and parts	6.82%	7.27%	5.84%	9.38%
Other transportation equipment	-8.60%	-6.60%	-9.21%	-5.13%
Furniture and related products	6.88%	8.99%	6.60%	11.59%
Miscellaneous manufacturing	-1.68%	-4.22%	-2.05%	-1.75%
Food, beverage, and tobacco products	-1.66%	-5.41%	-4.71%	-10.04%
Textile mills and textile product mills	10.11%	16.55%	-7.72%	26.77%
Apparel and leather and allied products	6.01%	8.52%	7.35%	16.57%
Paper products	6.55%	4.38%	6.99%	9.24%
Printing and related support activities	-0.13%	-0.33%	-0.50%	1.82%
Petroleum and coal products	-28.84%	-23.79%	-33.71%	-34.03%
Chemical products	-0.06%	-2.12%	-2.39%	-4.67%
Plastics and rubber products	7.78%	9.68%	7.29%	12.27%
Wholesale trade	-9.46%	-9.69%	-2.76%	-4.48%
Retail trade	8.20%	4.99%	10.85%	8.08%
Air transportation	25.39%	21.35%	35.42%	82.90%
Railroad transportation	12.73%	19.16%	12.92%	19.58%
Water transportation	11.49%	14.03%	28.63%	27.03%
Truck transportation	-21.54%	-21.47%	17.05%	-13.49%
Transit and ground passenger transportation	3.39%	1.42%	42.72%	22.63%
Pipeline transportation	3.02%	2.22%	16.99%	16.88%
Other transportation and support activites	19.80%	26.75%	64.84%	59.52%
Warehousing and storage	9.91%	5.57%	11.76%	3.94%
Publishing industries (including software)	6.70%	2.07%	12.34%	15.62%
Motion picture and sound recording industries	-4.41%	-3.53%	-4.43%	-3.92%
Broadcasting and telecommunications	0.95%	2.11%	33.89%	36.94%
Information and data processing services	6.69%	2.67%	5.70%	4.56%
Federal Reserve banks	59.20%	52.30%	84.52%	78.93%
Credit intermediation and related activities	5.85%	5.67%	20.35%	21.91%
Securities, commodity contracts, and investments	-3.81%	-8.72%	9.46%	16.76%
Insurance carriers and related activities	17.96%	15.96%	26.61%	24.26%
Funds, trusts, and other financial vehicles	32.46%	27.13%	74.47%	41.59%
Real estate	3.29%	3.31%	1.35%	0.60%
Rental and leasing services and lessors of intangible assets	1.37%	6.16%	31.27%	22.54%
Legal services	5.51%	3.57%	7.47%	8.99%
Computer systems design and related services	13.50%	5.24%	11.90%	9.54%
Miscellaneous professional, scientific, and technical services	-3.82%	-4.17%	-1.52%	-1.95%
Management of companies and enterprises	11.66%	6.35%	11.33%	8.25%
Administrative and support services	7.42%	3.50%	8.07%	5.89%
Waste management and remediation services	4.17%	4.69%	7.66%	5.92%
Educational services	11.52%	8.12%	11.44%	9.51%
Ambulatory health care services	-1.43%	0.87%	-6.34%	-4.40%
Hospitals	-0.04%	0.63%	-1.23%	1.16%
Nursing and residential care facilities	8.83%	6.71%	9.27%	7.51%
Social assistance	14.46%	12.15%	16.57%	15.68%
Performing arts, spectator sports, museums, and related activities	12.52%	16.17%	14.23%	16.83%
Amusements, gambling, and recreation industries	9.29%	13.16%	11.38%	13.89%
Accommodation	2.50%	4.28%	-2.42%	-1.73%
Food services and drinking places	2.04%	-1.78%	6.04%	-1.63%
Other services, except government	8.44%	7.20%	9.14%	9.29%

Overall, our equations can predict the fixed investment by all private industries very well, at least during the 2005 and 2006 historical simulation period, when we can predict exactly what the exogenous variables will be. The first simulation misses the FAA total by 1.47% in 2005 and 1.43% in 2006. At the same time, the second simulation performs not as good as the first simulation. The second simulation missed the FAA fixed investment by all private industries by 8.72% in 2005 and 8.04% in 2006. This overestimation errors of the second simulation is in line with the overestimation of private fixed investment in nonresidential equipment and software, described earlier.

For equipment investment by Agriculture, forestry, fishing, and hunting, the first simulation missed the BEA numbers by 4.16% and 7.79% in 2005 and 2006, respectively. The second simulation missed the same numbers by 5.98% and 6.17% in 2005 and 2006, respectively. Both simulations show relatively comparable performance in predicting fixed investment in equipment by Agriculture, forestry, fishing, and hunting. However, the detailed results, shown in Table 4.9, tell a different story. The first simulation performs better than the second simulation in predicting the equipment fixed investment by both Farms and Forestry, fishing, and related activities. Both simulations overestimate the investment in Farms and underestimate the investment in Forestry, fishing, and hunting industries.

The first simulation missed the equipment fixed investment by Mining by 2.06% in 2005 and 3.44% in 2006. the second simulation missed the same numbers by 11.72% and 6.01% in 2005 and 2006, respectively. Most of the errors from both simulations come from the oil and gas extraction industry. The second simulation overestimate the expansion by 56.49% in 2005 and 44.73% in 2006.

For fixed investment in equipment by utilities industry, the second simulation provided a better forecast than the first simulation. Out-performing the second simulation, the first simulation performs quite well with errors of -6.94% in 2005 and -8.65% in 2006.

For the investment by construction industry, the first simulation overestimates the published numbers with errors of 3.46% in 2005 and 2.06% in 2006. The second simulation missed the same numbers by -1.02% in 2005 and -6.46% in 2006.

The first simulation performs very well in predicting the equipment investment by Manufacturing. It missed the published numbers by -1.77% in 2005 and -0.04% in 2006. The second simulation performs relatively well with errors of -3.53% in 2005 and -0.15% in 2006. From the detailed industries' forecast, most of the underestimation by both simulations in 2005 comes from nondurable goods manufacturing industries. In 2006, both simulations overestimate the investment by durable goods manufacturing and underestimate the investment by nondurable goods manufacturing. The underestimated forecast of the equipment fixed investment by the computer and electronic products, which contributes around 30% to the durable goods manufacturing investment, is the main contributor to the slightly underestimation of the equipment investment by durable goods manufacturing. For nondurable goods manufacturing equipment investment, the underestimated forecasts of investment by Food, beverage, and tobacco products and investment by petroleum and coal products are the two main sources of errors in the second simulation forecast of nondurable manufacturing equipment investment.

For Wholesale trade equipment investment, the first simulation missed the published numbers by -9.46% and -9.69% in 2005 and 2006, respectively. The second simulation missed the same number by -2.76% in 2005 and -4.48%, respectively.

The equipment investment by Retail trade is overestimated by the first simulation with errors of 8.20% in 2005 and 4.99% in 2006. The second simulation missed the same number by 10.85% in 2005 and 8.08% in 2006.

Overall, the first simulation can predict most of the major components of equipment investment by Service industries. The first simulation forecast of the Finance and insurance industry, the biggest component of nominal fixed investment in equipment by services industries, is not as good as the forecast of other major components such as Real estate and rental and leasing, Professional, scientific, and technical services, and Health care and social services. The first simulation missed the published numbers of Finance and insurance investment by 8.31% in 2005 and 7.01% in 2006. Three industry groups, with the forecast errors by the first simulation over ten percent, are 1) Management of companies and enterprises, 2) Educational services, and 3) Arts, entertainment, and recreation. For these three industry groups, the second simulation generated relative the same magnitude of errors in each industry.

However, the second simulation performs a lot worse than the first simulation in most of the big components of the equipment investment in services industry. Four industry groups have forecast errors by the second simulation bigger than 20% in both 2005 and 2006. These four industries are 1) Transportation and warehousing, 2) Information, 3) Finance and insurance, and 4) Real estate and rental and leasing.

From Table 4.9, the source of the significant errors in these four industry groups is that the second simulation forecast significantly missed the biggest component of each of the four industry groups. For Transportation and warehousing equipment investment, the second simulation missed its biggest component, Air transportation, by 35.42% in 2005 and 82.90% in 2006. For Information industry equipment investment, the second simulation missed the published numbers of equipment investment by Broadcasting and telecommunication industry by 33.89% and 36.94% in 2005 and 2006, respectively. For Finance and insurance industry equipment investment, the second simulation missed the published numbers of equipment investment by Credit intermediation and related activities industry by 20.35% in 2005 and 21.91% in 2006. Lastly, for Real estate and rental and leasing industry, the second simulation missed the published numbers of equipment investment by Rental and leasing services by 31.27% and 22.54% in 2005 and 2006, respectively.

With the results from the first and the second simulation, we observe that our approach can forecast the nominal fixed investment by major industry groups quite well when we have accurate exogenous inputs, *i.e.* the first historical simulation. Specifically, the accuracy of the nonresidential fixed investment in equipment and software directly affects the accuracy of the approach, especially in the forecast of equipment investment by Service industries, as Service industries fixed investment is typically mostly in equipment and software.

Figure 4.5: Plots compared BEA numbers with numbers from Historical Simulations

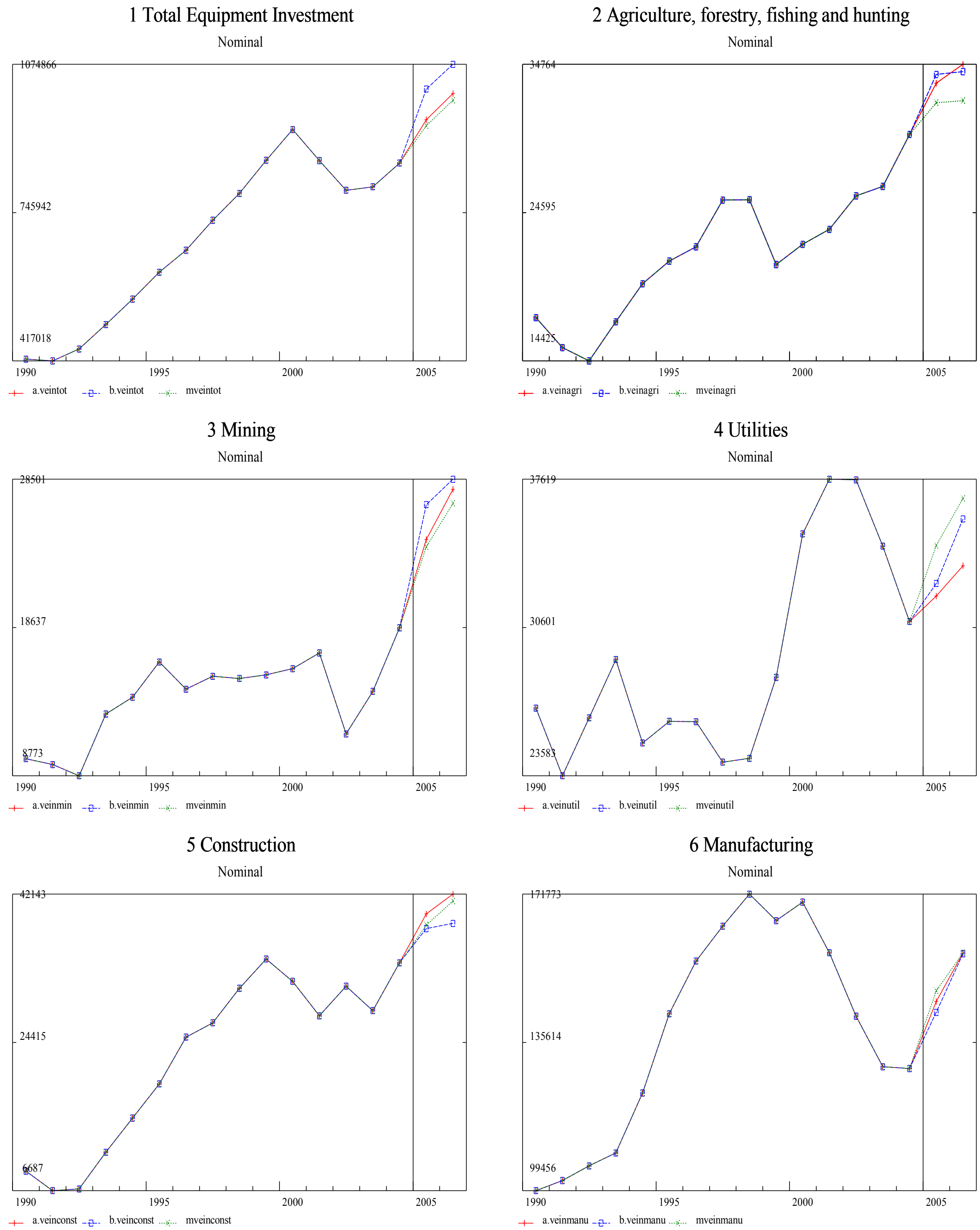


Figure 4.5 (cont.)

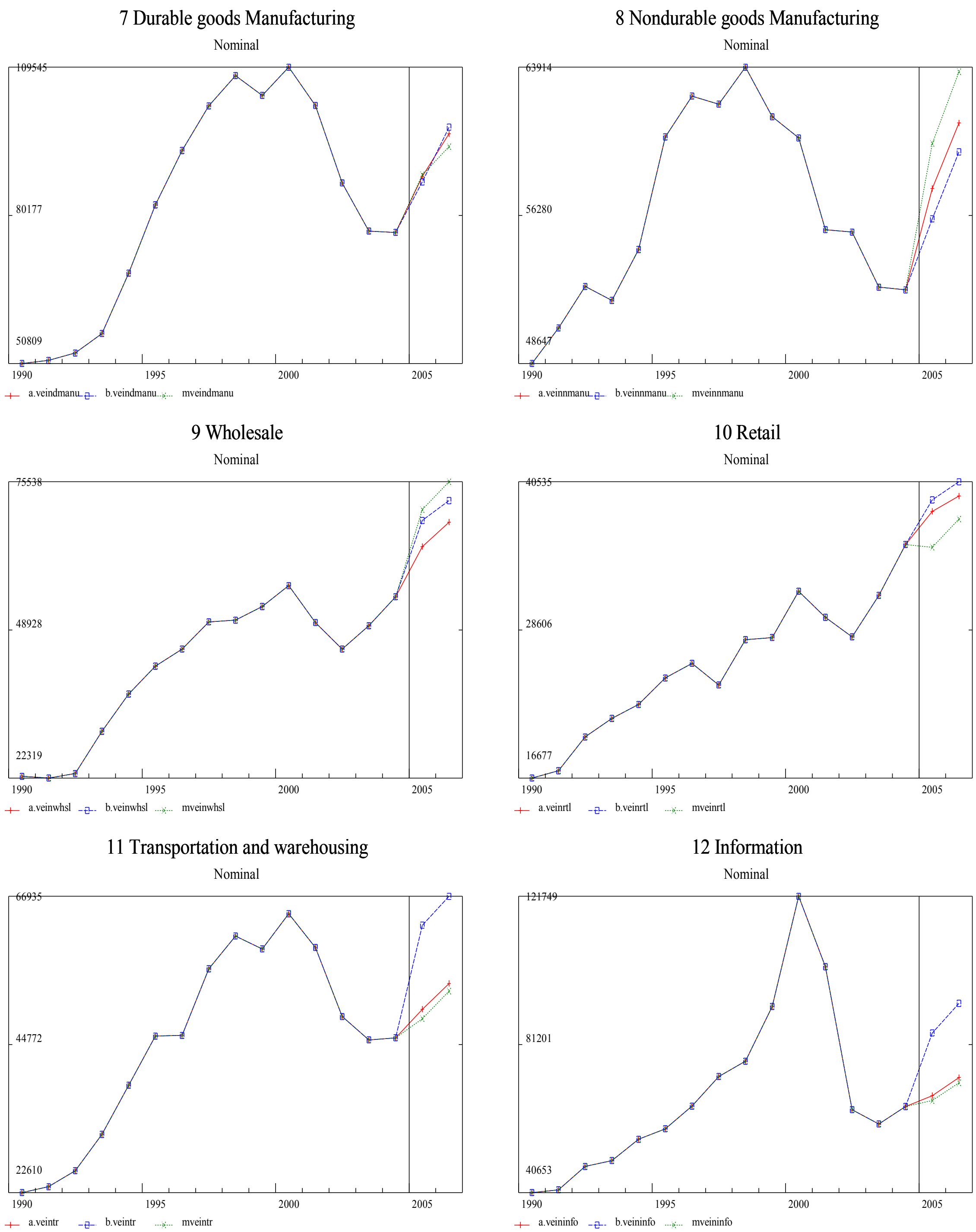


Figure 4.5 (cont.)

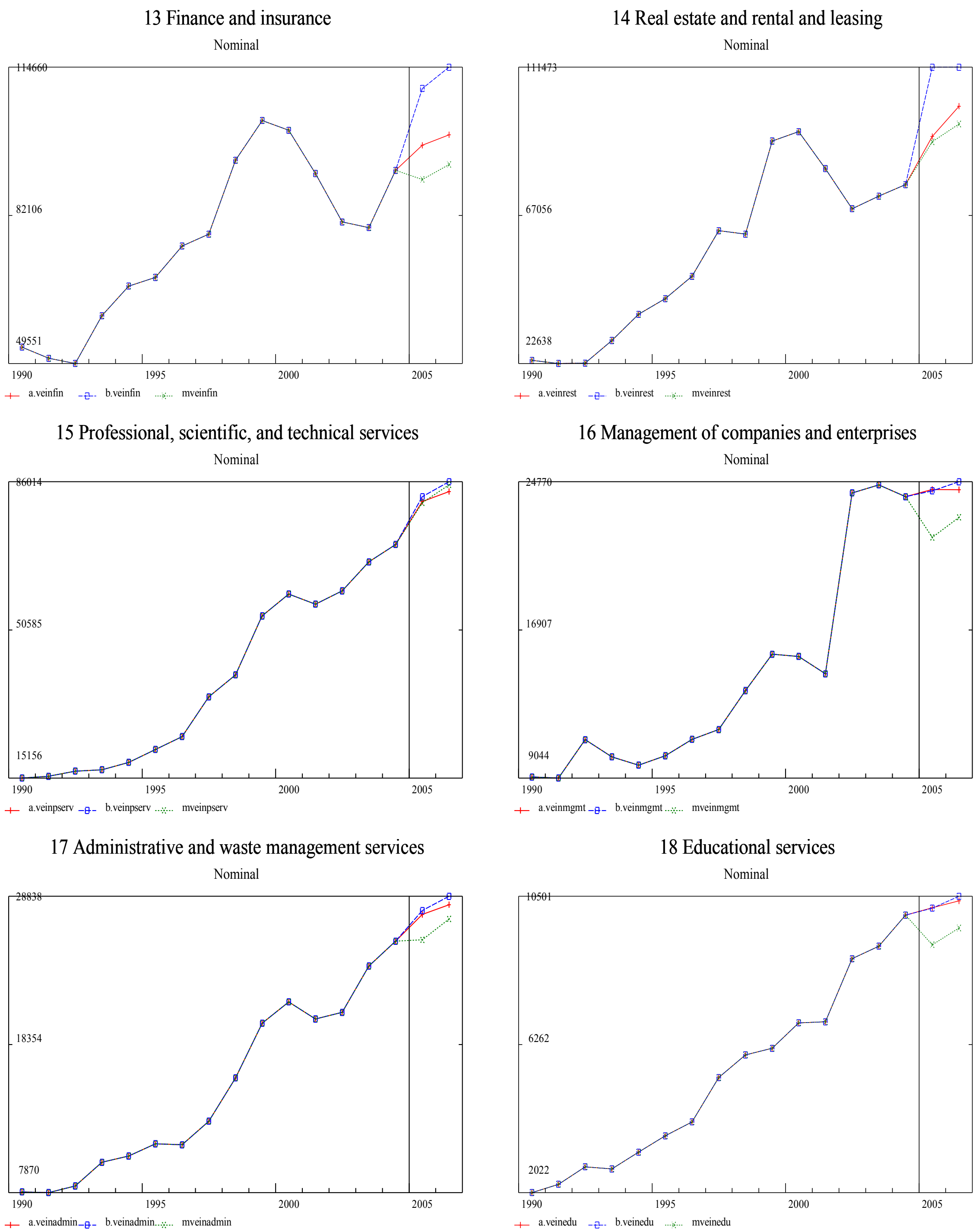
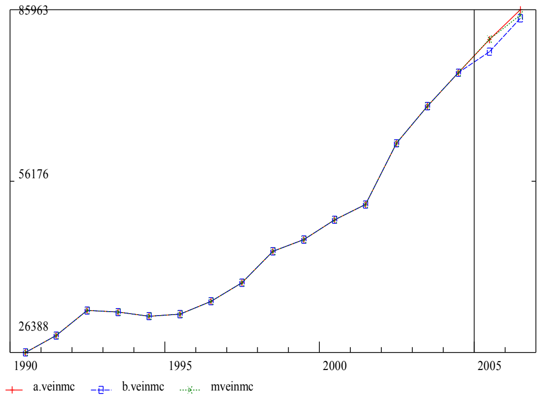


Figure 4.5 (cont.)

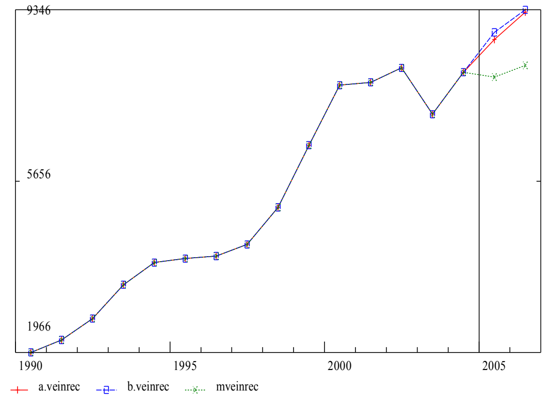
19 Health care and social assistance

Nominal



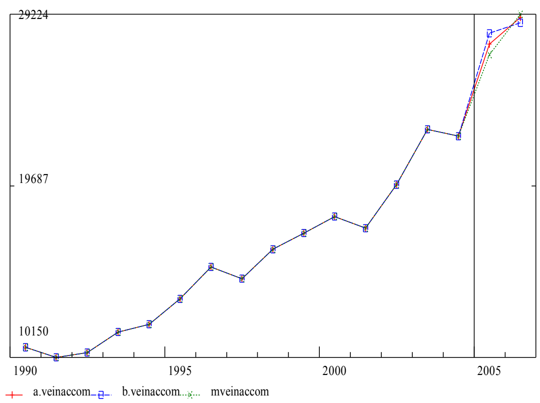
20 Arts, entertainment and recreation

Nominal



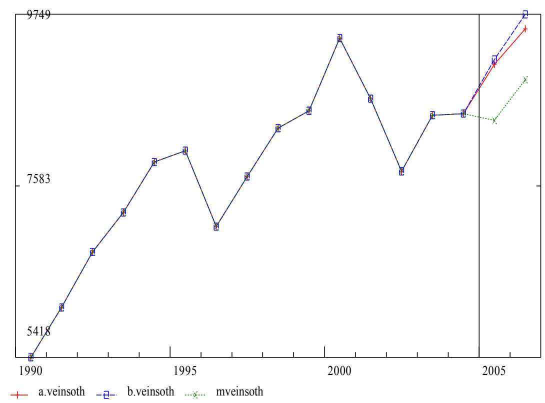
21 Accommodation and food services

Nominal



22 Other services, except government

Nominal



4.6 Forecast of Private Fixed Investment in Equipment and Software through 2008

In this section, I discuss a short-term Outlook of U.S. Private fixed investment in Equipment and software in 2007 and 2008. The forecast is given from the approach described earlier with equations discussed in previous sections.

The outlook is presented by industry groups. The readers can find all detailed forecast estimates and plots of both investment classifications (NIPA by asset types and FAA by purchasing industries) in Appendix 4.2, Appendix 4.3, Appendix 4.4, and Appendix 4.5.

Forecast Assumptions

This approach needs only three exogenous variables which are provided by the QUEST model. Table 4.10 shows all values of the exogenous variables used in this forecast.

Table 4.10: Assumptions of exogenous variables used in fixed investment forecast

		2007Q4	2008Q1	2008Q2	2008Q3	2008Q4
vfnre	Nominal value of Nonresidential Equipment and Software fixed investment	1017.66	1020.93	1021.16	1028.88	1036.08
pvfnre	Price index of Nonresidential Equipment and Software fixed investment	94.85	94.83	94.82	94.83	94.84
vfr	Nominal value of Residential investment	638.83	631.77	626.18	627.30	623.69

The nominal value of residential investment is predicted to be declining in 2008. This is a reasonable estimate as the residential investment (both structures and equipment) is directly affected by the downturn in Real estate market which presents a possible economic recession in the short-term.

The nominal value of nonresidential private fixed investment in equipment and software is predicted to be steadily increasing. However, the growth rates are slower between the last quarter of 2007 and the first half of 2008 while it is predicted to grow faster in the second half of 2008. At the same time, the price index of nonresidential private fixed investment in equipment and software is predicted to be generally stable during the forecast period.

Outlook of Fixed Investment in Equipment and Software

This discussion contains only the fixed investment by purchasing industries as it is the objective and it can be used in the Inforum model. The 63 industries are grouped into 19 industry groups for discussion. Within the Manufacturing industry group, we show 2 subgroups, Durable goods manufacturing and Nondurable goods manufacturing. Total Private fixed investment in equipment and software is also included.

Table 4.11 shows the historical and forecasted value by industry groups between 1990 and 2008 in both nominal and real 2000. Table 4.12 shows the growth rates between 2001 and 2008. Figure 4.6 shows plots between nominal and real 2000 value of the investment by industry groups.

Table 4.11: Summary of Forecast by Major Industry Groups

	1990	1995	2000	2005	2006	2007	2008
Nominal in Million of dollars							
Total Equipment Investment	420,324	612,831	929,682	937,976	994,854	1,027,601	1,070,163
Agriculture, forestry, fishing and hunting	17,372	21,260	22,408	32,131	32,253	32,868	34,087
Mining	9,904	16,319	15,897	23,976	26,885	25,673	23,772
Utilities	26,776	26,158	35,022	34,468	36,695	38,175	39,119
Construction	8,982	19,433	31,714	38,395	41,293	44,640	48,145
Manufacturing	99,456	142,511	169,796	148,138	157,435	172,174	185,660
Durable goods Manufacturing	50,809	82,190	109,545	88,165	93,767	103,579	112,862
Nondurable goods Manufacturing	48,647	60,321	60,251	59,973	63,668	68,595	72,799
Wholesale	22,620	42,402	56,839	70,502	75,538	74,850	74,900
Retail	16,677	24,731	31,707	35,246	37,504	38,834	40,521
Transportation and warehousing	22,610	46,004	64,297	48,630	52,738	51,083	48,717
Information	40,653	58,030	121,749	65,764	70,655	72,506	75,686
Finance and insurance	53,129	68,420	100,793	89,964	93,256	95,545	99,561
Real estate and rental and leasing	23,483	42,025	92,126	89,065	94,406	92,211	93,359
Professional, scientific, and technical services	15,156	21,915	59,106	80,977	85,182	86,444	89,956
Management of companies and enterprises	9,088	10,225	15,489	21,807	22,882	24,304	25,813
Administrative and waste management services	7,917	11,317	21,345	25,742	27,232	28,727	30,425
Educational services	2,022	3,648	6,874	9,113	9,589	10,300	11,013
Health care and social assistance	26,388	33,031	49,388	80,788	85,023	91,413	98,992
Arts, entertainment and recreation	1,966	3,988	7,714	7,890	8,144	8,446	8,929
Accommodation and food services	10,707	13,389	17,974	26,973	29,224	29,635	30,972
Other services, except government	5,418	8,025	9,444	8,407	8,920	9,773	10,536
Real 2000 in Million of dollars							
Total Equipment Investment	399,686	566,897	929,682	1,012,195	1,086,428	1,133,253	1,216,615
Agriculture, forestry, fishing and hunting	20,199	22,195	22,408	29,793	29,270	29,168	29,810
Mining	10,773	16,425	15,897	23,346	25,857	24,376	22,530
Utilities	28,373	25,908	35,022	34,377	36,228	37,223	38,275
Construction	9,477	19,261	31,714	38,165	40,730	43,663	47,301
Manufacturing	102,317	139,159	169,796	150,976	159,594	173,391	189,130
Durable goods Manufacturing	51,572	79,974	109,545	90,393	95,712	105,192	116,145
Nondurable goods Manufacturing	50,858	59,213	60,251	60,565	63,865	68,204	73,022
Wholesale	21,958	39,121	56,839	76,185	83,314	84,025	87,888
Retail	16,396	23,072	31,707	37,796	40,837	42,937	46,667
Transportation and warehousing	21,873	42,957	64,297	51,057	55,641	53,878	52,007
Information	34,414	50,292	121,749	74,926	81,990	85,433	92,126
Finance and insurance	44,706	58,045	100,793	106,610	115,471	123,203	138,441
Real estate and rental and leasing	22,072	37,962	92,126	98,552	107,734	108,122	115,985
Professional, scientific, and technical services	12,029	18,995	59,106	94,428	101,577	105,589	115,520
Management of companies and enterprises	7,259	8,800	15,489	25,748	27,874	30,570	34,573
Administrative and waste management services	7,474	10,446	21,345	27,997	30,004	32,080	35,225
Educational services	1,769	3,256	6,874	10,240	10,975	12,012	13,381
Health care and social assistance	23,097	29,035	49,388	89,884	95,642	103,450	113,772
Arts, entertainment and recreation	2,127	3,949	7,714	7,885	8,122	8,417	9,060
Accommodation and food services	11,994	13,671	17,974	25,865	27,614	27,614	28,809
Other services, except government	5,429	7,690	9,444	8,772	9,357	10,311	11,431

Table 4.12: Growth rates of Fixed Investment in Equipment and Software 2001-2008

	2001	2002	2003	2004	2005	2006	2007	2008
Nominal								
Total Equipment Investment	-7.40%	-7.67%	1.01%	6.52%	9.67%	6.06%	3.29%	4.14%
Agriculture, forestry, fishing and hunting	4.61%	9.74%	2.52%	13.51%	7.33%	0.38%	1.91%	3.71%
Mining	6.50%	-31.87%	24.60%	29.35%	28.97%	12.13%	-4.51%	-7.41%
Utilities	7.42%	-0.11%	-8.35%	-10.36%	11.65%	6.46%	4.03%	2.47%
Construction	-13.10%	12.91%	-9.40%	20.30%	13.21%	7.55%	8.11%	7.85%
Manufacturing	-7.26%	-9.85%	-8.69%	-0.34%	14.68%	6.28%	9.36%	7.83%
Durable goods Manufacturing	-6.94%	-15.11%	-10.96%	-0.39%	14.87%	6.35%	10.46%	8.96%
Nondurable goods Manufacturing	-7.83%	-0.21%	-5.15%	-0.26%	14.39%	6.16%	7.74%	6.13%
Wholesale	-11.71%	-9.42%	9.23%	10.41%	28.60%	7.14%	-0.91%	0.07%
Retail	-6.68%	-5.23%	11.91%	13.03%	-0.64%	6.41%	3.55%	4.34%
Transportation and warehousing	-7.85%	-17.41%	-7.16%	0.64%	6.35%	8.45%	-3.14%	-4.63%
Information	-15.90%	-38.14%	-6.19%	8.00%	2.49%	7.44%	2.62%	4.39%
Finance and insurance	-9.48%	-11.68%	-1.49%	15.83%	-2.15%	3.66%	2.45%	4.20%
Real estate and rental and leasing	-12.04%	-14.89%	5.54%	4.65%	16.92%	6.00%	-2.33%	1.25%
Professional, scientific, and technical services	-4.03%	5.55%	11.56%	6.30%	14.05%	5.19%	1.48%	4.06%
Management of companies and enterprises	-5.94%	65.85%	1.75%	-2.50%	-9.03%	4.93%	6.22%	6.21%
Administrative and waste management services	-5.69%	2.34%	15.99%	7.32%	0.38%	5.79%	5.49%	5.91%
Educational services	0.51%	26.02%	4.13%	9.80%	-8.47%	5.22%	7.41%	6.92%
Health care and social assistance	5.47%	20.44%	10.27%	8.38%	7.76%	5.24%	7.52%	8.29%
Arts, entertainment and recreation	0.86%	3.95%	-12.34%	12.74%	-1.28%	3.22%	3.71%	5.71%
Accommodation and food services	-3.67%	14.01%	15.55%	-1.60%	20.18%	8.35%	1.41%	4.51%
Other services, except government	-8.09%	-10.58%	9.12%	0.26%	-1.00%	6.10%	9.56%	7.81%
Real 2000								
Total Equipment Investment	-5.20%	-5.72%	2.53%	7.20%	10.83%	7.33%	4.31%	7.36%
Agriculture, forestry, fishing and hunting	4.02%	9.10%	1.22%	10.90%	4.36%	-1.76%	-0.35%	2.20%
Mining	6.77%	-31.69%	24.16%	27.70%	27.00%	10.76%	-5.73%	-7.57%
Utilities	7.94%	0.79%	-7.98%	-11.03%	10.22%	5.38%	2.75%	2.83%
Construction	-12.64%	13.62%	-9.37%	19.32%	12.10%	6.72%	7.20%	8.33%
Manufacturing	-6.55%	-8.68%	-7.92%	-0.59%	13.84%	5.71%	8.64%	9.08%
Durable goods Manufacturing	-6.21%	-13.92%	-10.09%	-0.47%	14.22%	5.88%	9.90%	10.41%
Nondurable goods Manufacturing	-7.18%	0.92%	-4.54%	-0.77%	13.28%	5.45%	6.79%	7.06%
Wholesale	-9.22%	-7.41%	10.52%	10.43%	30.67%	9.36%	0.85%	4.60%
Retail	-4.56%	-3.27%	13.52%	13.45%	0.26%	8.05%	5.14%	8.69%
Transportation and warehousing	-5.88%	-16.23%	-6.57%	0.69%	7.05%	8.98%	-3.17%	-3.47%
Information	-13.16%	-36.41%	-3.70%	10.65%	4.60%	9.43%	4.20%	7.83%
Finance and insurance	-4.96%	-8.07%	1.20%	17.39%	1.90%	8.31%	6.70%	12.37%
Real estate and rental and leasing	-8.60%	-12.73%	6.94%	4.59%	19.91%	9.32%	0.36%	7.27%
Professional, scientific, and technical services	-1.12%	9.43%	15.37%	9.27%	17.13%	7.57%	3.95%	9.41%
Management of companies and enterprises	-2.62%	72.45%	5.33%	0.05%	-6.07%	8.25%	9.67%	13.09%
Administrative and waste management services	-3.67%	4.67%	18.17%	8.49%	1.47%	7.17%	6.92%	9.80%
Educational services	3.19%	29.53%	6.77%	11.98%	-6.79%	7.18%	9.45%	11.40%
Health care and social assistance	8.39%	23.03%	12.67%	10.91%	9.21%	6.41%	8.16%	9.98%
Arts, entertainment and recreation	1.63%	4.76%	-12.12%	11.82%	-2.30%	3.01%	3.62%	7.65%
Accommodation and food services	-3.81%	14.04%	15.00%	-3.04%	17.65%	6.76%	0.00%	4.33%
Other services, except government	-6.80%	-9.12%	10.29%	0.29%	-0.85%	6.67%	10.20%	10.86%

In general, we expect the economy to rebound in 2008. Toward the end of 2007, we have experienced the problem in the credit markets that not only affected the consumer but also the ability of businesses to acquire necessary capital for investment. We could see the real growth rate of equipment investment of 4.31% in 2007 and 7.36% in 2008. Thus, we should not expect a recession induced by low investment in equipment and software in 2008 unless the problem in the credit markets is becoming worse than expected or there is another economic shock. The continuing depreciation of the U.S. dollar could be factor in the expansion of many industries, especially manufacturing industries.

There is a sign of expansion in the Agriculture, forestry, fishing, and hunting industry group. In 2006, the real growth rate of this industry is -1.76%. We expect the real growth rate to improve to -0.35% in 2007 and 2.20% in 2008. The agriculture industries such as farms would benefit from the depreciation of U.S. dollar as it its price becomes more competitive in the world market. Also, the more expensive imports create higher demand for local goods in the domestic market by the substitution effect.

Mining's investment in equipment and software is expected to decline in 2007 and 2008. The real growth rate is expected to be -5.73% in 2007 and -7.57% in 2008 compared to the real growth rate of more than 25% between 2003 and 2005. Mining, except Oil and gas, has real growth rate of -16.25% in 2008.

I believe this expected decline in investment growth of this industry is a result of massive increase in investment in the past 4 years to update the current infrastructures and building new ones, which was accelerated by the September 11 attack and the rapidly increasing world oil price. This investment has been done and should start paying off in 2007 and 2008. Thus, I think this slow down is plausible.

Utilities show reasonable growth in real investment of equipment of 2.75% in 2007 and 2.83% in 2008.

Surprisingly, the investment in equipment and software by Construction is expected to keep increasing at 7.20% and 8.33% in real terms in 2007 and 2008, respectively. This real growth rates are in the same range as the growth rate in 2006 of 6.72%. Considering the problem in the sub-prime credit market in 2007, this predicted growth rate might be on the high side.

Manufacturing shows strong growth in equipment investment in 2007 and 2008. The growth rates are expected to be 8.64% in 2007 and 9.08% in 2008 in real terms. Expansion in the durable good manufacturing contributes to the majority of this growth rate as Table 4.11 shows that durable good manufacturing contributes to about 60% of real investment in equipment by manufacturing industries. Durable goods manufacturing investment in equipment and software is expected to grow by 9.90% and 10.41% in real terms in 2007 and 2008, respectively. Nondurable goods manufacturing growth rate in real investment in equipment is 6.79% and 7.06% in 2007 and 2008, respectively. As discussed earlier, the depreciation of U.S. dollar might be a factor in the increasing investment by this industry, especially in durable goods manufacturing industries which are more capital intensive than the nondurable goods manufacturing industries.

Wholesale trade exhibits modest real investment growth in equipment and software of 0.85% in 2007. The growth rate of this industry's equipment investment increase to 4.60% in 2008. The higher growth rate in 2008 is a result of predicted lower cost of investment in Wholesale trade in equipment and software as the nominal value of equipment investment by wholesale trade industry is relatively the same size between 2007 and 2008.

Retail trade industry has growth rates of 5.14% in 2007 and 8.69% in 2008 in real terms. From the plots of nominal and real investment in Figure 4.6, this growth rate seems to be in line with its long term trend.

Transportation and warehousing has growth rates of real investment in equipment of -3.17% and -3.47% in 2007 and 2008, respectively. From Appendix 4.3, all detailed industries in this group exhibit the same declining investment pattern except Railroad transportation and Warehousing and storage. Railroad transportation shows a strong real equipment investment growth of 11.90% and 12.78% in 2007 and 2008, respectively. Truck transportation shows as much as a -22.60% decline in real investment in 2007 while Transit and ground passenger transportation shows the decline in real investment growth of -15.07% in 2007.

Information services shows decent equipment investment growth of 4.20% in 2007 and 7.83% in 2008 in real terms. This growth rate shows that this industry continues its expansion after the last recession in 2000 which affected this industry equipment investment well into 2003, as shown in Figure 4.6. Within this industry group, Information and data processing services shows the strongest real investment growth with the rate of 8.80% in 2007 and 10.39% in 2008.

Finance and insurance services shows growth rate of real fixed investment in equipment and software of 6.70% and 12.37% in 2007 and 2008, respectively. Credit intermediation and related activities account for most of this growth as it is the biggest portion and in 2008 grows at the rate of 13.01%. This forecast is likely to be optimistic. As discussed earlier, in 2007, we have seen many banks, big and small, affected by the problem in the sub-prime mortgage market. The outlook into 2008 does not seem to be better for liquidity,so that this industry could slow down its investment in equipment and software in the near future.

Real estate and rental and leasing services investment in equipment and software is 0.36% in 2007 and 7.27% in 2008 in real terms. The real estate services which accounts for about 25% of this industry group's nominal equipment investment has stable growth of 4.82% in 2007 and 5.94% in real terms. This growth rate appears to me to be unlikely to happen in 2008. The reason for this stable growth rate in 2008 comes from the forecast of residential equipment investment in 2008 which has a growth rate of 2.18% in 2008 in real terms while accounts for about 90% of all the growth of investment in the real estate services. It is likely that we will see the slowdown in real estate market in 2008 which should slowdown the investment in residential equipment. Thus, the slower growth in equipment investment by real estate industry.

Professional, scientific and technical services shows the equipment investment growth of 3.95% and 9.41% in 2007 and 2008 in real terms. This growth rate shows the continuing expansion of this industry group throughout the last two decades.

Table 4.12 and Figure 4.6 show that most of the services industries are expected to grow at around the average growth rate of the last decade (1990s and early 2000s). However, two industries merit note. Social assistance services continues to grow at a rapid rate which reflects the aging population of the United States, especially the "Baby Boomers" generation. The growth rate of real investment in equipment and software by social assistance services is 15.64% in 2007 and 11.27% in 2008.

The investment in equipment and software by Food services and drinking places shows a decline of -0.94% in 2007 in real terms. The real investment picks up in 2008 with a growth rate of 4.07% in 2008.

Figure 4.6: Plots of Fixed Investment Forecast by Purchasing Industries

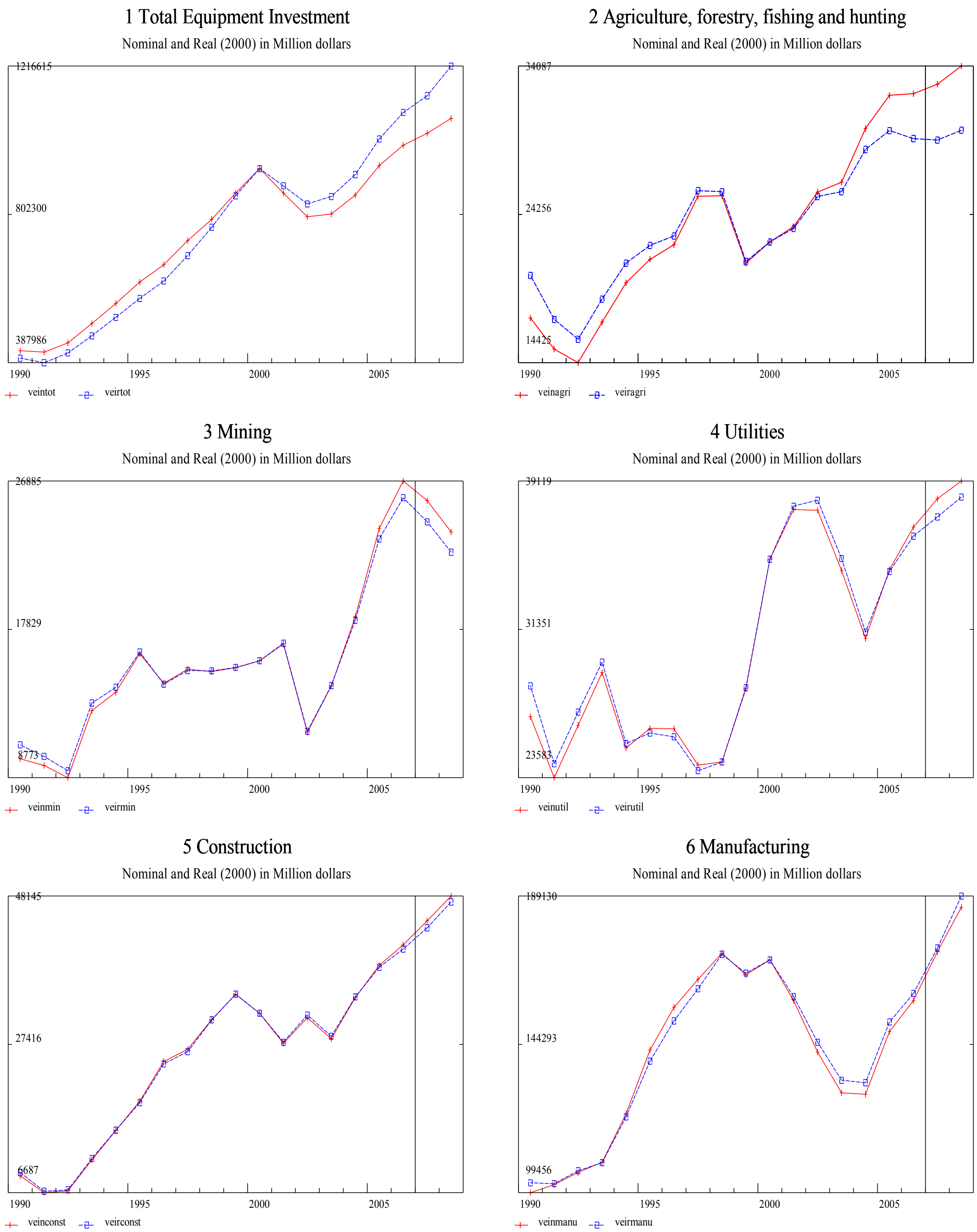


Figure 4.6 (cont.)

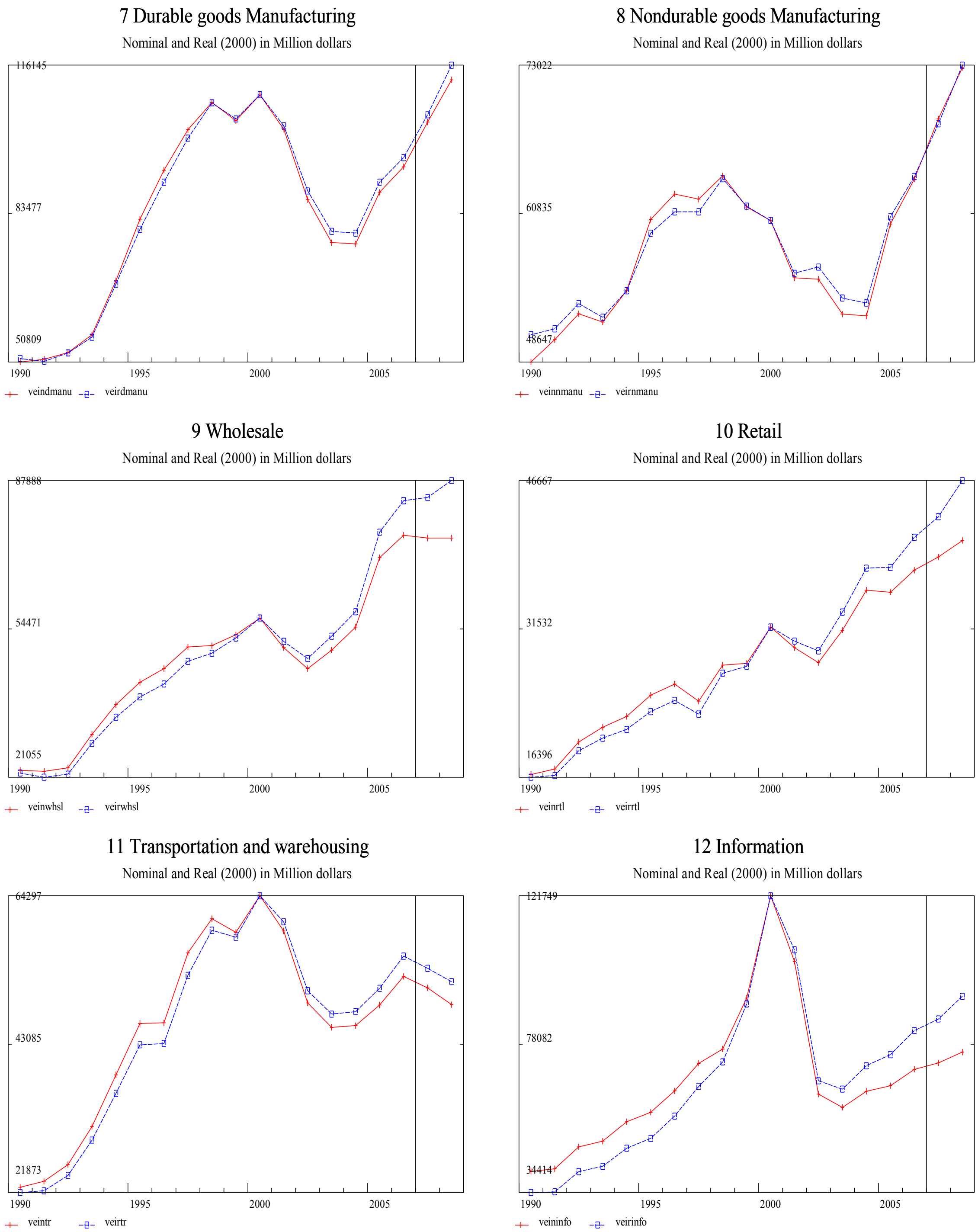
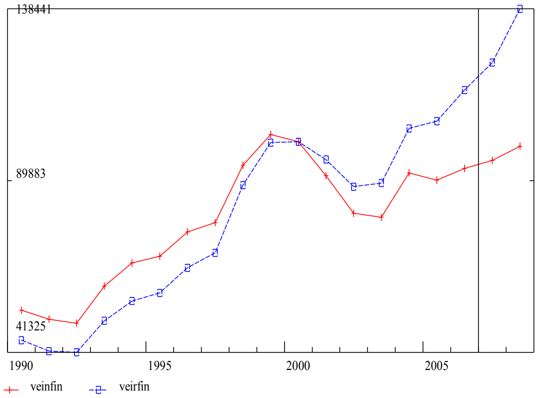


Figure 4.6 (cont.)

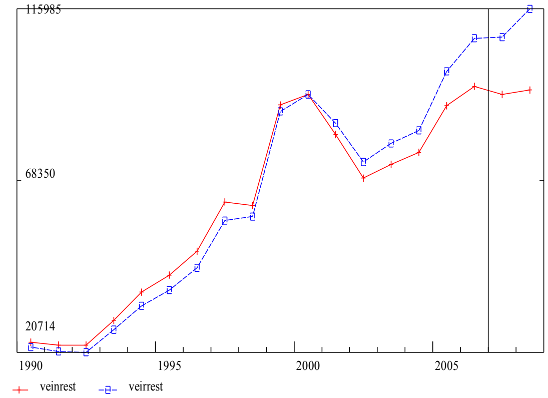
13 Finance and insurance

Nominal and Real (2000) in Million dollars



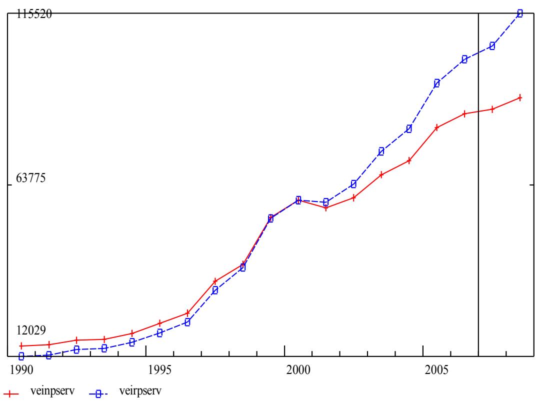
14 Real estate and rental and leasing

Nominal and Real (2000) in Million dollars



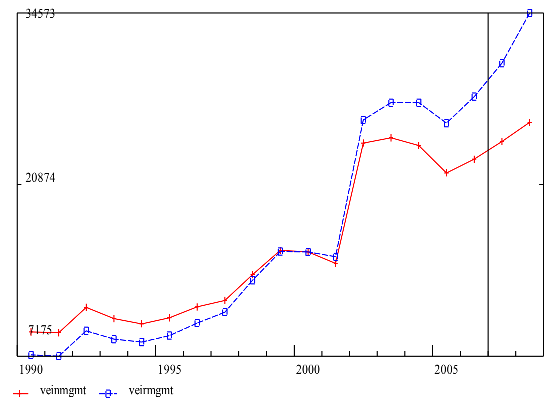
15 Professional, scientific, and technical services

Nominal and Real (2000) in Million dollars



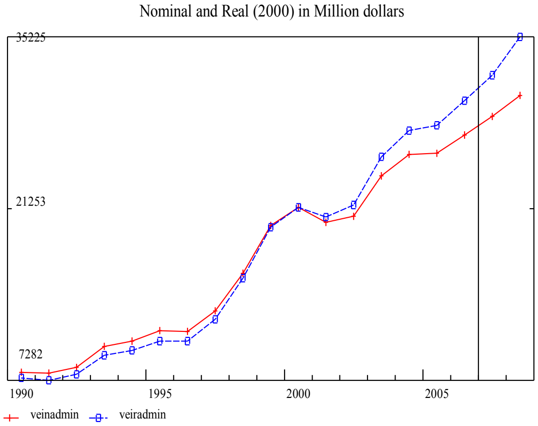
16 Management of companies and enterprises

Nominal and Real (2000) in Million dollars



17 Administrative and waste management services

Nominal and Real (2000) in Million dollars



18 Educational services

Nominal and Real (2000) in Million dollars

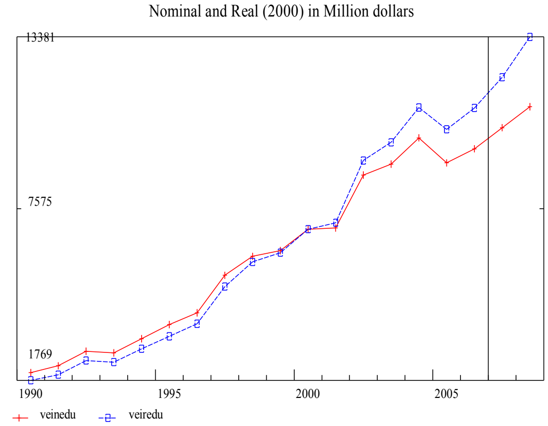
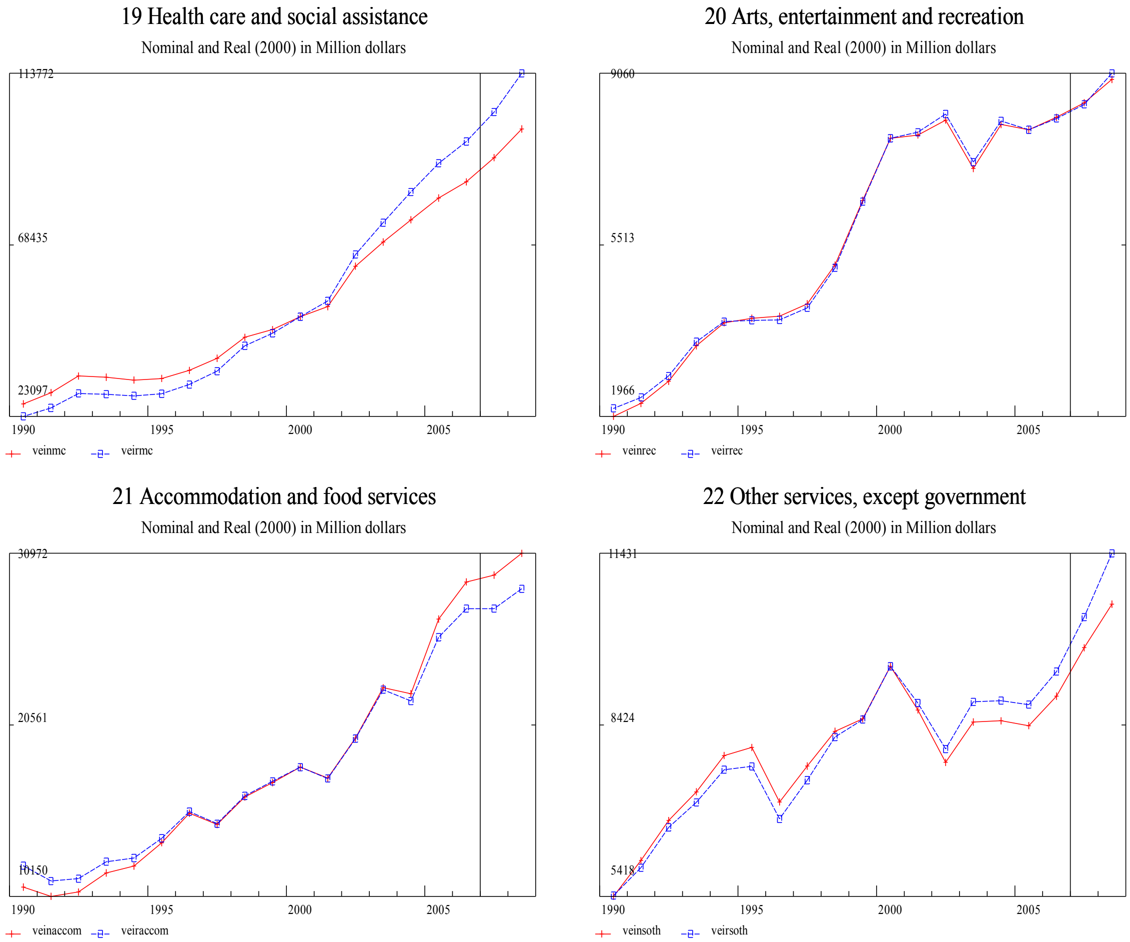


Figure 4.6 (cont.)



Chapter 5. Investment in Structures

As observed at the beginning of Chapter 4, investment in structures is about the same size as investment in equipment. Roughly two-thirds of it is residential structures and one third nonresidential structures. Quarterly data is available in the NIPA for five components of nonresidential structures and for three different categories of residential structures plus one for residential equipment. Recent values of these series are shown in Table 5.1 in current prices, and Figures 5.1 and 5.2 on following pages graph these series in constant prices.[19]

Table 5.1: NIPA Quarterly Data on Investment in Structures

Table 5.3.5. Private Fixed Investment in Structures by Type
Extract from File Section5All_xls.xls Sheet 50305 Qtr

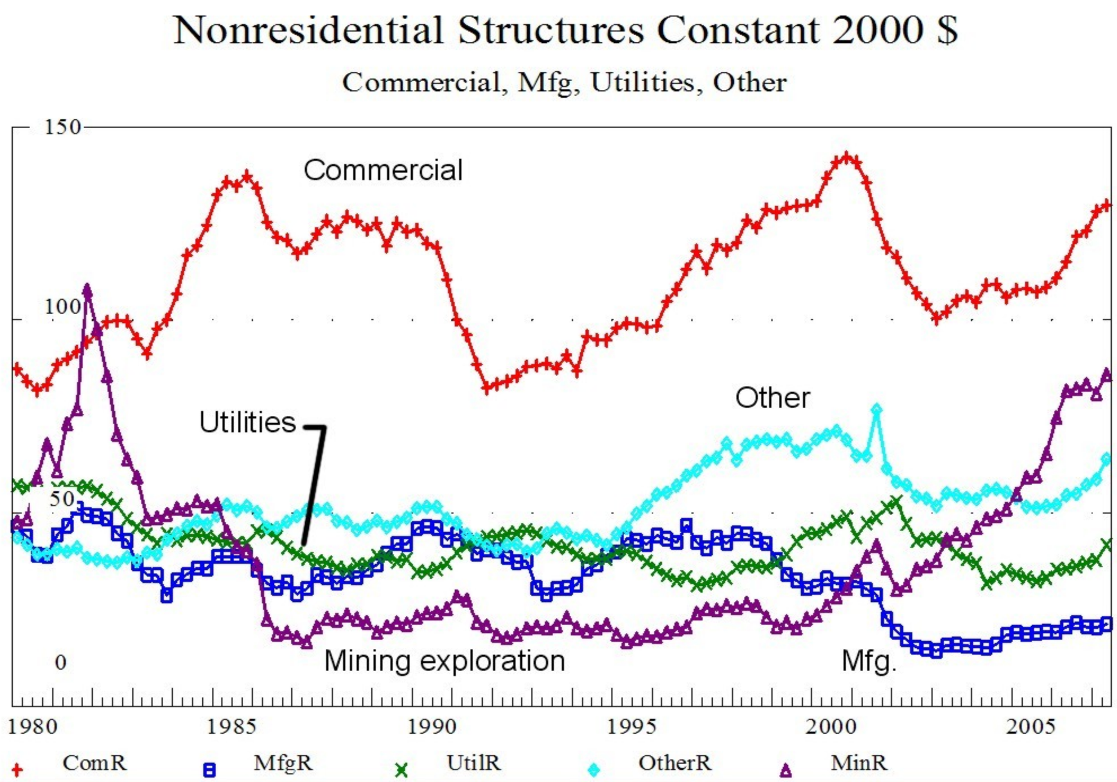
Line		2006 1	2006 2	2006 3	2006 4	2007 1	2007 2	2007 3
3	**Nonresidential Structures**	**375.7**	**400.2**	**416.1**	**428.4**	**439.6**	**464.5**	**478.5**
4	Commercial and health care	142.5	149.7	159.8	164.0	172.8	174.7	178.5
5	Manufacturing	24.6	26.8	28.4	27.3	27.5	28.9	28.0
6	Power and communication	45.4	46.3	47.7	49.6	51.1	57.1	58.5
7	Mining exploration, shafts, and wells	96.2	106.3	107.9	111.2	109.1	117.4	122.5
8	Other structures \1\	67.0	71.1	72.3	76.4	79.1	86.5	91.0
18	**Residential Structures**	**799.9**	**778.6**	**736.4**	**705.7**	**677.8**	**655.2**	**617.7**
19	Permanent site	515.7	490.7	451.9	417.8	387.2	369.6	345.0
20	Single family	463.7	437.7	399.5	363.1	334.1	319.1	295.9
21	Multifamily	51.9	53.0	52.4	54.7	53.2	50.6	49.1
22	Other structures \2\	284.2	287.9	284.5	288.0	290.6	285.6	272.7
23	**Residential Equipment**	**9.6**	**9.6**	**9.7**	**9.6**	**9.7**	**9.6**	**9.7**

1. Consists primarily of religious, educational, vocational, lodging, railroads, farm, and amusement and recreational structures, net purchases of used structures, and brokers' commissions on the sale of structures.
2. Consists primarily of manufactured homes, improvements, dormitories, net purchases of used structures, and brokers' commissions on the sale of residential structures.

19 For Nonresidential construction, four of the five series had almost the same deflator with that for manufacturing being slightly the most stable; it was used for all series so that in any quarter the relative sizes are the same as the relative sizes of the current price series. The outlier deflator was Mining exploration, shafts, and wells. As high oil prices strongly stimulated exploration beginning in 2001, costs also rose sharply. For Residential construction, all deflators rose nearly proportionally and the average has been used for all series. Residential equipment was deflated by its own deflator, which grew much less rapidly than any of the deflators for structures.

The graphs show that investment in structures is no less volatile than investment in equipment. For example, over the two years from the beginning of 1990 to the end of 1991, spending on Commercial structures fell by a third. Single-family residential construction likewise fell by a third from the end of 2005 to mid 2007. This volatility, coupled with the important magnitude of construction spending, make accurate short-term forecasting of investment in structures both important and challenging.

Figure 5.1: Investment in Nonresidential Structures, NIPA Quarterly Data. All series deflated by the NIPA deflator for Manufacturing construction.



5.1 Data and Estimation Approaches for Private Fixed Investment in Structures

Our first question must be the choice of the categories in which we will forecast construction. That choice depends, in the first place, on the categories available in the data sources. We have for construction all the sources we had for equipment plus two more highly important ones. Namely, as in equipment, we have:

NIPA Quarterly (See Table 5.1)

NIPA Annual (See Table 5.2)

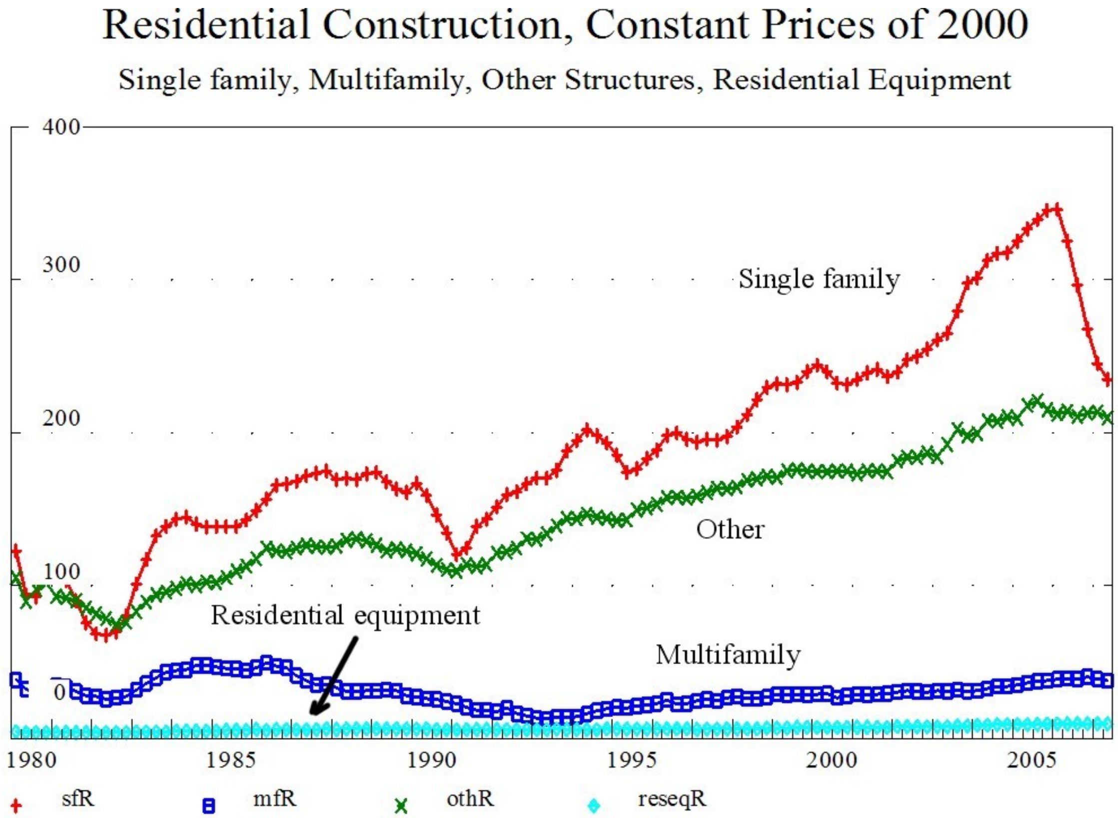
FAA Annual (See Table 5.3).

In addition, we have a monthly survey conducted by the Bureau of the Census on the value of construction put in place (VIP) which is the fundamental source for the NIPA and FAA series. It is available both monthly and annually. Thus we have also:

VIP Monthly (See Table 5.4)

VIP Annual (See Table 5.5).

Figure 5.2: NIPA Residential Construction series, all deflated by the average deflator.



Finally, it is relevant to know the detail available in the 2002 benchmark input-output table for the inputs into various types of construction. We can certainly have more detail in the types construction we forecast than is shown in the input-output table, but if we do, we will either have to assume that several of the types we distinguish have the same input structure or go to the trouble to split the input structure provided by BEA. In the 2002 benchmark table there are only three types of Nonresidential construction and and two types of Residential, namely:

230101 Nonresidential commercial and health care structures

230102 Nonresidential manufacturing structures

230103 Other nonresidential structures

230201 Residential permanent site single- and multi-family structures

230202 Other residential structures

Table 5.2: NIPA Annual Table 5.4.5B Private Fixed Investment in Structures by Asset Types

Table 5.2: NIPA Annual Table 5.4.5B. Private Fixed Investment in Structures by Type

Line		2002	2003	2004	2005	2006
1	**Private fixed investment in structures**	**775.5**	**841.8**	**965.3**	**1,093.8**	**1,160.3**
2	**Nonresidential**	**279.2**	**277.2**	**298.2**	**334.6**	**405.1**
3	Commercial and health care	116.8	112.2	122.1	132.6	154.0
4	Office \1\	40.6	35.1	37.8	42.8	53.1
5	Health care	25.3	27.3	29.6	32.1	37.4
6	Hospitals and special care	19.7	20.5	21.0	23.1	29.2
7	Hospitals	15.8	17.2	18.2	20.6	25.8
8	Special care	4.0	3.3	2.8	2.5	3.4
9	Medical buildings	5.5	6.8	8.5	9.0	8.2
10	Multimerchandise shopping	14.8	14.6	17.9	21.6	27.7
11	Food and beverage establishments	7.5	7.9	7.8	7.4	7.0
12	Warehouses	11.3	11.7	11.5	12.2	13.6
13	Other commercial \2\	17.3	15.5	17.6	16.5	15.3
14	Manufacturing	17.8	16.7	18.5	23.3	26.8
15	Power and communication	49.5	44.2	39.1	40.9	47.3
16	Power	31.2	32.1	26.2	25.2	29.2
17	Electric	23.5	24.1	19.2	18.1	20.4
18	Other power	7.6	8.0	6.9	7.1	8.8
19	Communication	18.4	12.1	12.9	15.7	18.0
20	Mining exploration, shafts, and wells	35.6	45.7	55.7	73.7	105.4
21	Petroleum and natural gas	33.7	44.2	53.3	70.6	101.5
22	Mining	1.9	1.6	2.4	3.1	3.9
23	Other structures	59.5	58.4	62.9	64.1	71.7
24	Religious	8.1	8.3	7.9	7.5	7.5
25	Educational and vocational	14.6	14.7	13.9	14.2	14.7
26	Lodging	13.0	12.3	14.8	15.7	21.9
27	Amusement and recreation	9.0	9.3	10.1	9.0	10.9
28	Transportation	6.5	6.1	6.7	7.0	7.8
29	Air	1.4	1.1	1.0	0.9	0.9
30	Land \3\	5.1	5.0	5.7	6.1	6.9
31	Farm	5.6	5.1	5.5	5.9	5.3
32	Other \4\	2.6	2.4	3.2	3.6	2.9
33	Brokers' commissions on sale of structures	2.1	2.1	2.2	2.3	2.7
34	Net purchases of used structures	-1.9	-2.0	-1.4	-1.1	-1.9
35	**Residential**	**496.3**	**564.5**	**667.0**	**759.2**	**755.2**
36	Permanent site	298.8	345.7	417.5	480.8	469.0
37	Single-family structures	265.9	310.6	377.6	433.5	416.0
38	Multifamily structures	33.0	35.1	39.9	47.3	53.0
39	Other structures	197.5	218.8	249.5	278.4	286.2
40	Manufactured homes	8.5	7.1	7.5	9.1	7.4
41	Dormitories	1.5	1.8	1.7	1.5	2.1
42	Improvements	121.8	133.2	146.9	160.7	178.5
43	Brokers' commissions on sale of structures	68.8	80.3	96.1	109.9	101.5
44	Net purchases of used structures	-3.1	-3.5	-2.6	-2.8	-3.4
	Addenda:					
45	Private fixed investment in new structures \5\	709.7	764.9	871.0	985.5	1,061.3
46	Nonresidential structures	279.1	277.2	297.5	333.4	404.3
47	Residential structures	430.7	487.7	573.6	652.1	657.0

1. Consists of office buildings, except those constructed at manufacturing sites and those constructed by power utilities for their own use.
   Includes all financial buildings. Medical buildings are included in health care.
2. Includes buildings and structures used by the retail, wholesale and selected service industries. Consists of auto dealerships, garages, service stations, drug stores, restaurants, mobile structures, and other structures used for commercial purposes. Bus or truck garages are included in transportation.
3. Consists primarily of railroads.
4. Includes water supply, sewage and waste disposal, public safety, highway and street, and conservation and development.
5. Excludes net purchases of used structures and brokers' commissions on the sale of structures.

Table 5.3: Construction Categories in the BEA Fixed Assets Accounts

1. Office, including medical buildings
2. Commercial
3. Hospitals and special care
4. Manufacturing
5. Electric
6. Other power
7. Communication
8. Petroleum and natural gas
9. Mining
10. Religious
11. Educational
12. Other buildings
13. Railroads
14. Farm
15. Other

Table 5.4: Monthly Value of Construction Put in Place (VIP), Census Bureau

	Type of Construction:	Jan 2007	Feb 2007	Mar 2007	Apr 2007	May 2007	Jun 2007	Jul 2007
1	**Total Private Construction**	884,379	889,677	886,834	888,025	888,085	884,975	874,388
2	Residential	567,526	562,934	555,606	551,730	544,767	538,721	528,017
3	Nonresidential	316,853	326,743	331,228	336,295	343,318	346,254	346,371
4	Lodging	20,634	22,016	25,030	26,203	28,078	28,463	29,852
5	Office	54,497	53,510	52,823	52,813	52,682	54,299	53,447
6	Commercial	78,607	79,906	80,243	82,311	82,287	82,395	82,082
7	Health care	35,618	36,315	36,542	36,473	36,302	35,956	36,340
8	Educational	15,014	15,547	15,301	15,479	15,380	16,480	17,096
9	Religious	7,792	7,783	7,631	7,614	7,449	7,366	7,544
10	Amusement and recreation	8,448	8,427	9,323	8,507	8,728	8,686	8,388
11	Transportation	8,152	8,150	8,226	8,234	8,481	8,398	8,442
12	Communication	21,777	24,839	25,380	24,462	26,367	26,760	25,761
13	Power	30,431	32,854	34,186	35,679	38,247	39,138	39,532
14	Manufacturing	34,329	35,736	34,999	36,491	37,437	36,447	36,201
15	Other	1,554	1,660	1,544	2,029	1,880	1,866	1,686

Millions of dollars, seasonally adjusted at annual rates.

Table 5.5: Value of Construction Put in Place (VIP). Annual Data, Bureau of the Census

Type of Construction:	2002	2003	2004	2005	2006
Total Private Construction	659,651	705,276	803,305	897,989	937,047
Residential	421,912	475,941	564,827	641,345	641,332
New single family	265,889	310,575	377,557	433,510	415,997
New multi-family	32,952	35,116	39,944	47,297	53,020
Improvements	123,071	130,250	147,326	160,538	172,315
Nonresidential	237,739	229,335	238,478	256,644	295,715
Lodging	10,467	9,930	11,982	12,666	17,687
Office	35,296	30,579	32,879	37,276	46,194
General	32,356	27,380	28,679	32,962	41,390
Financial	2,857	3,174	4,186	4,285	4,742
Commercial	59,008	57,505	63,195	66,584	72,148
Automotive	5,807	5,039	5,235	5,614	5,463
Sales	2,235	2,099	2,443	2,834	2,306
Service/parts	2,308	1,866	1,978	1,805	2,089
Parking	1,265	1,074	814	975	1,068
Food/beverage	7,914	8,369	8,232	7,795	7,417
Food	4,207	4,234	3,590	3,128	2,773
Dining/drinking	2,916	3,321	3,937	4,078	3,735
Fast food	792	813	705	590	908
Multi-retail	15,581	15,400	18,828	22,750	29,126
General merchandise	6,009	5,341	6,416	6,740	5,849
Shopping center	6,605	6,867	9,256	12,462	18,446
Shopping mall	2,108	2,231	2,138	2,631	3,320
Other commercial	12,083	11,249	13,341	11,744	10,574
Drug store	1,644	1,790	1,427	1,315	1,301
Building supply store	2,471	2,268	2,521	2,416	2,628
Other stores	7,145	6,214	8,229	7,075	5,707
Warehouse	11,908	12,345	12,074	12,827	14,292
General commercial	10,934	11,004	10,830	11,468	13,298
Mini-storage	951	1,326	1,141	1,311	976
Farm	5,611	5,103	5,485	5,854	5,277
Health Care	22,438	24,217	26,272	28,495	33,183
Hospital	13,925	15,234	16,147	18,250	22,860
Medical building	4,924	6,068	7,615	8,031	7,292
Special care	3,538	2,915	2,510	2,213	3,032
Educational	13,109	13,424	12,701	12,788	13,745
Preschool	593	711	674	516	489
Primary/secondary	3,605	3,204	3,202	2,718	3,205
Higher education	6,875	7,259	6,496	6,946	7,561
Instructional	3,619	3,701	3,200	3,556	3,454
Dormitory	1,528	1,761	1,669	1,537	2,085
Sports/recreation	772	677	739	821	854
Other educational	1,651	1,785	1,998	2,294	2,067
Gallery/museum	1,312	1,371	1,335	1,745	1,675

Table 5.5 continued.

Religious	8,335	8,559	8,153	7,715	7,690
House of worship	6,021	6,238	6,015	5,992	6,231
Other religious	2,312	2,322	2,138	1,723	1,459
Auxiliary building	1,358	1,296	1,258	1,251	1,190
Public Safety	217	185	289	408	448
Amusement and Recreation	7,478	7,781	8,432	7,507	9,041
Theme/amusement park	230	270	198	200	386
Sports	1,427	1,306	900	807	839
Fitness	1,286	1,262	1,141	1,425	1,999
Performance/meeting center	900	844	1,054	1,072	783
Social center	2,285	1,996	2,594	1,626	1,478
Movie theater/studio	568	855	1,218	1,248	1,214
Other					2,342
Transportation	6,773	6,568	6,841	7,124	7,937
Air	1,281	1,012	869	748	715
Land	5,325	5,462	5,800	6,214	7,049
Railroad	4,584	4,851	5,392	5,816	6,589
Other					
Communication	18,384	14,456	15,468	18,846	21,621
Power	32,608	33,619	27,360	26,304	30,481
Electric	24,998	25,592	20,431	19,192	21,660
Gas	6,080	6,358	5,096	5,239	5,741
Oil	1,193	1,068	1,579	1,293	1,876
Other					1,204
Sewage and Waste Disposal	246	278	331	240	284
Water Supply	397	393	405	326	445
Manufacturing	22,744	21,434	23,667	29,886	34,278
Food/beverage/tobacco	2,817	2,695	3,157	4,677	4,892
Textile/apparel/leather & allied	284	218	188	415	146
Wood	477	376	485	982	1,505
Paper	584	818	548	467	562
Print/publishing	666	630	654	777	748
Petroleum/coal	887	717	1,204	771	1,666
Chemical	5,625	5,368	5,507	6,588	9,239
Plastic/rubber	776	659	936	877	839
Nonmetallic mineral	536	865	896	1,163	1,961
Primary metal	241	436	312	836	1,489
Fabricated metal	833	662	595	699	568
Machinery	797	707	645	917	924
Computer/electronic/electrical	1,918	1,444	2,835	4,247	4,324
Transportation equipment	3,832	3,314	2,610	3,702	2,557
Furniture	148	278	217	96	131
Miscellaneous	2,325	2,248	2,878	2,674	2,726

p Preliminary

Note: Total private construction includes the following categories of construction not shown separately: highway and street, and conservation and development.

This is the least detail for construction inputs ever given in a benchmark input-output table. The 1997 table, also a NAICS-based table, gave inputs for the following types of construction:

2301	New residential
230110	New residential 1-unit structures, nonfarm
230120	New multifamily housing structures, nonfarm
230130	New residential additions and alterations, nonfarm
230140	New farm housing units and additions and alterations
2302	New nonresidential construction
230210	Manufacturing and industrial buildings
230220	Commercial and institutional buildings
230230	Highway, street, bridge, and tunnel construction
230240	Water, sewer, and pipeline construction
230250	Other new construction

Since the 1997 table could be used fairly easily to make a table balanced to the 2002 row and column totals but with the 9 columns of the 1997 table instead of the 5 of the BEA 2002 table. Furthermore, it is not necessarily pointless to distinguish two or more types of construction which use the same input structure. For example, since Offices and Hospitals are built by the same input-output sector, it will not matter for the rest of the economy whether or not we combine them or keep them separate. But it may prove much more natural to formulate scenarios with them separate rather than with them combined. Nonetheless, the limited detail in the input-output table is something of a damper on enthusiasm for forecasting construction in great detail such as is provided by the annual VIP or even the annual NIPA.

We also need to inquire about the content and comparability of NIPA and VIP data. According to Census documentation, VIP includes:

- New buildings and structures
- Additions, alterations, major replacements, etc. to existing buildings and structures
- Installed mechanical and electrical equipment
- Installed industrial equipment, such as boilers and blast furnaces
- Site preparation and outside construction, such as streets, sidewalks, parking lots, utility connections
- Cost of labor and materials (including owner supplied)
- Cost of construction equipment rental
- Profit and overhead costs

- Cost of architectural and engineering (A&E) work

- Any miscellaneous costs of the project that appear on the owner's books as capital assets.

This definition is very close to the NIPA definition except that NIPA includes three series not included in VIP, namely (1) Mining exploration, shafts and wells,(2) Brokers' commissions, and (3) Net purchases of used structures. Other than in these three items, the two series are close together, as is to be expected since the VIP are the main source for the other NIPA series. The Brokers' commissions amount to little for Nonresidential structures but are significant part of NIPA Residential construction. I have been unable to find a "reconciliation" of VIP and NIPA on either the BEA or the Census websites, though NIPA documentation makes plain the difference described above. Table 5.6 shows that adjusting the NIPA totals for the three series known not to be in VIP brings the NIPA total down to within one percent of the VIP total for 2001 through 2006.

Table 5.6: Comparison of NIPA and VIP Total Nonresidential Construction

Line		2001	2002	2003	2004	2005	2006
1	NIPA Nonresidential construction	322.6	279.2	277.2	298.2	334.6	405.1
2	Less Mining exploration, shafts, wells	39.2	35.6	45.7	55.7	73.7	105.4
3	Less Brokers' commissions	2.4	2.1	2.1	2.2	2.3	2.7
4	Net purchases of used structures	1.6	-1.9	-2	-1.4	-1.1	-1.9
5	Equals Census definition, NIPA data	279.4	243.4	231.4	241.7	259.7	298.9
6	Census data	273.9	237.7	229.3	238.5	256.6	295.7
7	NIPA data – Census data	5.5	5.7	2.1	3.2	3.1	3.2
8	Percent difference	2.00%	2.38%	0.90%	1.35%	1.19%	1.08%

Manufacturing is higher in VIP than NIPA because it includes offices at manufacturing plants which have been moved to Offices in the NIPA, so Offices are higher in NIPA than in VIP. Since the input-output table will match the NIPA in this respect, our final product also needs to match NIPA.

5.2 Approach to Forecast Investment in Structures

5.2.1 Nonresidential Investment in Structures

We can now pull together what we know of data availability to formulate a plan for short-term forecasting of Nonresidential construction. Table 5.7 shows, for 2006, the relations among the annual values of five NIPA series available quarterly and annual values of the twelve VIP series available monthly. The two largest differences, in Manufacturing and in Offices, are due to the fact that offices built on the site of a manufacturing plant are counted in Manufacturing in VIP and in Offices in NIPA. Otherwise, the agreement is close enough to justify the following five-step procedure for short-term forecasting of the NIPA series which go into the model.

Step 1. Forecast, using time-series methods, the 12 VIP monthly series three months ahead and extend the series by as many of these months as necessary to round out the current quarter.

Step 2. Convert the monthly series developed in Step 1 to quarterly series.

Step 3. Forecast these 12 quarterly VIP-based series to the end of the following year, relating them to quarterly series from QUEST. Do the same for Mining exploration, for which the quarterly NIPA provide values.

Step 4. Convert these 13 quarterly series to annual series.

Step 5. Use the 13 annual series as regressors to forecast the corresponding annual NIPA series. These should be the series needed by the interindustry model.

Table 5.7: Integration of VIP with NIPA

			Nonresidential Structures	NIPA Ann 2006	VIP Ann 2006	NIPA-VIP
NIPA Quaterly						
	VIP Monthly and NIPA annual			405.100	402.115	2.99
1		Commercial and health care				
	1		Office	53.100	46.194	6.91
	2		Commercial (incl. farm)	68.900	72.148	-3.25
	3		Health care	37.400	33.183	4.22
2		Manufacturing				
	4		Manufacturing	26.800	34.278	-7.48
3		Power and communication				
	5		Communication	18.000	21.621	-3.62
	6		Power	29.200	30.481	-1.28
4		Mining exploration, shafts, and wells*		105.400	105.400	0
5		Other structures				
	7		Religious	7.500	7.690	-0.19
	8		Education	14.700	13.745	0.96
	9		Lodging	21.900	17.687	4.21
	10		Amusement	10.900	9.041	1.86
	11		Transportation	7.800	7.937	-0.14
	12		Other	3.800	1.710	2.09
			Brokers' commissions*	2.900	2.900	0
			Net used *	-1.900	-1.900	0
		Sum of detail		406.400	402.115	4.29
		Sum without NIPA-only items		300.000	295.715	4.28

Sum of detail may not equal total because of rounding
* Item available only in NIPA

Brokers' commissions and Net purchases of used structures need to be projected annually exogenously. No specific data is available on them at a higher frequency.

This plan makes no use of the four NIPA quarterly series numbered 1, 2, 3, and 5 in Table 5.7. It is assumed, at least initially, that these do not provide any significant information in addition to the twelve VIP series which compose them.

5.2.2 Residential Investment in Structures

The plan for Residential construction will be significantly different because the quarterly NIPA give important information not contained in the monthly VIP. Namely, whereas monthly VIP gives only one series for all Residential construction, the quarterly NIPA give three series: (1) Single family, (2) Multifamily, and (3) Other. These are distinctions worth keeping because the 2002 benchmark I-O table has two separate columns, one for the sum of the first two series and one for the third. Moreover, by borrowing information from the 1997 table, it should be possible to split the first of those columns so that we would have three columns matching exactly the three quarterly NIPA series. The following plan makes use of all this data.

Step 1. Forecast with time-series methods the monthly VIP series three months ahead.

Step 2. Convert this series to quarterly frequency. The converted series will not go past the present quarter.

Step 3. Regress each of the three NIPA quarterly series on this one and use to forecast the NIPA series through the current quarter.

Step 4. Forecast these three quarterly series further ahead, through the end of the next year, with exogenous variables from QUEST

Step 5. Convert these three series to annual values for use in the annual multisector model.

5.3 Monthly VIP Equations

This section shows the estimation results from Step 1 in both Nonresidential structures and Residential structures, a total of 13 series. In November 2007, the Census Bureau published the VIP data up through July 2007. Thus, all equations in this section are estimated with data from July 1993 to July 2007.

In this section, all regressors are lagged dependent variables. Many equations do not have intercept as it has little to no explanatory power according to Mexvals. Using only Time-series analysis in these equations should not affect the usefulness of the forecast since the objective of equations in this section are to complete the current quarter of the monthly series which are at most a three months forecast.

Figure 5.3 shows fitted plots of all equations discussed in this section.

In general, most of the equations have very good closeness of fit statistics. The BasePred plots also capture the long-term trend of each series quite well except in some categories, such as Lodging, Manufacturing, and Other Nonresidential structures, that are affected by recessions. The failure to be responsive to short-term fluctuation in economic conditions is expected from equations that rely only on lagged dependent variables. All 13 monthly VIP equation results are presented in the following paragraphs.

Lodging

```
:                                   Lodging
  SEE   =     855.81 RSQ   = 0.9682 RHO =   0.02 Obser  =  169 from 1993.007
  SEE+1 =     855.78 RBSQ  = 0.9680 DurH = 999.00 DoFree =  167 to   2007.007
  MAPE  =       5.61 Test period:   SEE 30907.88 MAPE 3.09e+12 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mviplodge             - - - - - - - - - - - - - - - - -  12592.94 - - -
  1 mviplodge[1]             0.92249    36.0   0.91    1.01  12448.89
  2 mviplodge[2]             0.09116     0.4   0.09    1.00  12313.96  0.086
```

Office

```
:                                   Office
  SEE   =    1416.29 RSQ   = 0.9826 RHO =   0.06 Obser  =  169 from 1993.007
  SEE+1 =    1413.90 RBSQ  = 0.9826 DurH =  0.80 DoFree =  168 to   2007.007
  MAPE  =       3.20 Test period:   SEE 54157.32 MAPE 5.42e+12 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipoffice            - - - - - - - - - - - - - - - - -  36450.11 - - -
  1 mvipoffice[1]            1.00440  2583.2   1.00    1.00  36250.42
```

Commercial

```
:                                 Commercial
  SEE   =    1478.70 RSQ   = 0.9813 RHO =  -0.08 Obser  =  169 from 1993.007
  SEE+1 =    1473.62 RBSQ  = 0.9813 DurH = -1.00 DoFree =  168 to   2007.007
  MAPE  =       2.16 Test period:   SEE 83202.80 MAPE 8.32e+12 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipcommerce          - - - - - - - - - - - - - - - - -  57672.79 - - -
  1 mvipcommerce[1]          1.00452  3868.2   1.00    1.00  57387.73
```

Health Care

```
:                                 Health Care
  SEE   =     604.45 RSQ   = 0.9903 RHO =  -0.23 Obser  =  169 from 1993.007
  SEE+1 =     587.57 RBSQ  = 0.9903 DurH = -3.05 DoFree =  168 to   2007.007
  MAPE  =       2.27 Test period:   SEE 37021.50 MAPE 3.70e+12 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipmc                - - - - - - - - - - - - - - - - -  21451.11 - - -
  1 mvipmc[1]                1.00619  3591.3   1.00    1.00  21325.46
```

Health care structures has shown to be immuned to the recession in 2000-2001. The plot shows that it keeps expanding consistently throughout the test period. This trend is understandable as the demand of health care for the U.S. aging population keeps increasing.

Educational

```
:                             Educational structure
  SEE   =     406.60 RSQ   = 0.9842 RHO =   0.00 Obser  =  169 from 1993.007
  SEE+1 =     406.61 RBSQ  = 0.9841 DurH =  0.43 DoFree =  167 to   2007.007
  MAPE  =       3.35 Test period:   SEE 17320.00 MAPE 1.73e+12 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipedu               - - - - - - - - - - - - - - - - -  10523.03 - - -
  1 mvipedu[1]               0.81134    29.7   0.81    1.04  10452.21
  2 mvipedu[2]               0.19586     1.9   0.19    1.00  10382.45  0.195
```

Education structures also exhibits consistent growth over the test period.

Religious

```
:                                   Religious
  SEE   =     234.92 RSQ   = 0.9805 RHO =   0.00 Obser  =  169 from 1993.007
  SEE+1 =     234.92 RBSQ  = 0.9802 DurH =  0.23 DoFree =  166 to   2007.007
  MAPE  =       2.96 Test period:   SEE  7544.73 MAPE 7.54e+11 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mviprelig             - - - - - - - - - - - - - - - - -   6801.61 - - -
  1 intercept              160.67321     1.4   0.02   51.23      1.00
  2 mviprelig[1]             0.76168    26.9   0.76    1.05   6778.52  0.769
  3 mviprelig[2]             0.21872     2.5   0.22    1.00   6756.99  0.223
```

Amusement and Recreation

```
:                           Amusement and Recreation
  SEE   =     399.42 RSQ   = 0.9146 RHO =   0.01 Obser  =  169 from 1993.007
  SEE+1 =     399.42 RBSQ  = 0.9136 DurH =  0.34 DoFree =  166 to   2007.007
  MAPE  =       4.26 Test period:   SEE  8424.95 MAPE 8.42e+11 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mviprec               - - - - - - - - - - - - - - - - -   7745.07 - - -
  1 intercept              406.79519     1.6   0.05   11.71      1.00
  2 mviprec[1]               0.71617    24.3   0.71    1.06   7725.18  0.724
  3 mviprec[2]               0.23451     3.0   0.23    1.00   7699.99  0.241
```

Transportation

```
:                               Transportation
  SEE   =     349.82 RSQ   = 0.8938 RHO =  -0.08 Obser  =  169 from 1993.007
  SEE+1 =     348.74 RBSQ  = 0.8932 DurH = -1.39 DoFree =  167 to   2007.007
  MAPE  =       3.63 Test period:   SEE  8499.18 MAPE 8.50e+11 end  2007.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mviptr               - - - - - - - - - - - - - - - - -   6516.20 - - -
  1 mviptr[1]               0.80250    54.8   0.80    1.09   6494.70
  2 mviptr[4]               0.20186     4.2   0.20    1.00   6429.31  0.201
```

Communication

```
:                           Communication structure
  SEE   =    1037.43 RSQ   = 0.9412 RHO =  -0.02 Obser  =  169 from 1993.007
  SEE+1 =    1037.24 RBSQ  = 0.9409 DurH = -0.38 DoFree =  167 to   2007.007
  MAPE  =       4.74 Test period:   SEE 26612.39 MAPE 2.66e+12 end  2007.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipcomm             - - - - - - - - - - - - - - - - -  15813.46 - - -
  1 mvipcomm[1]             0.70062    35.6   0.70    1.16  15717.28
  2 mvipcomm[3]             0.30875     7.6   0.30    1.00  15515.44  0.297
```

Power

```
:                                    Power
  SEE   =    2555.48 RSQ   = 0.8537 RHO =  -0.01 Obser  =  169 from 1993.007
  SEE+1 =    2555.34 RBSQ  = 0.8519 DurH = -0.15 DoFree =  166 to   2007.007
  MAPE  =       7.12 Test period:   SEE 38419.49 MAPE 3.84e+12 end  2007.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvippower            - - - - - - - - - - - - - - - - -  25836.60 - - -
  1 mvippower[1]            1.03793    45.3   1.03    1.04  25734.06
  2 mvippower[2]           -0.14210     0.9  -0.14    1.04  25639.60 -0.139
  3 mvippower[6]            0.10604     1.9   0.10    1.00  25424.95  0.101
```

Manufacturing

```
:                                Manufacturing
  SEE   =    1536.09 RSQ   = 0.9464 RHO =  -0.14 Obser  =  169 from 1993.007
  SEE+1 =    1521.42 RBSQ  = 0.9464 DurH = -1.78 DoFree =  168 to   2007.007
  MAPE  =       3.44 Test period:   SEE 36328.22 MAPE 3.63e+12 end  2007.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipmanu             - - - - - - - - - - - - - - - - -  32354.69 - - -
  1 mvipmanu[1]             1.00117  2050.1   1.00    1.00  32270.44
```

Other Nonresidential Structures

```
:                              Other NR structure
  SEE   =     202.09 RSQ   = 0.5986 RHO =   0.01 Obser  =  169 from 1993.007
  SEE+1 =     202.07 RBSQ  = 0.5888 DurH =  0.31 DoFree =  164 to   2007.007
  MAPE  =       9.55 Test period:   SEE  1692.58 MAPE 1.69e+11 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipoth              - - - - - - - - - - - - - - - - -  1596.05 - - -
  1 intercept             341.52440     3.8   0.21    2.49      1.00
  2 mvipoth[1]              0.50126    12.1   0.50    1.12   1594.17  0.502
  3 mvipoth[2]              0.26303     2.9   0.26    1.03   1590.76  0.263
  4 mvipoth[3]              0.13697     0.8   0.14    1.02   1587.80  0.137
  5 mvipoth[6]             -0.11399     1.0  -0.11    1.00   1583.17 -0.114
```

Residential construction

```
:                             Residential structure
  SEE   =    4740.21 RSQ   = 0.9988 RHO =  -0.00 Obser  =  169 from 1993.007
  SEE+1 =    4740.17 RBSQ  = 0.9988 DurH = -0.02 DoFree =  166 to   2007.007
  MAPE  =       0.88 Test period:   SEE 510353.06 MAPE 5.10e+13 end  2007.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mvipr                - - - - - - - - - - - - - - - - - 403483.13 - - -
  1 mvipr[1]                1.40116    74.7   1.39    1.72 401656.57
  2 mvipr[2]               -0.29569     3.0  -0.29    1.11 399741.37 -0.297
  3 mvipr[6]               -0.10543     5.5  -0.10    1.00 391694.49 -0.107
```

Figure 5.3: Plots of Monthly VIP Equations

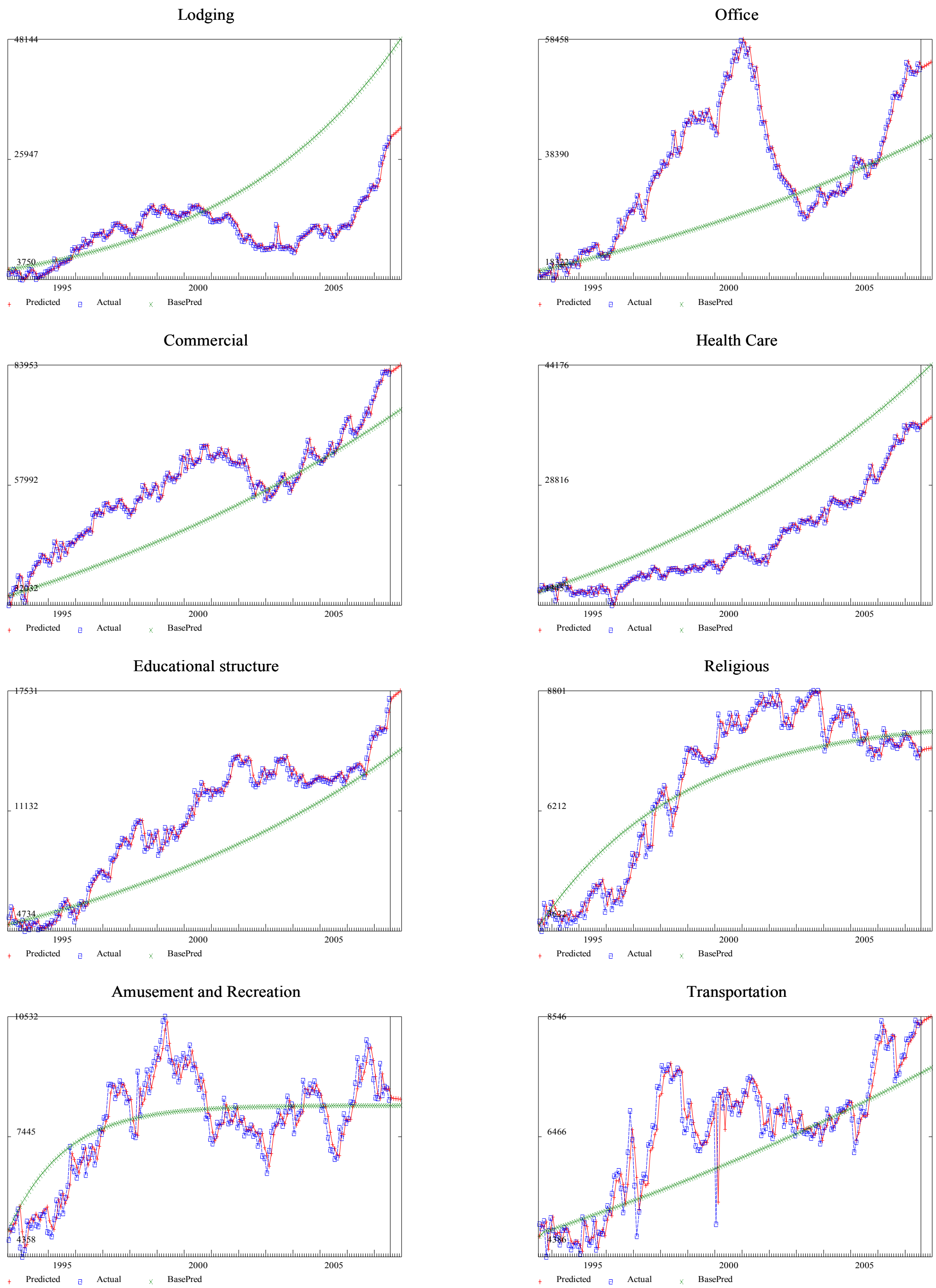
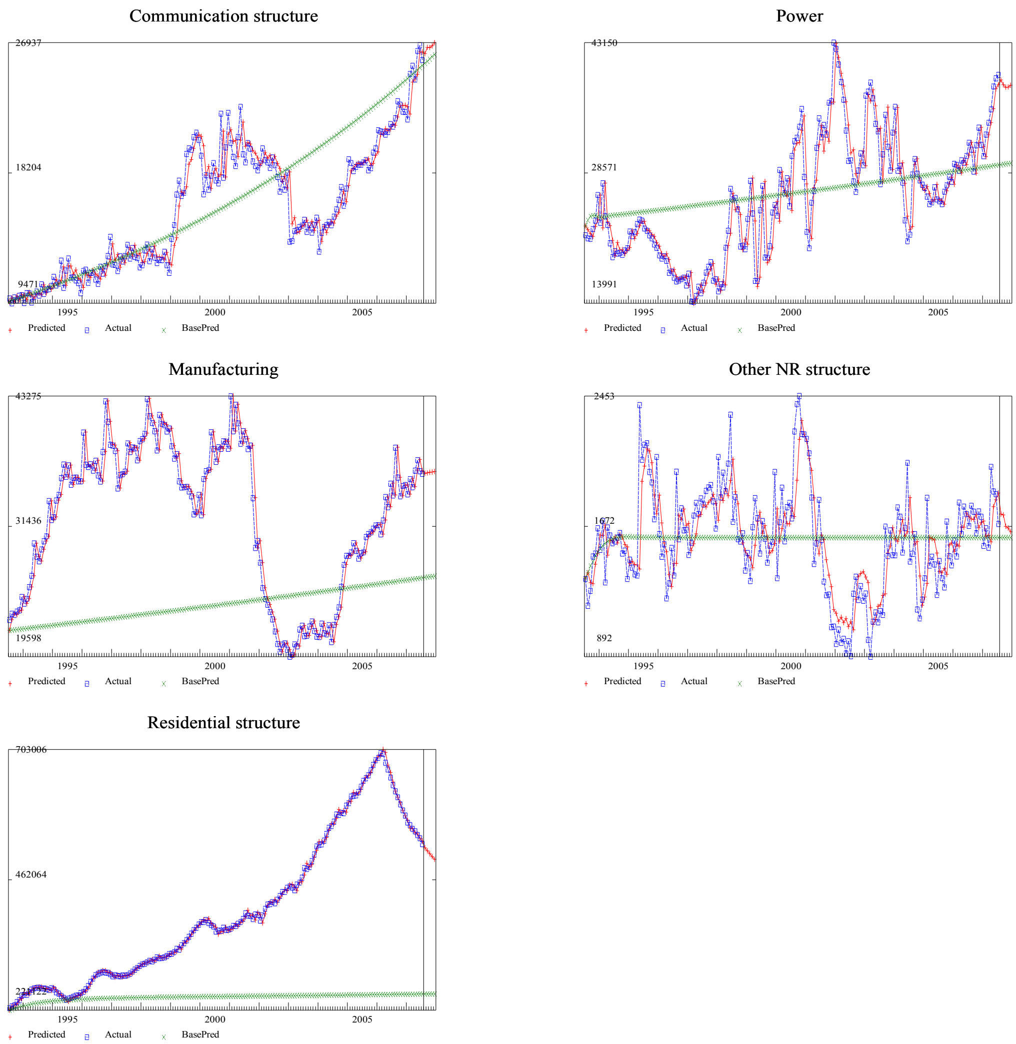


Figure 5.3 (cont.)



5.4 Nonresidential Fixed Investment in Structures Equations

5.4.1 Quarterly Equations for VIP-based Nonresidential Fixed Investment in Structures

This section, corresponding to Step 3 of our nonresidential procedure, develops the equations to forecast the 12 quarterly VIP-based series. All equations are estimated over the period from 1994Q1 to 2007Q3.

Figure 5.4 shows fitted plots of quarterly equations.

Lodging

```
:                                    Lodging
  SEE   =       0.96 RSQ   = 0.9622 RHO =   0.23 Obser  =   55 from 1994.100
  SEE+1 =       0.94 RBSQ  = 0.9608 DurH =  1.85 DoFree =   52 to   2007.300
  MAPE  =       6.28
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qviplodge             - - - - - - - - - - - - - - - - -     13.09 - - -
  1 qviplodge[1]            0.99267   178.9   0.96    1.65     12.62
  2 vfnrs                   0.08709    28.2   1.94    1.60    291.08  1.200
  3 vfnrs[1]               -0.08665    26.7  -1.89    1.00    285.69 -1.135
```

The equations shows very good fit with an adjusted R-square of 0.9698 and a MAPE of 6.28 percent. All three regressors have good Mexvals and reasonable signs. The fitted plot shows good fit by both predicted value and BasePred. The use of private fixed investment in nonresidential structures and its lagged value as additional regressors helps improve the BasePred.

Office

```
:                                   Office
  SEE   =       1.86 RSQ   = 0.9685 RHO =   0.24 Obser  =   55 from 1994.100
  SEE+1 =       1.81 RBSQ  = 0.9672 DurH =  1.91 DoFree =   52 to   2007.300
  MAPE  =       3.74
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvipoffice            - - - - - - - - - - - - - - - - -     37.28 - - -
  1 qvipoffice[1]           0.97591   227.4   0.96    1.61     36.67
  2 vfnrs                   0.15321    21.9   1.20    1.40    291.08  0.999
  3 vfnrs[1]               -0.15109    18.2  -1.16    1.00    285.69 -0.936
```

The equation has good closeness of fit statistics in both adjusted R-square and MAPE. Both plots have quite well to the actual series.

Commercial

```
:                                 Commercial
  SEE   =       1.59 RSQ   = 0.9764 RHO =   0.11 Obser  =   55 from 1994.100
  SEE+1 =       1.60 RBSQ  = 0.9755 DurH =  0.96 DoFree =   52 to   2007.300
  MAPE  =       2.21
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvipcommerce          - - - - - - - - - - - - - - - - -     58.78 - - -
  1 intercept               5.15421    10.1   0.09   42.45      1.00
  2 qvipcommerce[1]         0.66908    59.2   0.66    1.40     57.96  0.661
  3 vfnrs                   0.05101    18.2   0.25    1.00    291.08  0.336
```

With the help of private fixed investment in nonresidential structures, the BasePred moves very closely to the actual value of commercial structure investment. The adjusted R-square is 0.9755 and the MAPE is 2.21 percent. All regressors have good Mexvals and expected signs.

Health Care

```
:                                 Health Care
  SEE   =       0.72 RSQ   = 0.9869 RHO =  -0.03 Obser  =   55 from 1994.100
  SEE+1 =       0.72 RBSQ  = 0.9866 DurH = -0.22 DoFree =   53 to   2007.300
  MAPE  =       2.78
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvipmc                - - - - - - - - - - - - - - - - -     21.85 - - -
  1 qvipmc[1]               1.03000   303.7   1.01    1.00     21.47
  2 vfnrs                  -0.00081     0.1  -0.01    1.00    291.08 -0.009
```

From Figure 5.4, the actual health care construction has been increasing throughout the test period, with a small drop during the recession in 2001. The BasePred shows that the equation will overestimate the construction in the long run. The RHO of -0.03 will help correcting the overestimation in the short-run forecast. Overall, the equation fits very well with an adjusted R-square of 0.9866 and a MAPE of 2.78 percent. The use of private fixed investment in nonresidential structures helps moves down the BasePred in the fitted plot but has low Mexvals.

Educational

```
:                                   Educational
  SEE   =       0.45 RSQ   = 0.9799 RHO =  -0.06 Obser  =   55 from 1994.100
  SEE+1 =       0.45 RBSQ  = 0.9792 DurH = -0.48 DoFree =   52 to   2007.300
  MAPE  =       3.67
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvipedu               - - - - - - - - - - - - - - - - -     10.79 - - -
  1 intercept               -0.38803     1.9  -0.04   49.87      1.00
  2 qvipedu[1]               0.88213   262.4   0.86    1.30     10.57  0.874
  3 vfnrs                    0.00637    13.9   0.17    1.00    291.08  0.137
```

All the regressors have good Mexvals and appropriate signs. We have good closeness of fit statistics with an adjusted R-square of 0.9792 and a MAPE of 3.67 percent. The educational construction has very good fit as shown in Figure 5.4. Both predicted value and BasePred track the actual value very well. We should be able to get a reliable forecast from this equation given a good exogenous variable (*vfnrs*).

Religious

```
:                                    Religious
  SEE   =       0.28 RSQ   = 0.9696 RHO =   0.18 Obser  =   55 from 1994.100
  SEE+1 =       0.27 RBSQ  = 0.9696 DurH =  1.33 DoFree =   54 to   2007.300
  MAPE  =       3.08
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qviprelig             - - - - - - - - - - - - - - - - -      6.91 - - -
  1 qviprelig[1]            1.00667  2443.4   1.00    1.00      6.85
```

The actual series show that the religious construction has been expanding rapidly during the end of 1990s as the U.S. economy saw a rapid growth rate before the recession in 2001. Although the equation shows good closeness of fit statistics, we can clearly see the lag in movement of predicted value compared to the actual value throughout the test period. As the actual series exhibits a seasonal pattern, the lag from the predicted value should be averaged out when we annualized the predicted value to be used in the annual equations, which will be discussed in the next section.

Amusement and Recreation

```
:                            Amusement and recreation
  SEE   =       0.45 RSQ   = 0.8695 RHO =   0.20 Obser  =   55 from 1994.100
  SEE+1 =       0.45 RBSQ  = 0.8671 DurH =  1.58 DoFree =   53 to   2007.300
  MAPE  =       4.93
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qviprec               - - - - - - - - - - - - - - - - -      7.85 - - -
  1 intercept               0.84701     4.6   0.11    7.67      1.00
  2 qviprec[1]              0.89886   176.9   0.89    1.00      7.79  0.932
```

The equation has an adjusted R-square of 0.8671 and a MAPE of 4.93 percent. All regressors have good Mexvals and appropriate signs. The plot of predicted value reveal the lag in movement of predicted value as the amusement and recreation construction is quite volatile. The BasePred plot seems to be moving nicely in the middle of the fluctuation which should give a reasonable short-run forecast.

Transportation

```
:                                 Transportation
  SEE   =       0.38 RSQ   = 0.8635 RHO =  -0.07 Obser  =   55 from 1994.100
  SEE+1 =       0.38 RBSQ  = 0.8583 DurH = -0.84 DoFree =   52 to   2007.300
  MAPE  =       4.76
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qviptr               - - - - - - - - - - - - - - - - -      6.60 - - -
  1 intercept              0.98441     6.8   0.15    7.33      1.00
  2 qviptr[1]              0.65443    32.6   0.65    1.16      6.53  0.653
  3 vfnrs                  0.00460     7.9   0.20    1.00    291.08  0.304
```

The equation for transportation construction performs decently with an adjusted R-square of 0.8583. All regressors have good Mexvals and expected signs. From Figure 5.4, the actual series typically moves without much volatility but each shock had significant magnitude. Overall, the equation fits very well to the series during the test period as shown by both the Predicted value and the BasePred plots.

Communication

```
:                                  Communication
  SEE   =       1.00 RSQ   = 0.9450 RHO =   0.14 Obser  =   55 from 1994.100
  SEE+1 =       0.99 RBSQ  = 0.9439 DurH =  1.20 DoFree =   53 to   2007.300
  MAPE  =       4.59
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvipcomm             - - - - - - - - - - - - - - - - -     16.16 - - -
  1 qvipcomm[1]            0.73415    70.4   0.72    1.29     15.86
  2 vfnrs                  0.01563    13.5   0.28    1.00    291.08  0.250
```

The communication construction equation fit the actual series during the test period quite well. An adjusted R-square is 0.9439 and a MAPE is 4.59 percent. Both regressors have good Mexvals and appropriate signs. The fitted plots show the equation doing quite well in both the predicted value and the BasePred.

Power

```
:                                    Power
  SEE   =       3.18 RSQ   = 0.7702 RHO =  -0.04 Obser  =   55 from 1994.100
  SEE+1 =       3.18 RBSQ  = 0.7613 DurH = -0.44 DoFree =   52 to   2007.300
  MAPE  =       9.60
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvippower             - - - - - - - - - - - - - - - - -     26.11 - - -
  1 qvippower[1]            0.66446    44.8   0.66    1.30     25.84
  2 vfnrs                  -0.06778     1.4  -0.76    1.05    291.08 -0.697
  3 vfnrs[1]                0.10040     2.6   1.10    1.00    285.69  0.981
```

From Figure 5.4, the power structure construction had been quite volatile with big magnitude of changes. Considering the volatility, the equation performs quite well with an adjusted R-square of 0.7613 and a MAPE of 9.60 percent. All regressors have good Mexvals. The BasePred plot moves along the trend of the actual series very well during the test period. Thus, the short-term forecast from this equation should be reliable.

Manufacturing

```
:                                Manufacturing
  SEE   =       1.99 RSQ   = 0.9051 RHO =  -0.02 Obser  =   55 from 1994.100
  SEE+1 =       1.99 RBSQ  = 0.9014 DurH = -0.17 DoFree =   52 to   2007.300
  MAPE  =       4.69
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvipmanu              - - - - - - - - - - - - - - - - -     32.72 - - -
  1 intercept               3.32263     5.1   0.10   10.53      1.00
  2 qvipmanu[1]             1.14565   120.3   1.14    1.19     32.50  1.160
  3 qvipmanu[3]            -0.24470     9.0  -0.24    1.00     32.02 -0.256
```

Figure 5.4 shows the characteristics of manufacturing construction very well. The manufacturing structure investment typically is affected the most by a downturn in the overall economy. As explained earlier, businesses tend to be conservative in expansion decision, to avoid idle facilities, and they normally keep using the existing facilities until there is a real need for new or additional manufacturing facilities. This characteristics can be observed with the drop in construction in 2001 and the flat investment between

2002 and 2004. Considering this characteristics, the equation works quite well with a decent adjusted R-square and a good MAPE.

Other

```
:                                   Other NR
  SEE   =       0.18 RSQ   = 0.6045 RHO =   0.04 Obser  =   55 from 1994.100
  SEE+1 =       0.18 RBSQ  = 0.5812 DurH = 999.00 DoFree =   51 to   2007.300
  MAPE  =       9.21
    Variable name           Reg-Coef  Mexval  Elas   NorRes      Mean   Beta
  0 qvipoth               - - - - - - - - - - - - - - - - -       1.60 - - -
  1 intercept               0.47679     7.6   0.30    2.53       1.00
  2 qvipoth[1]              1.00217    41.7   1.00    1.11       1.60  1.001
  3 qvipoth[2]             -0.38932     3.9  -0.39    1.01       1.59 -0.388
  4 qvipoth[3]              0.08935     0.4   0.09    1.00       1.59  0.090
```

The construction of other nonresidential structures is another structure type that is affected by the recession. Ignoring the 2001 recession, Figure 5.4 shows that the construction seems to be slowly increasing during the test period. Overall, the equation is acceptable with decent closeness of fit statistics. The fitted plot shows an observable lag in movement from the actual value.

Mining Exploration, Shafts, and Wells

```
:                                 Mining (NIPA)
  SEE   =       3.01 RSQ   = 0.9904 RHO =   0.31 Obser  =   55 from 1994.100
  SEE+1 =       2.86 RBSQ  = 0.9904 DurH =  2.33 DoFree =   54 to   2007.300
  MAPE  =       5.73
    Variable name           Reg-Coef  Mexval  Elas   NorRes      Mean   Beta
  0 qvstnnmin             - - - - - - - - - - - - - - - - -      42.50 - - -
  1 qvstnnmin[1]            1.05063  1644.5   1.00    1.00      40.60
```

The equation has an adjusted R-square of 0.9904 and a MAPE of 5.73 percent. The BasePred overestimates the increasing trend of the fixed investment in Mining structures, which should not be a problem for the short-term forecast.

Figure 5.4: Plots of Quarterly Equations for Nonresidential Structures Investment

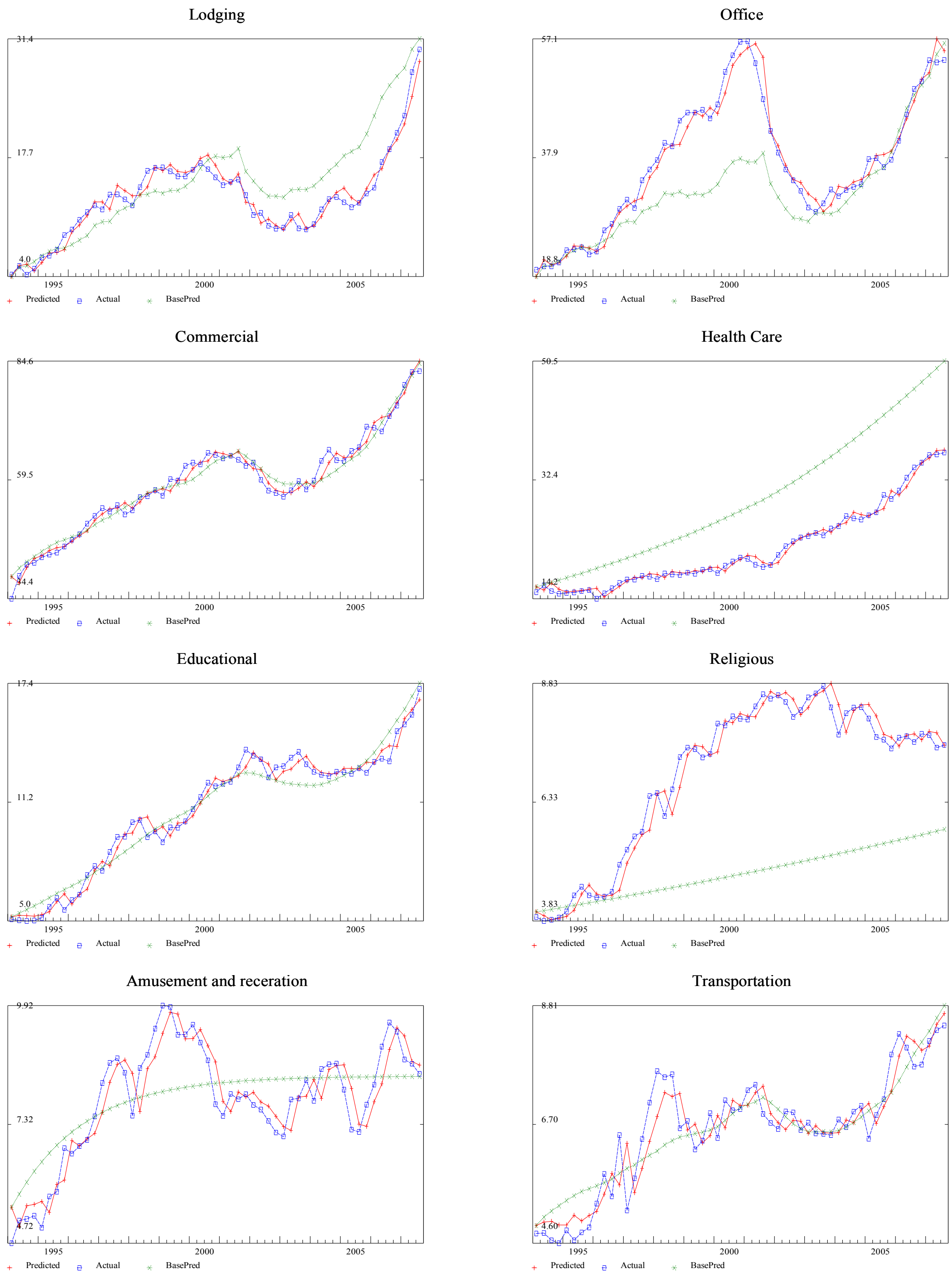
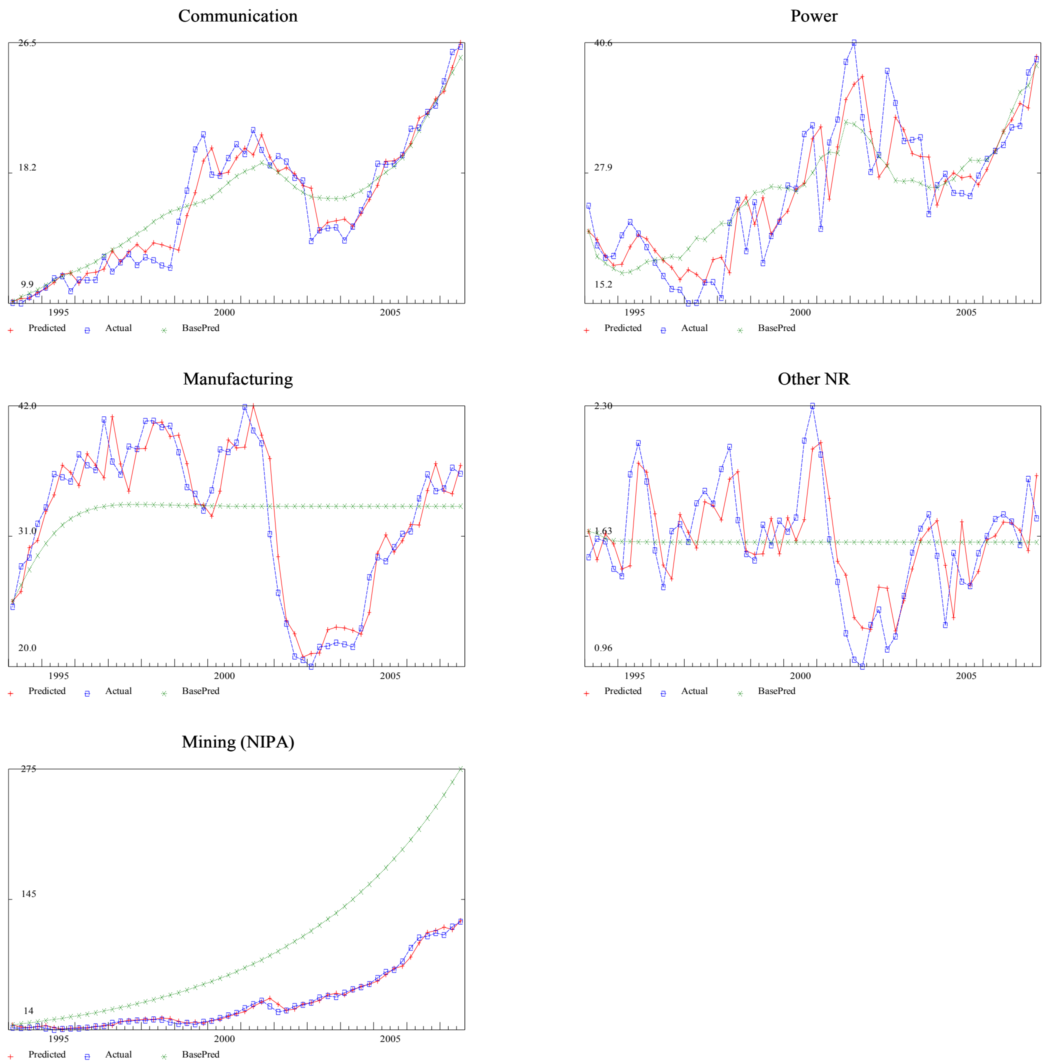


Figure 5.4 (cont.)



5.4.2 Annual NIPA Nonresidential Fixed Investment in Structures Equations

We now come to Step 5 of our procedure, Estimating annual NIPA series from annual VIP-based series. The BEA changed the classification of Private fixed investment in nonresidential structures in 1997 and, so far, has not released any data in new definition before 1997. All annual nonresidential structure investment equations are therefore estimated from 1997 to 2006. All fitted plots are shown in Figure 5.5.

In this section, I discuss 8 selected structure types. All 24 types' regression results are shown in Appendix 5.1.

Office

```
:                                  Office (NIPA)
  SEE   =       0.07 RSQ   = 0.9999 RHO =  -0.36 Obser  =   10 from 1997.000
  SEE+1 =       0.07 RBSQ  = 0.9999 DW  =   2.72 DoFree =    9 to   2006.000
  MAPE  =       0.14
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn1             - - - - - - - - - - - - - - - - -      46.27 - - -
  1 vipoffice             1.14934 64571.2   1.00    1.00      40.26
```

The VIP of office construction fits virtually perfectly with the private fixed investment in office structures without an intercept. The equation has an adjusted R-square of 0.9999 and a MAPE of 0.14 percent. The fitted plot confirms the finding with the closeness of fit statistics.

Warehouses

```
:                                   Warehouses
  SEE   =       0.69 RSQ   = 0.6406 RHO =   0.25 Obser  =   10 from 1997.000
  SEE+1 =       0.71 RBSQ  = 0.5956 DW  =   1.51 DoFree =    8 to   2006.000
  MAPE  =       4.53
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn9                - - - - - - - - - - - - - - - - -     12.63 - - -
  1 vipcommerce              0.11288    85.8   0.55    2.67     61.44
  2 vipoffice                0.14031    63.3   0.45    1.00     40.26  0.887
```

The fixed investment of warehouses structure can be explained by the VIP of commercial building and office. Both regressors show very good Mexvals and Elasticities. The estimation has an adjusted R-square of 0.6406 and a MAPE of 4.53 percent.

Manufacturing

```
:                              Manufacturing (NIPA)
  SEE   =       2.62 RSQ   = 0.8905 RHO =   0.60 Obser  =   10 from 1997.000
  SEE+1 =       2.36 RBSQ  = 0.8768 DW  =   0.81 DoFree =    8 to   2006.000
  MAPE  =       7.52
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnnmanu             - - - - - - - - - - - - - - - - -     27.51 - - -
  1 intercept             -7.97617    18.0  -0.29    9.13      1.00
  2 vipmanu                1.10648   202.2   1.29    1.00     32.07  0.944
```

The VIP of manufacturing structures fits very well to the BEA's fixed investment in manufacturing structures. Plot in Figure 5.5 shows that the predicted value generally moves in the same direction as the actual series. The closeness of fit statistics are good with an adjusted R-square of 0.8768.

Electric power

```
:                                  Electric
  SEE   =       1.00 RSQ   = 0.9513 RHO =   0.17 Obser  =   10 from 1997.000
  SEE+1 =       1.01 RBSQ  = 0.9452 DW  =   1.66 DoFree =    8 to   2006.000
  MAPE  =       4.77
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn12              - - - - - - - - - - - - - - - - -     18.94 - - -
  1 intercept              -3.20768    18.1  -0.17   20.52      1.00
  2 vippower                0.81715   353.0   1.17    1.00     27.10  0.975
```

For fixed investment in electric power structures, we find that it can be explained with only the VIP of power structures. During the estimated period, the equation has an adjusted R-square of 0.9452 and a MAPE of 4.77 percent. The fitted plot shows that the predicted value also moves in the same direction (with slightly different magnitude) as the actual value.

Petroleum and natural gas

```
:                          Petroleum and natural gas
  SEE   =       0.25 RSQ   = 0.9999 RHO =  -0.56 Obser  =   10 from 1997.000
  SEE+1 =       0.20 RBSQ  = 0.9999 DW  =   3.12 DoFree =    8 to   2006.000
  MAPE  =       0.64
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn15              - - - - - - - - - - - - - - - - -     43.00 - - -
  1 intercept              -0.35667    22.4  -0.01 9761.48      1.00
  2 vstnnmin                0.96584  9780.0   1.01    1.00     44.89  1.000
```

Fixed investment in petroleum and natural gas structures is one of the two components of NIPA fixed investment in mining exploration, shafts, and wells structures (the other component is Mining structures). It is also the main contributor to the NIPA fixed investment in Mining exploration, shafts, and wells structures as it covers about 95% of nominal fixed investment in mining exploration, shafts, and wells structures. Thus, it's not surprising to find that fixed investment in mining exploration, shafts, and wells structures fits almost perfectly to the fixed investment in petroleum and natural gas structures with very high closeness of fit statistics and almost perfect fitted plot.

Educational and vocational

```
:                           Educational and vocational
  SEE   =       0.16 RSQ   = 0.9922 RHO =   0.27 Obser  =   10 from 1997.000
  SEE+1 =       0.16 RBSQ  = 0.9912 DW  =   1.47 DoFree =    8 to   2006.000
  MAPE  =       0.85
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn18              - - - - - - - - - - - - - - - - -     13.11 - - -
  1 intercept              0.80318    23.6   0.06  127.52      1.00
  2 vipedu                 1.03639  1029.2   0.94    1.00     11.87  0.996
```

The equation for educational and vocational structures has only one regressor, the VIP of educational structures. As to be expected, the equation performs very well throughout the estimation period with very good closeness of fit statistics and fitted plot. The biggest error seen in 2006 might be lower when BEA published its next revised data.

Air transportation

```
:                               Air transportation
  SEE   =       0.31 RSQ   = 0.4030 RHO =   0.41 Obser  =    9 from 1998.000
  SEE+1 =       0.29 RBSQ  = 0.3177 DurH =  2.16 DoFree =    7 to   2006.000
  MAPE  =      19.40
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn22              - - - - - - - - - - - - - - - - -      1.31 - - -
  1 vstnn22[1]             0.67994    37.4   0.69    1.17      1.32
  2 viptr                  0.05868     8.2   0.31    1.00      7.02  0.059
```

Air transportation is quite difficult to fit well. In this equation, we find that the use of one-period lagged dependent variable and the VIP of transportation structures works best bit still cannot achieve very good closeness of fit statistics, an adjusted R-square of 0.3177. However, the fitted plot gives a good general movement of the investment with pronounced lag which should be alleviated by the use of RHO adjustment in the forecast.

Farm

```
:                                     Farm
  SEE   =       0.43 RSQ   = 0.5655 RHO =   0.06 Obser  =   10 from 1997.000
  SEE+1 =       0.43 RBSQ  = 0.4414 DW  =   1.88 DoFree =    7 to   2006.000
  MAPE  =       6.40
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn24               - - - - - - - - - - - - - - - - -      5.17 - - -
  1 intercept               1.23534     2.5   0.24    2.30      1.00
  2 vipoth                 -0.83102    10.8  -0.25    2.13      1.58 -0.315
  3 vipcommerce             0.08538    45.9   1.01    1.00     61.44  0.702
```

This equation works decently in tracking the long-term trend of the fixed investment in farm structures. Both constructions of other nonresidential structures and commercial structures have good Mexvals. Although the adjusted R-square of 0.4414 is not very high, the MAPE of 6.40 percent is quite good. The fitted plot shows that the equations seems to miss the fluctuation in the last decade but generally gives estimated values in that are not far off the actual values.

Figure 5.5: Plots of Annual Equations for NIPA Nonresidential Structures Investment

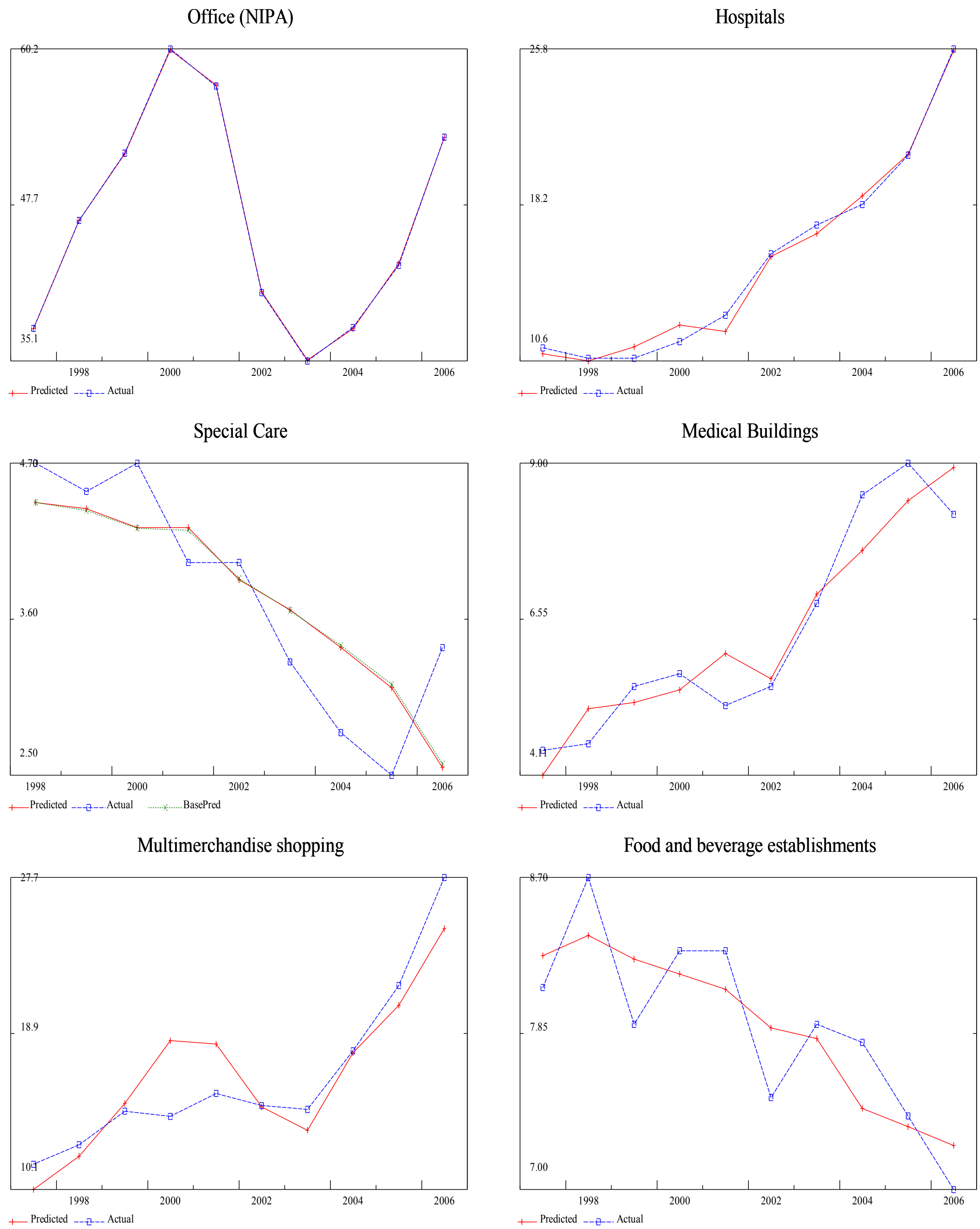


Figure5.5 (cont.)

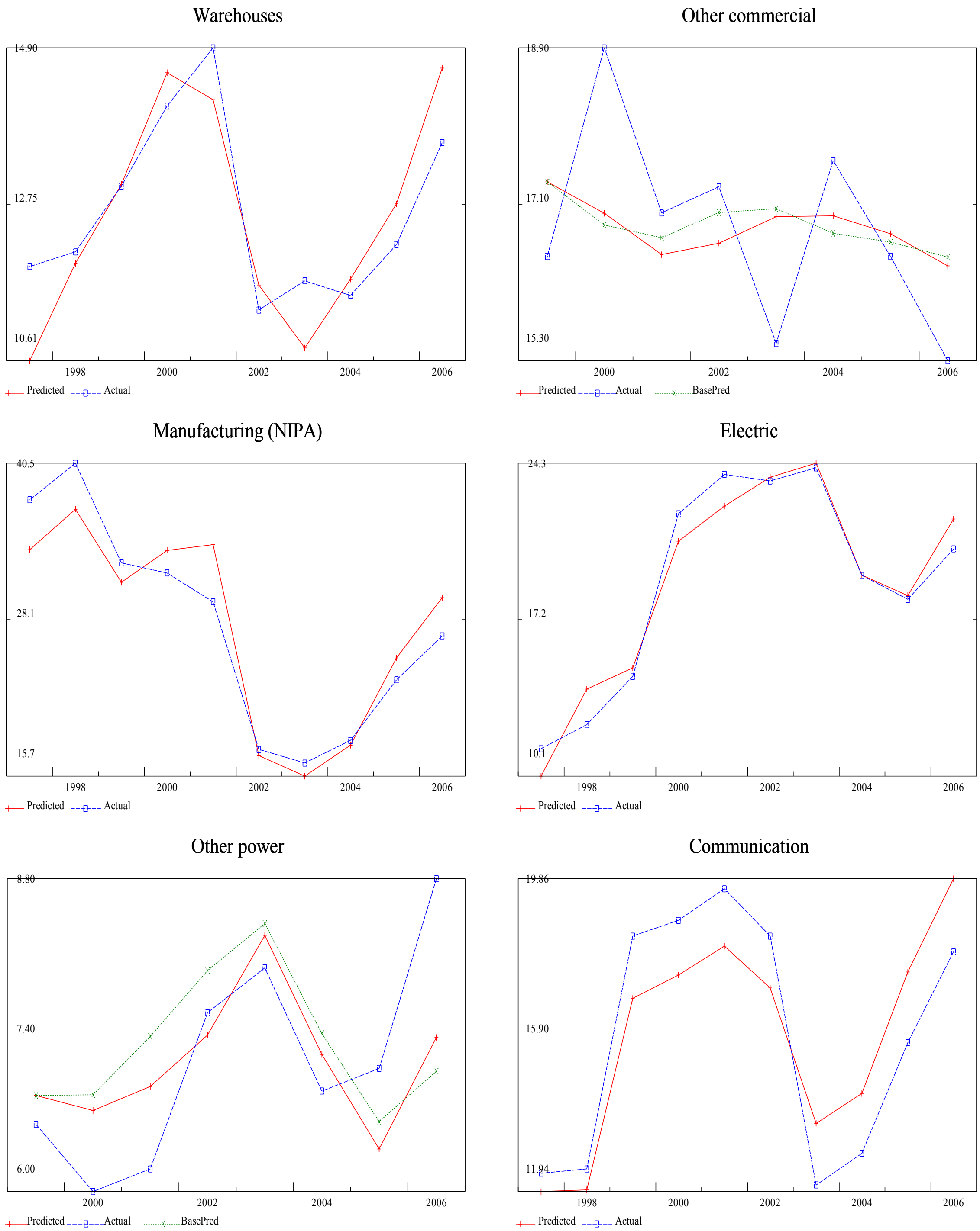


Figure5.5 (cont.)

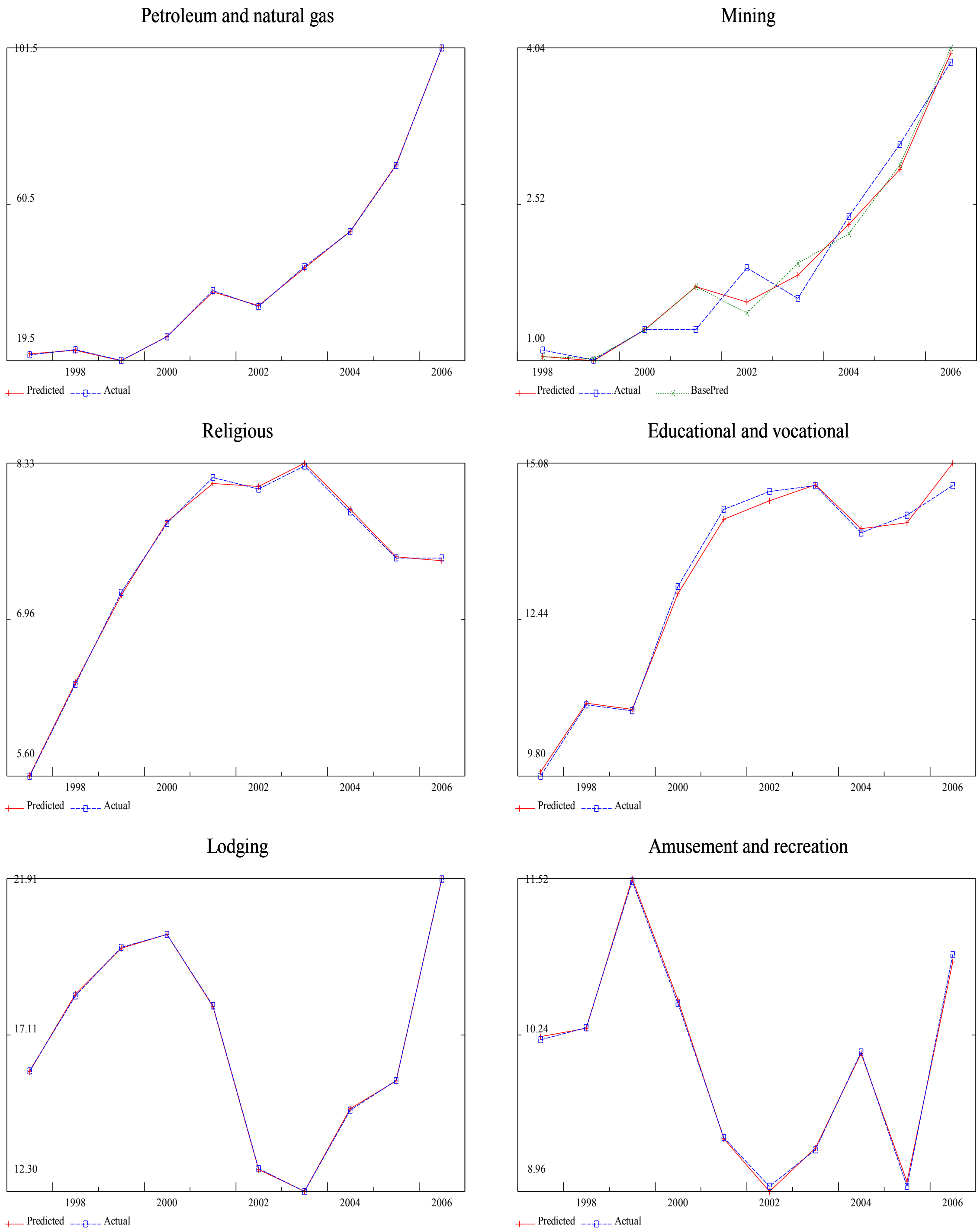


Figure5.5 (cont.)

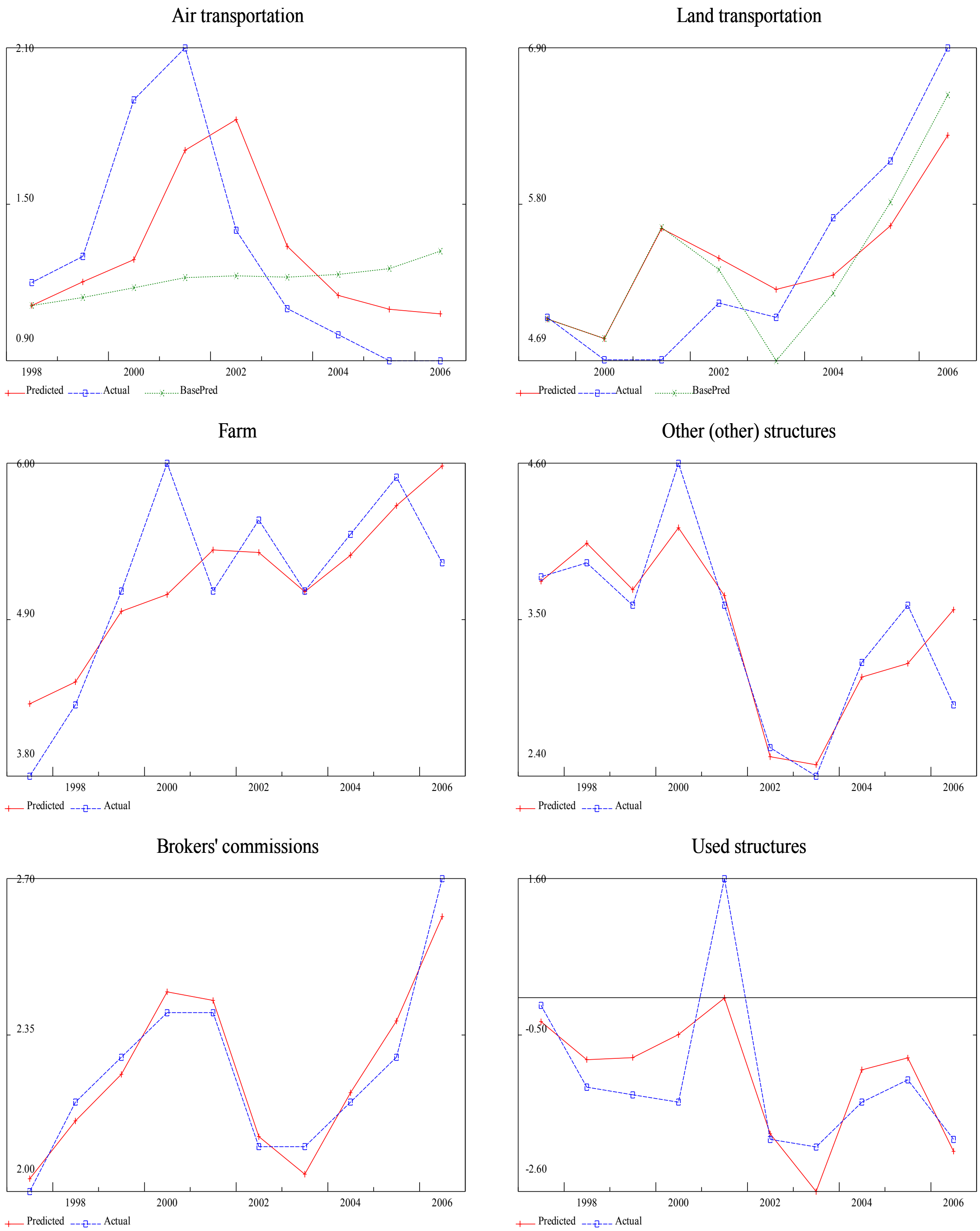
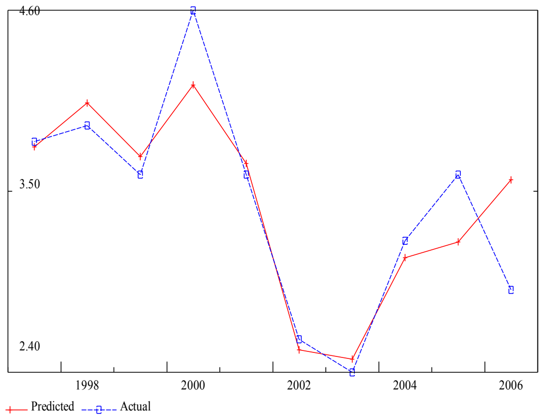
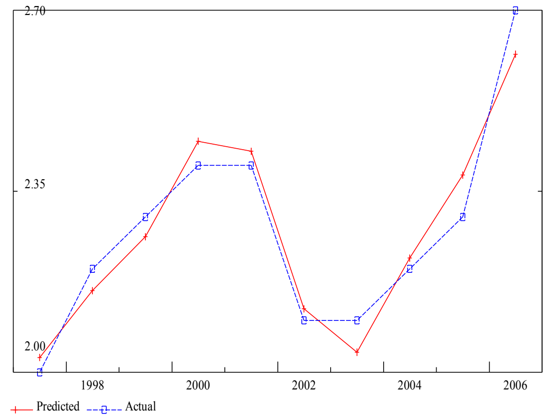


Figure5.5 (cont.)

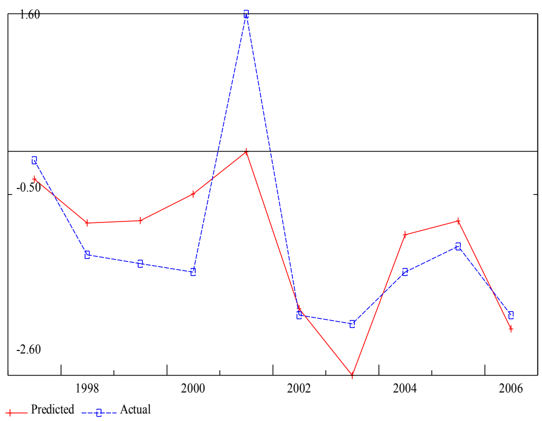
Other (other) structures



Brokers' commissions



Used structures



5.5 Residential Fixed Investment in Structures Equations

Step 1 of the procedure is discussed earlier in section 5.3. I discuss Step 3 and Step 4 for estimating Residential fixed investment in structures in this section.

5.5.1 Extending NIPA series using VIP-based Residential Construction

First, as indicated, we use a very short-term forecast of the VIP of residential construction estimated from the equation in section 5.2 to complete the current quarter of components of NIPA Fixed investment in residential structures. The following section discusses the regression equations that will be used to complete the current quarter NIPA series, Step 3. Figure 5.6 shows the fitted plots of these three series.

All three series, which are parts of NIPA Fixed investment in residential structures, can be explained very well with combinations of lagged dependent variables and the VIP of residential construction, *qvipr*, (and its lagged values). All three equations are estimated with data from 1994Q1 to 2007Q2.

The results show that all three equations have very high closeness of fit statistics in both adjusted R-square and MAPE. The plots of predicted value are very good with out showing a lag in movement when the sudden decline in residential investments occurred in the beginning of 2006. The BasePred plots also move along nicely with the actual series. These should provide accurate forecasts if we can get reliable forecasted values of the VIP of residential construction, especially when our objective is to just complete the current quarter.

Single-family structures

```
:                          Single-family structures
  SEE   =       6.79 RSQ   = 0.9947 RHO =   0.69 Obser  =   54 from 1994.100
  SEE+1 =       5.07 RBSQ  = 0.9945 DW  =   0.61 DoFree =   51 to   2007.200
  MAPE  =       2.30
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvstnnrsing           - - - - - - - - - - - - - - - - -    262.06 - - -
  1 intercept              -21.05345    39.2  -0.08  188.83      1.00
  2 qvipr                    0.94377   288.9   1.47    2.08    408.98  1.363
  3 qvipr[2]                -0.25902    44.1  -0.39    1.00    397.16 -0.376
```

Multifamily structures

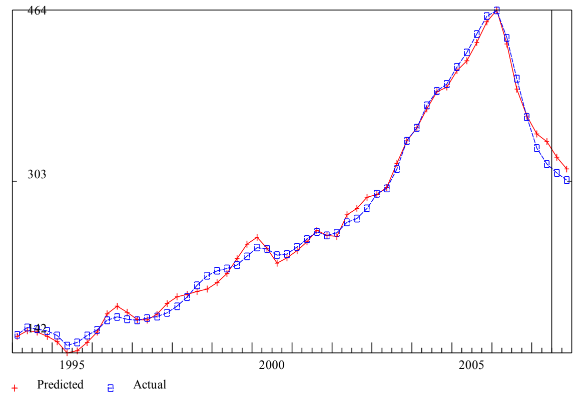
```
:                           Multifamily structures
  SEE   =       0.91 RSQ   = 0.9938 RHO =  -0.11 Obser  =   54 from 1994.100
  SEE+1 =       0.90 RBSQ  = 0.9936 DurH = -0.83 DoFree =   52 to   2007.200
  MAPE  =       2.45
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvstnnrmul            - - - - - - - - - - - - - - - - -     31.11 - - -
  1 qvstnnrmul[1]            0.81960   249.7   0.80    1.68     30.38
  2 qvipr                    0.01526    29.8   0.20    1.00    408.98  0.179
```

Other residential structures

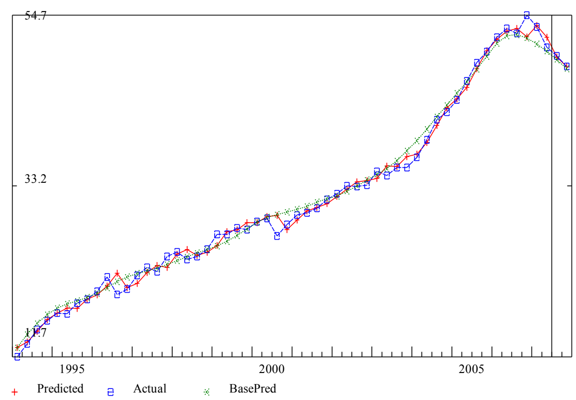
```
:                        Other Residential structures
  SEE   =       3.55 RSQ   = 0.9960 RHO =   0.14 Obser  =   54 from 1994.100
  SEE+1 =       3.53 RBSQ  = 0.9959 DurH =  1.06 DoFree =   52 to   2007.200
  MAPE  =       1.25
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvstnnroth            - - - - - - - - - - - - - - - - -    191.04 - - -
  1 qvstnnroth[1]            0.92260   245.0   0.91    1.11    187.89
  2 qvipr                    0.04265     5.5   0.09    1.00    408.98  0.102
```

Figure 5.6: Plots of Regressions of Fixed Residential Investment in Structures (Step 3)

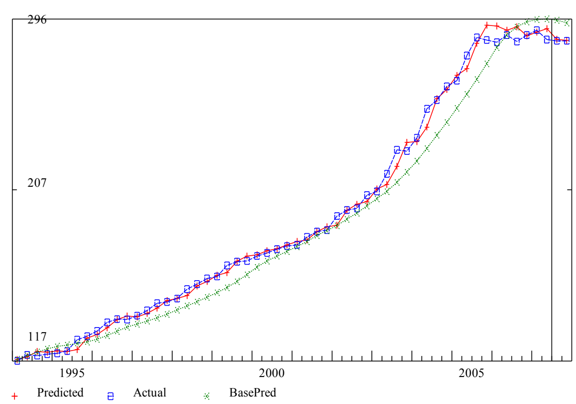
Single-family structures



Multifamily structures



Other Residential structures



5.5.2 Quarterly Residential Fixed Investment in Structures Equations

All equations in this section are estimated over the period from 1994Q1 to 2007Q2. These equations produce the forecast, which will be annualized, as discussed earlier as the final product of our approach.

Single-family structures

```
:                            Single-family structures
  SEE   =       4.18 RSQ   = 0.9980 RHO =   0.11 Obser  =   54 from 1994.100
  SEE+1 =       4.21 RBSQ  = 0.9979 DurH =  0.92 DoFree =   50 to   2007.200
  MAPE  =       0.99
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvstnnrsing           - - - - - - - - - - - - - - - - -    262.45 - - -
  1 intercept              -6.80430     6.7  -0.03  501.20      1.00
  2 qvstnnrsing[1]          0.73232    80.6   0.72    8.50    258.95  0.737
  3 vfr                     0.81737   187.1   1.53    5.07    491.67  1.403
  4 vfr[1]                 -0.66497   125.1  -1.23    1.00    484.62 -1.146
```

The equation for single-family structures investment has three regressors. The regressors are one-quarter lagged dependent variable, current period NIPA fixed residential investment and one-quarter lagged NIPA fixed residential investment (plus intercept). All regressors have good Mexvals and reasonable signs. The result shows very good closeness of fit statistics. The adjusted R-square is 0.9979 and the MAPE is 0.99 percent. Most of the explanatory power is provided by the NIPA fixed residential investment (investment in single-family structures accounts for 53% of NIPA fixed residential investment on average over the estimation period).   Plots of both predicted value and BasePred shows very good tracking ability throughout the estimation period.

Multifamily structures

```
:                          Multifamily structures
  SEE   =       0.87 RSQ   = 0.9943 RHO =  -0.19 Obser  =   54 from 1994.100
  SEE+1 =       0.85 RBSQ  = 0.9942 DurH = -1.45 DoFree =   52 to   2007.200
  MAPE  =       2.33
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvstnnrmul           - - - - - - - - - - - - - - - - -     31.14 - - -
  1 qvstnnrmul[1]          0.82639   252.2   0.81    1.65      30.38
  2 vfr                    0.01234    28.3   0.19    1.00     491.67  0.172
```

For the equation of Multifamily structures investment, one-quarter lagged dependent variable and the NIPA fixed residential investment are used as regressors (without intercept). We have very good closeness of fit statistics with an adjusted R-square of 0.9942 and a MAPE of 2.33 percent. Both regressors have very good Mexvals and positive signs. The plots show a very good fit by both the predicted values and the BasePred.

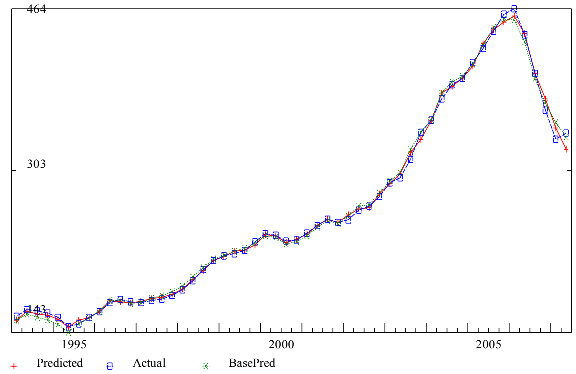
Other residential structures

```
:                       Other Residential structures
  SEE   =       2.63 RSQ   = 0.9978 RHO =   0.04 Obser  =   54 from 1994.100
  SEE+1 =       2.63 RBSQ  = 0.9977 DurH =  1.36 DoFree =   49 to   2007.200
  MAPE  =       0.94
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 qvstnnroth           - - - - - - - - - - - - - - - - -    191.15 - - -
  1 intercept             -2.56890     1.9  -0.01  462.33       1.00
  2 qvstnnroth[1]          0.72714    28.0   0.71    1.81     187.89  0.717
  3 qvstnnroth[2]          0.34476     6.7   0.33    1.79     184.58  0.334
  4 vfr                    0.19485    32.5   0.50    1.49     491.67  0.554
  5 vfr[1]                -0.21119    22.0  -0.54    1.00     484.62 -0.603
```

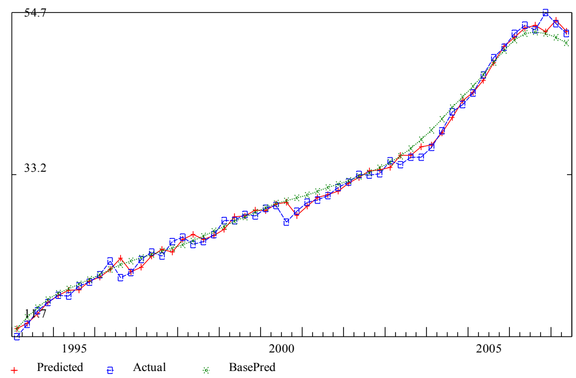
Other residential structures investment equation has four regressors plus an intercept. The regressors are 1) one-quarter lagged dependent variable, 2) two-quarter lagged dependent variable, 3) NIPA fixed residential investment, and 4) one-quarter lagged NIPA fixed residential investment. All regressors have good Mexvals and reasonable signs. The closeness of fit statistics are very good with an adjusted R-square of 0.9977 and a MAPE of 0.94 percent. The fitted plots show a very good fit by both the predicted value and the BasePred.

Figure 5.7: Plots of Regression of Fixed Residential Investment in Structures (Step 5)

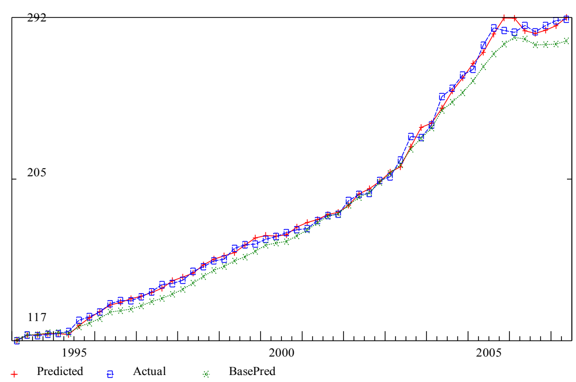
Single-family structures



Multifamily structures



Other Residential structures



5.6 Historical Simulations[20]

Using the same idea as described in previous chapters, two historical forecasts, one with all actual exogenous variables and one with exogenous variables generated by QUEST, are generated for 2005 and 2006. The assumptions of exogenous variables used in the historical simulation with QUEST (the second simulation) is shown in Table 5.8

Table 5.8: Assumptions of exogenous variables used in the Second Historical Simulation

		2005Q1	2005Q2	2005Q3	2005Q4
vfnrs	Private Fixed Investment in Nonresidential Structures (nominal) in Billion of dollars	295.94	298.79	311.91	314.95
vfr	Private Fixed Residential Investment (nominal) in Billion of dollars	686.01	700.45	720.79	729.85
		2006Q1	**2006Q2**	**2006Q3**	**2006Q4**
vfnrs	Private Fixed Investment in Nonresidential Structures (nominal) in Billion of dollars	317.30	316.87	319.28	322.90
vfr	Private Fixed Residential Investment (nominal) in Billion of dollars	732.88	743.59	750.72	761.58
Percentage difference from the published value		**2005Q1**	**2005Q2**	**2005Q3**	**2005Q4**
vfnrs	Private Fixed Investment in Nonresidential Structures (nominal) in Billion of dollars	-8.46%	-9.13%	-6.67%	-10.53%
vfr	Private Fixed Residential Investment (nominal) in Billion of dollars	-5.68%	-7.45%	-8.26%	-9.11%
		2006Q1	**2006Q2**	**2006Q3**	**2006Q4**
vfnrs	Private Fixed Investment in Nonresidential Structures (nominal) in Billion of dollars	-15.54%	-20.82%	-23.27%	-24.63%
vfr	Private Fixed Residential Investment (nominal) in Billion of dollars	-9.45%	-5.66%	0.62%	6.47%

As mentioned in Chapter 4, QUEST predicted that the residential fixed investment (*vfr*) would expand steadily in both 2005 and 2006. This forecast underestimates *vfr* from 2005Q1 to 2006Q2. Thus, I would expect to find that the second simulation will underestimate residential fixed investment in structures across all types, especially in 2005.

For private fixed investment in nonresidential structures, the numbers from QUEST increase steadily throughout the simulation period. However, the growth rate

20 As in previous Chapters, “The first simulation” refers to the historical simulation with actual exogenous variables and “The second simulation” refers to the historical simulation with exogenous variables generated from QUEST and other ad hoc assumptions.

from QUEST is much slower than what actually happened during 2005 and 2006. This discrepancy results in much lower values of private fixed investment in nonresidential structures that was used in the second simulation. Thus, I would expect the second simulation to underestimate the fixed investment in nonresidential structures across all asset types.

Table 5.9 shows the differences between each historical simulation and the published numbers. Figure 5.8 plots the results in Table 5.9 for easier visual comparison.

Table 5.9: Historical Simulations' Results in Major and Detailed Investment Industries

	Percentage difference from the published value	1st Sim		2nd Sim	
		2005	2006	2005	2006
1	Private fixed investment in structures	-0.03%	0.36%	-7.52%	-3.69%
2	Nonresidential	0.33%	1.02%	-3.24%	-13.50%
3	Commercial and health care	-0.37%	-0.40%	-8.46%	-17.32%
4	Office \1\	0.21%	-0.04%	-13.99%	-27.20%
5	Health care	-0.07%	-0.53%	-2.39%	-8.93%
6	Hospitals and special care	2.56%	-3.17%	-1.15%	-14.12%
7	Hospitals	0.44%	-0.30%	-4.15%	-14.08%
8	Special care	20.10%	-24.95%	23.58%	-14.41%
9	Medical buildings	-6.84%	8.90%	-5.58%	9.56%
10	Multimerchandise shopping	-4.90%	-10.34%	-18.75%	-32.98%
11	Food and beverage establishments	-2.39%	3.98%	-0.99%	6.23%
12	Warehouses	4.09%	7.39%	-5.55%	-12.25%
13	Other commercial \2\	1.08%	7.03%	2.03%	9.03%
14	Manufacturing	8.53%	11.78%	17.58%	12.15%
15	Power and communication	-0.29%	0.41%	3.09%	-6.89%
16	Power	-3.00%	-2.37%	7.73%	-4.18%
17	Electric	0.95%	6.68%	13.10%	3.48%
18	Other power	-13.05%	-23.35%	-5.96%	-21.93%
19	Communication	4.06%	5.46%	-4.37%	-10.76%
20	Mining exploration, shafts, and wells	0.02%	0.08%	-7.81%	-21.43%
21	Petroleum and natural gas	0.43%	-0.10%	-7.41%	-21.58%
22	Mining	-9.27%	4.83%	-16.93%	-17.56%
23	Other structures	-0.45%	1.73%	1.21%	-7.72%
24	Religious	0.14%	-0.36%	9.70%	12.60%
25	Educational and vocational	-1.03%	2.54%	-0.56%	-1.31%
26	Lodging	0.03%	0.03%	-0.64%	-21.28%
27	Amusement and recreation	0.41%	-0.58%	14.62%	-6.20%
28	Transportation	-1.10%	-2.89%	-3.90%	-17.45%
29	Air	15.03%	27.35%	13.99%	20.67%
30	Land \3\	-3.48%	-6.83%	-6.54%	-22.42%
31	Farm	-3.23%	12.84%	-7.78%	1.77%
32	Other \4\	-11.68%	23.07%	-15.35%	13.46%
33	Brokers' commissions on sale of structures	3.66%	-3.18%	-1.90%	-14.28%
34	Net purchases of used structures	-37.34%	9.92%	-22.24%	-11.21%
35	Residential	-0.19%	0.00%	-9.40%	1.57%
36	Permanent site	-0.38%	-1.26%	-12.53%	0.69%
37	Single-family structures	-0.29%	-1.05%	-13.34%	1.60%
38	Multifamily structures	-1.22%	-2.90%	-5.09%	-6.42%
39	Other structures	0.14%	2.06%	-4.00%	3.01%

Overall, the approach, described in this chapter, can predict the private fixed investment in structures very well, especially in the major asset types as seen by the results of the first historical simulation shown in Table 5.9. As expected, as a result of significantly low values of exogenous inputs, the second simulation underestimated the structure investment in most of the asset types. The notable asset types that the second simulation overestimated the investment with significant errors are Air transportation and Manufacturing.

For the total fixed investment in structures, the first simulation is very accurate during the simulation period with errors of -0.03% in 2005 and 0.36% in 2006. The second simulation missed the same published figures by -7.52% in 2005 and -3.69% in 2006.

The first simulation performs equally well in predicting the investment in nonresidential structures and residential structures. This means that the accuracy we observed for the total structure investment does not come from the averaging effect from residential and nonresidential structure investments.

For residential structures, the first simulation performs very well in predicting all of its components with small tendency to underestimate the permanent site structure investments. The second simulation underestimates all components of residential structure investment in 2005. It underestimates the residential investment in Single-family structures, which is the biggest component of residential structure investment, significantly with errors of -13.34% in 2005. However, in 2006, the second simulation performs relatively well with only slightly more errors than the first simulation.

For nonresidential structure investment, the first simulation missed the published NIPA numbers by 0.33% in 2005 and 1.02% in 2006. The second simulation missed the same numbers by -3.24% in 2005 and -13.50% in 2006.

The commercial and health care structure investment can be predicted pretty well by the first simulation. Considering the described error with the exogenous inputs, the second simulation performs relatively well in this major asset type. From the first simulation, the only asset type with significant errors is Special care structure investment, with errors of 20.10% in 2005 and -24.95% in 2006. This asset type, also, exhibits comparable performance from the second simulation.

The first simulation missed the nominal manufacturing structure investment by 8.53% in 2005 and 11.78% in 2006. The second simulation missed the same numbers by 17.58% and 12.15% in 2005 and 2006, respectively.

For Power and communication structure investment, the first simulation missed the published numbers by only -0.29% in 2005 and 0.41% in 2006. The second simulation missed the same numbers by 3.09% in 2005 and -6.89% in 2006. Other power structure investment is the only component of power and communication structure investment with significant errors from the first simulation. The first simulation missed the published numbers of other power structure investment by -13.05% in 2005 and -23.35% in 2006.

For Mining exploration, shafts, and wells structure investment, the first simulation missed the BEA numbers by only 0.02% in 2005 and 0.08% in 2006. The second simulation missed the same numbers by -7.81% in 2005 and -21.43% in 2006. These errors from both simulations can be traced to the accuracy – or inaccuracy -- of both simulations in predicting Petroleum and natural gas structure investment, the biggest component of Mining exploration, shafts, and wells structure investment. The first simulation missed the official numbers of the Petroleum and natural gas structure investment by 0.43% in 2005 and -0.10% in 2006 while the second simulation missed the same figures by -7.41% and -21.58% in 2005 and 2006, respectively.

Both simulations performed well in predicting the fixed investment in other structures. The first simulation performs very well in most of them except in some minor components such as Air transportation and Other-other structures[21]. At the same simulation period, the second simulation performs well in predicting the major components of fixed investment in other structures with the exception of Religious structure and Amusement and recreation structure. The second simulation missed the published numbers of investment in religious structure by 9.70% in 2005 and 12.60% in 2006. The second simulation, also, missed the published numbers of investment in Amusement and recreation structure by 14.62% in 2005 and -6.02% in 2006.

Overall, the first simulation shows that, with accurate exogenous inputs, our approach for estimating fixed investment in structures by asset types can produce reasonable and reliable results.

21 Includes water supply, sewage and waste disposal, public safety, highway and street, and conservation and development.

Figure 5.8: Plots compared BEA numbers with numbers from Historical Simulations

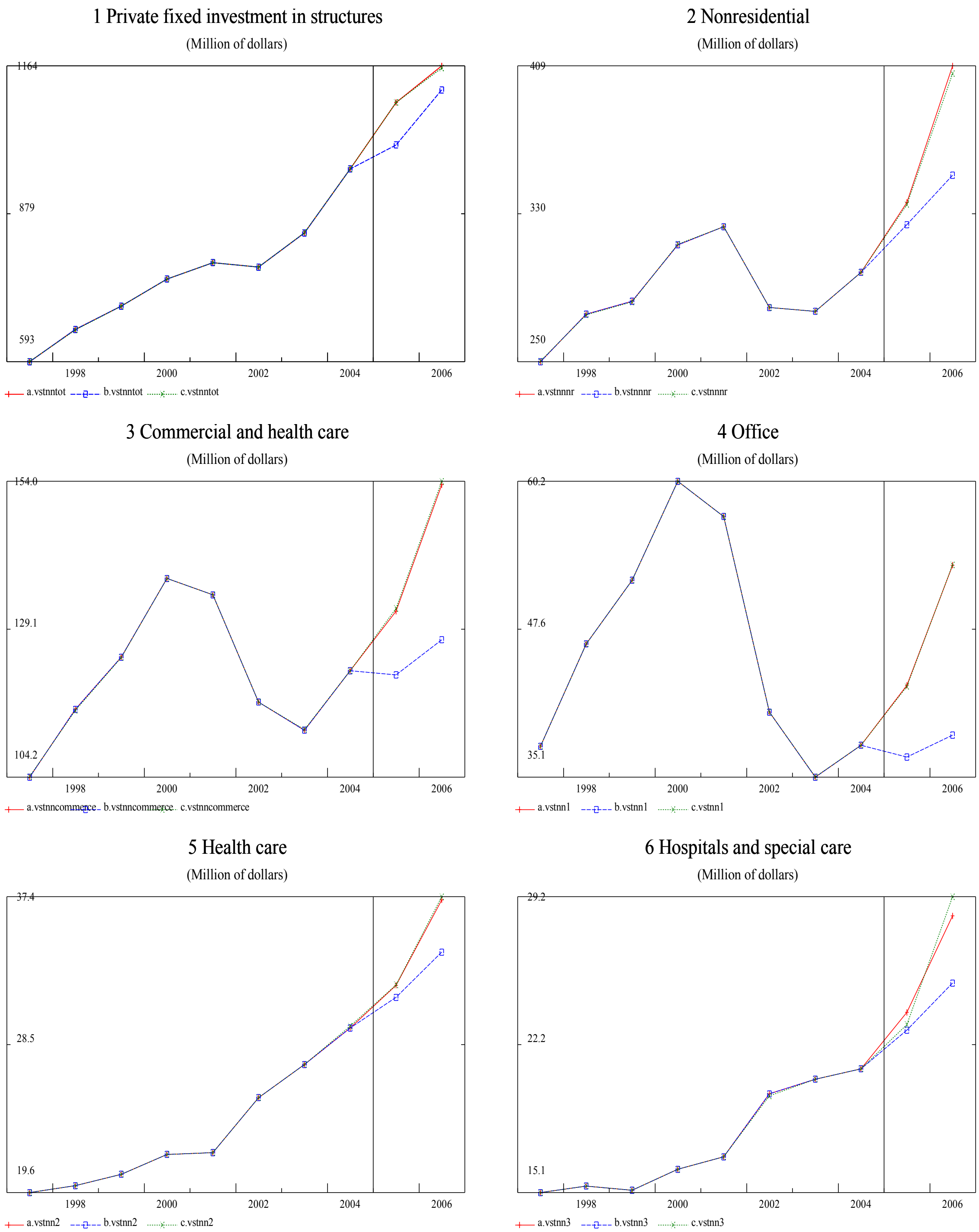


Figure 5.8 (cont.)

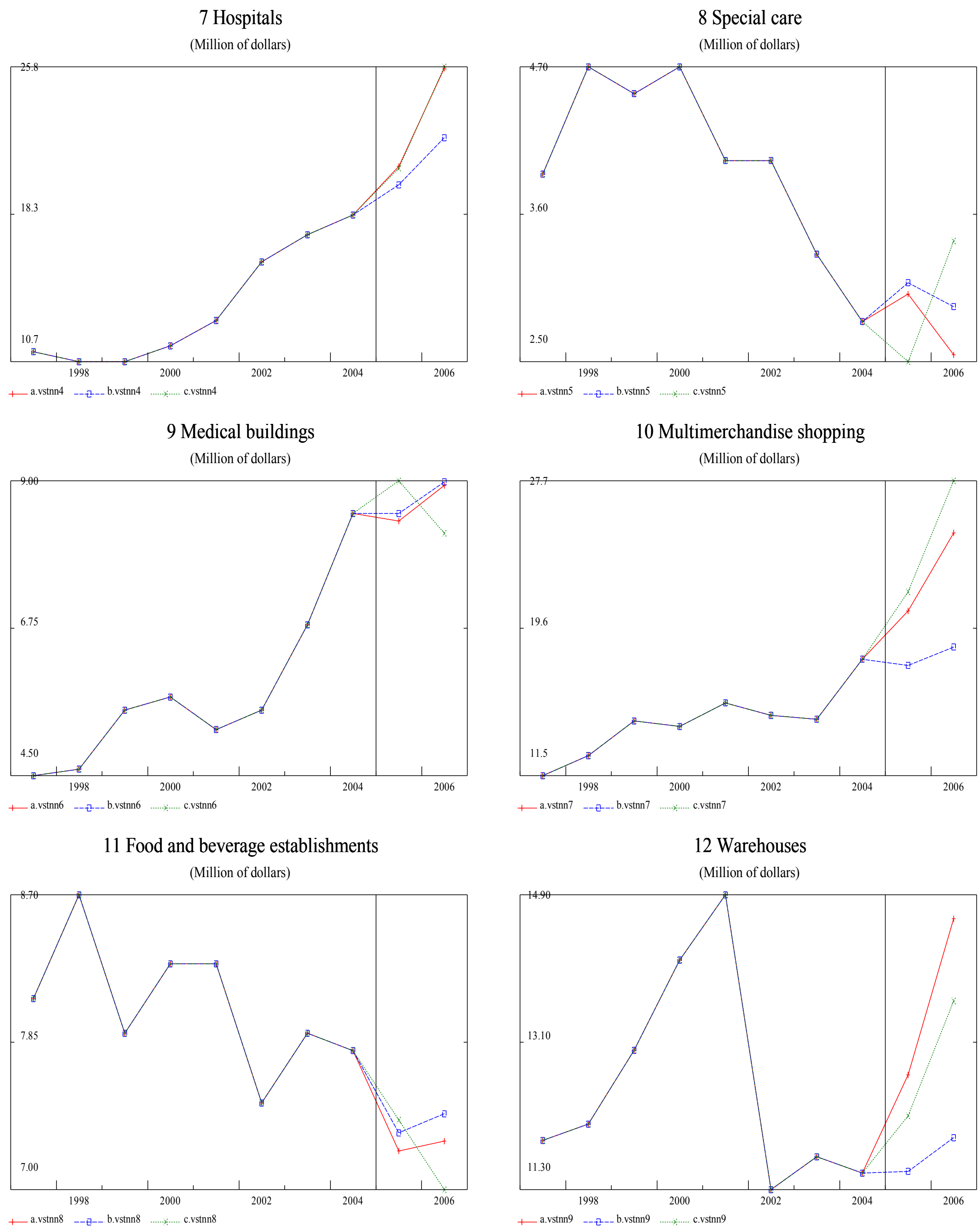


Figure 5.8 (cont.)

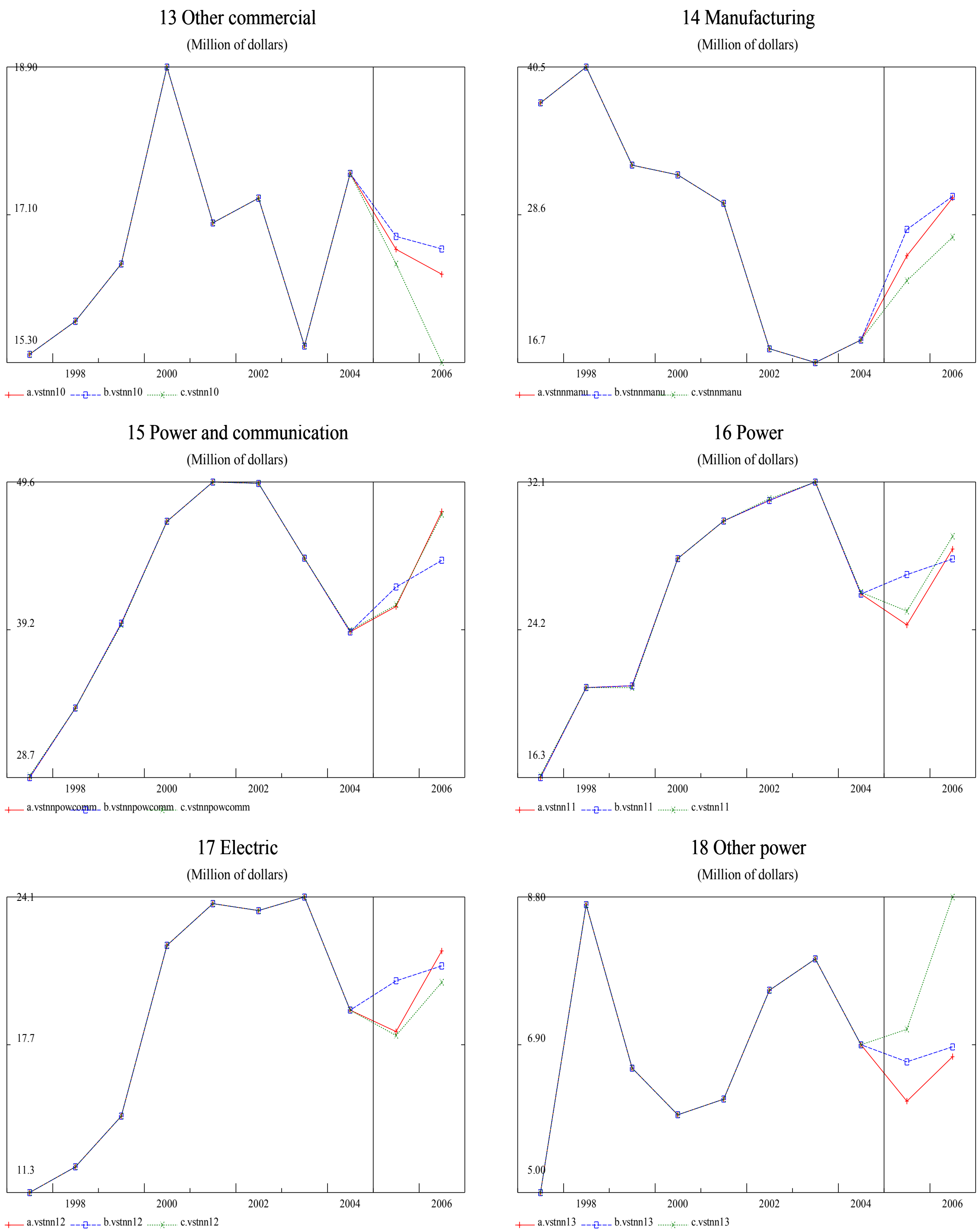


Figure 5.8 (cont.)

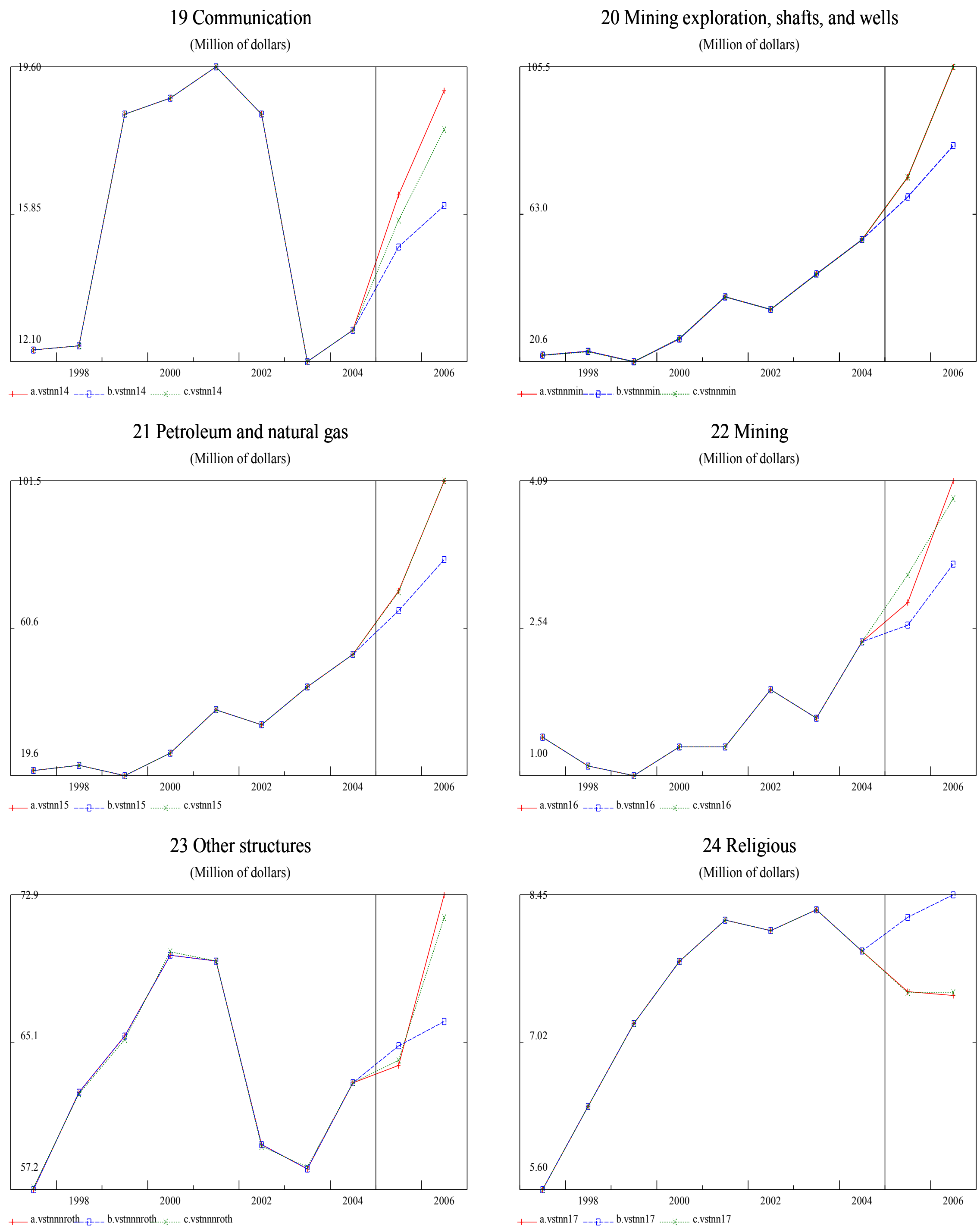
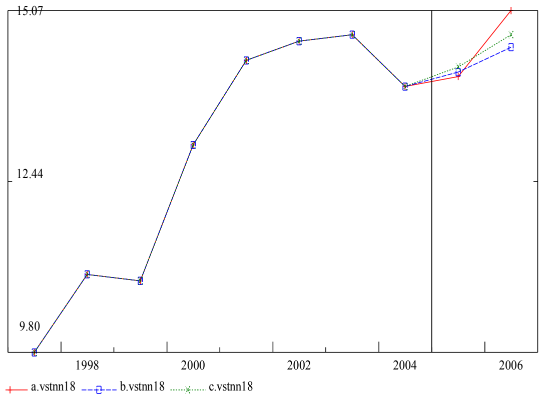


Figure 5.8 (cont.)

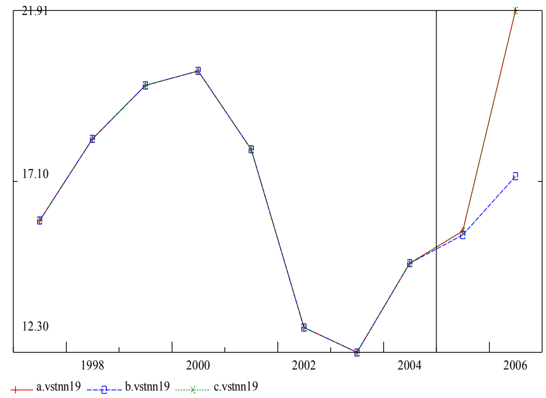
25 Educational and vocational

(Million of dollars)



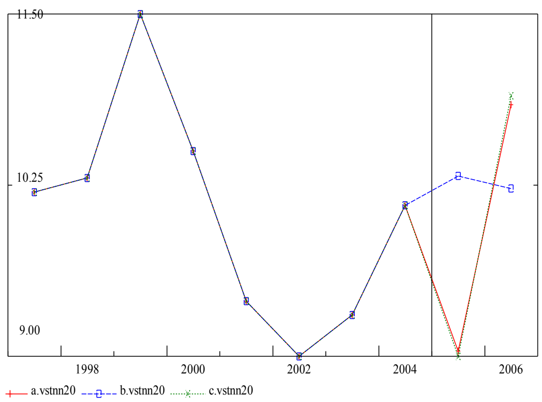
26 Lodging

(Million of dollars)



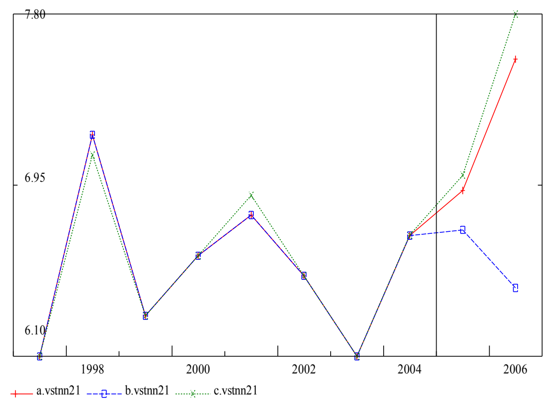
27 Amusement and recreation

(Million of dollars)



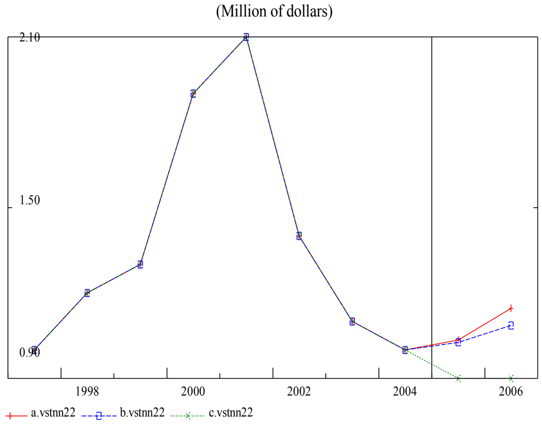
28 Transportation

(Million of dollars)



29 Air transportation

(Million of dollars)



30 Land transportation

(Million of dollars)

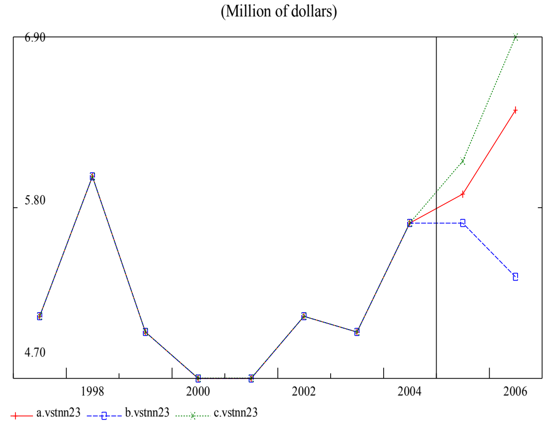
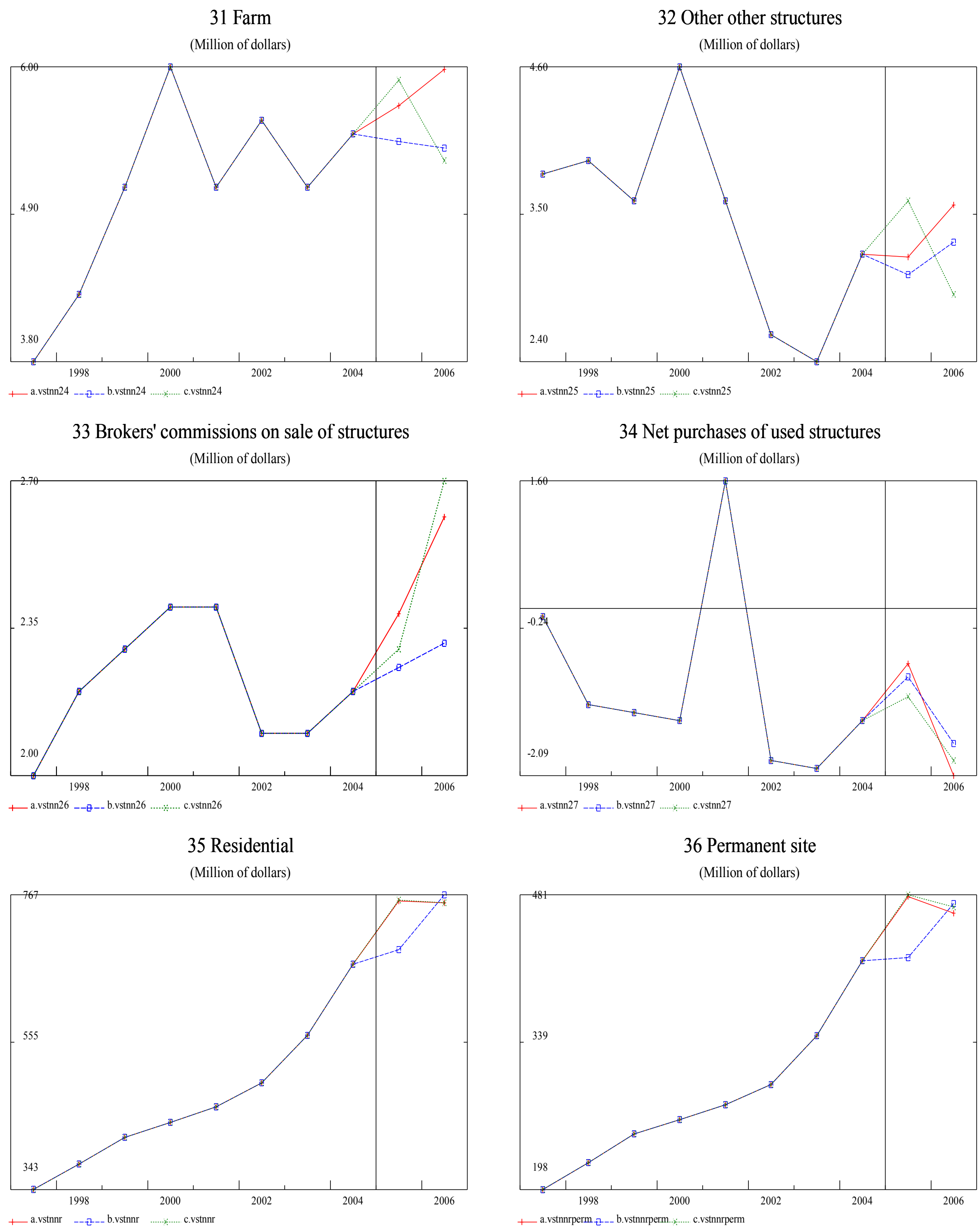


Figure 5.8 (cont.)



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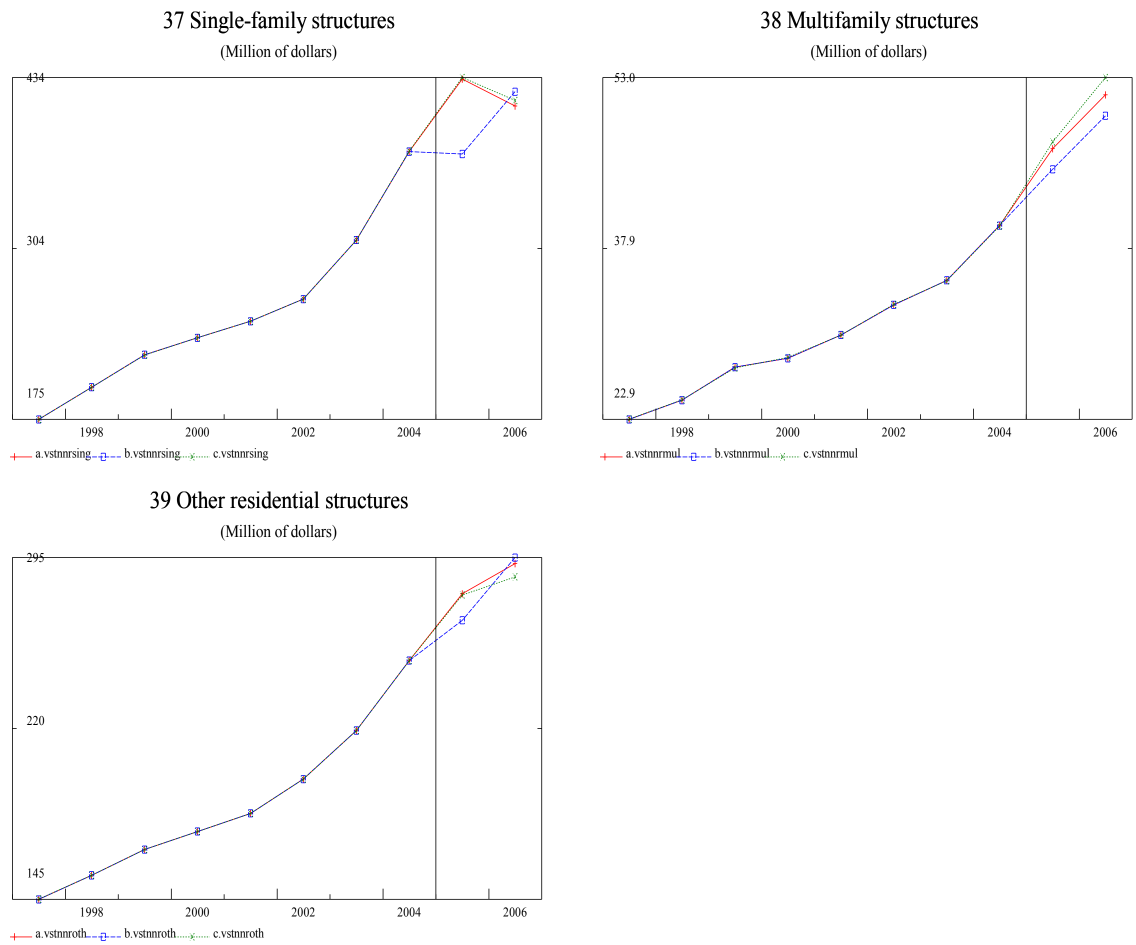


5.7 Forecast of Fixed Investment in Structures between 2007 and 2008

In this section, a short-term outlook of U.S. Private fixed investment in structures in 2007 and 2008 is generated from the described approach. In November 2007, we have monthly VIP data up through July 2007. Thus, after completing the third quarter of 2007 in the VIP monthly series, the forecast for the last quarter of 2007 and all four quarter of 2008 are forecasted.

Forecast Assumptions

Table 5.10: Assumptions of exogenous variables used in forecasting fixed investment of structures

		2007Q4	2008Q1	2008Q2	2008Q3	2008Q4
vfnrs	Private Fixed Investment in Nonresidential Structures (nominal) in Billion of dollars	483.50	492.94	501.54	500.17	504.47
vfr	Private Fixed Residential Investment (nominal) in Billion of dollars	638.83	631.77	626.18	627.30	623.69

There are only two exogenous variables used in this approach. Private fixed investment in nonresidential structures and Private fixed residential investment are forecasted though the end of 2008 by QUEST model. Table 5.10 shows the values of these two exogenous variables.

The Private fixed investment in nonresidential structures is forecasted to be increasing until the second quarter of 2008 when it will be stable until the end of 2008. The nominal value of residential investment is predicted to be declining in 2008 as the problem in the sub-prime mortgage market is still affecting the economy.

Outlook of Fixed Investment in Structures by Asset Types in 2007 and 2008

Plots of all fixed investment in structures by asset types are shown in Figure 5.9. Table 5.11 shows nominal value of fixed investment in structures from 1997 to 2008. Table 5.12 shows year-to-year growth rate of nominal Fixed investment in structures by types.

Overall, we expect to see a temporary drop in investment in structures in 2007. The investment will expand again in 2008 with a growth rate of 6.54 percent. With more recent data (up to November 2007), the forecasted growth rate in 2008 seems to be on the high side as many indicators show a sign that the problem in the credit market might persist well into 2008 which will affect the investment, especially residential investment.

Nonresidential

From 2002 to 2006, investment in Nonresidential structures accounts for less than 35% of total private fixed investment in structures on average. Its share is expected to increase in 2007 and 2008 as the problem in credit markets mainly affects the residential structures. However, the slowdown in investment will catch up to the nonresidential structures investment in 2008. We expect the Nonresidential structures investment to keep growing at 17.89% in 2007 and 12.08% in 2008 in nominal terms. This means that its share of the total structures investment will increase from 35% in 2006 to 44% in 2008. Power and communication structures and Mining exploration, shafts, and wells structures are the two asset types that will see the most expansion between 2006 and 2008.

Commercial and Health Care

Commercial and Health care structures investment is expected to grow by 15.02% in 2007 and 5.65% in 2008. Office structures investment will slowdown in 2008 from the growth rate of 15.92% in 2007 to 3.59 percent in 2008. Health care structures will keep expanding at a modest rate of 1.99% in 2007 and 6.91% in 2008. Most of the expansion in Health care structures comes from the construction of Hospitals and Medical building. The medical building structures investment is expected to grow rapidly in 2007 with a growth rate of 34.54% while special care structures will see a slowdown with growth rate of -30.83% in 2007 and -20.06% in 2008; this decreasing trend started in 2001.

Building of Food and beverage establishments is predicted to have a negative growth rate of -3.24 percent in 2007 and follow by growth of 9.08% in 2008. It should be noted that the negative growth rate began in 2001 while the structures investment in Multimerchandise shopping has been increasing at the same time. We expect Investment in Multimerchandise shopping structures to grow by 24.14% in 2007 and 13.86% in 2008.

Investment in Warehouses will grow by 21.7% in 2007 and 7.57% in 2008. Other commercial structures[22] investment will grow by 7.66% in 2007 but slowdown in 2008 with a growth rate of -2.77%.

Manufacturing

Manufacturing structures investment will grow by 12.52% in 2007 and will decrease by -2.77% in 2008 as the credit problem starts to affect the nonresidential structures investment.

22 Includes buildings and structures used by the retail, wholesale and selected service industries. Consists of auto dealerships, garages, service stations, drug stores, restaurants, mobile structures, and other structures used for commercial purposes. Bus or truck garages are included in transportation., Source:BEA

Power and Communication

Power and communication structures will expand rapidly in 2007 with a growth rate of 26.49% and will keep expanding in 2008 with a growth rate of 16.66%. Most of this expansion comes from the investment in Electric power structures, which has growth rates of 33.67% in 2007 and 21.42% in 2008. The Communication structures investment will be growing with growth rates of 21.90% in 2007 and 10.78% in 2008.

Mining exploration, Shafts, and Wells

Mining exploration, shafts, and wells investment is expected to grow at a rate of 13.19% in 2007 and 21.88% in 2008. This higher growth rate in 2008 is unique to this asset type as we observe the smaller growth rate of structures investment in all other nonresidential structures. The Petroleum and natural gas structures investment is the main contributor of this growth as it increase from 101.50 billion dollars in 2006 to 140.12 billion dollars in 2008. I believe this expected expansion is reasonable as the world price of petroleum products keep increasing and the U.S. dollar keep depreciating, which create pressure on the economy to reduce cost by using more domestic petroleum products.

Other Nonresidential Structures

Other nonresidential structures investment will expand with growth rates of 27.29% in 2007 and 12.81% in 2008. Historically, the biggest component of other nonresidential structures investment is investment in Lodging which is expected to have growth rates of 57.33% in 2007 and 16.43% in 2008. Educational and vocational structures investment, which is the second largest component, will keep growing by 21.07% in 2007 and 16.83% in 2008. Investment in amusement and recreation structures will slowdown with negative growth rate of -6.00% in 2007 and -2.01% in 2008.

Transportation structures investment shows decent growth as it will expand by 2.96% in 2007 and 6.30% in 2008. This increase in investment of transportation structures is provided from the increase in both Air transportation structures investment and Land transportation structures investment. Air transportation structures investment increases by 14.87% in 2007 from 0.90 billion dollar in 2006 to 1.03 billion dollar in 2007 while Land transportation structures investment increases from 6.90 billion dollars in 2006 to 7.00 billion dollars in 2007, which equal to a growth rate of 1.41%.

Farm structures investment will grow by 28.33% and 10.83% in 2007 and 2008, respectively.

Residential

Residential structures investment is expected to drop sharply in 2007 from 755.15 billion dollars in 2006 to 669.51 billion dollars in 2007, a 11.34% decrease. The Main contributor to this slowdown is the investment in single-family structures which drop by 86.73 billion dollars from the 416 billion dollars observed in 2006. Our forecast shows that the residential structures investment will stabilize in 2008 with a growth rate of 2.59%. However, this growth is provided mainly from the expansion in other residential structures investment[23] which grows by 6.78% in 2008 while the investment in Multifamily structures keeps decreasing further by -6.40% in 2008

As mentioned earlier, the outlook for the residential structures investment in 2008 is not optimistic as the problem in the credit market is expected to persist. Our equations are very likely to overestimate the investment in residential structures in 2008.

23 Consists of Manufactured homes, Dormitories, Improvements, Brokers' commissions on sale of residential structures, and Net purchases of used residential structures

Table 5.11: Nominal Private Fixed Investment in Structures 2003-2008

in Billion dollars

	2003	2004	2005	2006	2007	2008
Private fixed investment in structures	841.62	965.25	1,093.77	1,160.45	1,147.32	1,222.39
Nonresidential	277.10	298.20	334.60	405.30	477.81	535.55
Commercial and health care	112.10	122.10	132.60	154.10	177.25	187.27
Office \1\	35.10	37.80	42.80	53.10	61.56	63.77
Health care	27.30	29.50	32.10	37.40	41.51	44.38
Hospitals and special care	20.50	21.00	23.10	29.20	30.48	31.88
Hospitals	17.20	18.20	20.60	25.80	28.13	30.00
Special care	3.30	2.80	2.50	3.40	2.35	1.88
Medical buildings	6.80	8.50	9.00	8.20	11.03	12.50
Multimerchandise shopping	14.60	17.90	21.60	27.70	34.39	39.15
Food and beverage establishments	7.90	7.80	7.40	7.00	6.77	6.16
Warehouses	11.70	11.50	12.20	13.60	16.55	17.80
Other commercial \2\	15.50	17.60	16.50	15.30	16.47	16.02
Manufacturing	16.70	18.50	23.30	26.80	30.16	30.12
Power and communication	44.20	39.00	40.90	47.20	59.70	69.65
Power	32.10	26.10	25.20	29.20	37.76	45.35
Electric	24.10	19.20	18.10	20.40	27.27	33.11
Other power	8.00	6.90	7.10	8.80	10.49	12.24
Communication	12.10	12.90	15.70	18.00	21.94	24.31
Mining exploration, shafts, and wells	45.80	55.70	73.70	105.40	119.30	145.40
Petroleum and natural gas	44.20	53.30	70.60	101.50	114.89	140.12
Mining	1.60	2.40	3.10	3.90	4.41	5.28
Other structures	58.30	62.90	64.10	71.80	91.40	103.10
Religious	8.30	7.90	7.50	7.50	7.36	7.50
Educational and vocational	14.70	13.90	14.20	14.70	17.80	20.79
Lodging	12.30	14.80	15.70	21.90	34.46	40.12
Amusement and recreation	9.30	10.10	9.00	10.90	10.25	10.04
Transportation	6.10	6.70	7.00	7.80	8.03	8.54
Air	1.10	1.00	0.90	0.90	1.03	1.21
Land \3\	5.00	5.70	6.10	6.90	7.00	7.32
Farm	5.10	5.50	5.90	5.30	6.80	7.54
Other \4\	2.40	3.20	3.60	2.90	3.83	3.54
Brokers' commissions on sale of structures	2.10	2.20	2.30	2.70	2.94	3.16
Net purchases of used structures	-2.00	-1.40	-1.10	-1.90	-0.07	1.88
Residential	564.52	667.05	759.17	755.15	669.51	686.84
Permanent site	345.67	417.50	480.83	469.00	380.13	377.83
Single-family structures	310.55	377.55	433.52	416.00	329.63	330.56
Multifamily structures	35.13	39.95	47.30	53.00	50.50	47.26
Other structures	218.85	249.55	278.35	286.15	289.38	309.02

Table 5.12: Growth Rate of Nominal Private Fixed Investment in Structures

	2000-2005	2003-2004	2004-2005	2005-2006	2003-2006	2006-2007	2007-2008
Private fixed investment in structures	7.93%	14.69%	13.32%	6.10%	11.37%	-1.13%	6.54%
Nonresidential	1.74%	7.61%	12.21%	21.13%	13.65%	17.89%	12.08%
Commercial and health care	-0.38%	8.92%	8.60%	16.21%	11.24%	15.02%	5.65%
Office \1\	-5.33%	7.69%	13.23%	24.07%	15.00%	15.93%	3.59%
Health care	8.05%	8.06%	8.81%	16.51%	11.13%	10.99%	6.91%
Hospitals and special care	7.51%	2.44%	10.00%	26.41%	12.95%	4.37%	4.60%
Hospitals	12.52%	5.81%	13.19%	25.24%	14.75%	9.01%	6.66%
Special care	-11.65%	-15.15%	-10.71%	36.00%	3.38%	-30.83%	-20.06%
Medical buildings	10.30%	25.00%	5.88%	-8.89%	7.33%	34.54%	13.28%
Multimerchandise shopping	9.31%	22.60%	20.67%	28.24%	23.84%	24.14%	13.86%
Food and beverage establishments	-2.14%	-1.27%	-5.13%	-5.41%	-3.93%	-3.24%	-9.08%
Warehouses	-2.11%	-1.71%	6.09%	11.48%	5.28%	21.70%	7.57%
Other commercial \2\	-2.28%	13.55%	-6.25%	-7.27%	0.01%	7.66%	-2.77%
Manufacturing	-3.27%	10.78%	25.95%	15.02%	17.25%	12.52%	-0.12%
Power and communication	-2.36%	-11.76%	4.87%	15.40%	2.84%	26.49%	16.66%
Power	-1.62%	-18.69%	-3.45%	15.87%	-2.09%	29.32%	20.08%
Electric	-3.32%	-20.33%	-5.73%	12.71%	-4.45%	33.67%	21.42%
Other power	4.07%	-13.75%	2.90%	23.94%	4.36%	19.25%	16.59%
Communication	-1.56%	6.61%	21.71%	14.65%	14.32%	21.90%	10.78%
Mining exploration, shafts, and wells	23.61%	21.62%	32.32%	43.01%	32.31%	13.19%	21.88%
Petroleum and natural gas	24.00%	20.59%	32.46%	43.77%	32.27%	13.20%	21.96%
Mining	21.91%	50.00%	29.17%	25.81%	34.99%	13.01%	19.76%
Other structures	-1.39%	7.89%	1.91%	12.01%	7.27%	27.29%	12.81%
Religious	-0.70%	-4.82%	-5.06%	0.00%	-3.29%	-1.81%	1.79%
Educational and vocational	1.90%	-5.44%	2.16%	3.52%	0.08%	21.07%	16.83%
Lodging	-3.53%	20.33%	6.08%	39.49%	21.97%	57.33%	16.43%
Amusement and recreation	-2.74%	8.60%	-10.89%	21.11%	6.27%	-6.00%	-2.01%
Transportation	1.36%	9.84%	4.48%	11.43%	8.58%	2.96%	6.30%
Air	-12.67%	-9.09%	-10.00%	0.00%	-6.36%	14.87%	17.37%
Land \3\	5.51%	14.00%	7.02%	13.11%	11.38%	1.41%	4.66%
Farm	0.20%	7.84%	7.27%	-10.17%	1.65%	28.38%	10.83%
Other \4\	-2.28%	33.33%	12.50%	-19.44%	8.80%	32.10%	-7.64%
Brokers' commissions on sale of structures	-0.64%	4.76%	4.55%	17.39%	8.90%	8.96%	7.31%
Net purchases of used structures	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Residential	11.65%	18.16%	13.81%	-0.53%	10.48%	-11.34%	2.59%
Permanent site	12.80%	20.78%	15.17%	-2.46%	11.16%	-18.95%	-0.60%
Single-family structures	13.03%	21.57%	14.83%	-4.04%	10.79%	-20.76%	0.28%
Multifamily structures	10.95%	13.74%	18.40%	12.05%	14.73%	-4.72%	-6.40%
Other structures	9.83%	14.03%	11.54%	2.80%	9.46%	1.13%	6.78%

Figure 5.9: Plots of Private Fixed Investment in Structures

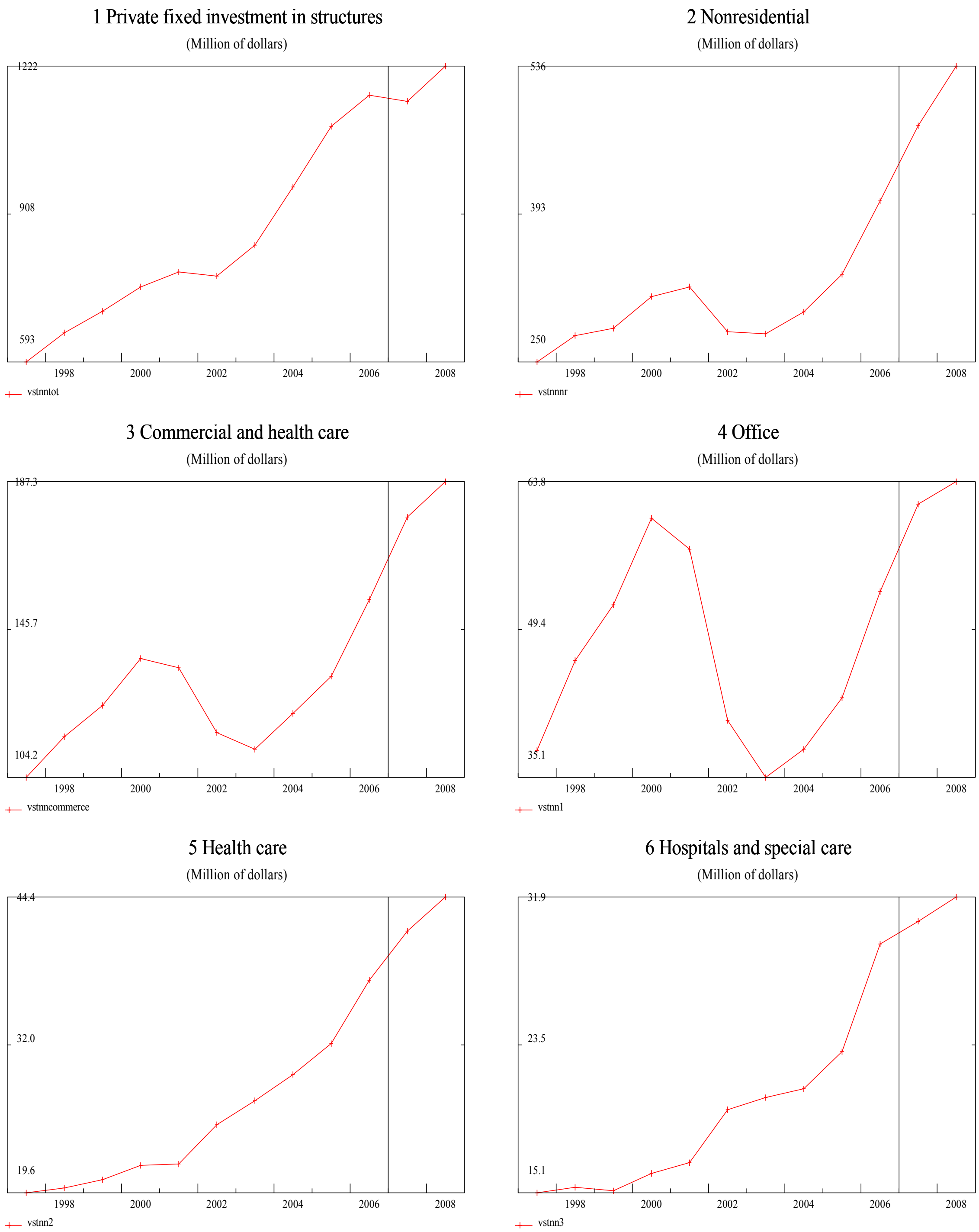


Figure 5.9 (cont.)

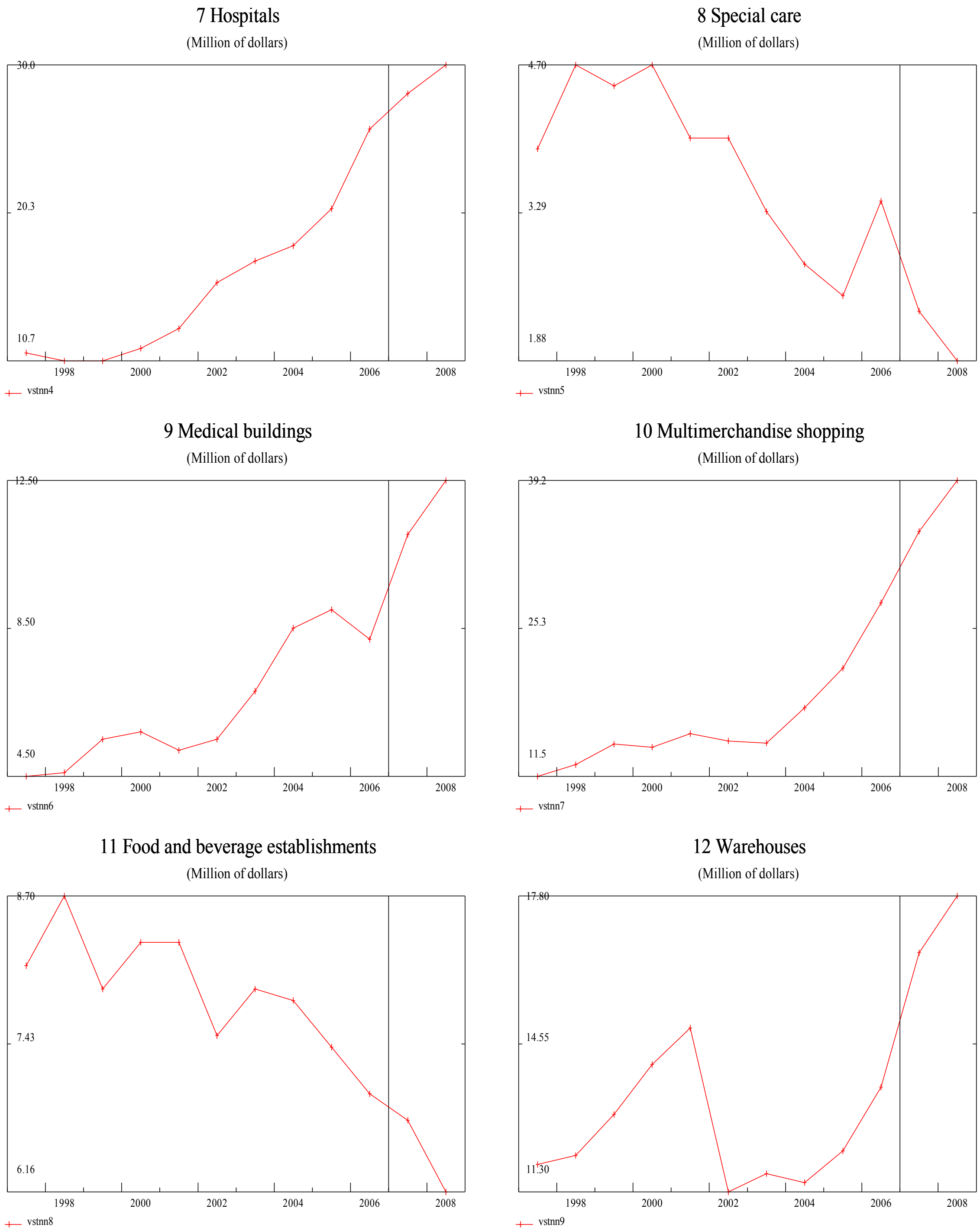


Figure 5.9 (cont.)

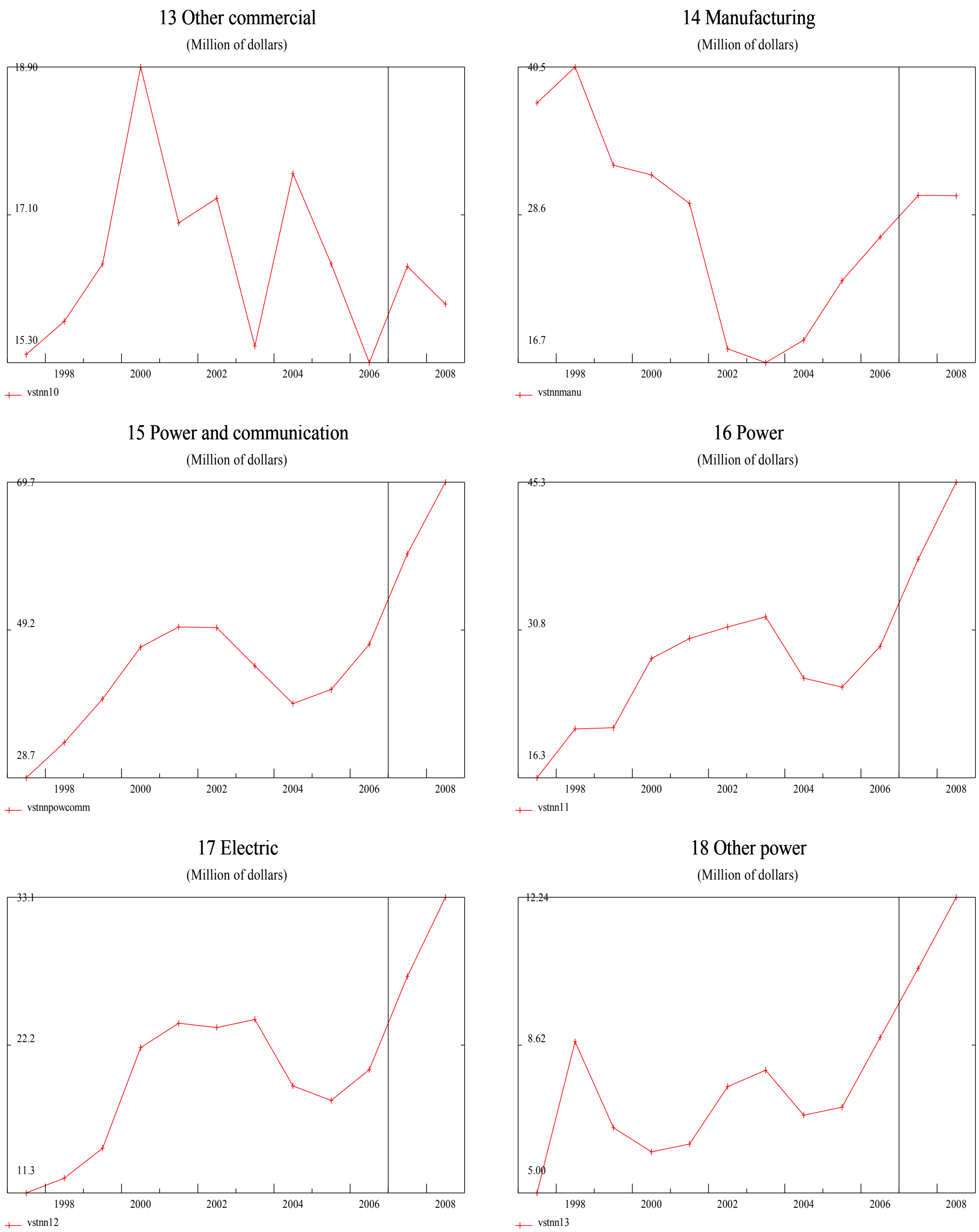
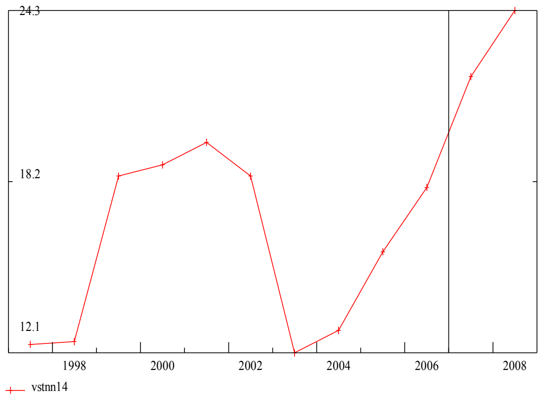


Figure 5.9 (cont.)

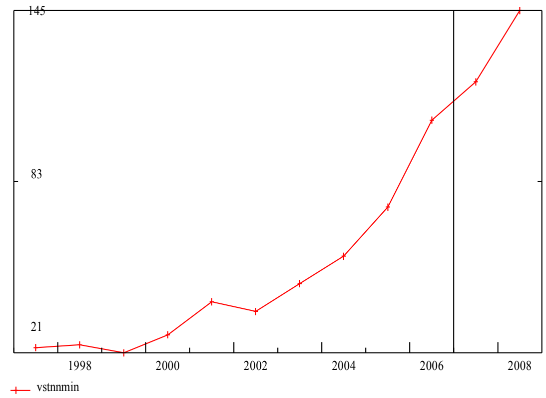
19 Communication

(Million of dollars)



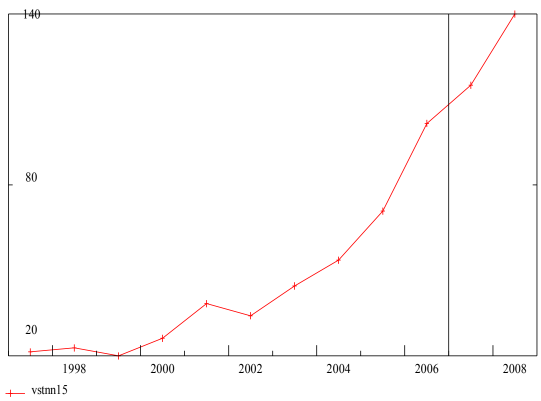
20 Mining exploration, shafts, and wells

(Million of dollars)



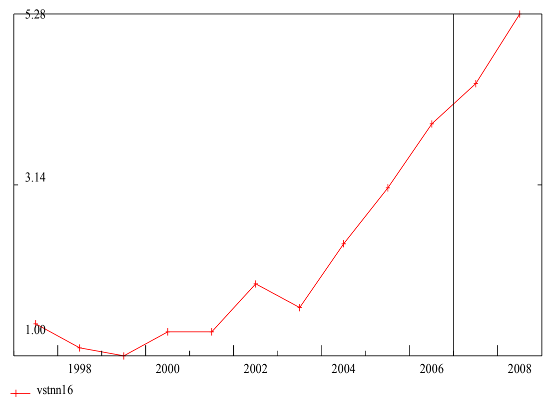
21 Petroleum and natural gas

(Million of dollars)



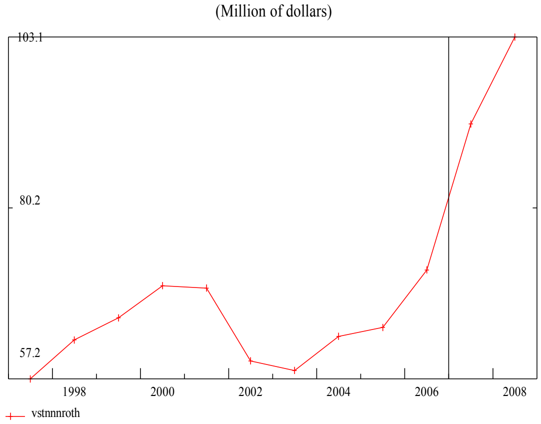
22 Mining

(Million of dollars)



23 Other structures

(Million of dollars)



24 Religious

(Million of dollars)

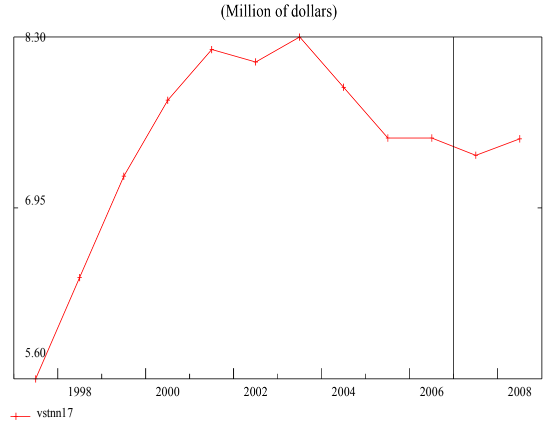


Figure 5.9 (cont.)

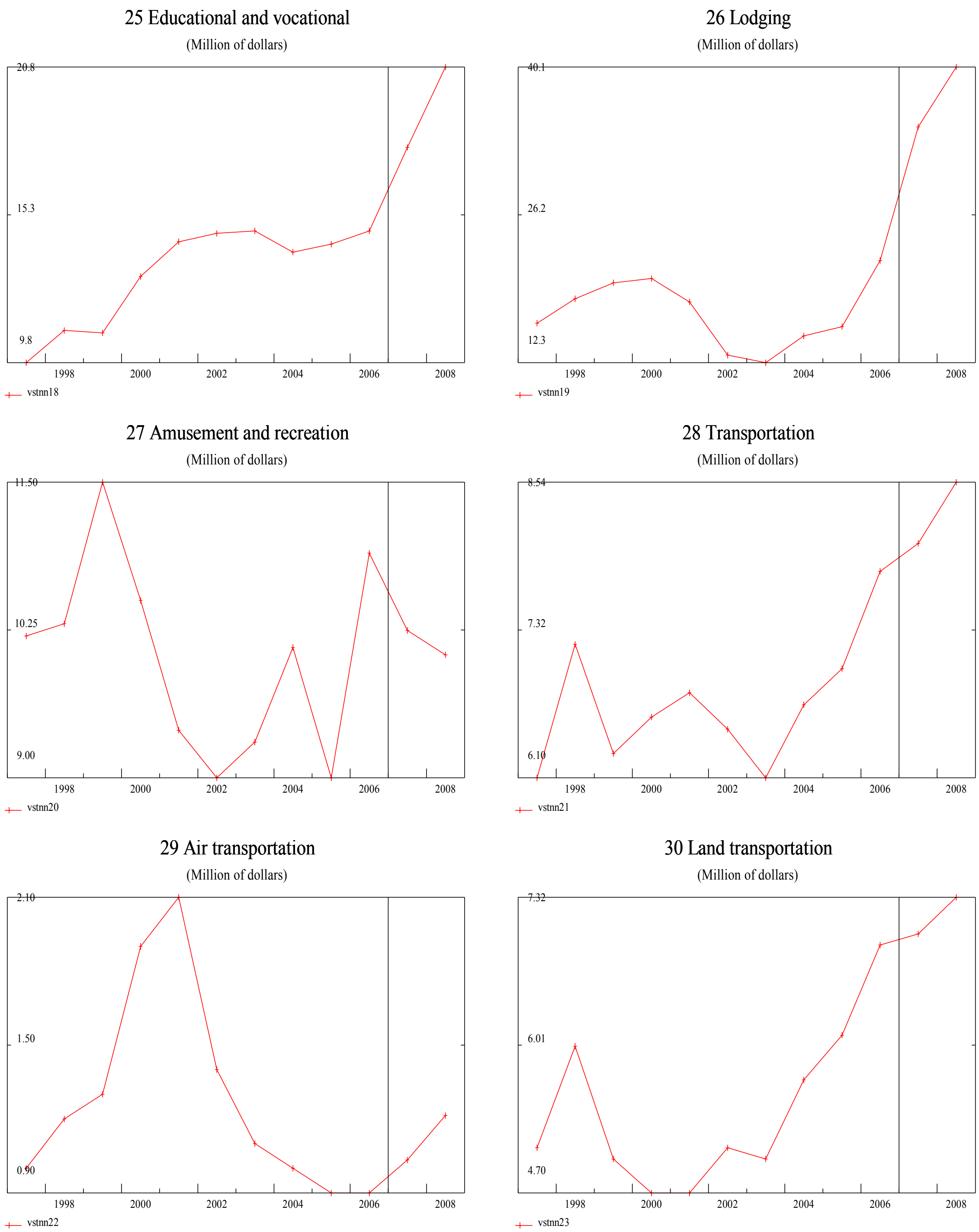


Figure 5.9 (cont.)

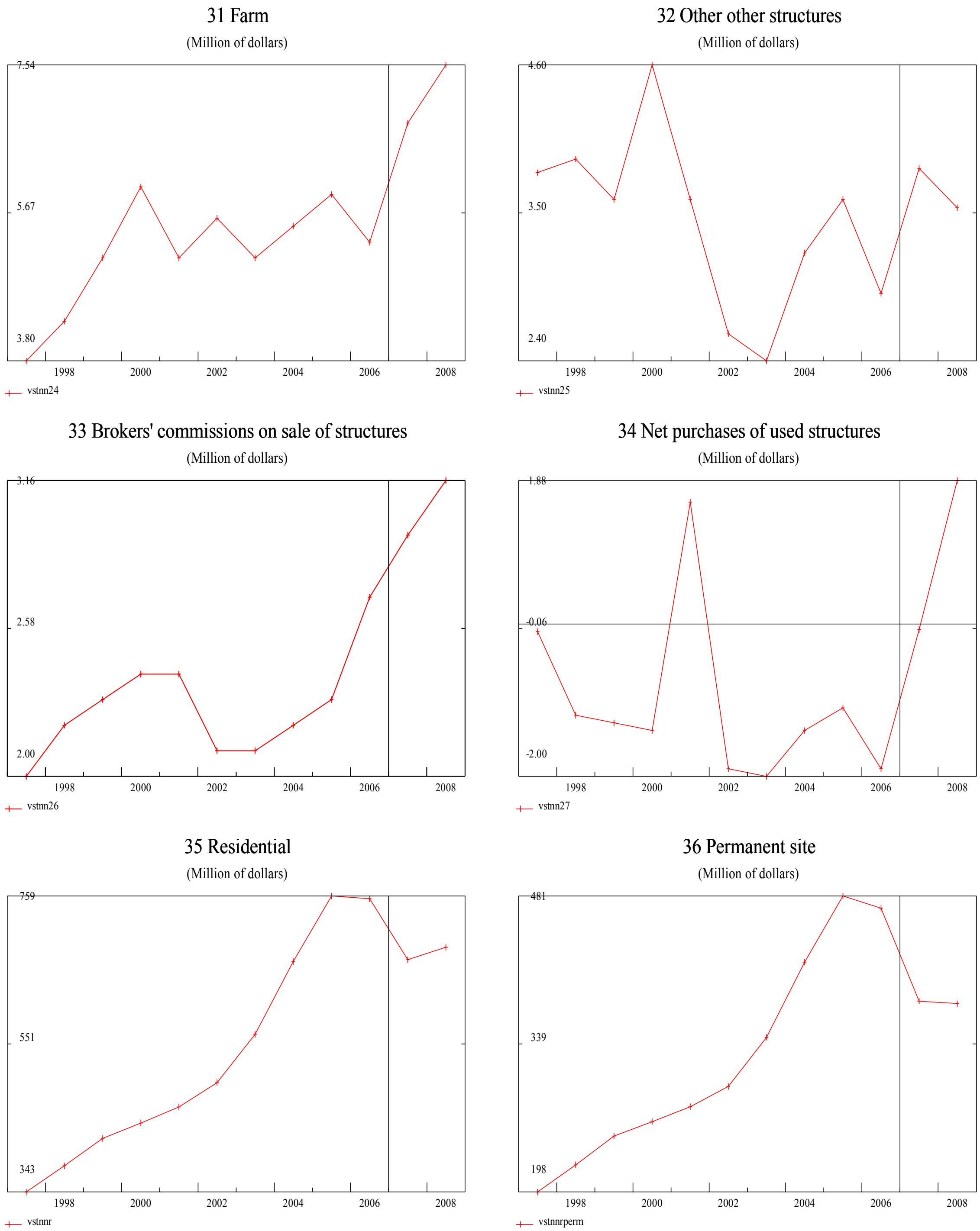
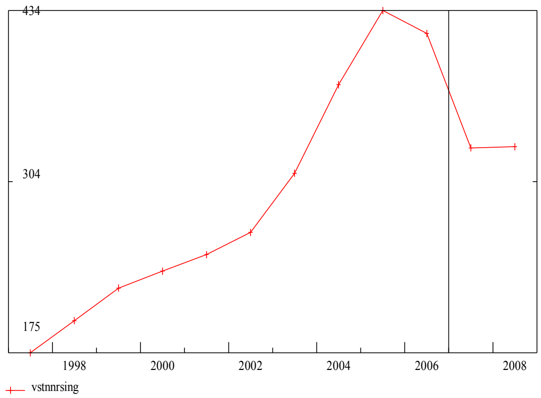


Figure 5.9 (cont.)

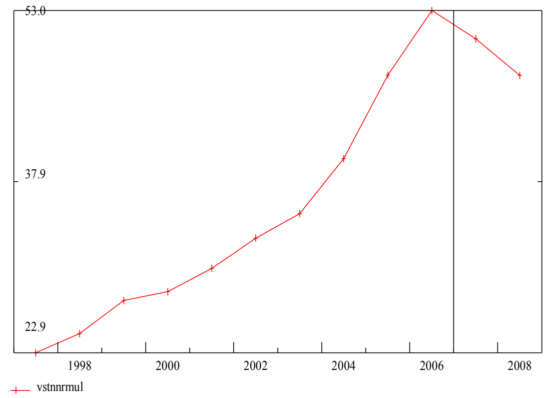
37 Single-family structures

(Million of dollars)



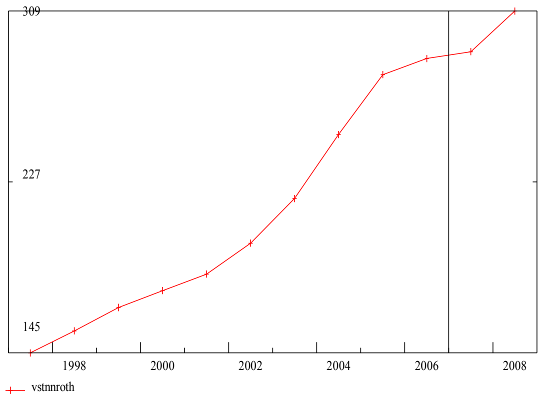
38 Multifamily structures

(Million of dollars)



39 Other residential structures

(Million of dollars)



Chapter 6: Gross Output by Industry

Gross output of the various industries in the input-output table – roughly speaking, the sales of the industries – is in the center of the computing sequence of interindustry models. They begin with the final demands, some of which we have already studied, and then go through the input-output computations to reach gross output by industry. They then use gross output to compute value added, compensation of employees, capital income, taxes, employment and perhaps other variables by industry. Thus, gross output is the key variable linking final demands to industry-specific variables.

Despite the fact that the gross outputs are well down the chain of calculations, users of the models – especially users who work in private industries – almost invariably look first at the gross output forecasts. Indeed, they look immediately at what the model says about gross output in their industry for the last year, the current year and the next year, precisely the period they know best from their own recent experience -- and the period where, up until now, the model's data base has been the weakest, sometimes two full years out of date. If what they find does not match what they know to be true, they can dismiss the model's results without further examination. Builders of quarterly macromodels do not face this problem, for it is a simple matter to have a model's database always updated with BEA's most recent data.

The strength of interindustry models in forecasting for an industry lies in ensuring consistency among the different industries and in accounting for basic variables, such as demographic changes, and policy variables, such as defense spending. These are long-term considerations and can be easily outweighed in the short terms by inventory or exchange rate fluctuations, overcapacity or undercapacity, or even weather. Yet it is precisely the failure to have up-to-date information on gross output that can readily discredit the model's results for years further in the future. Thus, this final chapter of our study has special importance for the model's credibility and acceptance.

In the U.S. input-output table, gross output of an industry consists of sales, or receipts, and other operating income, plus commodity taxes and changes in inventories. Thus, gross output represents the market value of an industry's production. Subtracting the industry's cost of purchased materials, energy and services gives value added, which represents the contribution of the industry's labor and capital to its gross output and to the overall GDP.

Gross output, however, has its limits as a measure of output for large parts of the economy because summing gross output across industries produces a rather meaningless number owing to "double" -- or better, multiple -- counting. The sum of gross outputs in the food producing sector of the economy would include the value of the corn fed to a pig PLUS the value of the pig sold to the slaughter house PLUS the value of the ham sold to a restaurant PLUS the value of meal served by the restaurant. So the corn would have been counted four times. This problem has led to the creation of measures of value added, which are summable. Gross output, however, maintains its importance because it is the industry-level variable which can be computed directly from the final demands and the input-output matrix.

For some purposes, moreover, it is a more appropriate variable than value added. Much of the recent literature on the estimation of production functions adopts this view. Jorgenson and Griliches (1967, 1972) recommend it as the proper measure of production. Hulten (1992) argued that gross output is the correct concept to use in empirical study of structure of production and productivity in contrast to the use of net output (Gross output minus depreciation), as net output requires “a peculiar notion of technological change”. Recently, Meade (2006) has argued cogently against using real value added as a measure of output in productivity studies.

Currently, BEA releases gross output data every year. The data are part of the annual industry accounts and have recently been released in December of the year following the reference year. Thus, data for 2006 was scheduled for release in December of 2007. However, BEA decided to delay the release until January 2008 in order to be able to use the Annual Survey of Manufactures for 2006. Previously, this Survey would not have been used in the first release of the annual industry accounts, but Census has accelerated its production process, and BEA judged the improvement in data quality worth the one-month delay in its release. Each release includes gross output by detailed industry of the previous year and a revision of previous releases.

Thus, the official gross output by industry data can be lagged by up to two years. For example, the data for 2005 is still the most up-to-date gross output data available in December 2007. Meanwhile, other economic indicators, such as Census's *Manufacturers' Shipments, Inventories, and Orders*, the Federal Reserve Board’s Industrial Production Indexes (IPI) and Census’s wholesale trade survey, have been released monthly or quarterly in a timely manner. We will use these other economic indicators to predict the annual Gross output by industry in the period where the BEA has not released the official information and to forecast the gross output into the near future.

In this chapter, I will discuss (1) sources of data on gross output and indicators that can be used to estimate its recent course, and (2) regression results for estimation of gross output from high-frequency data.

6.1 Data on Gross Output and High-Frequency Explanatory Variables

Gross output by industry 1947 – 2005

Since converting the annual industry accounts to North American Industry Classification System (NAICS) in 2002, BEA has also updated GDP by industry information from 1947 to be consistent with the current definition. However, because of the limited historical source data, there are many NAICS categories that cannot be extended back to 1947. Thus, BEA has published historical data in various degrees of aggregation.

There is not, however, any BEA data on gross output with frequency higher than annual. The situation is thus very different from that for PCE for which we have monthly data in full detail. Even for investment, we have monthly data for construction and quarterly data for some aggregate categories of equipment. With gross output, we have nothing until the first annual estimate appears, so our technique will need to be slightly different from what we have used previously. Namely, we will select high-frequency variables which should be good indicators of gross output, convert them to annual series and regress each gross output on the appropriate annualized version of the high-frequency variables. Then we extend the high-frequency series, annualize the extended series, and put it into the estimated regression equation to get predicted values of gross output. The process will be illustrated below. For the moment, it is sufficient to understand that we need data for gross output and the associated price indexes at an annual frequency and data for similar proxy variables at a high frequency.

BEA releases gross output and the associated price indexes at two levels of aggregation. The more aggregate of the two has 65 primary industry categories and a number of subtotal categories. These are the same 65 categories used in the annual input-output tables. These 65 categories are shown in Appendix 6.1. On the BEA website, they are in a file called GDPbyInd_VA_NAICS_1998-2006.xls . (Despite the name, there is no gross output data past 2005.) This same spreadsheet file also contains, for these same industries, series for cost of intermediate inputs, value added, and components of value added added such as wages and salaries, supplements, subsidies, taxes on production and imports, and gross operating surplus. Employment is also available in this classification. Thus, this sectoring is convenient for working with other industry-level data.

On the other hand, the 65-industry aggregation is unfortunately gross in some areas. All construction is in one sector; all utilities – electric, gas, water, and sewer – are in one sector; hospitals and nursing homes are in one sector. However, BEA offers a second set of much more detailed gross product data in 489 primary sectors in a file called GDPbyInd_GO_NAICS_1998-2005.xls . This classification remedies the limitations mentioned, but only gross output in current and constant prices is available, none of the other series.

The present work will be limited to the 65-sector classification, but the availability of data in the more detailed classification should be kept in mind for future work. The complete list of the 65 sectors is found in Appendix 6.1.

High-frequency explanatory variables

Industrial production index

The industrial production index (IPI) prepared by the Board of Governors of the Federal Reserve System measures the real output of the goods-producing industries, such as manufacturing, mining, and utilities, as defined by the North American Industry Classification System (NAICS) plus other industries such as logging and publishing that have traditionally been considered as manufacturing industries. The IPI contains more than 300 individual series, classified by market groups and industry groups. It is, however, fairly straight-forward to align the IPI sectors with corresponding sector for gross product. That has been done in the data bank used here, so that IPI series 10 (*ips10*) corresponds to gross output sector 10, namely, Primary metals. All IPI series used here are seasonally adjusted using CENSUS X-12 ARIMA[24].

Industrial production indexes are used in our model to explain most of the goods-producing industries. In this study, we used the IPI published in February 2007 which contains data through January 2007.

24 http://www.census.gov/srd/www/x12a/

In passing, we may note that, in the course of setting monetary policy, the Federal Reserve Board needs very current information on what is happening in the economy. It has therefore been making these indexes since 1938, long before the Commerce Department started preparing gross output by industry or even producing quarterly national accounts.

Producer price index

According to the Bureau of Labor Statistics (BLS), the universe the Producer Price Index (PPI) attempts to cover

> consists of the output of all industries in the goods-producing sectors of the American economy—mining, manufacturing, agriculture, fishing, and forestry—as well as gas, electricity, and goods competitive with those made in the producing sectors, such as waste and scrap materials. Imports are no longer included within the PPI universe; however, the BLS International Price Program publishes price indexes for both imports and exports. Domestic production of goods specifically made for the military is included, as are goods shipped between establishments owned by the same company (termed interplant or intracompany transfers). The output of the services sector and other sectors that do not produce physical products is also conceptually within the PPI universe, although, in 2002, actual coverage was approximately half of the service sector's output. As of January 2002, the PPI program published data for selected industries in the following industry groups: Railroad, water, and air transportation

of freight; air passenger transportation; motor freight transportation and warehousing; the U.S. Postal Service; petroleum pipelines; travel agencies; hotels and motels; communications; health services; finance, insurance, and real estate; business services; legal services; electrical power and natural-gas utilities; automotive rental and leasing; retail trade; engineering and architectural services; accounting, auditing, and bookkeeping services; and scrap and waste materials collection.[25]

The PPI is the major – though not the only – source of data for BEA's calculation of the price indexes for gross output. Not surprisingly, therefore, PPI is a really good indicator of prices of gross output by industry, especially in the goods-producing industries. In this study, we used PPI published in January 2007 which contains data through December 2006.

25 http://www.bls.gov/opub/hom/homch14_b.htm

Employment, hours, and earnings

For the many industries where there is no index of industrial production, we often need to rely on employment as an indicator of output. Each month, the Bureau of Labor Statistics (BLS) publishes widely used measures of employment. First, the Current Employment Statistics survey (CES)[26], which is a survey of businesses and government agencies and measures nonfarm payroll employment by industry. Second, the Current Population Survey (CPS)[27], measuring civilian employment, is a survey of households in the U.S. The CPS is often referred to as the "household survey" while the CES is called the "establishment survey."

The CPS is important for determining unemployment and the labor force, while the CES is regarded as the more accurate indicator of which industries provide the jobs. It certainly gives greater detail by industry. In this study, therefore, I use employment data from the CES or establishment survey. According to Kliesen (2007), the CES should be considered a superior time-series measure because the survey is conducted over about a third of all workers or a little more than 45 million workers.

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26 http://www.bls.gov/ces/home.htm

27 http://www.bls.gov/cps/home.htm

As indicators for gross output by industry, I use three of the 19 measures reported in the CES survey. These three are 1) all employees in each industry, 2) average weekly hours of production workers by industry, and 3) average hourly earnings of production workers. CES data is crucial to most of our equations. It is used as a proxy of either production cost (wages per hour) or labor input (employment times hours). In service-producing industries, the CES gives the main explanatory variables used in all the equations, for we have limited information from the IPI or the PPI.

The CES information used in this study was published in January 2007 and includes data up to December 2006.

Personal consumption expenditure

Personal consumption expenditure (PCE) information for this study is taken from PCE by product categories published by the BEA in the National Income and Product Accounts (NIPA). This data, which is both detailed and available at a monthly frequency, was described in detail in Chapter 3. For some industries selling primarily to consumers, PCE is useful in estimating real or nominal gross output. Again, PCE information used in this study was published in August 2007.

Wholesale and retail trade

U.S. Census Bureau publishes both annual and monthly wholesale and retail trade data which are used here for estimating the gross output of wholesale and retail trade, respectively. The annual wholesale trade,[28] the annual retail trade,[29] the monthly

28 http://www.census.gov/svsd/www/whltable.html
29 http://www.census.gov/svsd/www/artstbl.html

wholesale trade[30] and monthly retail trade[31] data are each in their separate data files indicated in the footnotes to this sentence. Both monthly surveys were updated to December 2006 for this study.

Annual farm labor expense

For farm related industries, CES does not provide any information. We use Annual farm total labor expense data[32] published by the United States Department of Agriculture (USDA). The labor expense data is published as a part of U.S. and State production expenses by expense category, which contains data from 1946. The information used here is updated to 2006.

Other indicators

There are two addition indicators used in estimating both level and price index of gross output by industry. There are exchange rate and crude oil price. The monthly crude oil price, and exchange rate are obtained from FRED database[33] from the St. Louis Federal Reserve Bank. The FRED databank provides the crude oil price (OILPRICE) in monthly average value from the spot oil price of West Texas Intermediate. The exchange rate is traded weighted exchange index (TWEXBMTH). The information used here was updated to January 2007.

30 http://www.census.gov/mwts/www/mwts.html
31 http://www.census.gov/mrts/www/mrts.html
32 http://www.ers.usda.gov/Data/FarmIncome/finfidmuWk4.htm
33 http://research.stlouisfed.org/fred2/

Summary

To summarize, the required data are :

BEA Annual Gross output by industry in current and constant prices

FRB monthly Industrial production index,

BLS monthly Producer Price index

BLS monthly Current Employment Statistics Survey

BEA National Income and Product Accounts

USDA Annual Farms Labor Expense

St. Louis Federal Reserve Bank: monthly crude oil price

St. Louis Federal Reserve Bank: traded weighted exchange index

U.S. Census Retail Trade survey

U.S. Census Wholesale Trade survey

QUEST: the independent macro economic forecast of exogenous variables

6.2 The Method

As already indicated, there are three steps in the extension of the gross output series and their price indexes.

Step 1. Regress annual gross output on annualized values of monthly series.

Step 2. Extend the monthly series to the end of the following year.

Step 3. Annualize the extended monthly series and use in the equations estimated in Step 1 to forecast the gross output to the end of the following year.

Thus, there are two sets of equations used in the process: 1) quantity and price equations at annual frequency and 2) forecasting equations at monthly frequency for each explanatory variable used in the first set of equations.

Annual Equations

All the equations in this step are estimated without lagged dependent variables. We will use the Primary metals industry as an example. The real value (or quantity) equation of the Primary metals industry has as explanatory variables the industrial production index of Primary metals (NAICS:331) (*ips10*) and all employees of the Primary metals industry from CES data (*ehe10*). The price index for gross output of the Primary metals industry has as explanatory variables only one indicator, namely, the producer price index of the Primary metals industry (*pri10*). The regression results are shown below.

```
:                       Real Gross Output: Primary Metals
  SEE   =    1502.60 RSQ   = 0.9735 RHO =  -0.08 Obser  =   13 from 1992.000
  SEE+1 =    1490.41 RBSQ  = 0.9682 DW  =   2.17 DoFree =   10 to   2004.000
  MAPE  =       0.81 Test period:   SEE   607.84 MAPE     0.41 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor10               - - - - - - - - - - - - - - - - - 149129.53 - - -
  1 intercept            -933.87108     0.1  -0.01   37.72      1.00
  2 ips10                1221.64143   441.2   0.86    3.19    105.04  0.894
  3 ehe10                  36.64322    78.7   0.15    1.00    593.22  0.249

:                  Price Index of Gross Output: Primary Metals
  SEE   =       0.48 RSQ   = 0.9952 RHO =   0.25 Obser  =   13 from 1992.000
  SEE+1 =       0.47 RBSQ  = 0.9948 DW  =   1.50 DoFree =   11 to   2004.000
  MAPE  =       0.34 Test period:   SEE     0.28 MAPE     0.21 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop10               - - - - - - - - - - - - - - - - -    100.43 - - -
  1 intercept              -4.00796    14.3  -0.04  210.10      1.00
  2 pri10                   0.86651  1349.5   1.04    1.00    120.53  0.998
```

The easiest check on the plausibility of the results is by use of the elasticities at the mean, given in the "Elas" column. In the first equation, we see that if the industrial production index goes up by 1 percent, real gross output goes up by 0.86 percent, while if employment goes up by 1 percent, gross output goes up by 0.15 percent. Thus, if *both* industrial production and employment go up by 1 percent, gross output goes up by 1.01 percent, an altogether reasonable relation. The "mexvals" are also easy to interpret: if we had only employment – and thus dropped industrial production – the standard error of the estimate (SEE) would rise by 441.2 percent, while if we dropped employment and had to rely solely on industrial production, the SEE would rise by 78.7 percent. Thus, each of the explanatory variables is making an important contribution to the forecast. The R^2 of 0.9735 with the ρ value of -0.08 indicate that the equation fits well with essentially no correlation in the errors. Note that all of the statistics referred to are purely descriptive. We make no use of test statistics such as the t values because we do not propose that there is true, causative equation of the form we are estimating. Rather, we merely propose that there is a complicated reality that results in the gross output, the industrial production, and the employment we observe. We are just trying to see how well we could guess the gross output if we had only the other two, not to test for a causative relation which we do not believe exists.

In the price equation, we again see a plausible elasticity close to 1, namely 1.04, a good fit with R^2 of 0.9952 with the ρ value of 0.25, low enough not to suggest an important missing variable but high enough to make it desirable to use a rho-adjusted forecast.

The explanatory variables *ips10, ehe10* and *pri10* will be extended into the future by the monthly equations to be described in the next section..

The estimation results for these annual equations for all 65 sectors are given in Appendix 6.3. Please note that, as shown in Appendix 6.3, each sector's gross output price index and level are estimated by separate equations, one for the price index and one for the level of gross output (Real or Nominal). The level equation for each industry will estimate either real value or nominal value. The main reason is simply a better fit between the two. The other reason is that, in some industries, I find a good explanatory value of the price index in explaining both real value and nominal value. Thus, I pick the nominal value equation because having a price index (*ppi*) as a regressor for real variable is counterintuitive. As we always estimate the price index of each industry, the other level variable will be calculated as an implied value. For example, we estimate the real gross output and the price index for primary metals, as discussed above and the nominal gross output of primary metals will be calculated by identity. Table 6.1 lists how each variable (real, nominal, or price index) is estimated by industries, an R indicates the variable is calculated by regression, while an M means it is implied. Appendix 6.5 shows all variables used in this chapter and their description.

Table 6.1: How each variable of each 65 detailed industries is estimated

		Nominal	Real	Price Index
1	Farms	R	M	R
2	Forestry, fishing, and related activities	M	R	R
3	Oil and gas extraction	M	R	R
4	Mining, except oil and gas	M	R	R
5	Support activities for mining	M	R	R
6	Utilities	R	M	R
7	Construction	M	R	R
8	Wood products	M	R	R
9	Nonmetallic mineral products	M	R	R
10	Primary metals	M	R	R
11	Fabricated metal products	R	M	R
12	Machinery	M	R	R
13	Computer and electronic products	M	R	R
14	Electrical equipment, appliances, and components	M	R	R
15	Motor vehicles, bodies and trailers, and parts	M	R	R
16	Other transportation equipment	M	R	R
17	Furniture and related products	M	R	R
18	Miscellaneous manufacturing	M	R	R
19	Food and beverage and tobacco products	M	R	R
20	Textile mills and textile product mills	M	R	R
21	Apparel and leather and allied products	M	R	R
22	Paper products	M	R	R
23	Printing and related support activities	M	R	R
24	Petroleum and coal products	R	M	R
25	Chemical products	R	M	R
26	Plastics and rubber products	M	R	R
27	Wholesale trade	M	R	R
28	Retail trade	M	R	R
29	Air transportation	M	R	R
30	Rail transportation	R	M	R
31	Water transportation	R	M	R
32	Truck transportation	R	M	R
33	Transit and ground passenger transportation	M	R	R
34	Pipeline transportation	R	M	R
35	Other transportation and support activities	M	R	R
36	Warehousing and storage	M	R	R
37	Publishing industries (includes software)	R	M	R
38	Motion picture and sound recording industries	M	R	R
39	Broadcasting and telecommunications	M	R	R
40	Information and data processing services	R	M	R
41	Federal Reserve banks, credit intermediation, and related activities	M	R	R
42	Securities, commodity contracts, and investments	M	R	R
43	Insurance carriers and related activities	M	R	R
44	Funds, trusts, and other financial vehicles	M	R	R
45	Real estate /1/	M	R	R
46	Rental and leasing services and lessors of intangible assets	M	R	R
47	Legal services	M	R	R
48	Computer systems design and related services	M	R	R
49	Miscellaneous professional, scientific, and technical services	M	R	R
50	Management of companies and enterprises	M	R	R
51	Administrative and support services	M	R	R
52	Waste management and remediation services	M	R	R
53	Educational services	M	R	R
54	Ambulatory health care services	R	M	R
55	Hospitals and nursing and residential care facilities	M	R	R
56	Social assistance	M	R	R
57	Performing arts, spectator sports, museums, and related activities	R	M	R
58	Amusements, gambling, and recreation industries	M	R	R
59	Accommodation	M	R	R
60	Food services and drinking places	M	R	R
61	Other services, except government	R	M	R
62	Federal, General government	R	M	R
63	Federal, Government enterprises	R	M	R
64	State & Local, General government	R	M	R
65	State & Local, Government enterprises	R	M	R

Remark: R = Estimated from regression, M = Implied value

Monthly Equations

Time-series analysis is used on all equations with high frequency, as proven useful in generating short-term forecast of economic variables. All equations in this step have the following structure:

$$Y_t = \alpha + \phi(L) Y_t + \gamma W_t + \epsilon_t$$

where

Y_t = value of dependent variable at time *t*

$\phi(L)$ = polynomial of lag operators : $\phi_1 L + \phi_2 L^2 + \dots$

W_t = vector of exogenous explanatory variables at time *t*

ϵ_t = error terms at time *t*

$\alpha, \phi_1, \phi_2, \dots, \gamma$ = regression coefficients.

The use of the *W* variables, additional explanatory variables besides the lagged dependent variables, helps to guide the movement of the forecasts along the long-term trend; without them, a purely autoregressive systems can begin to explode or oscillate. Generally, these exogenous explanatory variables are macroeconomic variables such as GDP and major aggregates of PCE. Table 6.2 shows these *W* variables and their definitions.

The lagged dependent variables are forecast within the process using time series analysis. Forecasts of other exogenous variables are obtained from (1) QUEST or other macroeconomic model, or (2) simple regression against a time trend or lagged dependent variables, or (3) an *ad hoc* forecast in the case of variables that are difficult to predict mechanically, such as the oil prices and exchange rate variables.

Table 6.2: Lists of Exogenous Variables Used in the Monthly Equations

cfurgr	:	Monthly growth rate of nominal personal consumption expenditure of Furniture, including mattresses and bedspring
mnipaqcloth	:	Monthly nominal PCE of Clothing and shoes, BEA
mnipaqdoth	:	Monthly nominal PCE of Other durables, BEA
mnipaqfood	:	Monthly nominal PCE of Food, BEA
mnipaqfur	:	Monthly nominal PCE of Furniture and household equipment, BEA
mnipaqgas	:	Monthly nominal PCE of Gasoline, fuel oil, and other energy goods, BEA
mnipaqho	:	Monthly nominal PCE of Household operation, BEA
mnipaqhous	:	Monthly nominal PCE of Housing, BEA
mnipaqmc	:	Monthly nominal PCE of Medical care, BEA
mnipaqmv	:	Monthly nominal PCE of Motor vehicles and parts, BEA
mnipaqnoth	:	Monthly nominal PCE of Other nondurables, BEA
mnipaqrec	:	Monthly nominal PCE of Recreation, BEA
mnipaqsoth	:	Monthly nominal PCE of Other services, BEA
mnipaqtr	:	Monthly nominal PCE of Transportation, BEA
mnipaqvfr	:	Monthly Private fixed investment in Residential, BEA
mnipaqvnre	:	Monthly Private fixed investment in Nonresidential equipment, BEA
mnipaqvnrs	:	Monthly Private fixed investment in Nonresidential Structures, BEA
mgdp	:	Monthly nominal Gross Domestic Product, BEA
mgdpgr	:	Monthly growth rate of nominal Gross Domestic Product, BEA
mtime	:	Monthly time trend (December 1969 = 0)
mvnrsgr	:	Monthly growth rate of Private fixed investment in Nonresidential Structures, BEA

Continuing the example of the annual Primary metals equation, the results of equations for *ips10, ehe10* and *pri10* are shown below. Table 6.2 shows a list of exogenous variables used in the monthly equations and their definitions.

```
#Primary metals
:                                    IPI: g331
  SEE   =       2.24 RSQ   = 0.8834 RHO =  -0.32 Obser  =  144 from 1993.001
  SEE+1 =       2.11 RBSQ  = 0.8809 DurH = -3.89 DoFree =  140 to   2004.012
  MAPE  =       1.69 Test period:   SEE     7.63 MAPE     5.87 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips10m               - - - - - - - - - - - - - - - - -    106.10 - - -
  1 ips10m[1]               1.00208   900.3   1.00    1.01    105.96
  2 mnipaqgas               0.00213     0.0   0.00    1.01    165.14  0.012
  3 mnipaqmv               -0.01123     0.3  -0.04    1.00    345.86 -0.123
  4 mnipaqmv[4]             0.01008     0.2   0.03    1.00    339.61  0.112

:                                 BLS: CES et331
  SEE   =       2.29 RSQ   = 0.9988 RHO =  -0.13 Obser  =  144 from 1993.001
  SEE+1 =       2.27 RBSQ  = 0.9987 DurH = -1.67 DoFree =  140 to   2004.012
  MAPE  =       0.28 Test period:   SEE     9.05 MAPE     1.58 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe10m               - - - - - - - - - - - - - - - - -    590.11 - - -
  1 intercept               0.94029     0.1   0.00  801.68      1.00
  2 ehe10m[1]               1.20589   232.0   1.21    1.59    591.18  1.192
  3 ehe10m[5]              -0.20588     3.9  -0.21    1.00    595.58 -0.193
  4 ehe10m[9]              -0.00185     0.0  -0.00    1.00    600.17 -0.002

:                                    PPI: u331
  SEE   =       0.67 RSQ   = 0.9937 RHO =  -0.07 Obser  =  144 from 1993.001
  SEE+1 =       0.67 RBSQ  = 0.9936 DurH = -1.30 DoFree =  140 to   2004.012
  MAPE  =       0.34 Test period:   SEE     7.08 MAPE     3.72 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri10m               - - - - - - - - - - - - - - - - -    121.26 - - -
  1 intercept               0.46039     0.1   0.00  159.97      1.00
  2 pri10m[1]               1.75021   168.1   1.75    2.35    120.95  1.657
  3 pri10m[2]              -0.75815    44.3  -0.75    1.03    120.65 -0.677
  4 mnipaqgas               0.00352     1.4   0.00    1.00    165.14  0.016
```

In the Industrial production index equation (*ips10m*), we have a plausible elasticity of 1.00 for the lagged dependent variable, a decent fit with adjusted R-Square of 0.8809 and a MAPE of 1.69 percent. The RHO of -0.32 shows that there is unlikely to be an important missing variable but the forecast should be adjusted with the rho-adjustment.

In the employment equation (*ehe10m*), we have a very good fit with adjusted R-square of 0.9987 and a MAPE of 0.28 percent with the elasticity of 1. There is little correlation in errors with a RHO of -0.13.

The producer price index equation (*pri10m*) also has a very good fit with an adjusted R-Square of 0.9936 and a MAPE of 0.34 percent. With a very low RHO of -0.07, the equation fits well without significant correlation in the errors. All regressors have appropriate signs and decent Mexvals.

The estimated monthly equations are given in Appendix 6.4. The forecast from these monthly equations are annualized and used in forecasting the annual gross output by detailed industries using the annual equations discussed earlier.

6.3 Illustration and Evaluation of the Method

The forecasting accuracy of the method has been evaluated by two tests of the method in forecasting 2003 and 2004 on the basis of equations estimated with data through 2002. The difference between the two tests only is in where they get the exogenous data which, in actual practice, would have to come for QUEST or some other quarterly forecasting model. In the first test, we used the actual values of these variables, as the later proved to be. In the second test, we used the values which QUEST would have produced at the end of 2002 using mechanical projections of its exogenous variables. Thus, the first test shows the error inherent in the methods developed in this study, while the second test compounds these errors with errors in forecasting the variables from the macromodel.

Table 6.3 shows the percentage differences of both simulations from the published real gross output in the 65 detailed industries.

Table 6.3: 65 detailed Industries Real Gross Output Simulations Results

Percentage difference from the published value		1st Sim		2nd Sim	
		2003	2004	2003	2004
1	Farms	0.31%	0.70%	0.32%	-0.37%
2	Forestry, fishing, and related activities	-3.23%	-3.50%	-1.65%	-6.25%
3	Oil and gas extraction	-0.41%	-0.23%	-0.48%	-0.96%
4	Mining, except oil and gas	-0.01%	-0.38%	2.09%	0.01%
5	Support activities for mining	-6.11%	-2.57%	3.53%	16.00%
6	Utilities	-2.09%	0.55%	2.84%	11.47%
7	Construction	-0.71%	-1.68%	-1.39%	-7.21%
8	Wood products	0.17%	2.00%	0.37%	1.08%
9	Nonmetallic mineral products	-0.13%	0.84%	-0.56%	-0.13%
10	Primary metals	0.17%	1.13%	0.81%	-3.71%
11	Fabricated metal products	2.36%	-2.97%	4.67%	2.42%
12	Machinery	-0.60%	-0.10%	4.50%	6.76%
13	Computer and electronic products	-2.95%	0.67%	-1.10%	-2.38%
14	Electrical equipment, appliances, and components	-0.23%	1.61%	2.10%	4.47%
15	Motor vehicles, bodies and trailers, and parts	-0.96%	-0.04%	-3.06%	-2.20%
16	Other transportation equipment	-1.95%	-0.56%	1.08%	14.21%
17	Furniture and related products	0.66%	-0.67%	4.60%	1.84%
18	Miscellaneous manufacturing	-0.44%	0.76%	-0.46%	2.61%
19	Food and beverage and tobacco products	-0.02%	-0.31%	-1.15%	1.81%
20	Textile mills and textile product mills	-1.11%	-1.61%	2.25%	2.91%
21	Apparel and leather and allied products	2.59%	2.80%	-2.30%	-13.54%
22	Paper products	-0.44%	0.69%	-0.19%	-6.98%
23	Printing and related support activities	-0.24%	0.63%	-3.15%	-13.48%
24	Petroleum and coal products	1.82%	-0.80%	-11.77%	-35.47%
25	Chemical products	0.99%	0.51%	0.23%	-5.71%
26	Plastics and rubber products	-0.57%	0.63%	-1.00%	1.51%
27	Wholesale trade	-1.70%	3.85%	-1.09%	-1.23%
28	Retail trade	-0.95%	1.13%	-1.32%	-2.55%
29	Air transportation	11.35%	5.29%	10.81%	6.14%
30	Rail transportation	-1.33%	-13.08%	-2.57%	-18.62%
31	Water transportation	-0.29%	-2.76%	3.10%	-1.29%
32	Truck transportation	1.48%	-6.20%	1.41%	-11.87%
33	Transit and ground passenger transportation	-1.83%	-2.01%	-2.98%	-2.77%
34	Pipeline transportation	1.24%	-0.26%	0.71%	1.42%
35	Other transportation and support activities	-0.88%	-1.08%	1.31%	1.14%
36	Warehousing and storage	-0.43%	3.61%	0.53%	2.58%
37	Publishing industries (includes software)	-0.94%	-1.31%	0.44%	-8.61%
38	Motion picture and sound recording industries	-2.60%	-1.04%	-1.36%	-1.05%
39	Broadcasting and telecommunications	1.14%	-1.42%	-0.94%	-0.34%
40	Information and data processing services	-4.21%	-9.37%	-4.43%	-11.92%
41	Federal Reserve banks, credit intermediation, and	3.63%	7.76%	3.40%	5.84%
42	Securities, commodity contracts, and investments	-2.36%	-5.77%	-0.50%	-3.05%
43	Insurance carriers and related activities	1.56%	-1.90%	0.33%	-6.10%
44	Funds, trusts, and other financial vehicles	1.48%	5.25%	-5.35%	-12.48%
45	Real estate /1/	0.43%	-2.35%	-0.04%	-5.46%
46	Rental and leasing services and lessors of intangi	-5.63%	-15.67%	-10.50%	-10.28%
47	Legal services	-1.96%	-0.51%	-2.36%	-1.68%
48	Computer systems design and related services	-6.34%	-8.13%	-5.90%	0.28%
49	Miscellaneous professional, scientific, and techni	-0.17%	0.05%	3.10%	1.19%
50	Management of companies and enterprises	-3.54%	-6.71%	0.97%	-4.80%
51	Administrative and support services	-4.97%	-5.44%	-3.79%	-2.75%
52	Waste management and remediation services	-0.52%	0.75%	-0.59%	-3.02%
53	Educational services	0.21%	1.53%	0.23%	1.39%
54	Ambulatory health care services	-1.88%	-0.57%	-1.90%	-6.42%
55	Hospitals and nursing and residential care facilit	-0.05%	-0.20%	-0.33%	-0.59%
56	Social assistance	-2.19%	-1.12%	-2.15%	-3.89%
57	Performing arts, spectator sports, museums, and re	-4.75%	-3.94%	-4.27%	-1.89%
58	Amusements, gambling, and recreation industries	-0.41%	-0.20%	-0.34%	-1.33%
59	Accommodation	-2.71%	-2.69%	-2.21%	-4.81%
60	Food services and drinking places	0.45%	2.79%	-1.53%	-4.36%
61	Other services, except government	-0.90%	-0.91%	-1.57%	-5.32%
62	General government	-1.70%	-3.39%	-3.05%	-5.39%
63	Government enterprises	-0.48%	-2.01%	-1.38%	-3.28%
64	General government	0.11%	-1.29%	-0.05%	-0.45%
65	Government enterprises	1.41%	3.54%	1.29%	2.73%

Generally, the first test can predicted most of the real gross output of each industry quite well, especially the important industry such as Construction and Retail trade, in both one-period and two-period ahead forecasts. The second test, generally, shows slightly bigger errors than the first test. These bigger errors emphasize the importance of the accuracy of exogenous variables.

Air transportation is the only important industry that has unusually large errors, between 5% to 11%. These errors are relatively equally large in both tests. Thus, this indicates that our equations for estimating Air transportation does not perform as well as equations for other industries.

For the remainder of this section, I show these results in a more graphical way with more discussion of the more aggregates industries. It can be skipped.

Graphical presentation of the results is certainly more "graphic" than the table and shows the forecast in the context of the historical series. But because the graphs also take a lot of space, I have aggregated the 65 industries into 22 groups for the graphs. All real values are aggregated from the 65-sector level using chain-weighted Fisher indexes. Tabulated numerical results of these 22 industry groups are in Appendix 6.2; the graphs follow here. Unless otherwise noted, each graph shows three lines:

1. a historical simulation using true values of exogenous variables (represented by the red line and marked with plus signs +),

2. a historical simulation with exogenous variables generated using QUEST and other simple methods such as simple time-series analysis (represented by blue line and marked by the square boxes □), Table 6.4 shows the assumptions of these exogenous variables between 2003 and 2004, and

3. the historical BEA published Gross output by industry group as of April 2007 (represented by green line marked by x's).

All values (shown in Table 6.4), except exchange rate *(exrim)* and oil price *(oilpm)*, are generated as quarterly series by the QUEST model and converted to monthly data by @qtom command.

Table 6.4: Assumptions of all exogenous variables used in the Second Historical Simulation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
exrim												
2003	123.44	123.29	122.81	121.83	117.86	117.22	118.43	119.74	118.40	116.06	115.93	114.36
2004	112.46	113.01	114.13	114.94	116.81	115.70	114.88	115.05	114.58	112.97	110.11	108.89
oilpm												
2003	32.94	35.87	33.55	28.25	28.14	30.72	30.76	31.59	28.29	30.33	31.09	32.15
2004	34.27	34.74	36.76	36.69	40.28	38.02	40.69	44.94	45.95	53.13	48.46	43.33
mnipaqmv												
2003	409.85	407.32	408.62	418.67	423.92	429.30	442.22	442.29	436.93	410.72	406.04	407.49
2004	428.02	432.01	432.42	423.96	421.15	418.73	414.15	414.37	416.86	424.91	429.48	433.86
mnipaqfur												
2003	325.62	327.90	330.32	333.90	335.83	337.14	337.48	337.78	337.69	336.54	336.22	336.05
2004	335.66	336.04	336.85	338.87	339.91	340.75	341.51	341.89	342.01	340.88	341.18	341.95
mnipaqdoth												
2003	176.01	177.62	178.93	179.52	180.51	181.48	182.75	183.47	183.95	183.62	184.04	184.66
2004	185.47	186.45	187.62	189.78	190.71	191.20	190.83	190.79	190.64	190.05	189.95	190.00
mnipaqfood												
2003	1,017.84	1,018.61	1,018.55	1,017.67	1,015.94	1,013.37	1,008.07	1,005.25	1,003.00	1,001.78	1,000.36	999.18
2004	997.56	997.39	997.99	999.51	1,001.52	1,004.19	1,008.44	1,011.72	1,014.95	1,016.47	1,020.86	1,026.47
mnipaqcloth												
2003	305.96	305.75	305.40	304.93	304.26	303.40	301.86	301.05	300.46	300.41	300.01	299.58
2004	298.82	298.56	298.50	298.70	298.99	299.43	300.21	300.80	301.40	301.52	302.50	303.84
mnipaqgas												
2003	204.30	210.98	217.86	225.15	232.28	239.45	248.48	254.39	258.98	257.32	262.98	271.02
2004	285.53	295.26	304.32	316.17	321.26	323.06	316.84	315.62	314.66	315.26	313.86	311.74
mnipaqnoth												
2003	605.42	605.43	604.74	602.85	601.09	598.98	595.43	593.43	591.90	591.80	590.47	588.88
2004	585.84	584.61	584.01	584.71	584.84	585.09	585.42	585.91	586.53	586.72	588.05	589.94
mnipaqhous												
2003	1,137.25	1,137.46	1,136.62	1,135.53	1,132.03	1,126.91	1,117.12	1,111.03	1,105.61	1,099.76	1,096.48	1,094.68
2004	1,096.95	1,096.16	1,094.90	1,091.89	1,090.67	1,089.94	1,089.41	1,089.91	1,091.15	1,092.56	1,095.67	1,099.94
mnipaqho												
2003	420.43	421.29	421.54	421.17	420.18	418.56	414.71	413.06	412.00	412.06	411.80	411.74
2004	412.03	412.28	412.63	412.50	413.50	415.05	418.82	420.21	420.89	419.51	419.80	420.40
mnipaqtr												
2003	293.09	294.74	296.16	296.91	298.19	299.55	301.29	302.63	303.86	305.00	305.96	306.76
2004	306.86	307.79	308.99	311.65	312.50	312.72	311.83	311.18	310.27	308.79	307.62	306.43
mnipaqmc												
2003	1,252.52	1,252.59	1,251.18	1,249.12	1,244.14	1,237.07	1,222.52	1,215.30	1,210.02	1,211.56	1,206.50	1,199.72
2004	1,186.86	1,179.90	1,174.48	1,171.74	1,168.55	1,166.04	1,164.82	1,163.22	1,161.86	1,159.13	1,159.42	1,161.14
mnipaqrec												
2003	307.94	308.67	309.49	311.02	311.57	311.75	311.59	311.00	310.02	307.39	306.55	306.27
2004	307.45	307.55	307.50	306.65	306.79	307.28	309.15	309.55	309.51	307.74	307.81	308.42
mnipaqsoth												
2003	1,037.19	1,038.74	1,040.36	1,044.15	1,044.30	1,042.91	1,038.77	1,035.25	1,031.12	1,023.67	1,020.36	1,018.49
2004	1,020.50	1,019.64	1,018.35	1,014.42	1,013.98	1,014.80	1,019.83	1,020.96	1,021.14	1,016.94	1,017.78	1,020.23
mnipaqvnrs												
2003	268.45	267.48	267.06	267.96	268.05	268.11	268.67	268.25	267.41	263.29	263.70	265.80
2004	270.84	275.38	280.67	290.10	294.34	296.79	294.38	295.54	297.21	301.08	302.50	303.15
mnipaqvnre												
2003	782.63	791.58	803.54	822.03	837.39	853.14	876.00	887.48	894.30	889.54	892.26	895.53
2004	895.04	902.64	914.02	933.68	949.25	965.23	986.85	999.71	1,009.04	1,011.46	1,016.29	1,020.15
mnipaqvfr												
2003	534.67	542.20	550.27	565.56	569.68	569.33	556.35	553.13	551.54	551.88	553.31	556.12
2004	560.97	566.09	572.12	581.64	587.57	592.48	597.84	599.61	599.27	591.42	590.88	592.26
mgdp												
2003	10,640.83	10,668.81	10,701.08	10,754.03	10,782.53	10,803.01	10,814.69	10,819.64	10,817.14	10,783.32	10,783.73	10,794.56
2004	10,823.52	10,849.32	10,879.73	10,923.03	10,956.37	10,988.09	11,020.77	11,047.22	11,070.10	11,077.57	11,102.07	11,131.80

Table 6.5: Percentage differences of the exogenous variables from the actual values

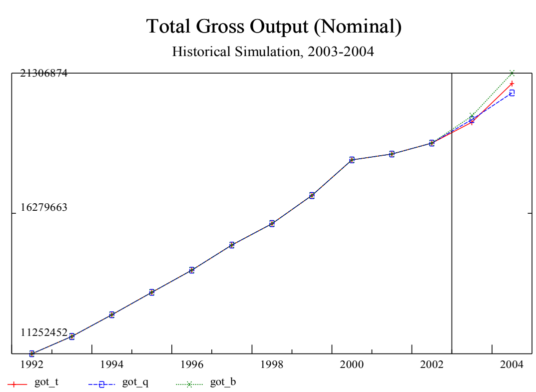
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
exrim												
2003	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2004	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
oilpm												
2003	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2004	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
mnipaqmv												
2003	-2.01%	-2.68%	-2.97%	-2.57%	-2.32%	-1.92%	-0.28%	-0.41%	-1.22%	-5.03%	-5.54%	-4.99%
2004	-0.98%	-0.14%	-0.05%	-1.64%	-2.37%	-3.16%	-4.59%	-5.03%	-5.07%	-4.59%	-3.97%	-3.05%
mnipaqfur												
2003	1.83%	2.52%	2.91%	3.01%	2.77%	2.22%	0.85%	0.11%	-0.55%	-1.01%	-1.59%	-2.17%
2004	-2.97%	-3.39%	-3.66%	-3.46%	-3.65%	-3.91%	-4.28%	-4.67%	-5.10%	-5.82%	-6.19%	-6.44%
mnipaqdoth												
2003	2.63%	3.39%	3.60%	2.77%	2.27%	1.60%	0.29%	-0.29%	-0.65%	-0.49%	-0.69%	-0.91%
2004	-1.56%	-1.56%	-1.30%	-0.11%	0.17%	0.20%	-0.22%	-0.52%	-0.89%	-1.43%	-1.90%	-2.40%
mnipaqfood												
2003	-0.50%	-0.83%	-1.14%	-1.11%	-1.67%	-2.47%	-4.07%	-4.90%	-5.54%	-5.61%	-6.17%	-6.85%
2004	-7.98%	-8.57%	-8.99%	-9.10%	-9.28%	-9.40%	-9.24%	-9.39%	-9.65%	-10.41%	-10.55%	-10.48%
mnipaqcloth												
2003	1.00%	1.01%	0.67%	-0.21%	-1.10%	-2.18%	-4.24%	-5.08%	-5.52%	-4.67%	-5.00%	-5.61%
2004	-7.37%	-7.84%	-7.94%	-6.96%	-6.82%	-6.83%	-7.07%	-7.30%	-7.61%	-8.26%	-8.50%	-8.63%
mnipaqgas												
2003	-5.35%	-4.08%	-0.43%	12.30%	17.50%	20.62%	18.16%	19.48%	21.19%	24.41%	26.27%	27.72%
2004	28.86%	29.33%	29.33%	28.44%	27.95%	27.36%	27.71%	26.12%	23.71%	18.44%	16.29%	14.94%
mnipaqnoth												
2003	-0.54%	-0.94%	-1.37%	-1.47%	-2.19%	-3.17%	-5.07%	-6.04%	-6.76%	-6.94%	-7.42%	-7.90%
2004	-8.38%	-8.86%	-9.35%	-9.90%	-10.34%	-10.73%	-11.06%	-11.37%	-11.63%	-11.92%	-12.07%	-12.14%
mnipaqhous												
2003	-0.16%	-0.43%	-0.77%	-1.04%	-1.67%	-2.50%	-3.82%	-4.80%	-5.75%	-6.83%	-7.57%	-8.16%
2004	-8.31%	-8.79%	-9.31%	-10.01%	-10.53%	-10.99%	-11.42%	-11.76%	-12.04%	-12.26%	-12.42%	-12.51%
mnipaqho												
2003	-0.40%	-0.77%	-1.17%	-1.62%	-2.11%	-2.65%	-3.36%	-3.89%	-4.36%	-4.66%	-5.11%	-5.59%
2004	-6.28%	-6.67%	-6.95%	-7.09%	-7.17%	-7.16%	-6.70%	-6.80%	-7.08%	-7.90%	-8.30%	-8.64%
mnipaqtr												
2003	0.38%	0.58%	0.75%	0.89%	1.00%	1.08%	1.06%	1.13%	1.21%	1.37%	1.44%	1.47%
2004	1.37%	1.43%	1.54%	2.04%	1.99%	1.74%	1.17%	0.59%	-0.11%	-1.09%	-1.88%	-2.66%
mnipaqmc												
2003	-0.58%	-1.18%	-1.88%	-2.62%	-3.57%	-4.65%	-6.27%	-7.34%	-8.24%	-8.59%	-9.48%	-10.52%
2004	-12.04%	-13.09%	-14.03%	-14.77%	-15.53%	-16.23%	-16.87%	-17.47%	-18.02%	-18.60%	-19.00%	-19.32%
mnipaqrec												
2003	-0.10%	-0.27%	-0.50%	-0.70%	-1.09%	-1.59%	-2.17%	-2.90%	-3.76%	-5.01%	-5.91%	-6.71%
2004	-7.39%	-8.06%	-8.67%	-9.35%	-9.78%	-10.07%	-9.95%	-10.21%	-10.55%	-11.26%	-11.56%	-11.75%
mnipaqsoth												
2003	-0.03%	-0.17%	-0.39%	-0.49%	-0.96%	-1.62%	-2.70%	-3.55%	-4.40%	-5.26%	-6.13%	-7.01%
2004	-7.95%	-8.76%	-9.52%	-10.38%	-10.93%	-11.33%	-11.20%	-11.59%	-12.10%	-13.26%	-13.63%	-13.75%
mnipaqvnrs												
2003	-0.15%	-0.75%	-1.58%	-3.38%	-4.10%	-4.51%	-4.08%	-4.28%	-4.58%	-5.65%	-5.62%	-5.18%
2004	-3.88%	-2.97%	-2.00%	-0.06%	0.29%	0.02%	-1.97%	-2.61%	-3.02%	-2.48%	-3.01%	-3.87%
mnipaqvnre												
2003	1.26%	2.35%	3.55%	5.13%	6.30%	7.32%	8.58%	9.07%	9.18%	7.92%	8.03%	8.50%
2004	9.92%	10.74%	11.49%	12.06%	12.75%	13.44%	14.74%	15.01%	14.85%	13.60%	13.17%	12.87%
mnipaqvfr												
2003	0.12%	0.52%	1.07%	3.61%	3.11%	1.44%	-3.34%	-5.55%	-7.31%	-8.58%	-9.56%	-10.20%
2004	-9.90%	-10.36%	-10.95%	-11.98%	-12.53%	-12.96%	-12.85%	-13.38%	-14.12%	-15.61%	-16.35%	-16.89%
mgdp												
2003	-0.23%	-0.34%	-0.42%	-0.16%	-0.41%	-0.87%	-1.86%	-2.44%	-2.97%	-3.44%	-3.87%	-4.25%
2004	-4.56%	-4.87%	-5.15%	-5.41%	-5.64%	-5.86%	-5.99%	-6.22%	-6.47%	-6.81%	-7.07%	-7.32%

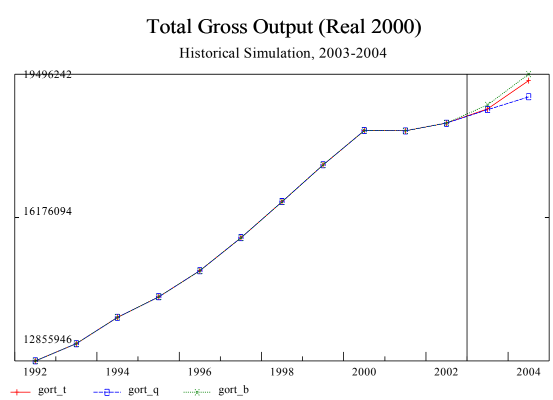
Table 6.5 shows that there are big errors in the exogenous variables generated by the QUEST models, especially in the PCE of Nondurables and Services. It should be noted that we used the actual values of the exchange rate and the oil price in the second simulation.

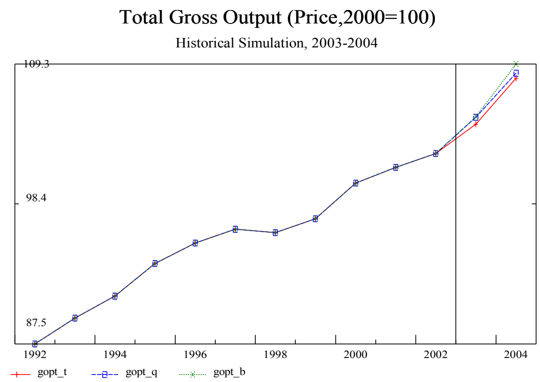
For each industry or group of industries there are three graphs. The top left is nominal gross output; the top right is real gross output in prices of 2000; and the bottom center is the price index.

Total Gross Output

Total gross output, need it be said, is not equal to Gross domestic product because it includes intermediate consumption. Nonetheless, it provides a useful measure of how the method worked overall. The two preceding years, 2001 and 2002, had been years of stagnation or very slow growth. At this most aggregate level, our method indicated resumed growth and a gave a good forecast from both historical simulations for nominal gross output in 2003 but missed a bit on the low side for 2004. In 2003, the first and the second simulation underestimated the actual value by 1.08 percent and 0.64 percent, respectively. That is, the QUEST-based forecast proved a bit closer than the actual-based forecast. In 2004, the simulations underestimated the later- published value by 1.80 percent and 3.36 percent, respectively.







Turning to real total gross output, we find the first simulation with the true exogenous variables missing the published figures by -0.51 percent and -0.78 percent in 2003 and 2004, respectively. The second simulation with exogenous values from QUEST missed the BEA numbers by -0.59 percent and -2.72 percent, respectively.

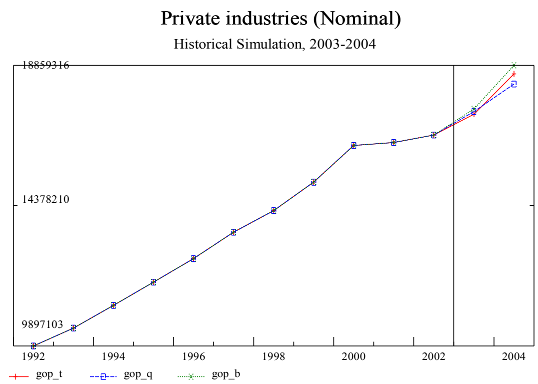
The estimated price indexes are quite accurate. In 2003, the first and the second simulations missed the announced price index by -0.57 percent and -0.06 percent, respectively. The rapid rise of the petroleum price since 2003 caused a slightly worse performance in 2004. The first simulation missed the published number by -1.03 percent in 2004 while the second simulation missed the published number by -0.66 percent in the same year.

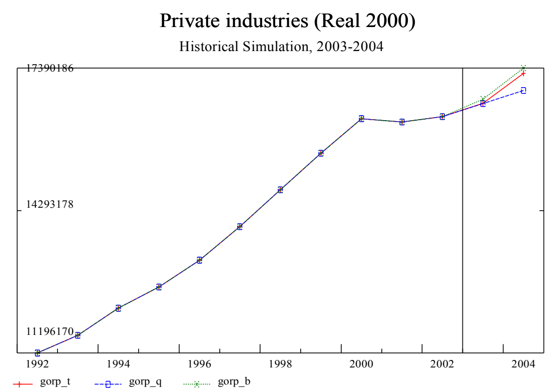
Private industries

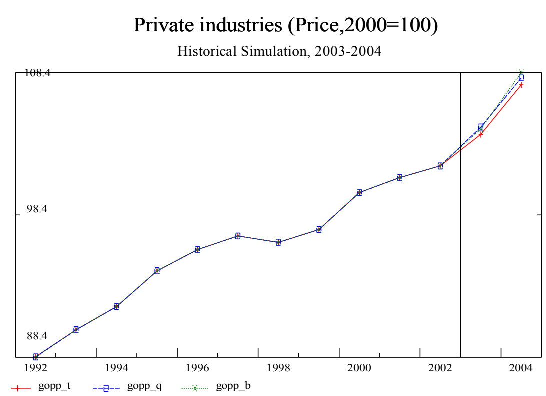
Gross output of U.S. private industries contributes approximately 90 percent of U.S. total Gross output in nominal value. Thus, the model's performance in estimating Gross output of private industries is unsurprisingly very similar to the performance seen in the total Gross output. The first simulation missed the published number by -0.93

percent in 2003 and -1.49 percent in 2004. The second simulation missed by -0.44 percent in 2003 and -3.20 percent in 2004.

The first simulation missed the chained real 2000 private industries Gross output by –0.54 percent and -0.68 percent in 2003 and 2004, respectively. The second simulation missed by -0.55 percent in 2003 and -2.84 percent in 2004.







The BEA published a price index for private industries' gross output of 104.48 and 108.45 in 2003 and 2004, respectively. In 2003, the first simulation missed the published figure by -0.40 percent while the second simulation missed it by only 0.11 percent. In 2004, the first and the second simulations missed the published number by

-0.82 percent and -0.36 percent, respectively. Given the break from the previous trend, these forecasts look quite accurate.

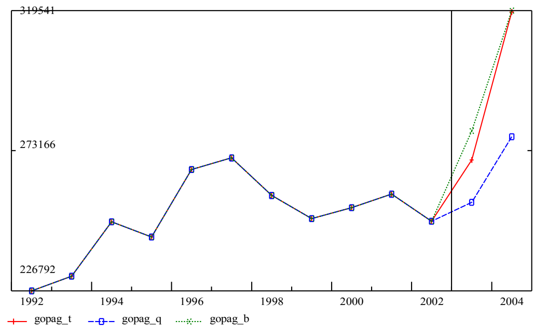
Agriculture, forestry, fishing, and hunting

Both simulations performed fairly well in predicting real Gross output. The first simulation missed the BEA figures by -0.36 percent and -0.12 percent in 2003 and 2004, respectively while the second simulation missed them by -0.05 percent in 2003 and -1.43 percent in 2006. Agricultural prices soared in 2003 and 2004, and both simulations underestimated the price index.

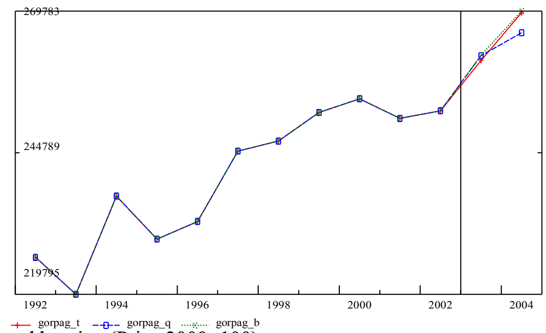
The first simulation performed fairly well. It missed the published price index by -3.06 percent in 2003 and by -0.04 percent in 2004. The second simulation missed the published numbers by -8.42 percent and -11.82 percent in 2003 and 2004, respectively. Evidently and not surprisingly, QUEST and the time-series methods used for the exogenous variables in this forecast did not provide the basis for anticipating this sudden, unprecedented rise in the farm price index. Specifically, shown in Appendix 6.3 and Appendix 6.4, nominal PCE of Furniture and household equipment is the only exogenous variable used in this industry group. compared the PCE numbers in Table 6.4 with the BEA quarterly NIPA, I find that the assumption match the published numbers quite well until the last quarter of 2003 in which QUEST start to underestimate the PCE of furniture significantly by around nearly 10% each quarter through the end of 2004. Naturally, the nominal gross output forecast will show the combined effect of the real quantity and the price forecasts. The first simulation missed the published number by -3.41 percent in

2003 but by only -0.16 percent in 2004. However, the second simulation did not do as well. It missed the BEA numbers by -8.46 percent and -13.08 percent in 2003 and 2004, respectively. From just looking at the graph, however, this second simulation looks like an altogether plausible guess of where the series was going to go in 2003 and 2004; what really happened looks highly implausible.

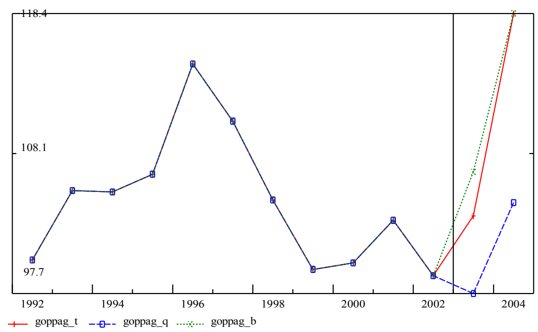
Agriculture, forestry, fishing, and hunting (Nominal)
Historical Simulation, 2003-2004



Agriculture, forestry, fishing, and hunting (Real 2000)
Historical Simulation, 2003-2004

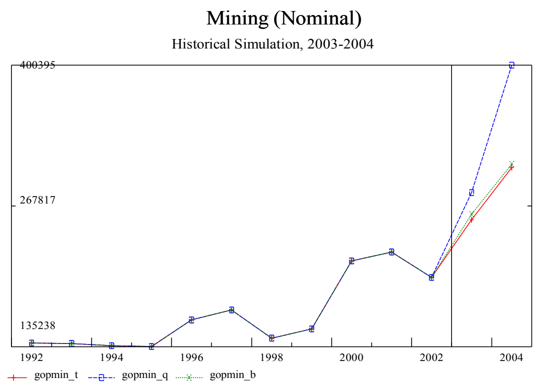


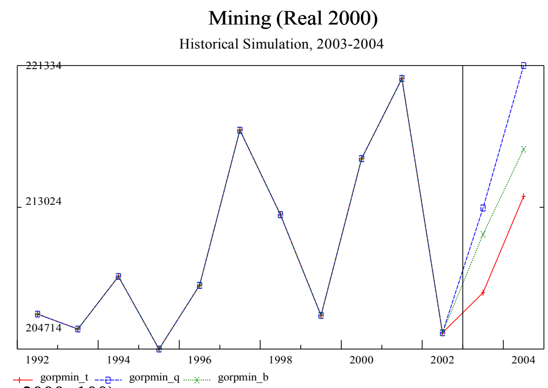
Agriculture, forestry, fishing, and hunting (Price,2000=100)
Historical Simulation, 2003-2004

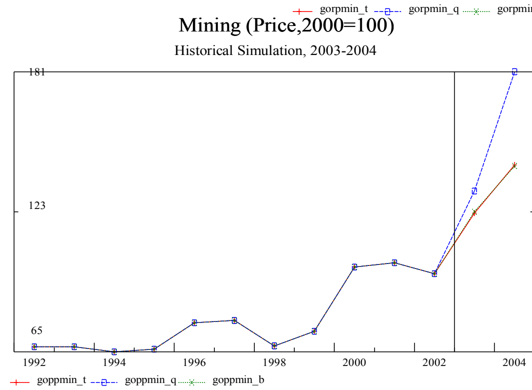


Mining (including petroleum)

The first simulation performed quite well as it missed the published nominal numbers by -2.10 percent and -1.05 percent in 2003 and 2004, respectively. The second simulation overestimated the nominal gross output by 7.79 percent in 2003 and 30.39 percent in 2004. On the other hand, both simulations gave good forecasts for the real gross output of Mining. The first simulation missed the published numbers by -1.62 percent and -1.27 percent in 2003 and 2004, respectively. The second simulation missed the same numbers by 0.72 percent in 2003 and 2.27 percent in 2004.







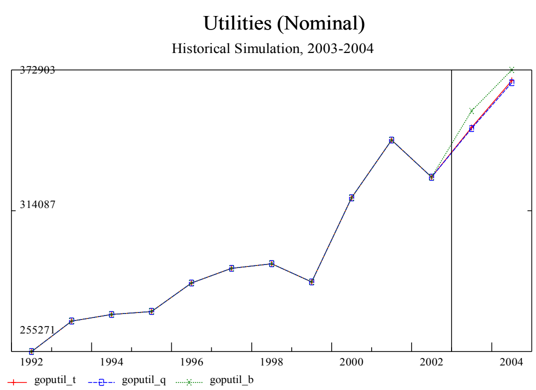
As in agriculture, the performance of the second simulation in forecasting the price index helps explaining its poor performance in estimating the nominal gross output. While the first simulation missed the published number by only -0.49 percent in 2003 and 0.23 percent in 2004, the second simulation missed the published numbers by 7.01 percent in 2003 and 27.49 percent in 2004, respectively.

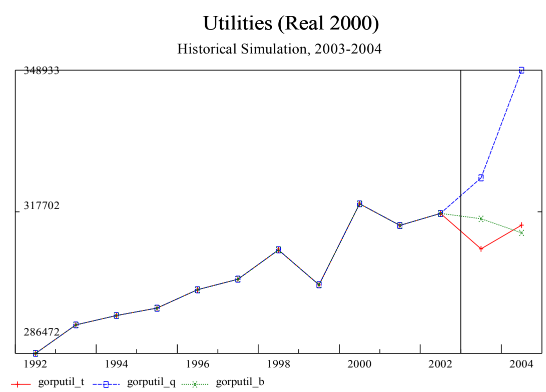
Mining industry includes oil and gas extraction industry, which is responsible for about two-third of the nominal Gross output of Mining industry. The exploding nominal gross output of the industry is to be expected because of the increasing petroleum price.

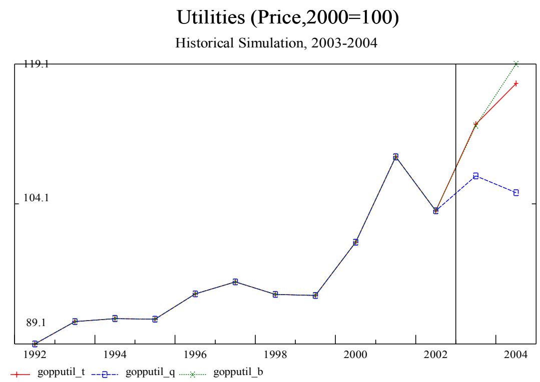
The overestimation of the price index in the second simulation is caused by the overestimated nominal PCE of Gasoline, fuel oil, and other energy goods by QUEST.

Utilities

The first simulation missed the BEA nominal values by -1.96 percent in 2003 and -1.21 percent in 2004 while the second simulation missed the BEA figures by -20.9 percent in 2003 and -1.48 percent in 2004. The difference is evident in estimating the real gross output. The first simulation did fairly well. It missed the published numbers by -20.9 percent and 0.55 percent in 2003 and 2004, respectively. The second simulation overestimated the published number by quite a bit, especially in 2004. It missed the BEA figures by 2.84 percent in 2003 and 11.47 percent in 2004. As in the two previous industry groups, the performance between the two simulations in estimating the price index shows the difference we have seem in the estimation of the chained 2000 real gross output. The first simulation missed the published price index by 0.13 percent in 2003 and -1.75 percent in 2004. The second simulation underestimates the same numbers by -4.80 percent in 2003 and -11.62 percent in 2004.



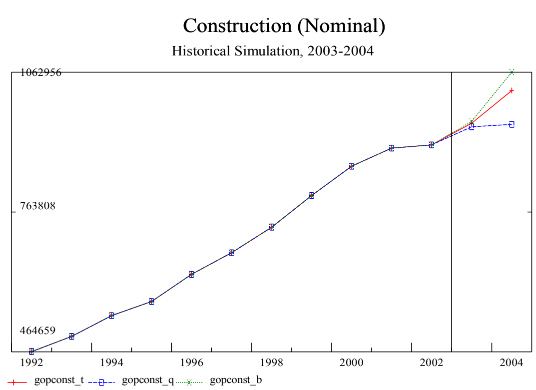


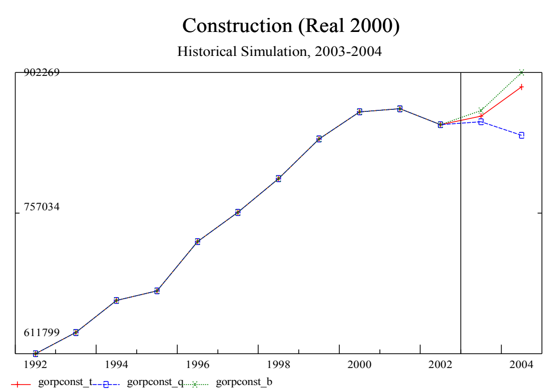


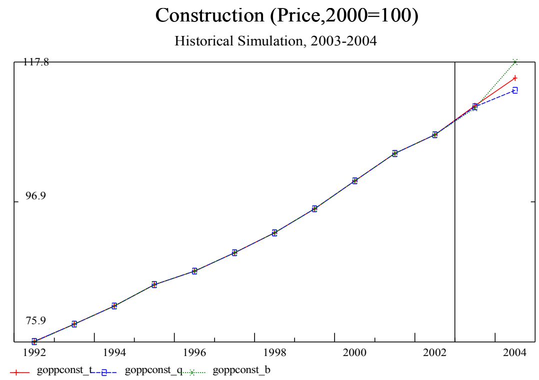
Construction

The first simulation missed the published nominal numbers by -0.39 percent in 2003 and -3.73 in 2004. The second simulation missed the published numbers by -1.17 in 2003 and -10.55 in 2004.

The first simulation underestimated the official numbers by -0.71 percent and -1.68 percent in 2003 and 2004, respectively. The second simulation missed the same numbers by -1.39 percent and -7.21 percent in 2003 and 2004, respectively







Both simulations estimated the price index quite accurately in 2003 and underestimated the price index slightly in 2004. The first simulation missed the official price index by 0.32 percent in 2003 and -2.08 percent in 2004. The second simulation missed the same price index by 0.22 percent in 2003 and -3.60 percent in 2004.

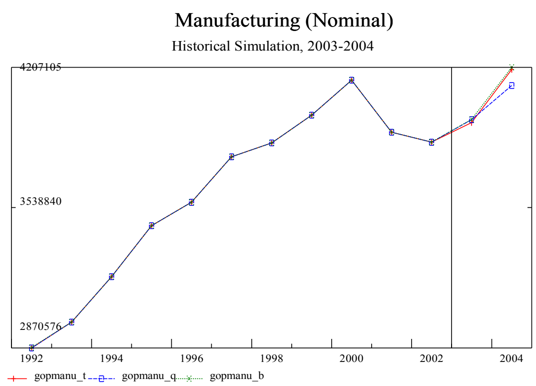
Both simulations predicted a slowdown in the construction industry in 2004, especially in the price index. This slowdown did not happen until the end of 2005.

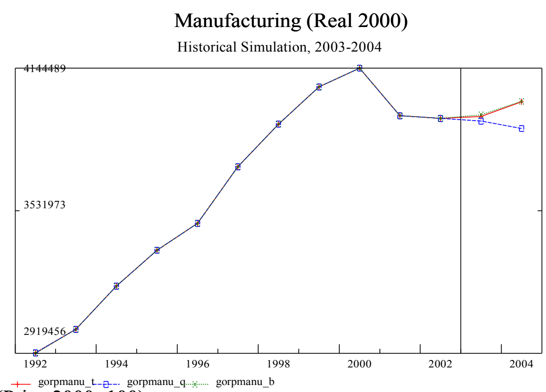
Manufacturing

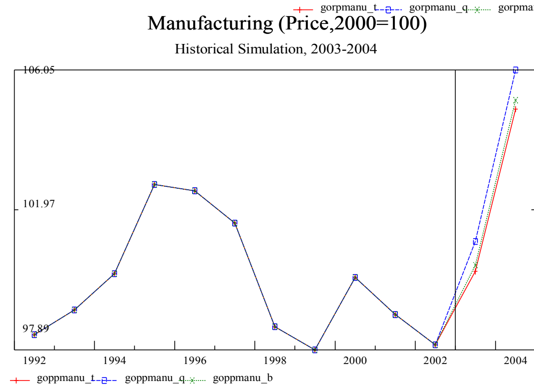
We expect to achieve good estimates from the manufacturing industry as the high frequency data used in the equations of this industry, such as Industrial production index and producer price index, are the main information the BEA used in producing the annual Gross output in these industries. As expected, the model, as seen in the performance of the first simulation, did very well in estimating the Gross output of manufacturing industry in 2003 and 2004.

In 2003, the first simulation missed the BEA nominal gross output by -0.37 percent while the second simulation missed the same number by -0.03 percent. In 2004, the discrepancies are -0.28 percent and -20.7 percent for the first and the second simulation, respectively.

With the chained 2000 real Gross output of manufacturing industry, the first simulation missed the official numbers by -0.19 percent in 2003 and -0.04 percent in 2004. The second simulation missed the same numbers by -0.71 percent and -2.89 percent in 2003 and 2004, respectively.







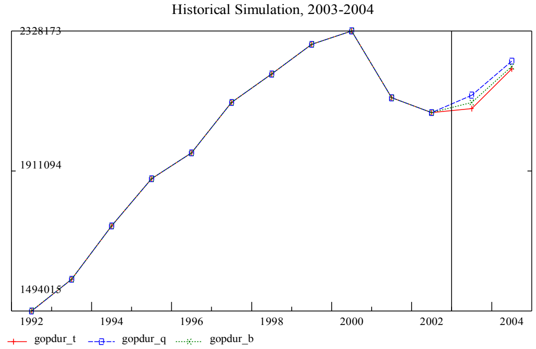
The BEA published the price index of gross output of manufacturing industry of 100.35 and 105.16 in 2003 and 2004, respectively. The first simulation missed this numbers by -0.18 percent in 2003 and -0.25 percent in 2004. The second simulation missed the official numbers by 0.69 percent in 2003 and 0.85 percent in 2004.

Durable goods manufacturing

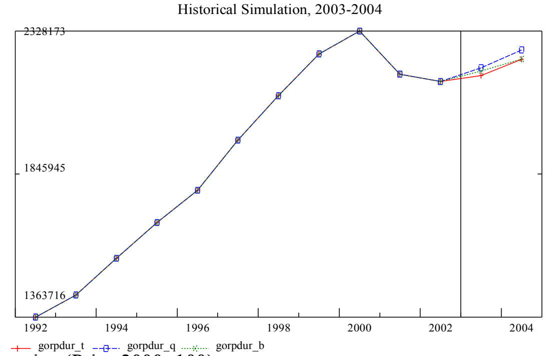
The first simulation missed the published numbers by -0.91 percent and -0.31 percent in 2003 and 2004, respectively. The second simulation missed the same official figures by 1.02 percent in 2003 and 0.71 percent in 2004.

In estimating the chained 2000 real gross output, the first simulation missed the official numbers by -0.68 percent in 2003 and -0.05 percent in 2004 while the second simulation missed the numbers by 0.50 percent and 1.37 percent in 2003 and 2004, respectively.

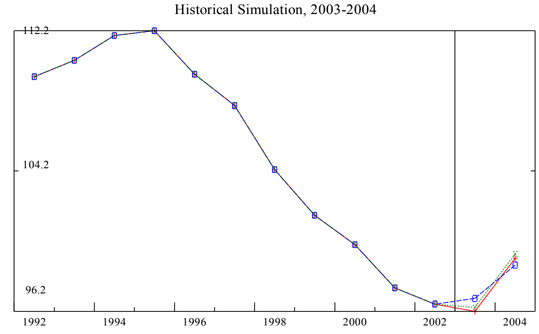
Durable goods manufacturing (Nominal)
Historical Simulation, 2003-2004



Durable goods manufacturing (Real 2000)
Historical Simulation, 2003-2004



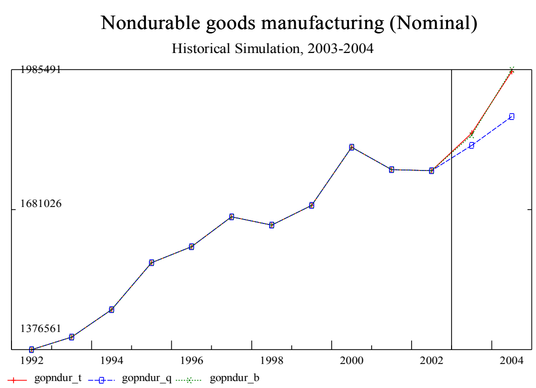
Durable goods manufacturing (Price,2000=100)
Historical Simulation, 2003-2004

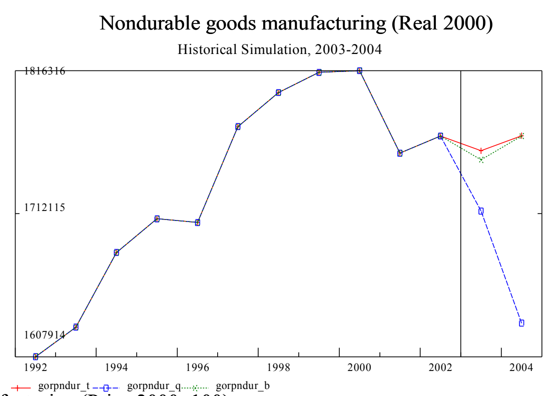


The official price index of durable goods manufacturing industry is 96.44 and 99.48 in 2003 and 2004, respectively. The first simulation missed the numbers by -0.23 percent and -0.26 percent in 2003 and 2004, respectively. The second simulation missed the same numbers by 0.51 percent in 2003 and -0.65 percent in 2004.

Nondurable goods manufacturing

The BEA published the nominal gross output of nondurable goods manufacturing of 1,843 billion dollars and 1,985 billion dollars in 2003 and 2004, respectively. The first simulation with actual inputs missed the official figures by 0.24 percent in 2003 and -0.25 percent in 2004. The second simulation did not do as well. It missed the published numbers by -1.22 percent in 2003 and -5.18 percent in 2004.





For the estimates of chained 2000 real gross output, the first simulation did very well in both 2003 and 2004. It over estimated the published numbers by less than 0.5 percent in both year. The second simulation did well in 2003 with the error of -2.13 percent. However, in 2004, the second simulation missed the published number by -7.70 percent.

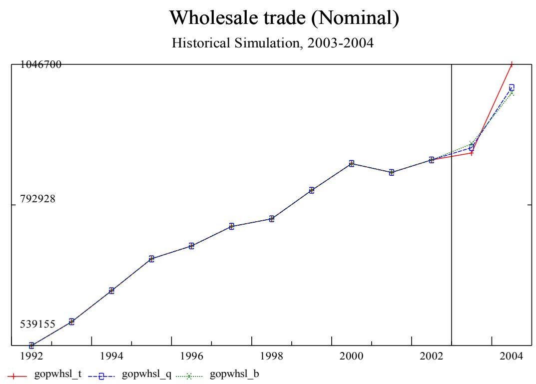
Both simulations did well in estimating the price index. The first simulation estimates the price index of 105.08 in 2003 and 111.97 in 2004. The second simulation estimates the same price index of 106.19 and 115.33 in 2003 and 2004, respectively.

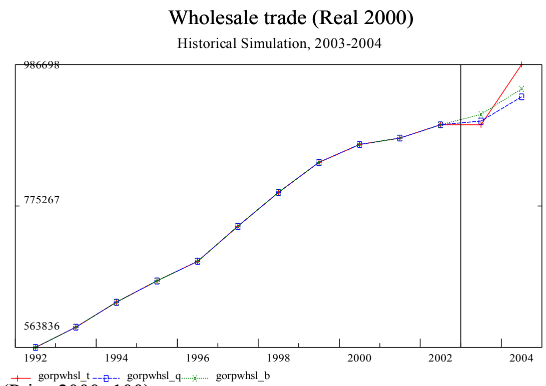
Wholesale trade

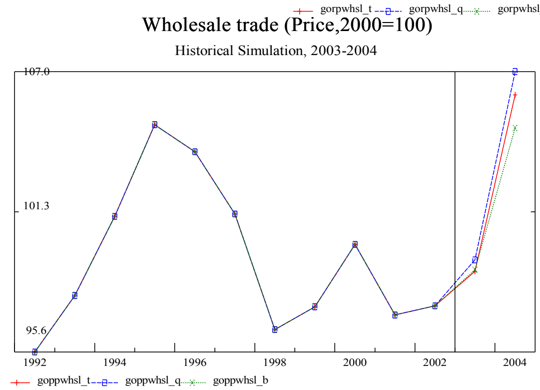
The first simulation missed the nominal gross output by -1.77 percent in 2003 and 5.19 percent in 2004. The second simulation missed the same numbers by -0.69 percent and 0.94 percent in 2003 and 2004.

The first simulation missed the published real numbers by -1.70 percent and 3.85 percent in 2003 and 2004, respectively. The second simulation missed the same official figures by -1.09 percent in 2003 and -1.23 percent in 2004.

The model did very well in predicting the price index. The first simulation missed the published price index by -0.07 percent in 2003 and 1.29 percent in 2004. The second simulation missed the same price index by 0.41 percent and 2.20 percent in 2003 and 2004, respectively.





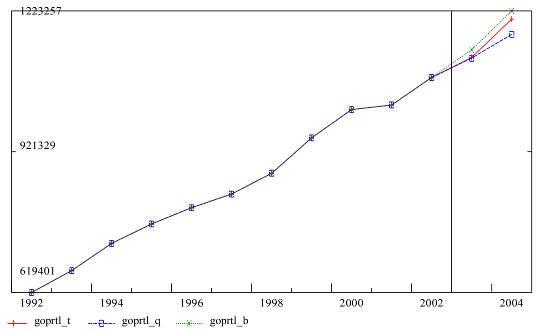


Retail trade

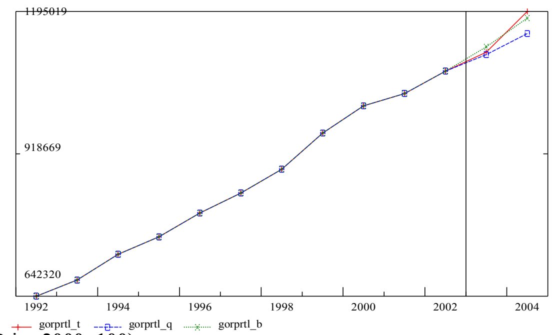
BEA published the nominal gross output of retail trade of 1,139 billion dollars in 2003 and 1,223 billion dollars in 2004. The first simulation underestimated the numbers by 1.44 percent in 2003 and 1.46 percent in 2004. The second simulation missed the same official number by -1.54 percent in 2003 and -4.17 percent in 2004.

For the real gross output, the first simulation estimates are 1,115 billion dollars in 2003 and 1,195 billion dollars in 2004 or the first simulation missed the published numbers by -0.95 percent in 2003 and 1.13 percent in 2004. The second simulation missed the same numbers by -1.32 percent and -2.55 percent in 2003 and 2004, respectively.

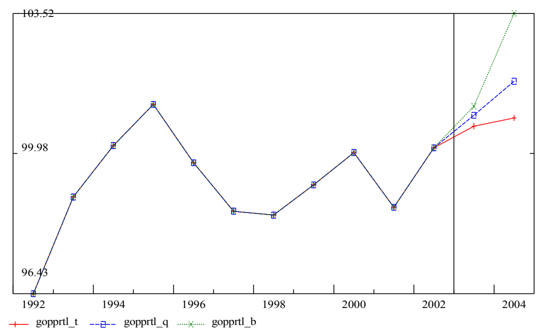
Retail trade (Nominal)
Historical Simulation, 2003-2004



Retail trade (Real 2000)
Historical Simulation, 2003-2004



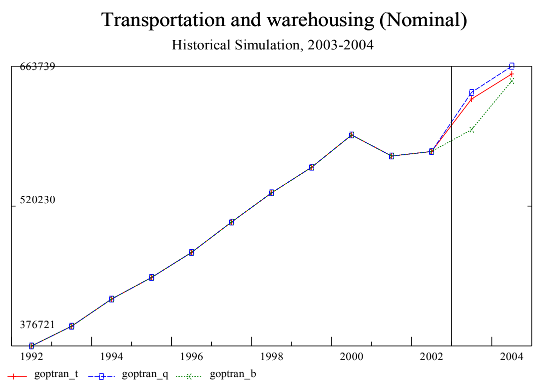
Retail trade (Price,2000=100)
Historical Simulation, 2003-2004

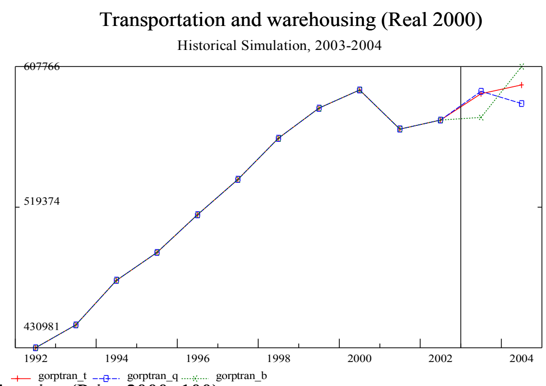


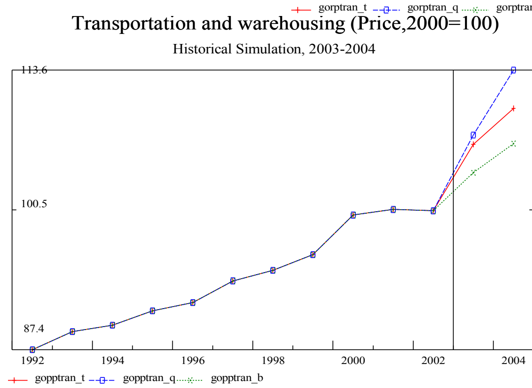
The first simulation missed the price index of retail trade gross output by -0.49 percent and -2.56 percent in 2003 and 2004, respectively. The second simulation underestimated the published numbers by -0.23 percent in 2003 and -1.66 percent in 2004.

Transportation and warehousing

BEA published the nominal gross output of transportation and warehousing industry of 598 billion dollars in 2003 and 648 billion dollars in 2004. The first simulation gave estimates of 630 billion dollars in 2003 and 655 billion dollars in 2004. These estimates gave errors of 5.21 percent in 2003 and 1.10 percent in 2004. The second simulation missed the published numbers by 6.33 percent and 2.37 percent in 2003 and 2004, respectively.







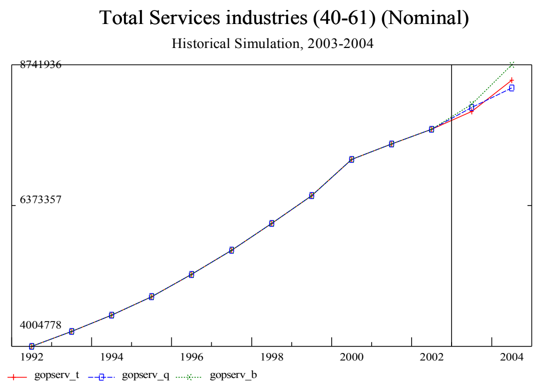
The official numbers for chained 2000 real gross output of transportation and warehousing industry are 576 billion dollars in 2003 and 608 billion dollars in 2004. The first simulation missed it by 2.58 percent and -1.94 percent in 2003 and 2004, respectively. The second simulation missed the same numbers by 2.85 percent in 2003 and -3.86 percent in 2004.

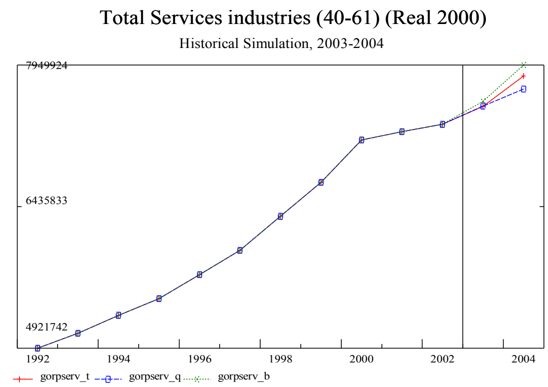
The first simulation missed the official price index by -0.49 percent in 2003 and -2.56 percent in 2004. The second simulation missed the same price index by -0.23 percent and -1.66 percent in 2003 and 2004, respectively.

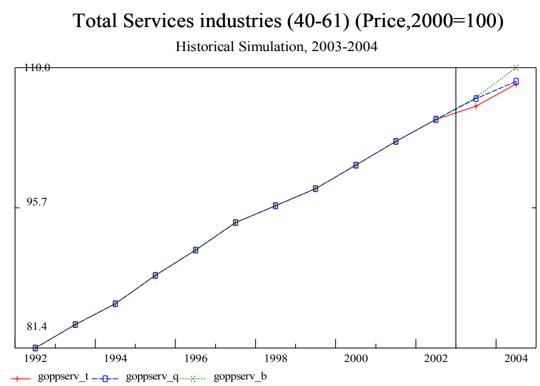
Service industries

BEA's definition of service-producing industries includes Wholesale trade, Retail trade, and Transportation. In this discussion, the Service industries are more narrowly defined to consist of Information and data processing services; Finance, insurance, real estate, rental, and leasing; Professional and business services; Educational services, health care, and social assistance; Arts, entertainment, recreation, accommodation, and food services; and Other services, except government. Thus, the numbers reported here are not to be compared to the BEA's Gross output of services-producing industries. The values presented as BEA figures in this section are derived from the detailed industries published figures.

The method performs well in this service industry, which contributes about 40 percent to total gross output in nominal value in 2000. The trend is that the model underestimated the published numbers in all three measures (nominal value, real value, and price index).







The first simulation missed the nominal gross product by -1.52 percent in 2003 and -3.02 percent in 2004. The second simulation missed the same numbers by -0.72 percent and -4.51 percent in 2003 and 2004, respectively.

The first simulation missed the real gross output of the services industries by -0.72 percent in 2003 and -1.51 percent in 2004. The second simulation missed the same real values by -0.64 percent and -3.25 percent in 2003 and 2004, respectively. For the price index, the first simulation underestimated by -0.81 percent in 2003 and -1.53

percent in 2004 while the second simulation missed by -0.09 percent and -1.31 percent in 2003 and 2004, respectively.

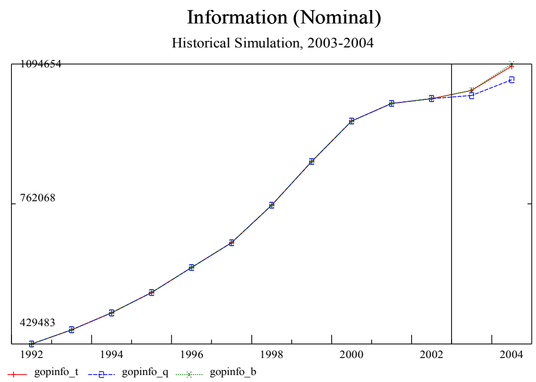
Information

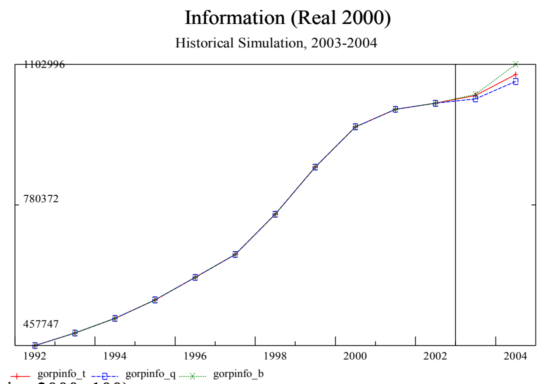
Information is one of the industry groups that has increased its share to the total GDP in the last decade as both information processing services and software publishing industry are included in this group. The model did quite well in estimating the nominal and real gross output of this industry.

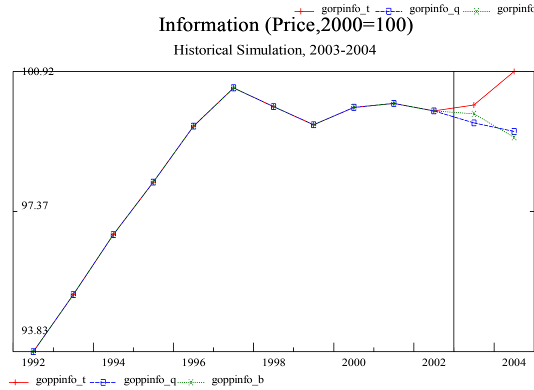
The first simulation missed the published nominal gross output of information industry by 0.03 percent in 2003 and -0.54 percent in 2004. The second simulation missed the same nominal values by -1.22 percent and -3.46 percent in 2003 and 2004, respectively.

For the real side, the first simulation missed the real numbers by -0.20 percent in 2003 and -2.19 percent in 2004. The second simulation missed the same numbers by -1.00 percent and -3.60 percent in 2003 and 2004, respectively.

The first simulation missed the price index by 0.23 percent in 2003 and 1.69 percent in 2004. The second simulation missed the same price index by -0.22 percent and 0.15 percent in 2003 and 2004, respectively.

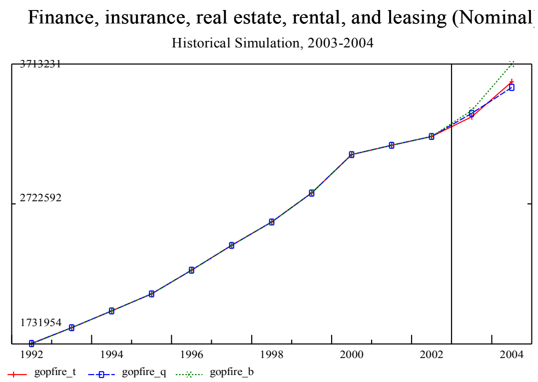


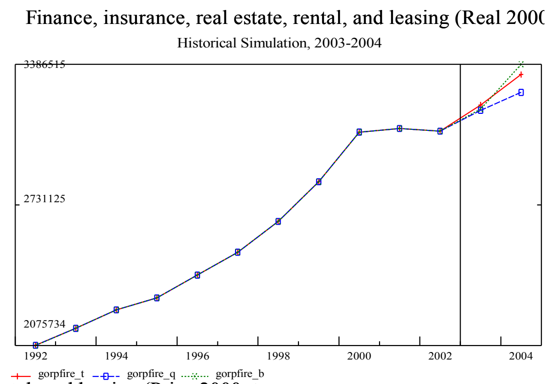


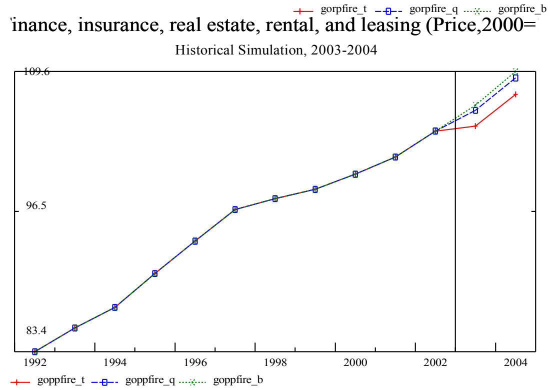


Finance, insurance, real estate, rental, and leasing

As discussed earlier, Finance, insurance, real estate, rental and leasing industries are the top contributors to the services-producing industry. The BEA published the nominal gross output of this industry at 3,383 billion dollars and 3,713 billion dollars in 2003 and 2004, respectively. The first simulation missed the published numbers by -1.25 percent and -3.41 percent in 2003 and 2004, respectively. The second simulation missed the same numbers by -0.62 percent in 2003 and -4.47 percent in 2004.







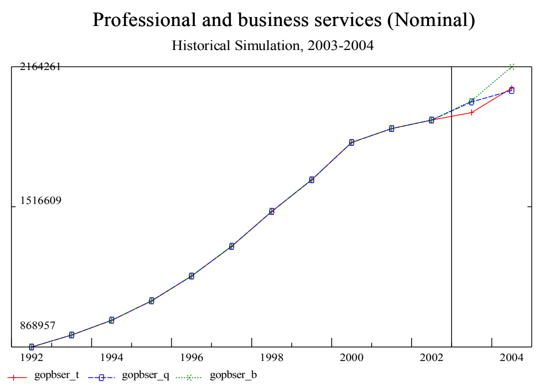
The first simulation missed the official real gross output figures by 0.61 percent in 2003 and -1.44 percent in 2004. The second simulation missed the same numbers by -0.18 percent in 2003 and -3.90 percent in 2004.

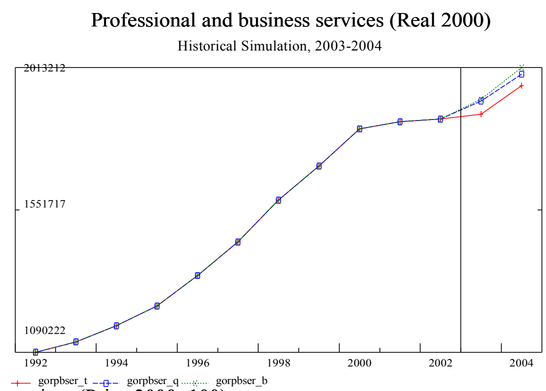
The official price index of Finance, insurance, real estate, rental and leasing industries are 106.46 in 2003 and 109.65 in 2004. The first simulation missed the published numbers by -1.84 percent in 2003 and -1.99 percent in 2004. The second simulation missed the same price index by -0.44 percent and -0.59 percent in 2003 and 2004, respectively.

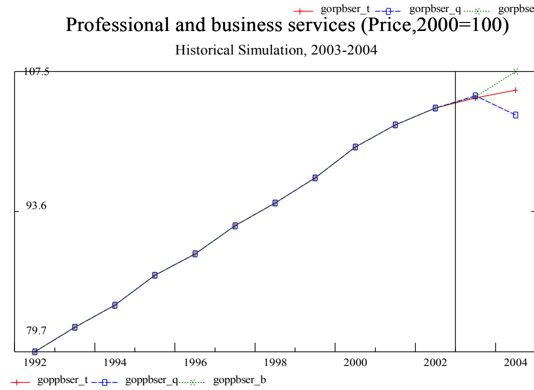
Professional and business services

The first simulation missed the published nominal numbers by -2.60 percent in 2003 and -4.63 percent in 2004. The second simulation, also, underestimated the same published numbers by -0.18 percent in 2003 and -5.07 percent in 2004.

On the real side, the first simulation underestimated the published numbers by -2.51 percent in 2003 and -2.92 percent in 2004. The second simulation missed the same official numbers by -0.27 percent and -1.09 percent in 2003 and 2004, respectively.



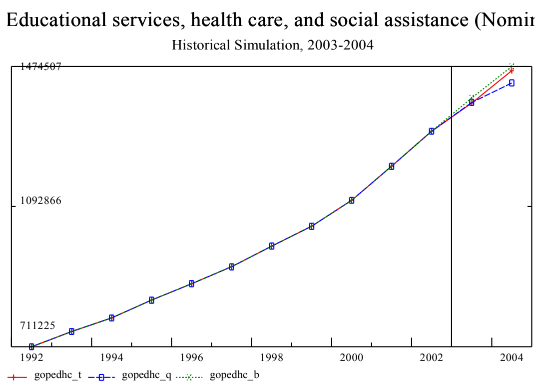


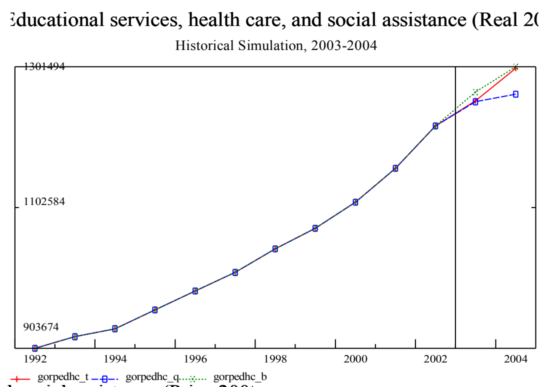


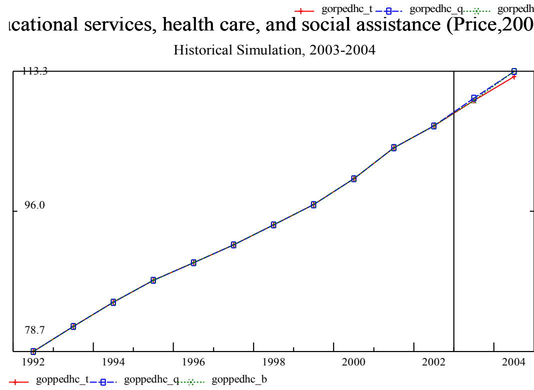
The first simulation missed the chained 2000 price index of this industry by -0.09 percent in 2003 and -1.76 percent in 2004. The second simulation missed the same official price index by 0.09 percent in 2003 and -4.02 percent in 2004.

Educational services, health care, and social assistance

BEA published nominal gross output of Educational services, health care and social assistance of 1,388 billion dollars in 2003 and 1,475 billion dollars in 2004. The first simulation missed the published numbers by -0.95 percent and -0.81 percent in 2003 and 2004, respectively. The second simulation missed the same official numbers by -0.83 percent in 2003 and -3.06 percent in 2004.







The first simulation missed the official chained 2000 real gross output of this industry by -0.94 percent in 2003 and -0.22 percent in 2004. The second simulation missed the same published numbers by -1.05 percent and -3.02 percent in 2003 and 2004, respectively.

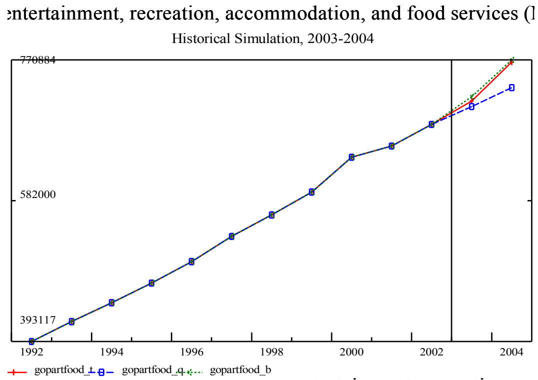
The chained 2000 price index of gross output is 109.69 in 2003 and 113.29 in 2004. The first simulation missed the official numbers by -0.02 percent in 2003 and -0.59 percent in 2004. The second simulation missed the same price index by 0.22 percent and -0.04 percent in 2003 and 2004, respectively.

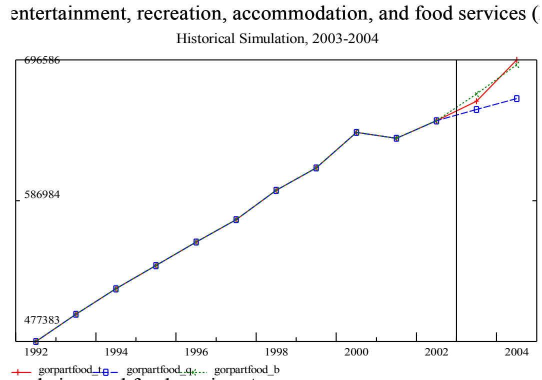
Arts, entertainment, recreation, accommodation, and food services

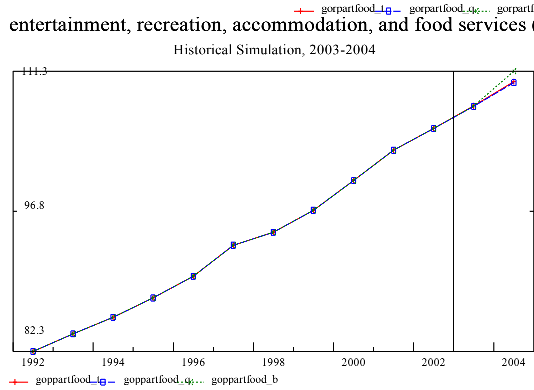
The first simulation missed the published nominal numbers by -0.80 percent and -0.42 percent in 2003 and 2004, respectively. The second simulation missed the same official numbers by -1.84 percent in 2003 and -4.85 percent in 2004.

The first simulation missed the official chained 2000 real gross output of this industry by -0.86 percent in 2003 and 0.59 percent in 2004. The second simulation missed the same published numbers by -1.81 percent and -3.80 percent in 2003 and 2004, respectively.

The chained 2000 price index of gross output is 107.67 in 2003 and 111.32 in 2004. The first simulation missed the official numbers by 0.05 percent in 2003 and -1.00 percent in 2004. The second simulation missed the same price index by -0.03 percent and -1.09 percent in 2003 and 2004, respectively.







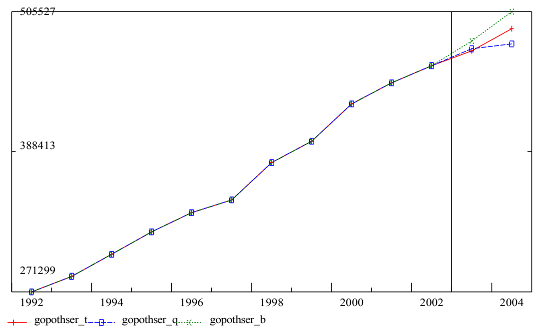
Other services, except government

The BEA published the nominal gross output of other services of 481 billion dollars and 506 billion dollars in 2003 and 2004, respectively. The first simulation missed the published numbers by -1.67 percent in 2003 and -2.88 percent in 2004. The second simulation, also, underestimated the same published numbers by -1.37 percent in 2003 and -5.36 percent in 2004.

For the real gross output, the first simulation underestimated the published numbers by -0.90 percent in 2003 and -0.91 percent in 2004. The second simulation missed the same official numbers by -1.57 percent and -5.32 percent in 2003 and 2004, respectively.

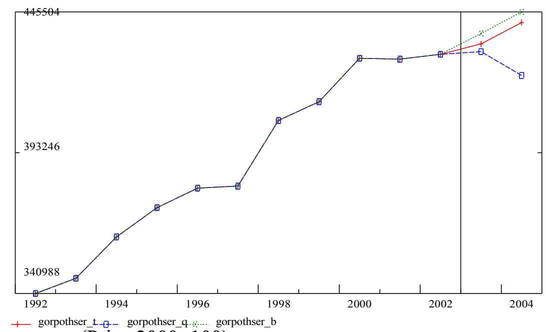
Other services, except government (Nominal)

Historical Simulation, 2003-2004



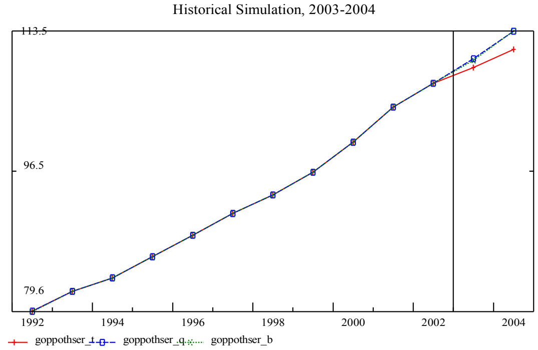
Other services, except government (Real 2000)

Historical Simulation, 2003-2004



Other services, except government (Price,2000=100)

Historical Simulation, 2003-2004



The first simulation missed the chained 2000 price index of this industry by -0.78 percent in 2003 and -1.99 percent in 2004. The second simulation missed the same official price index by 0.20 percent in 2003 and -0.04 percent in 2004.

Government

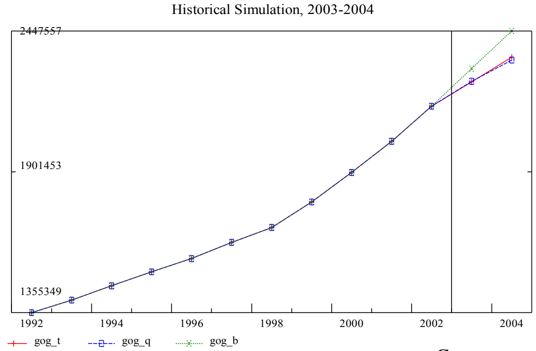
BEA published nominal gross output of Government of 2,300 billion dollars in 2003 and 2,448 billion dollars in 2004. The first simulation missed the published numbers by -2.20 percent and -4.17 percent in 2003 and 2004, respectively. The second simulation missed the same official numbers by -2.14 percent in 2003 and -4.65 percent in 2004.

The first simulation missed the official chained 2000 real gross output of this industry by -0.34 percent in 2003 and -1.58 percent in 2004. The second simulation missed the same published numbers by -0.88 percent and -1.79 percent in 2003 and 2004, respectively.

The chained 2000 price index of gross output is 111.04 in 2003 and 116.17 in 2004. The first simulation missed the official numbers by -1.87 percent in 2003 and -2.63 percent in 2004. The second simulation missed the same price index by -1.27 percent and -2.91 percent in 2003 and 2004, respectively.

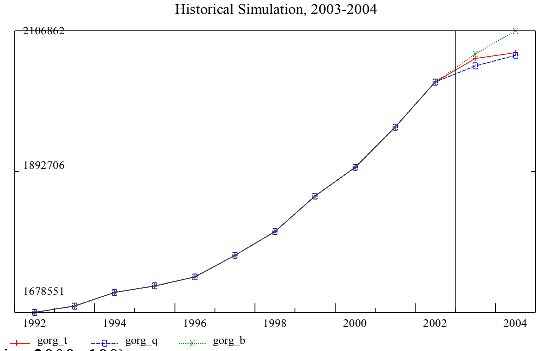
Government (Nominal)

Historical Simulation, 2003-2004



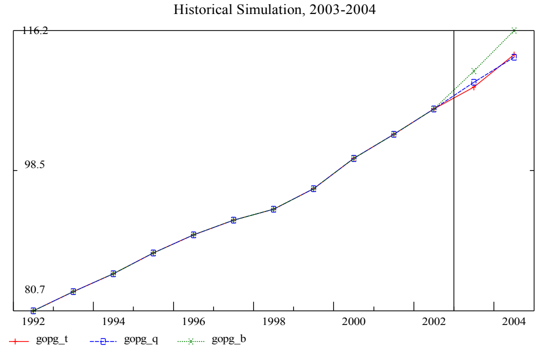
Government (Real 2000)

Historical Simulation, 2003-2004



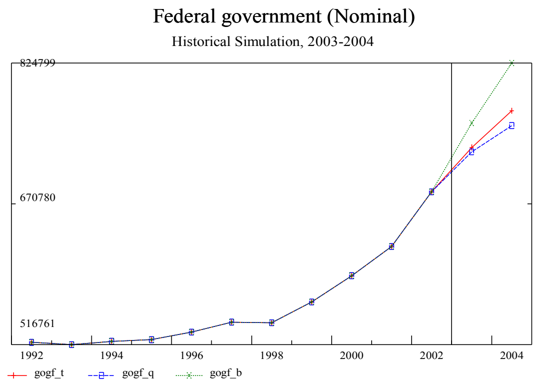
Government (Price,2000=100)

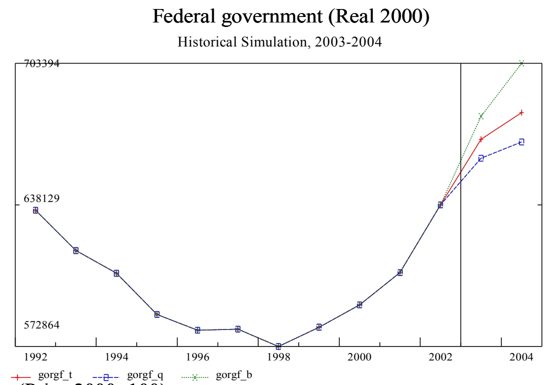
Historical Simulation, 2003-2004

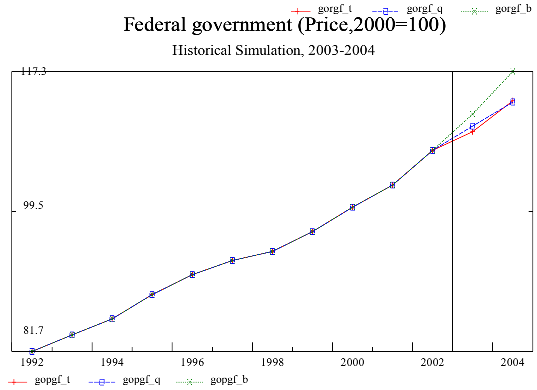


Federal government

For the nominal gross output, the first simulation estimates gave errors of -3.51 percent in 2003 and -6.34 percent in 2004. The second simulation missed the published numbers by -4.15 percent and -8.32 percent in 2003 and 2004, respectively.







On the real side, the first simulation missed it by -1.56 percent and -3.24 percent in 2003 and 2004, respectively. The second simulation missed the same numbers by -2.86 percent in 2003 and -5.16 percent in 2004.

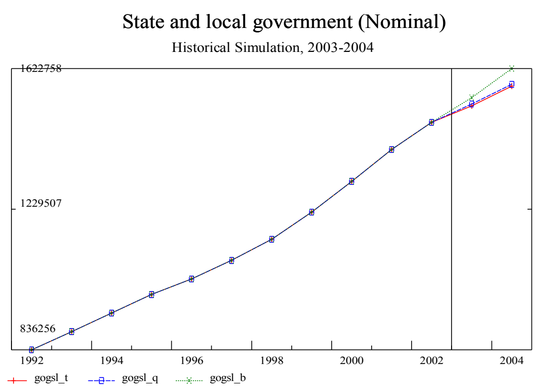
The first simulation missed the official price index by -1.98 percent in 2003 and -3.20 percent in 2004. The second simulation missed the same price index by -1.33 percent and -3.33 percent in 2003 and 2004, respectively.

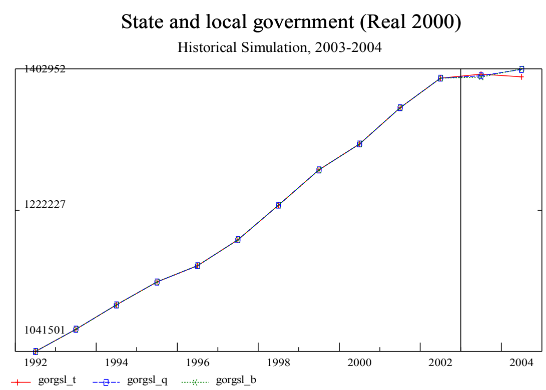
With the increasing federal government spending in 2003 and 2004, due to the "War on Terrorism", this may explain the increase spending per government workers which reflect in both real gross output and the price index.

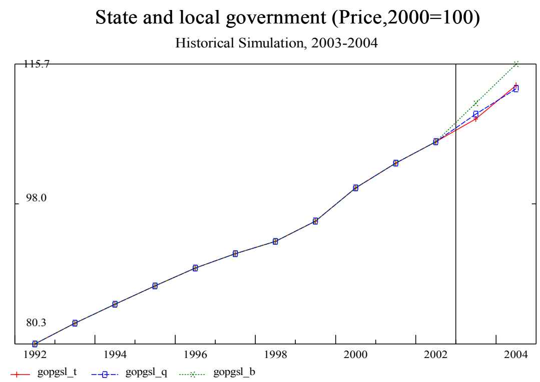
State and local government

The BEA published the nominal gross output of State and local government of 1,541 billion dollars and 1,623 billion dollars in 2003 and 2004, respectively. The first simulation missed the published numbers by -1.56 percent in 2003 and -3.06 percent in 2004. The second simulation, also, underestimated the same published numbers by -1.15 percent in 2003 and -2.79 percent in 2004.

The published chained 2000 real gross output of this industry is 1,392 billion dollars and 1,403 billion dollars in 2003 and 2004, respectively. The first simulation missed the published numbers by 0.26 percent in 2003 and -0.74 percent in 2004. The second simulation missed the same official numbers by -0.10 percent and -0.08 percent in 2003 and 2004, respectively.







The first simulation missed the chained 2000 price index of this industry by -1.81 percent in 2003 and -2.35 percent in 2004. The second simulation missed the same official price index by -1.25 percent in 2003 and -2.71 percent in 2004.

6.4 Forecast of Gross Output between 2006-2008

In this section, I applied the earlier discussed method to forecast the annual gross output by detailed industry from 2006 to 2008. The discussion of the Gross output forecast is presented by Major industry groups, as previously shown in Section 6.3. The detailed forecast is shown in Appendix 6.6.

Forecast assumptions

This approach requires 19 exogenous inputs of monthly variables. All of the exogenous inputs except crude oil price (*oilpm*) and trade weighted exchange rate index (*exrim*) are provided by QUEST, where we do not have official numbers (July 2007 to December 2008). *oilpm* and *exrim* are generated by ad hoc outlook of the economy from the author's opinion.

Table 6.6: Assumptions of Exogenous Variables Used in Forecasting Gross Output

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
exrim												
2006	105.03	104.67	104.31	103.96	103.60	103.25	102.90	102.55	102.20	101.86	101.51	101.16
2007	100.82	100.48	100.14	99.80	99.46	99.12	98.78	98.44	98.11	97.78	97.44	97.11
2008	96.78	96.45	96.13	95.80	95.47	95.15	94.82	94.50	94.18	93.86	93.54	93.22
oilpm												
2006	52.75	53.80	54.88	55.97	57.09	58.24	59.40	60.59	61.80	63.04	64.30	65.58
2007	66.89	68.23	69.60	70.99	72.41	73.86	75.33	76.84	78.38	79.94	81.54	83.17
2008	84.84	86.53	88.27	90.03	91.83	93.67	95.54	97.45	99.40	101.39	103.42	105.49
mnipaqmv												
2006	429.57	433.38	435.14	431.11	431.55	432.74	436.94	437.92	437.94	433.88	434.34	436.18
2007	443.15	444.97	445.38	444.38	441.97	438.15	441.47	443.65	445.93	448.81	450.89	452.70
2008	454.34	455.48	456.24	455.45	456.34	457.74	460.12	462.19	464.44	466.84	469.42	472.16
mnipaqfur												
2006	398.01	401.04	402.75	401.09	401.72	402.59	403.91	405.08	406.31	407.51	408.95	410.54
2007	413.19	414.38	415.03	415.13	414.68	413.69	410.38	409.10	408.35	408.71	408.53	408.41
2008	408.51	408.40	408.23	407.90	407.71	407.54	407.40	407.29	407.21	407.17	407.16	407.18
mnipaqdoth												
2006	208.15	209.54	210.21	208.94	209.13	209.54	210.50	211.11	211.70	212.11	212.77	213.51
2007	214.32	215.26	216.32	217.49	218.76	220.15	220.98	221.76	222.47	223.10	223.65	224.12
2008	224.47	224.82	225.13	225.04	225.52	226.22	227.42	228.34	229.27	230.20	231.14	232.09
mnipaqfood												
2006	1,230.81	1,236.89	1,241.51	1,241.58	1,245.61	1,250.51	1,255.77	1,262.78	1,271.04	1,283.39	1,292.00	1,299.72
2007	1,306.85	1,312.57	1,317.18	1,320.68	1,323.07	1,324.35	1,332.60	1,338.68	1,344.39	1,349.85	1,354.74	1,359.18
2008	1,363.00	1,366.65	1,369.97	1,371.51	1,375.24	1,379.72	1,385.76	1,391.11	1,396.59	1,402.20	1,407.93	1,413.79
mnipaqcloth												
2006	350.27	351.27	352.37	353.54	354.86	356.30	358.20	359.64	360.96	361.36	363.04	365.20
2007	370.02	371.49	371.79	370.92	368.89	365.69	367.49	368.26	368.92	369.37	369.91	370.43
2008	371.07	371.46	371.73	371.43	371.81	372.40	373.45	374.30	375.20	376.14	377.13	378.16
mnipaqgas												
2006	312.82	315.89	324.99	353.44	364.62	371.84	381.18	375.94	362.18	316.51	303.29	299.11
2007	310.23	319.45	333.03	350.96	373.25	399.89	382.89	378.34	374.58	371.47	369.38	368.16
2008	364.04	367.43	374.53	397.60	402.96	402.87	391.23	384.77	377.42	369.18	360.03	349.99
mnipaqnoth												
2006	712.21	716.71	720.88	724.73	728.21	731.36	733.79	736.52	739.19	741.26	744.19	747.46
2007	752.70	755.40	757.20	758.10	758.10	757.20	763.58	767.97	772.18	776.28	780.09	783.70
2008	786.98	790.22	793.33	795.49	798.91	802.79	807.62	812.06	816.60	821.24	825.97	830.80
mnipaqhous												
2006	1,340.46	1,347.71	1,355.23	1,363.62	1,371.17	1,378.52	1,385.37	1,392.50	1,399.63	1,406.80	1,413.91	1,421.00
2007	1,428.17	1,435.13	1,442.00	1,448.77	1,455.43	1,462.00	1,469.15	1,476.72	1,484.56	1,493.61	1,501.30	1,508.56
2008	1,515.53	1,521.83	1,527.60	1,530.98	1,537.07	1,544.01	1,552.57	1,560.64	1,568.98	1,577.59	1,586.48	1,595.64
mnipaqho												
2006	497.72	496.62	496.06	495.74	496.45	497.91	501.13	503.31	505.46	506.99	509.56	512.56
2007	517.34	520.19	522.47	524.17	525.29	525.84	529.52	532.37	535.06	537.58	539.91	542.06
2008	543.96	545.80	547.51	548.53	550.42	552.61	555.44	557.99	560.59	563.25	565.96	568.73
mnipaqtr												
2006	333.47	334.70	335.93	337.11	338.39	339.71	341.10	342.49	343.90	345.59	346.86	347.96
2007	348.33	349.51	350.96	352.66	354.61	356.83	358.66	360.48	362.29	364.27	365.93	367.44
2008	368.79	370.02	371.11	371.61	372.78	374.16	375.96	377.59	379.28	381.01	382.79	384.63
mnipaqmc												
2006	1,550.94	1,558.42	1,565.54	1,572.25	1,578.70	1,584.85	1,589.63	1,595.94	1,602.73	1,608.09	1,617.26	1,628.35
2007	1,646.69	1,657.60	1,666.42	1,673.15	1,677.80	1,680.35	1,695.79	1,707.86	1,719.72	1,731.92	1,742.92	1,753.30
2008	1,762.98	1,772.12	1,780.68	1,786.60	1,795.51	1,805.37	1,817.03	1,828.15	1,839.58	1,851.32	1,863.36	1,875.71
mnipaqrec												
2006	369.57	371.10	372.63	373.56	375.55	377.99	381.54	384.41	387.24	390.87	393.02	394.51
2007	394.41	395.29	396.21	397.17	398.19	399.24	400.86	402.84	405.00	407.63	409.97	412.31
2008	414.77	416.98	419.07	420.59	422.80	425.23	428.08	430.81	433.62	436.50	439.46	442.49
mnipaqsoth												
2006	1,253.73	1,261.13	1,269.33	1,281.61	1,288.95	1,294.64	1,293.79	1,299.83	1,307.89	1,322.23	1,331.10	1,338.77
2007	1,344.24	1,350.25	1,355.81	1,360.91	1,365.55	1,369.74	1,382.12	1,391.27	1,399.94	1,408.39	1,415.88	1,422.69
2008	1,428.23	1,434.11	1,439.75	1,443.65	1,449.92	1,457.07	1,466.19	1,474.27	1,482.40	1,490.59	1,498.84	1,507.14
mnipaqvnrs												
2006	367.68	375.67	383.75	393.31	400.52	406.77	411.33	416.23	420.73	424.46	428.44	432.30
2007	433.70	439.06	446.04	454.64	464.86	476.70	477.19	480.35	483.62	487.25	490.58	493.84
2008	497.07	500.16	503.17	507.45	509.23	509.89	507.07	507.25	508.07	509.52	511.62	514.35
mnipaqvnre												
2006	986.01	992.88	996.21	990.03	990.78	992.49	999.16	999.78	998.36	990.17	988.20	987.73
2007	989.46	991.47	994.46	998.43	1,003.37	1,009.30	1,010.51	1,012.69	1,014.90	1,017.67	1,019.52	1,020.99
2008	1,022.03	1,022.79	1,023.20	1,021.71	1,022.62	1,024.36	1,028.13	1,030.65	1,033.11	1,035.51	1,037.86	1,040.15
mnipaqvfr												
2006	811.36	810.42	806.42	798.36	788.97	777.26	758.46	745.68	734.16	725.12	715.19	705.59
2007	695.76	687.25	679.49	672.49	666.25	660.76	651.66	646.43	642.96	643.93	642.01	639.87
2008	636.99	634.79	632.75	630.09	628.97	628.60	630.68	630.53	629.85	628.64	626.90	624.64
mgdp												
2006	12,888.41	12,967.14	13,038.24	13,103.17	13,157.90	13,203.93	13,227.60	13,266.39	13,306.70	13,345.44	13,391.02	13,440.43
2007	13,489.34	13,549.54	13,616.81	13,691.07	13,772.35	13,860.67	13,896.12	13,945.47	13,996.15	14,049.64	14,101.82	14,154.22
2008	14,206.81	14,259.58	14,312.56	14,364.16	14,418.70	14,474.66	14,534.06	14,591.19	14,648.18	14,704.98	14,761.61	14,818.06

Table 6.6 shows all values of the exogenous variables used in this forecast.

Outlook of Gross Output by Industries

Table 6.7 shows the forecasted values and their growth rates of Gross output by industry groups from 2006 to 2008 of nominal value, real 2000 value, and price indexes. Figure 6.1 shows plots of these forecasts by industry groups.

Overall, real total Gross output is expected to grow steadily at the average rate of 3.5% annually during 2006-2008. Most of this growth is coming from the growth in Gross output of Private industries which grows at an average rate of 4.41% in real terms between 2006 and 2008. The Gross output of Government is expected to decline significantly in 2007 and 2008 in real terms as the increasing price index crowds out the growth of government nominal gross output. In real terms, the government gross output will decline by -2.8% and -3.41% in 2007 and 2008, respectively.

Among industry groups, the industries that exhibit strong positive growth between 2006 and 2008 are Service industries, Wholesale trade, Retail trade, and Mining industry. Other industry groups grow at a much lower rate, especially in 2007 and 2008.

Table 6.7: Outlook of Gross output by Industry Groups, 2006-2008

Gross output

Forecast real 2000 (Million of Dollars)	2005	2006	2007	2008	05-06	06-07	07-08
Total Gross Output	20,058,940	20,900,634	21,639,600	22,368,236	4.20%	3.54%	3.37%
Private industries	17,937,770	18,780,048	19,593,794	20,415,080	4.70%	4.33%	4.19%
Total Services industries (40-61)	8,266,276	8,593,869	9,041,576	9,516,695	3.96%	5.21%	5.25%
Agriculture, forestry, fishing, and hunting	271,988	275,967	278,746	282,101	1.46%	1.01%	1.20%
Mining	215,154	234,499	242,825	249,499	8.99%	3.55%	2.75%
Utilities	308,632	326,804	325,695	336,083	5.89%	-0.34%	3.19%
Construction	935,694	974,130	973,468	981,431	4.11%	-0.07%	0.82%
Manufacturing	4,041,547	4,163,015	4,272,347	4,371,470	3.01%	2.63%	2.32%
Durable goods manufacturing	2,320,544	2,474,611	2,530,347	2,587,441	6.64%	2.25%	2.26%
Nondurable goods manufacturing	1,731,693	1,715,345	1,767,631	1,809,873	-0.94%	3.05%	2.39%
Wholesale trade	972,399	1,085,999	1,182,849	1,284,355	11.68%	8.92%	8.58%
Retail trade	1,225,873	1,314,233	1,388,841	1,460,585	7.21%	5.68%	5.17%
Transportation and warehousing	633,736	650,313	673,491	695,050	2.62%	3.56%	3.20%
Information	1,184,287	1,284,127	1,355,553	1,387,912	8.43%	5.56%	2.39%
Finance, insurance, real estate, rental, and leasing	3,549,877	3,723,020	3,944,919	4,173,934	4.88%	5.96%	5.81%
Professional and business services	2,100,988	2,188,728	2,298,667	2,418,824	4.18%	5.02%	5.23%
Educational services, health care, and social assistance	1,348,384	1,390,250	1,457,779	1,541,394	3.10%	4.86%	5.74%
Arts, entertainment, recreation, accommodation, and food services	707,874	738,169	768,446	791,797	4.28%	4.10%	3.04%
Other services, except government	444,704	439,733	455,239	473,153	-1.12%	3.53%	3.94%
Government	2,125,267	2,132,010	2,072,299	2,001,617	0.32%	-2.80%	-3.41%
Federal government	710,359	715,079	695,107	669,418	0.66%	-2.79%	-3.70%
State and local government	1,414,380	1,416,386	1,376,662	1,331,714	0.14%	-2.80%	-3.26%

Forecast nominal (Million of dollars)	2005	2006	2007	2008	05-06	06-07	07-08
Total Gross Output	22,857,144	24,510,822	26,289,532	28,128,810	7.23%	7.26%	7.00%
Private industries	20,256,014	21,811,932	23,489,066	25,227,638	7.68%	7.69%	7.40%
Total Services industries (40-61)	9,343,153	9,987,533	10,784,158	11,650,302	6.90%	7.98%	8.03%
Agriculture, forestry, fishing, and hunting	312,372	327,810	356,912	364,944	4.94%	8.88%	2.25%
Mining	396,278	457,485	515,217	593,814	15.45%	12.62%	15.26%
Utilities	409,979	455,648	474,331	529,597	11.14%	4.10%	11.65%
Construction	1,174,995	1,252,784	1,360,278	1,501,666	6.62%	8.58%	10.39%
Manufacturing	4,501,822	4,786,128	5,067,578	5,302,899	6.32%	5.88%	4.64%
Durable goods manufacturing	2,364,127	2,561,733	2,656,236	2,760,741	8.36%	3.69%	3.93%
Nondurable goods manufacturing	2,137,695	2,224,395	2,411,341	2,542,159	4.06%	8.40%	5.43%
Wholesale trade	1,073,587	1,237,017	1,427,440	1,588,718	15.22%	15.39%	11.30%
Retail trade	1,288,716	1,406,178	1,510,383	1,626,061	9.11%	7.41%	7.66%
Transportation and warehousing	712,142	777,285	821,052	883,809	9.15%	5.63%	7.64%
Information	1,161,134	1,247,692	1,300,356	1,315,753	7.45%	4.22%	1.18%
Finance, insurance, real estate, rental, and leasing	3,990,862	4,282,525	4,634,455	5,028,573	7.31%	8.22%	8.50%
Professional and business services	2,318,478	2,521,346	2,745,371	2,967,522	8.75%	8.89%	8.09%
Educational services, health care, and social assistance	1,578,006	1,667,520	1,801,734	1,961,808	5.67%	8.05%	8.88%
Arts, entertainment, recreation, accommodation, and food services	815,391	857,173	900,394	946,595	5.12%	5.04%	5.13%
Other services, except government	522,252	535,339	573,564	615,880	2.51%	7.14%	7.38%
Government	2,601,131	2,698,891	2,800,466	2,901,174	3.76%	3.76%	3.60%
Federal government	872,257	910,285	947,121	980,974	4.36%	4.05%	3.57%
State and local government	1,728,874	1,788,606	1,853,345	1,920,199	3.45%	3.62%	3.61%

Forecast price index (2000=100)	2005	2006	2007	2008	05-06	06-07	07-08
Total Gross Output	113.95	117.27	121.49	125.75	2.92%	3.59%	3.51%
Private industries	112.92	116.14	119.88	123.57	2.85%	3.22%	3.08%
Total Services industries (40-61)	113.03	116.22	119.27	122.42	2.82%	2.63%	2.64%
Agriculture, forestry, fishing, and hunting	114.85	118.79	128.04	129.37	3.43%	7.79%	1.03%
Mining	184.18	195.09	212.18	238.00	5.92%	8.76%	12.17%
Utilities	132.84	139.43	145.64	157.58	4.96%	4.45%	8.20%
Construction	125.57	128.61	139.74	153.01	2.41%	8.65%	9.50%
Manufacturing	111.39	114.97	118.61	121.31	3.21%	3.17%	2.27%
Durable goods manufacturing	101.88	103.52	104.98	106.70	1.61%	1.41%	1.64%
Nondurable goods manufacturing	123.45	129.68	136.42	140.46	5.05%	5.20%	2.96%
Wholesale trade	110.41	113.91	120.68	123.70	3.17%	5.95%	2.50%
Retail trade	105.13	107.00	108.75	111.33	1.78%	1.64%	2.37%
Transportation and warehousing	112.37	119.52	121.91	127.16	6.37%	2.00%	4.30%
Information	98.04	97.16	95.93	94.80	-0.90%	-1.27%	-1.18%
Finance, insurance, real estate, rental, and leasing	112.42	115.03	117.48	120.48	2.32%	2.13%	2.55%
Professional and business services	110.35	115.20	119.43	122.68	4.39%	3.68%	2.72%
Educational services, health care, and social assistance	117.03	119.94	123.59	127.27	2.49%	3.04%	2.98%
Arts, entertainment, recreation, accommodation, and food services	115.19	116.12	117.17	119.55	0.81%	0.90%	2.03%
Other services, except government	117.44	121.74	125.99	130.17	3.66%	3.49%	3.31%
Government	122.39	126.59	135.14	144.94	3.43%	6.75%	7.25%
Federal government	122.79	127.30	136.26	146.54	3.67%	7.04%	7.55%
State and local government	122.24	126.28	134.63	144.19	3.31%	6.61%	7.10%

Real Gross output of agriculture, forestry, fishing, and hunting is expected to grow by 1.46%, 1.01%, and 1.20% in 2006, 2007, and 2008, respectively. This growth rate of the real gross output is consistent with its long-term trend as shown in Figure 6.1. In 2007, nominal gross output of this industry will grow significantly by 8.88% as its price index rises by 7.79%.

Real Gross output of Mining industry grows by 8.99%, 3.55%, and 2.75% in 2006, 2007, and 2008, respectively. Surprisingly, Appendix 6.6 shows that the main contributor to this growth is coming from supporting activities for mining industry which has historically been the smallest components of the real gross output of mining industry. The price index of this industries' gross output is expected to rise significantly at rates of 8.76% in 2007 and 12.17% in 2008.

Since 2001, the real gross output of utilities has been slowly decreasing. In 2006, we expect to see a positive growth rate of utilities' real gross output of 5.89%. The real gross output will decline slightly in 2007 by -0.34% and will increase by 3.19% in 2008.

As the problem in sub-prime credit market persists, we expect the real gross output of construction industry will grow at the rate of -0.07% in 2007 and 0.82% in 2008.

Manufacturing industry group contributes on average of 20% to the nominal total gross output. We expect the real gross output of manufacturing industry to grow consistently between 2006 and 2007 at an average rate of 2.65% annually. In 2006, real gross output of durable manufacturing grows significantly by 6.64% while real gross output of nondurable manufacturing decline slightly by -0.94%. Both durable and nondurable manufacturing industries grow steadily in 2007 and 2008 at an average rate of around 2.5% annually. From Appendix 6.6, Computer and electronic products gross output grows by 21.5% in 2006 and will have significantly smaller growth rate in 2007 and 2008 of 11.03% and 3.74%, respectively. Also, the petroleum and coal products, which expected to have its real gross output reduced by -12.47% in 2006, will expand significantly in 2007 and 2008 with growth rates of 13.71% and 17.15%, respectively. Apparel and leather and allied products real gross output is expected to decline significantly in 2008 by -32.82%.

Real gross output of wholesale trade will have growth rates of 11.68%, 8.92%, and 8.58% in 2006, 2007, and 2008, respectively. This growth rate is slightly stronger than its average between 1993 and 2005.

Retail trade will keep growing consistently with its historical trend, as shown in Figure 6.1. The real gross output of this industry will grow at rates of 7.21% in 2006, 5.68% in 2007, and 5.17% in 2008.

Overall, the real gross output of service industries will grow by 3.96%, 5.21%, and 5.25% in 2006, 2007, and 2008, respectively. Most of this growth comes from the three biggest contributors to the service industry's nominal gross output; 1) Finance, insurance, real estate, rental, and leasing, 2) Professional and business services, and 3) Educational services, health care, and social assistance.

Finance, insurance, real estate, rental, and leasing is expected to see its real gross output grow by 4.88%, 5.96%, and 5.81% in 2006, 2007, and 2008, respectively. Federal Reserve banks, credit intermediation, and related activities will see significantly smaller growth in 2007 and 2008 of 2.36% and 1.94%, respectively as the problem in credit market persists.

Professional and business services industry's real gross output will grow by an average of 4.81% annually from 2006 to 2008. Among its components, Miscellaneous professional, scientific, and technical services, which is the biggest contributor to Professional and business services industry's real gross output, will grow the most with an average growth rate of 7.73% annually between 2006 and 2008. The real gross output of Management of companies and enterprises will decline slightly by -0.55% in 2006 but will grow rapidly in 2007 and 2008 at rates of 8.01% and 9.14%, respectively.

For Educational services, health care, and social assistance, the real gross output will grow by 3.10%, 4.86%, and 5.74% in 2006, 2007, and 2008, respectively. All of its components show steady positive growth rate consistent with their historical rate since 1993. Between the forecast period, Ambulatory health care services' real gross output has the highest average growth rate of 5.87% annually.

From Appendix 6.6, Performing arts, spectator sports, museums, and related activities' real gross output will be declining throughout the forecast period. This industries' real gross output will decline by -3.23% in 2006, -4.47% in 2007, and -1.16% in 2008.

Figure 6.1: Plots of Gross output by Industry Groups

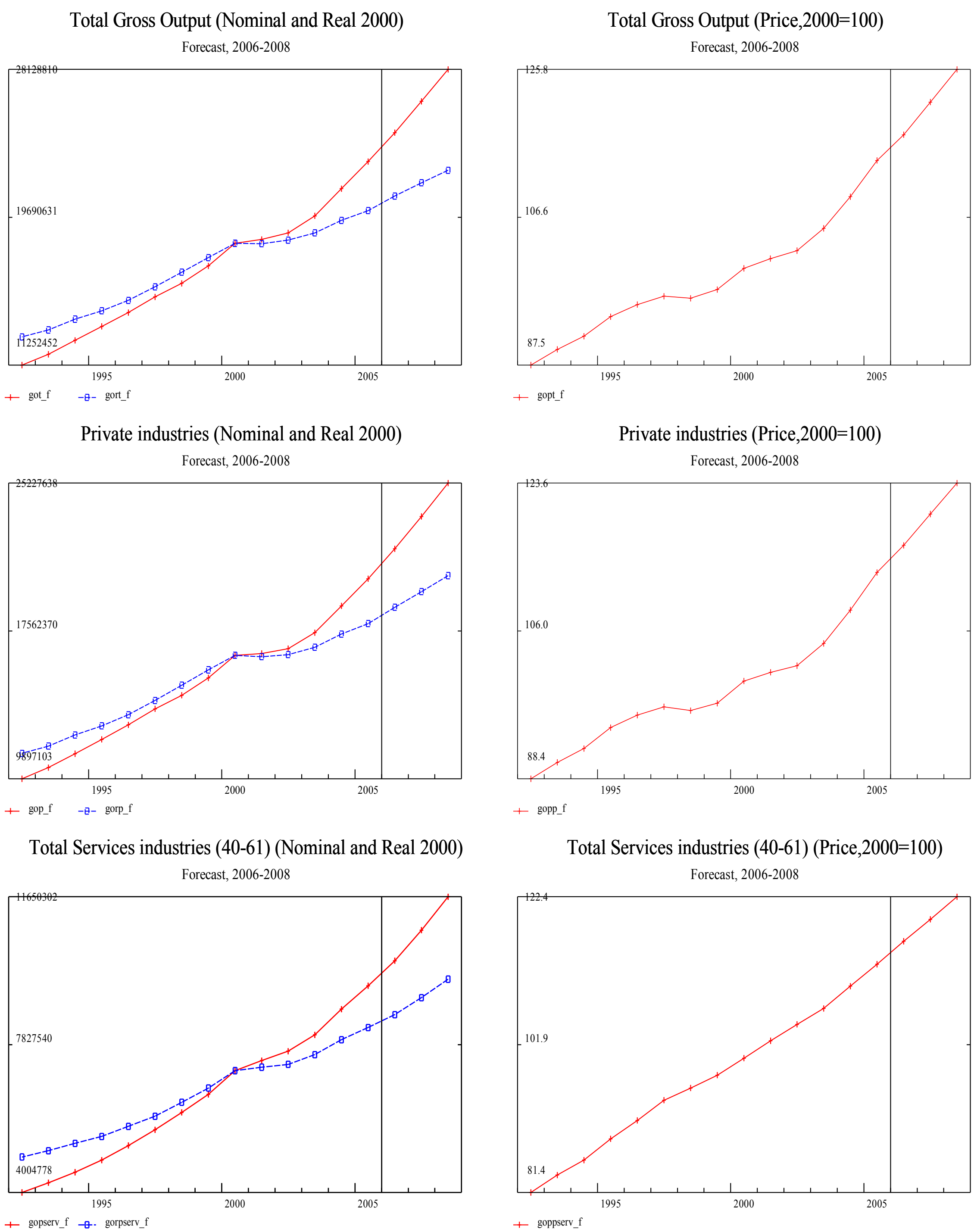


Figure 6.1 (cont.)

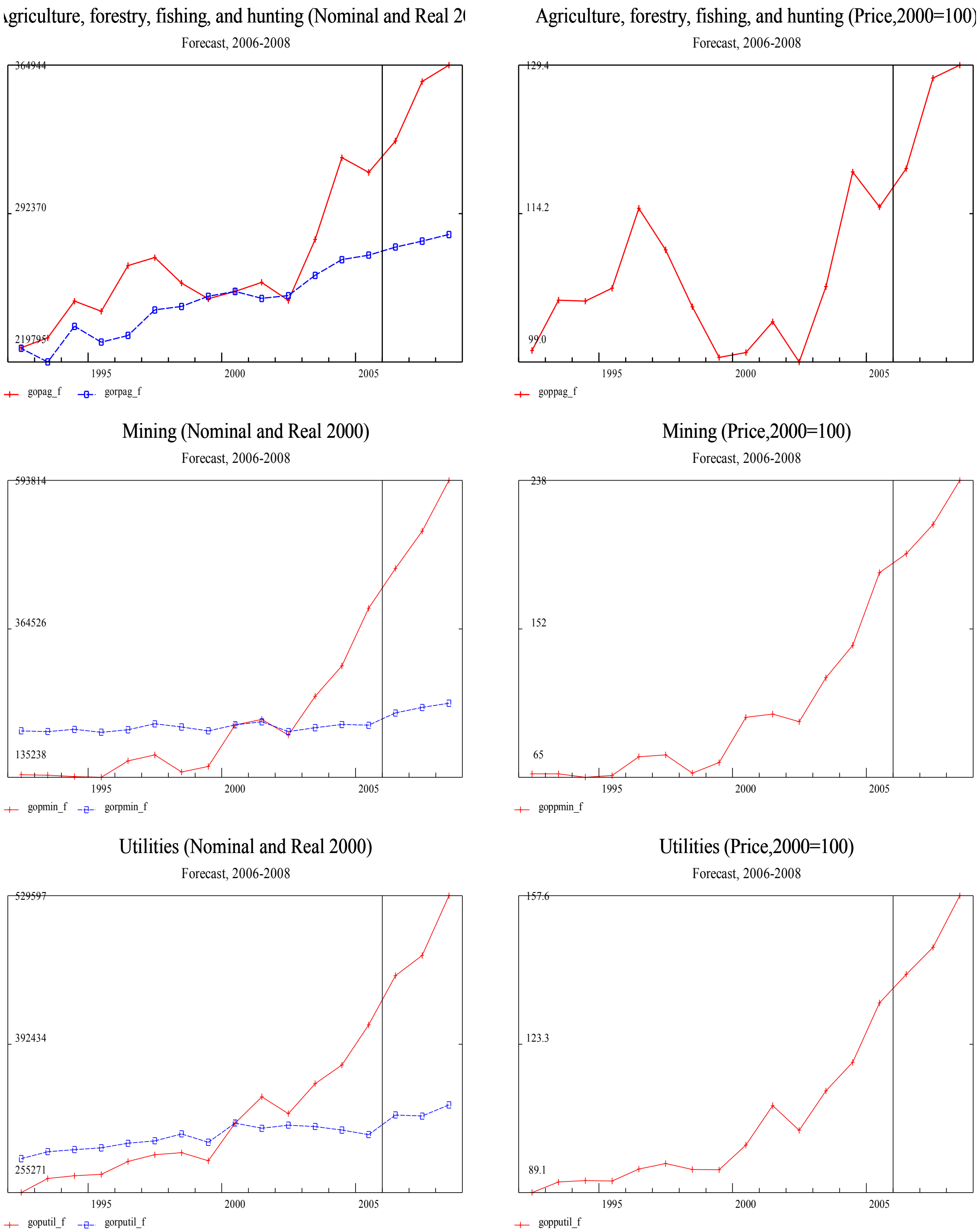


Figure 6.1 (cont.)

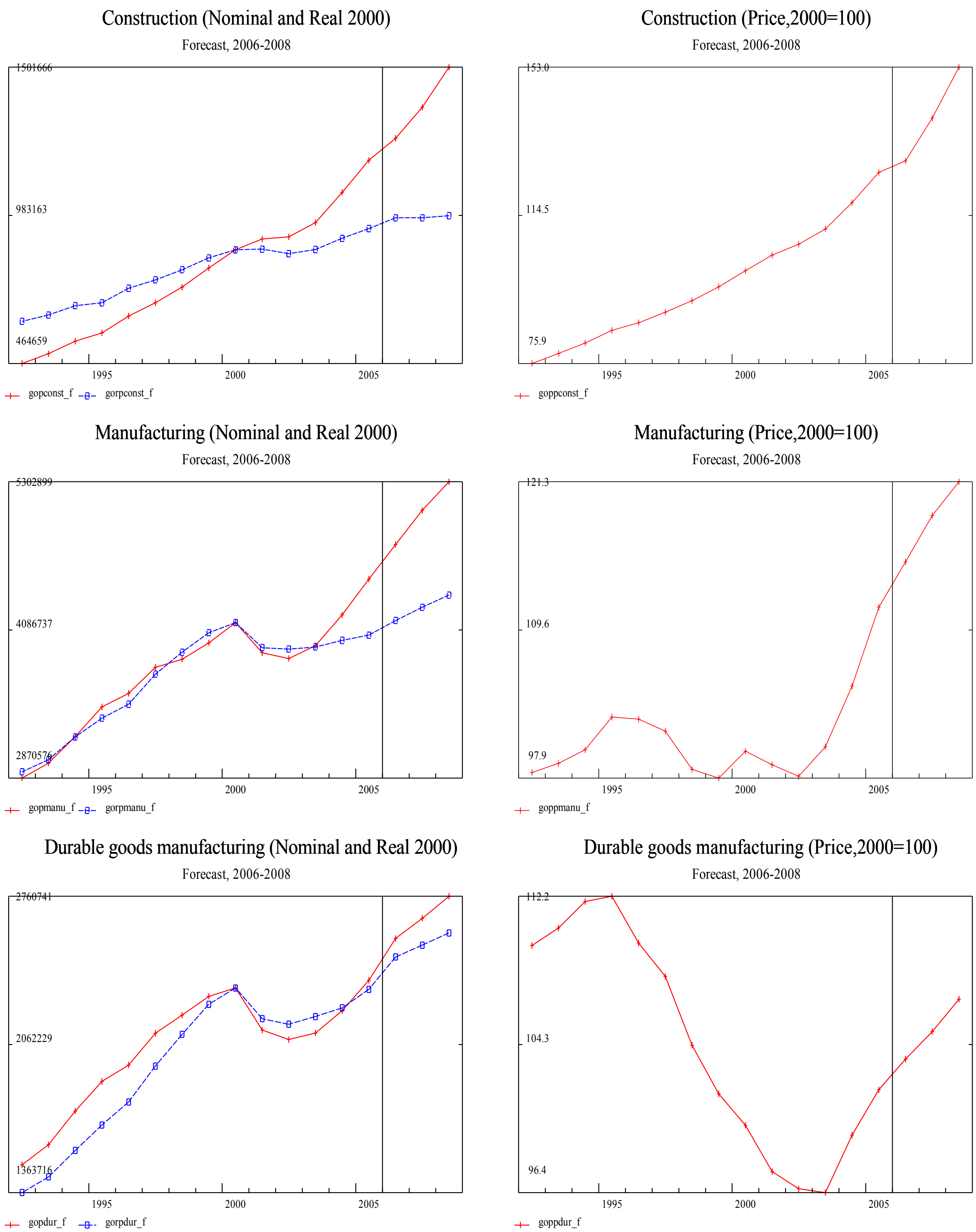
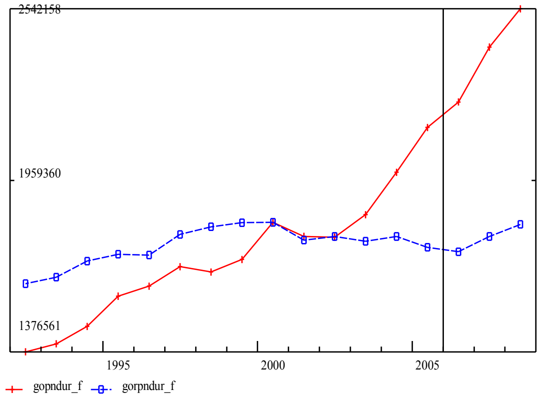


Figure 6.1 (cont.)

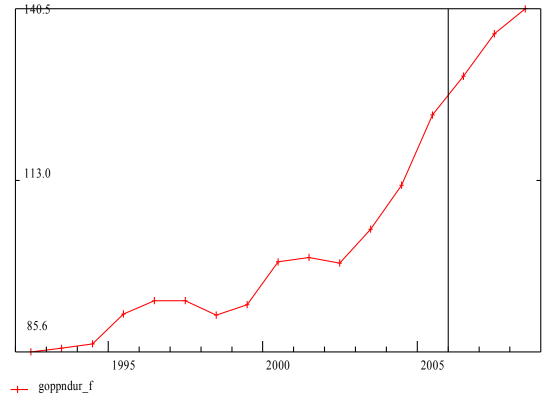
Nondurable goods manufacturing (Nominal and Real 2000

Forecast, 2006-2008



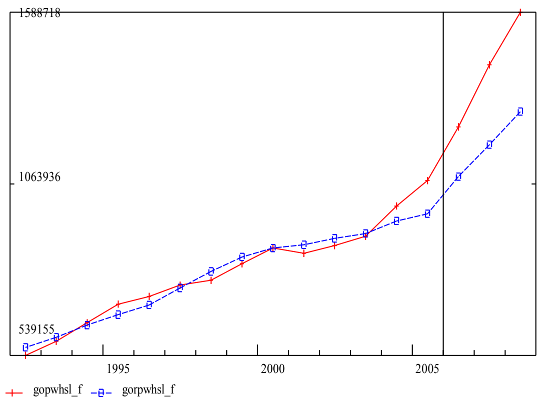
Nondurable goods manufacturing (Price,2000=100)

Forecast, 2006-2008



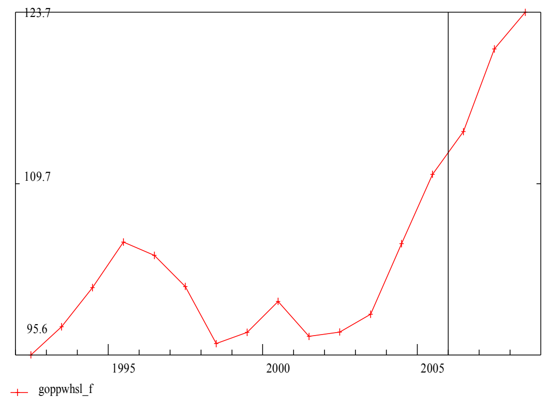
Wholesale trade (Nominal and Real 2000)

Forecast, 2006-2008



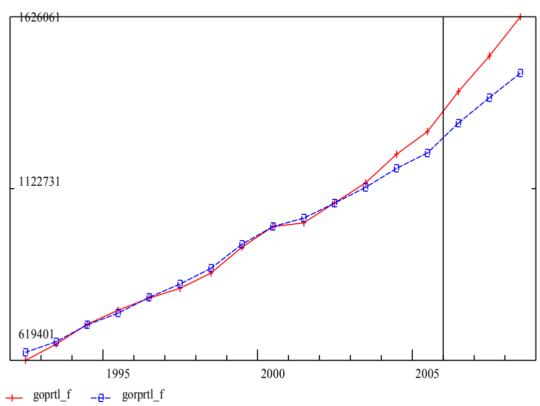
Wholesale trade (Price,2000=100)

Forecast, 2006-2008



Retail trade (Nominal and Real 2000)

Forecast, 2006-2008



Retail trade (Price,2000=100)

Forecast, 2006-2008

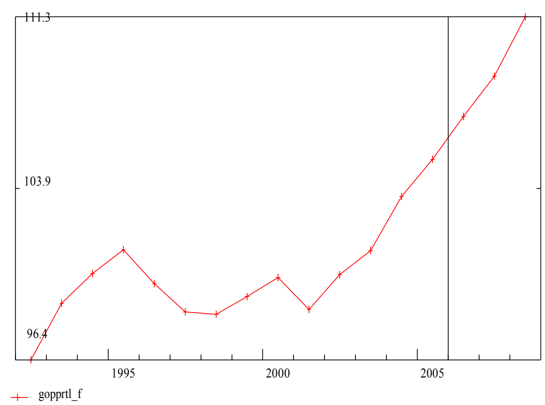


Figure 6.1 (cont.)

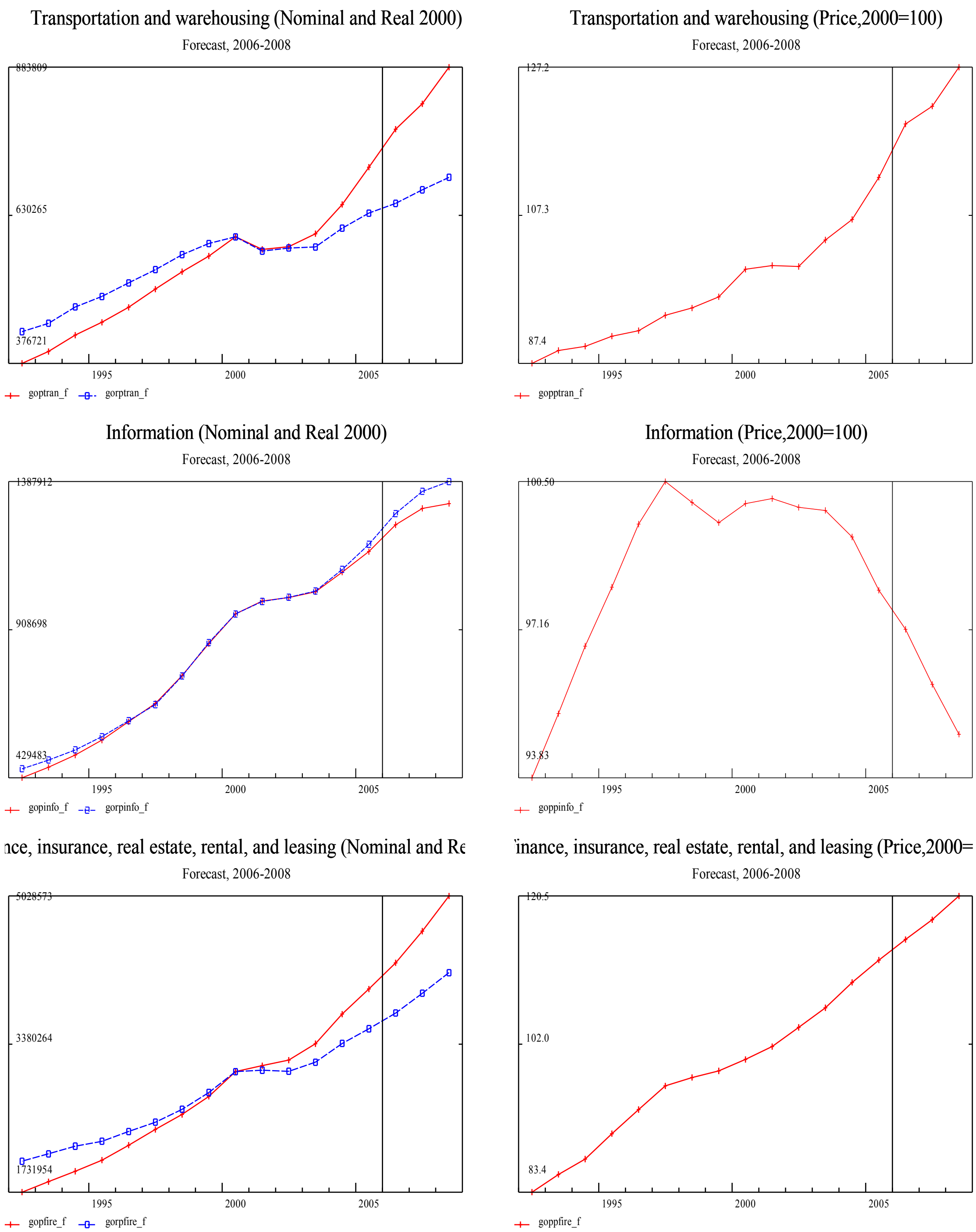
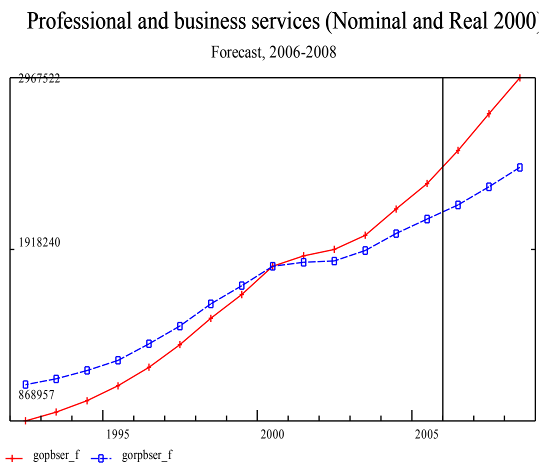
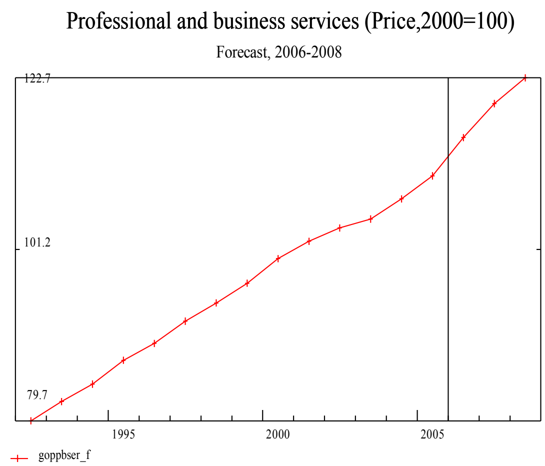
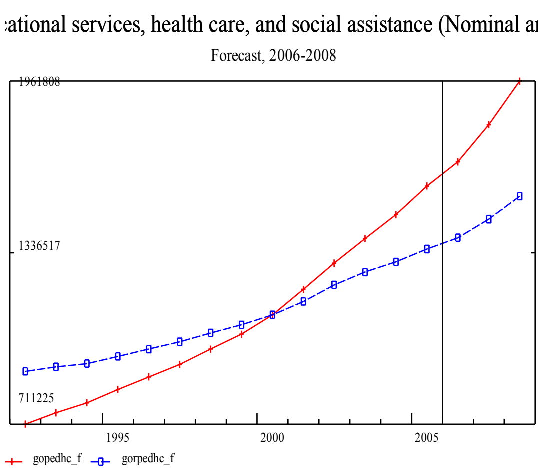
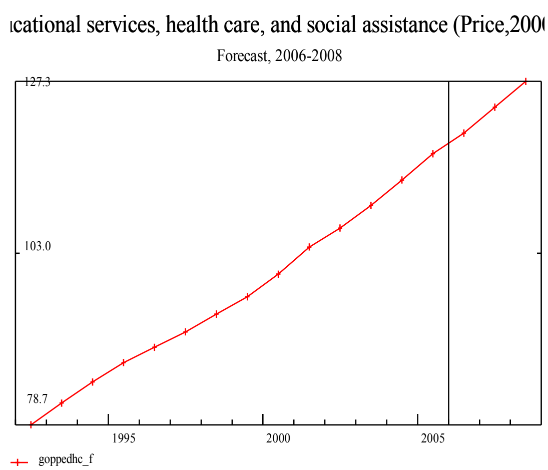


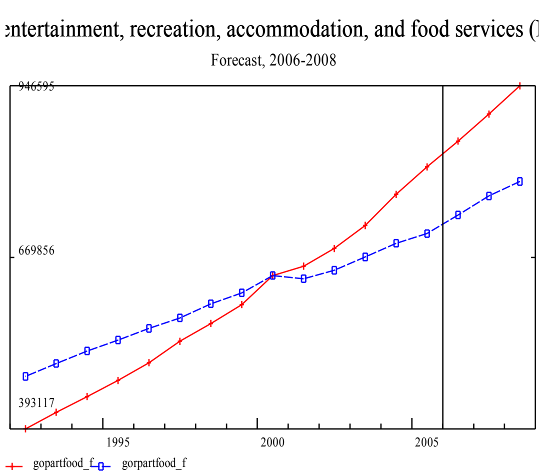
Figure 6.1 (cont.)











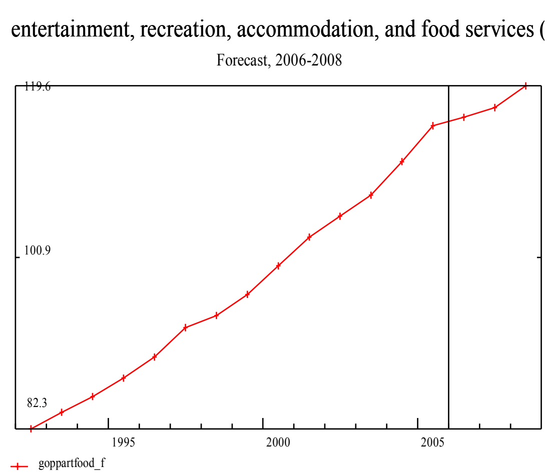
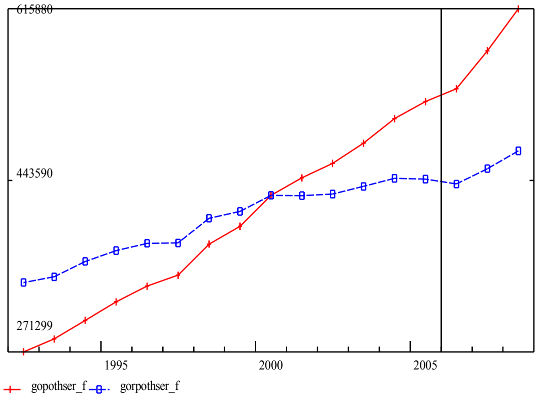


Figure 6.1 (cont.)

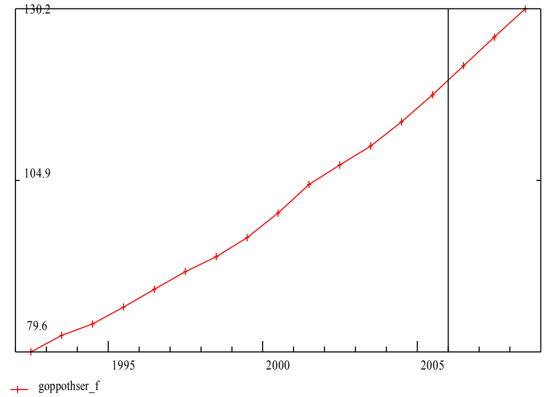
Other services, except government (Nominal and Real 2000

Forecast, 2006-2008



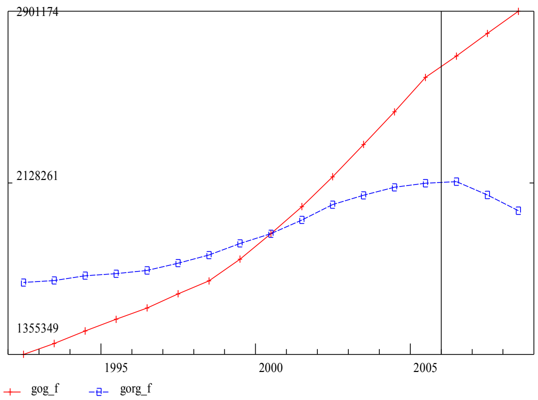
Other services, except government (Price,2000=100)

Forecast, 2006-2008



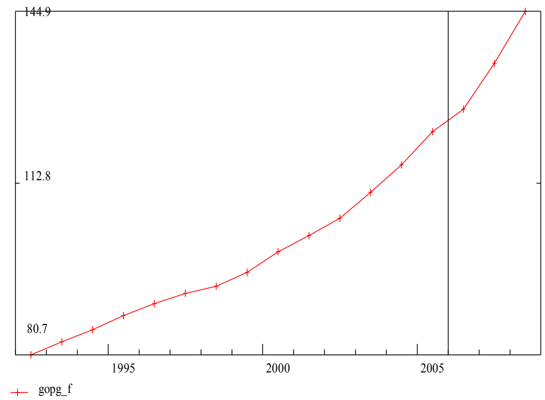
Government (Nominal and Real 2000)

Forecast, 2006-2008



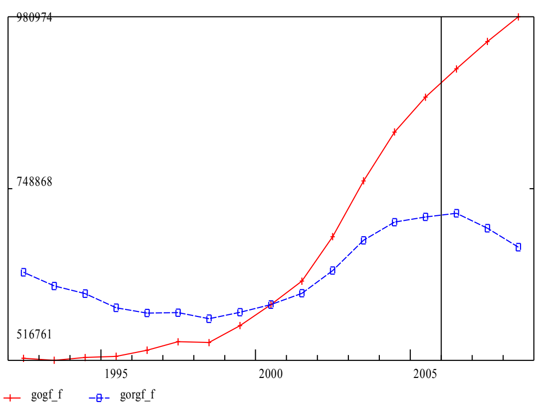
Government (Price,2000=100)

Forecast, 2006-2008



Federal government (Nominal and Real 2000)

Forecast, 2006-2008



Federal government (Price,2000=100)

Forecast, 2006-2008

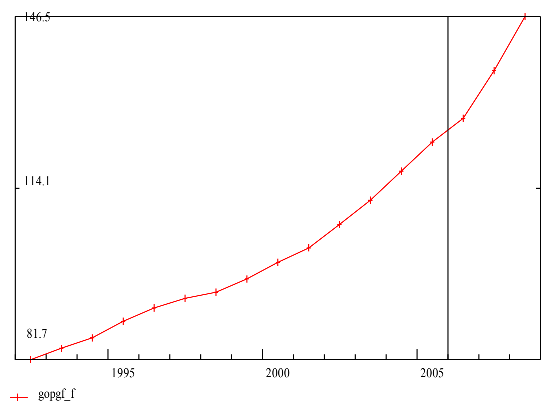
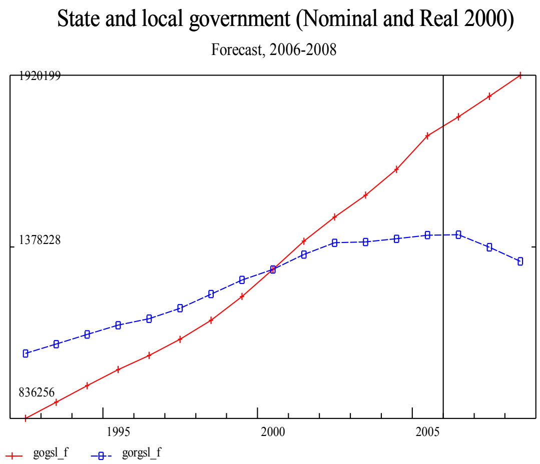
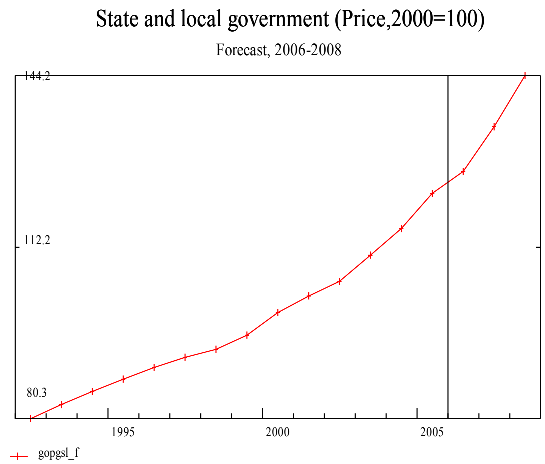


Figure 6.1 (cont.)





Chapter 7: Conclusion

The objective of this dissertation is to find a solution to the problem of the "ragged end" of historical data for long-term modeling. Using time-series analysis, this study develops processes to generate values between the last published data and up to two years into the future.

I studied four bodies of data used by a long-term economic model. Personal consumption expenditures, Gross output, Investment in equipment and software, and Investment in structures are estimated in detailed industries or categories.

The processes to estimate the series are generally similar and involve the use of high-frequency data series and time-series analysis. The differences in the methods used for these four bodies of data are due to the differences in the characteristics of the data.

I find that the performance of the forecasts depends heavily on the accuracy of the exogenous variables used in each forecast. The estimated detailed values are consistent with the macroeconomic data, used as regressors in the processes. Thus, generally, the results will be reliable as long as we have a good forecast of macroeconomic variables.

The performance of the first-period forecast also depends on where in the calendar year the last published data is. The closer to the end of the year, the better is the accuracy of the forecast.

Overall, this study met the goal of the dissertation. It established processes to generate detailed economic data which will be used as starting values of a long-term economic model. Nevertheless, there is room for improving these processes. First, the accuracy of the exogenous variables can be improved by improving the macroeconomic model, *i.e.* QUEST, used in estimating these variables. Then, the processes' performance can be increased by improving some equations that exhibit relatively higher errors than their peers, such as the equation for nominal gross output of Airline transportation.

Although not perfect, I believe this study will help improve the short-term accuracy of a long-term economic model, which is an important concern for many applied economists.

Appendices

Appendix 3.1: Personal Consumption Expenditures by Type of Product

1 Durable goods
2 Motor vehicles and parts
3 New autos (70)
4 New domestic autos
5 New foreign autos
6 Net purchases of used autos (71)
7 Net transactions in used autos
8 Used auto margin
9 Employee reimbursement
10 Other motor vehicles (72)
11 Trucks, new and net used
12 New trucks
13 Net purchases of used trucks
14 Net transactions in used trucks
15 Used truck margin
16 Recreational vehicles
17 Tires, tubes, accessories, and other parts (73)
18 Tires and tubes
19 Accessories and parts
20 Furniture and household equipment
21 Furniture, including mattresses and bedsprings (29)
22 Kitchen and other household appliances (30)
23 Major household appliances
24 Small electric appliances
25 China, glassware, tableware, and utensils (31)
26 Video and audio goods, including musical instruments, and computer goods (91)
27 Video and audio goods, including musical instruments (92)
28 Television receivers, video cassette recorders, and videotapes
29 Television receivers
30 Video equipment and media
31 Audio equipment, media, and instruments
32 Audio equipment
33 Records, tapes, and disks
34 Musical instruments
35 Computers, peripherals, and software (93)
36 Computers and peripherals
37 Software
38 Other durable house furnishings (32)
39 Floor coverings
40 Durable house furnishings, n.e.c.
41 Clocks, lamps, and furnishings
42 Blinds, rods, and other
43 Writing equipment
44 Hand tools
45 Tools, hardware, and supplies
46 Outdoor equipment and supplies
47 Other
48 Ophthalmic products and orthopedic appliances (46)
49 Wheel goods, sports and photographic equipment, boats, and pleasure aircraft (90)
50 Sports and photographic equipment, bicycles and motorcycles
51 Guns
52 Sporting equipment
53 Photographic equipment
54 Bicycles
55 Motorcycles
56 Pleasure boats and aircraft
57 Pleasure boats
58 Pleasure aircraft
59 Jewelry and watches (18)
60 Books and maps (87)
61 Nondurable goods
62 Food
63 Food and alcoholic beverages purchased for off-premise consumption (3)
64 Food purchased for off-premise consumption
65 Cereals
66 Bakery products
67 Beef and veal
68 Pork
69 Other meats
70 Poultry
71 Fish and seafood
72 Eggs
73 Fresh milk and cream

74	Processed dairy products
75	Fresh fruits
76	Fresh vegetables
77	Processed fruits and vegetables
78	Juices and nonalcoholic drinks
79	Coffee, tea and beverage materials
80	Fats and oils
81	Sugar and sweets
82	Other foods
83	Pet food
84	Alcoholic beverages purchased for off-premise consumption (9)
85	Beer and ale, at home
86	Wine and brandy, at home
87	Distilled spirits, at home
88	Purchased meals and beverages (4)
89	Food in purchased meals
90	Elementary and secondary school lunch
91	Higher education school lunch
92	Other purchased meals
93	Meals at limited service eating places
94	Meals at other eating places
95	Meals at drinking places
96	Alcohol in purchased meals
97	Food furnished to employees (including military) and food produced and consumed on
98	Food furnished to employees (including military)
99	Food supplied civilians
100	Food supplied military
101	Food produced and consumed on farms
102	***Clothing and shoes***
103	Shoes (12)
104	Women's and children's clothing and accessories except shoes (14)
105	Clothing and sewing for females
106	Clothing for females
107	Clothing for infants
108	Sewing goods for females
109	Luggage for females
110	Men's and boys' clothing and accessories except shoes (15+16)
111	Men's and boys' clothing, sewing goods, and luggage, except military issue
112	Clothing and sewing for males
113	Clothing for males
114	Sewing goods for males
115	Luggage for males
116	Standard clothing issued to military personnel
117	***Gasoline, fuel oil, and other energy goods***
118	Gasoline and oil (75)
119	Gasoline and other motor fuel
120	Lubricants
121	Fuel oil and coal (40)
122	Fuel oil
123	Liquified petroleum gas and other fuel, and farm fuel
124	Liquified petroleum gas and other fuel
125	Farm fuel
126	***Other***
127	Tobacco products (7)
128	Toilet articles and preparations (21)
129	Soap
130	Cosmetics and perfumes
131	Other personal hygiene goods
132	Semidurable house furnishings (33)
133	Cleaning and polishing preparations, and miscellaneous household supplies and paper products
134	Cleaning preparations
135	Lighting supplies
136	Paper products
137	Drug preparations and sundries (45)
138	Prescription drugs
139	Nonprescription drugs
140	Medical supplies
141	Gynecological goods
142	Nondurable toys and sport supplies (89)
143	Toys, dolls, and games
144	Sport supplies, including ammunition
145	Film and photo supplies
146	Stationery and writing supplies (35)
147	Stationery and school supplies
148	Greeting cards
149	Net foreign remittances (111 less 113)
150	Expenditures abroad by U.S. residents
151	Government expenditures abroad
152	Other private services
153	Less: Personal remittances in kind to nonresidents
154	Magazines, newspapers, and sheet music (88)
155	Magazines and sheet music
156	Newspapers
157	Flowers, seeds, and potted plants (95)
158	***Services***
159	***Housing***
160	Owner-occupied nonfarm dwellings--space rent (24)
161	Owner occupied mobile homes

162 Owner occupied stationary homes
163 Tenant-occupied nonfarm dwellings--rent (25)
164 Tenant occupied mobile homes
165 Tenant occupied stationary homes
166 Tenant landlord durables
167 Rental value of farm dwellings (26)
168 Other (27)
169 Hotels and motels
170 Clubs and fraternity housing
171 Higher education housing
172 Elementary and secondary education housing
173 Tenant group room and board
174 Tenant group employee lodging
175 Household operation
176 Electricity and gas
177 Electricity (37)
178 Gas (38)
179 Other household operation
180 Water and other sanitary services (39)
181 Water and sewerage maintenance
182 Refuse collection
183 Telephone and telegraph (41)
184 Local and cellular telephone
185 Cellular telephone
186 Local telephone
187 Long distance telephone
188 Intrastate toll calls
189 Interstate toll calls
190 Domestic service (42)
191 Domestic service, cash
192 Domestic service, in kind
193 Other (43)
194 Moving and storage
195 Household insurance
196 Household insurance premiums
197 Less: Household insurance benefits paid
198 Rug and furniture cleaning
199 Electrical repair
200 Reupholstery and furniture repair
201 Postage
202 Household operation services, n.e.c.
203 Transportation
204 User-operated transportation
205 Repair, greasing, washing, parking, storage, rental, and leasing (74)
206 Motor vehicle repair
207 Motor vehicle rental, leasing, and other
208 Motor vehicle rental
209 Motor vehicle leasing
210 Auto leasing
211 Truck leasing
212 Other motor vehicle services
213 Other user-operated transportation (76+77)
214 Bridge, tunnel, ferry, and road tolls
215 Insurance
216 Purchased local transportation
217 Mass transit systems (79)
218 Taxicab (80)
219 Purchased intercity transportation
220 Railway (82)
221 Bus (83)
222 Airline (84)
223 Other (85)
224 Medical care
225 Physicians (47)
226 Dentists (48)
227 Other professional services (49)
228 Home health care
229 Medical laboratories
230 Eye examinations
231 All other professional medical services
232 Hospitals and nursing homes (50)
233 Hospitals
234 Nonprofit
235 Proprietary
236 Government
237 Nursing homes
238 Non-profit nursing homes
239 Proprietary and government nursing homes
240 Health insurance (56)
241 Medical care and hospitalization
242 Income loss
243 Workers' compensation
244 Recreation
245 Admissions to specified spectator amusements (96)
246 Motion picture theaters
247 Legitimate theaters and opera, and entertainments of nonprofit institutions
248 Spectator sports
249 Other (94+100+101+102+103)

250 Radio and television repair
251 Clubs and fraternal organizations
252 Commercial participant amusements
253 Sightseeing
254 Private flying
255 Bowling and billiards
256 Casino gambling
257 Other commercial participant amusements
258 Pari-mutual net receipts
259 Other
260 Pets and pets services excluding veterinarians
261 Veterinarians
262 Cable television
263 Film developing
264 Photo studios
265 Sporting and recreational camps
266 High school recreation
267 Lotteries
268 Video cassette rental
269 Commercial amusements n.e.c.
270 Internet service providers
271 Commercial amusements n.e.c. except Internet service providers

272 Other

273 Personal care
274 Cleaning, storage, and repair of clothing and shoes (17)
275 Shoe repair
276 Cleaning, laundering, and garment repair
277 Dry cleaning
278 Laundry and garment repair
279 Barbershops, beauty parlors, and health clubs (22)
280 Beauty shops, including combination
281 Barber shops
282 Other (19)
283 Watch, clock, and jewelry repair
284 Miscellaneous personal services
285 Personal business
286 Brokerage charges and investment counseling (61)
287 Equities commissions including imputed
288 Broker charges on mutual fund sales
289 Trading profits on debt securities
290 Trust services of commercial banks
291 Investment advisory services of brokers
292 Commodities revenue
293 Investment counseling services
294 Bank service charges, trust services, and safe deposit box rental (62)
295 Commercial bank service charges on deposit accounts
296 Commercial bank fees on fiduciary accounts
297 Commercial bank other fee income
298 Charges and fees of other depository institutions
299 Services furnished without payment by financial intermediaries except life insurance
300 Commercial banks
301 Other financial institutions
302 Expense of handling life insurance and pension plans (64)
303 Legal services (65)
304 Funeral and burial expenses (66)
305 Other (67)
306 Labor union expenses
307 Profession association expenses
308 Employment agency fees
309 Money orders
310 Classified ads
311 Tax return preparation services
312 Personal business services, n.e.c.
313 Education and research
314 Higher education (105)
315 Private higher education
316 Public higher education
317 Nursery, elementary, and secondary schools (106)
318 Elementary and secondary schools
319 Nursery schools
320 Other (107)
321 Commercial and vocational schools
322 Foundations and nonprofit research
323 Religious and welfare activities (108)
324 Political organizations
325 Museums and libraries
326 Foundations to religion and welfare
327 Social welfare
328 Child care
329 Social welfare
330 Religion
331 Net foreign travel
332 Foreign travel by U.S. residents (110)
333 Passenger fares for foreign travel
334 U.S. travel outside the U.S.
335 U.S. student expenditures
336 Less: Expenditures in the United States by nonresidents (112)
337 Foreign travel in the U.S.

338 Medical expenditures of foreigners
339 Expenditures of foreign students in the U.S.
n.e.c. Not elsewhere classified
Note. Numbers in parentheses refer to line numbers in NIPA table 2.5.5
published in the Survey of Current Business.

Source: BEA

Appendix 3.2: PCE categories to be calculated, 116 categories

No.	**Table A1**	**Definition**
1	3	New autos (70)
2	6	Net purchases of used autos (71)
3	10	Other motor vehicles (72)
4	13	Tires; tubes; accessories; and other parts (73)
5	17	Furniture; including mattresses and bedsprings (29)
6	18	Kitchen and other household appliances (30)
7	21	China; glassware; tableware; and utensils (31)
8	23	Video and audio goods; including musical instruments (92)
9	32	Computers and peripherals
10	33	Software
11	35	Floor coverings
12	36	Durable house furnishings; n.e.c.
13	39	Writing equipment
14	40	Hand tools
15	44	Ophthalmic products and orthopedic appliances (46)
16	47	Guns
17	48	Sporting equipment
18	49	Photographic equipment
19	50	Bicycles
20	51	Motorcycles
21	53	Pleasure boats
22	54	Pleasure aircraft
23	55	Jewelry and watches (18)
24	56	Books and maps (87)
25	61	Cereals
26	62	Bakery products
27	63	Beef and veal
28	64	Pork
29	65	Other meats
30	66	Poultry
31	67	Fish and seafood
32	68	Eggs
33	69	Fresh milk and cream
34	70	Processed dairy products
35	71	Fresh fruits
36	72	Fresh vegetables
37	73	Processed fruits and vegetables
38	74	Juices and nonalcoholic drinks
39	75	Coffee; tea and beverage materials
40	76	Fats and oils
41	77	Sugar and sweets
42	78	Other foods
43	79	Pet food
44	81	Beer and ale; at home
45	82	Wine and brandy; at home
46	83	Distilled spirits; at home
47	84	Purchased meals and beverages (4)
48	93	Food furnished to employees (and food produced and consumed on farms (5+6)
49	99	Shoes (12)
50	100	Women's and children's clothing and accessories except shoes (14)
51	106	Men's and boys' clothing and accessories except shoes (15+16)
52	114	Gasoline and oil (75)
53	117	Fuel oil and coal (40)
54	123	Tobacco products (7)
55	124	Toilet articles and preparations (21)
56	128	Semidurable house furnishings (33)
57	129	Cleaning preparations; and miscellaneous household supplies and paper products
58	133	Drug preparations and sundries (45)
59	139	Toys; dolls; and games
60	140	Sport supplies; including ammunition
61	141	Film and photo supplies
62	142	Stationery and writing supplies (35)
63	145	Net foreign remittances (111 less 113)
64	150	Magazines; newspapers; and sheet music (88)
65	153	Flowers; seeds; and potted plants (95)
66	155	Housing
67	173	Electricity (37)
68	174	Gas (38)
69	176	Water and other sanitary services (39)
70	181	Cellular telephone
71	182	Local telephone
72	183	Long distance telephone
73	186	Domestic service (42)
74	189	Other (43)
75	202	Motor vehicle repair
76	203	Motor vehicle rental; leasing; and other
77	210	Bridge; tunnel; ferry; and road tolls
78	211	Insurance
79	213	Mass transit systems (79)
80	214	Taxicab (80)
81	216	Railway (82)
82	217	Bus (83)
83	218	Airline (84)

84	219	Other (85)
85	221	Physicians (47)
86	222	Dentists (48)
87	223	Other professional services (49)
88	229	Hospitals
89	233	Nursing homes
90	236	Health insurance (56)
91	241	Admissions to specified spectator amusements (96)
92	246	Radio and television repair
93	247	Clubs and fraternal organizations
94	248	Commercial participant amusements
95	254	Pari-mutual net receipts
96	255	Other Recreation Services
97	270	Cleaning; storage; and repair of clothing and shoes (17)
98	275	Barbershops; beauty parlors; and health clubs (22)
99	278	Other Personal Care(19)
100	282	Brokerage charges and investment counseling (61)
101	290	Bank service charges; trust services; and safe deposit box rental (62)
102	295	Services furnished without payment by fi except life insurance carriers (63)
103	298	Expense of handling life insurance and pension plans (64)
104	299	Legal services (65)
105	300	Funeral and burial expenses (66)
106	301	Other Personal Service(67)
107	310	Higher education (105)
108	313	Nursery; elementary; and secondary schools (106)
109	316	Other Education (107)
110	320	Political organizations
111	321	Museums and libraries
112	322	Foundations to religion and welfare
113	323	Social welfare
114	326	Religion
115	328	Foreign travel by U.S. residents (110)
116	332	Less: Expenditures in the United States by nonresidents (112)

Appendix 3.3:

Nominal equations

```
#1 cdmv E1NEW1 B "New autos (70)"
ti 1 New autos (70)
r pce1 = !pce1[1],cdmv,cdmv[1]
:                                1 New autos (70)
  SEE   =       3.77 RSQ   = 0.8669 RHO =  -0.28 Obser  =  162 from 1994.001
  SEE+1 =       3.62 RBSQ  = 0.8652 DurH = -3.79 DoFree =  159 to   2007.006
  MAPE  =       3.06
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce1                  - - - - - - - - - - - - - - - - -     95.19 - - -
  1 pce1[1]                 0.91716   172.1   0.92    2.71      95.07
  2 cdmv                    0.25604    63.0   1.00    2.15     371.63  1.719
  3 cdmv[1]                -0.23550    46.8  -0.92    1.00     370.50 -1.592

#2 cdmv E1NPU1 B "Net purchases of used autos (71)"
ti 2 Net purchases of used autos (71)

r pce2 = pce2[1],pce2[2],ddj
:                       2 Net purchases of used autos (71)
  SEE   =       4.20 RSQ   = 0.4749 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       4.19 RBSQ  = 0.4649 DurH = -1.45 DoFree =  158 to   2007.006
  MAPE  =       5.64
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce2                  - - - - - - - - - - - - - - - - -     56.50 - - -
  1 intercept              16.43134     6.8   0.29    1.90       1.00
  2 pce2[1]                 0.42090     9.5   0.42    1.13      56.41  0.428
  3 pce2[2]                 0.29215     5.0   0.29    1.04      56.29  0.307
  4 ddj                    -0.00212     1.8  -0.00    1.00      59.60 -0.137

#3 10 cdmv E1OAU1 C "Other motor vehicles (72)"
ti 3 Other motor vehicles (72)

r pce3 = pce3[1],cdmv,cdmv[1]
:                          3 Other motor vehicles (72)
  SEE   =       4.52 RSQ   = 0.9923 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       4.44 RBSQ  = 0.9921 DurH = -3.12 DoFree =  158 to   2007.006
  MAPE  =       2.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce3                  - - - - - - - - - - - - - - - - -    171.77 - - -
  1 intercept             -20.61022     4.4  -0.12  129.46       1.00
  2 pce3[1]                 0.79358    61.9   0.79    7.36     171.02  0.798
  3 cdmv                    0.62054   170.3   1.34    1.97     371.63  0.836
  4 cdmv[1]                -0.46947    40.3  -1.01    1.00     370.50 -0.637

#4 13 cdmv E1TBA1 C "Tires, tubes, accessories, and other parts (73)"
ti 4 Tires, tubes, accessories, and other parts

r pce4 = !pce4[1],pce4[2]
:                  4 Tires, tubes, accessories, and other parts
  SEE   =       0.67 RSQ   = 0.9920 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.67 RBSQ  = 0.9919 DurH = -1.88 DoFree =  160 to   2007.006
  MAPE  =       1.05
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce4                  - - - - - - - - - - - - - - - - -     48.16 - - -
```

```
  1 pce4[1]                  0.55608    17.6   0.55    1.25     47.99
  2 pce4[2]                  0.44880    11.7   0.45    1.00     47.82  0.450

#5 17 cdfur E1FNR1 C "Furniture, including mattresses and bedsprings (29)"
ti 5 Furniture, including mattresses and bedsprings

r pce5 = pce5[1],cdfur, cdfur[1]
:              5 Furniture, including mattresses and bedsprings
  SEE   =       0.58 RSQ   = 0.9976 RHO =  -0.15 Obser  =  162 from 1994.001
  SEE+1 =       0.57 RBSQ  = 0.9976 DurH = -2.69 DoFree =  158 to   2007.006
  MAPE  =       0.65
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce5                  - - - - - - - - - - - - - - - - -     65.40 - - -
  1 intercept                0.90914     2.8   0.01  420.03      1.00
  2 pce5[1]                  0.75875    49.9   0.76    2.27     65.14  0.760
  3 cdfur                    0.22248    45.0   1.04    1.45    306.14  1.095
  4 cdfur[1]                -0.17402    20.4  -0.81    1.00    304.81 -0.856

#6 18 cdfur E1APP1 C "Kitchen and other household appliances (30)"
ti 6 Kitchen and other household appliances

r pce6 = pce6[1],cdfur,cdfur[1]
:                  6 Kitchen and other household appliances
  SEE   =       0.29 RSQ   = 0.9955 RHO =  -0.29 Obser  =  162 from 1994.001
  SEE+1 =       0.27 RBSQ  = 0.9955 DurH = -3.96 DoFree =  158 to   2007.006
  MAPE  =       0.74
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce6                  - - - - - - - - - - - - - - - - -     30.94 - - -
  1 intercept                0.55108     1.3   0.02  224.38      1.00
  2 pce6[1]                  0.92431   195.0   0.92    1.80     30.86  0.919
  3 cdfur                    0.09084    32.6   0.90    1.64    306.14  1.241
  4 cdfur[1]                -0.08510    28.0  -0.84    1.00    304.81 -1.162

#7 21 cdfur E1CHN1 C "China, glassware, tableware, and utensils (31)"
ti 7 China, glassware, tableware, and utensils

r pce7 = pce7[1],cdfur,cdfur[1]
:                 7 China, glassware, tableware, and utensils
  SEE   =       0.25 RSQ   = 0.9979 RHO =  -0.20 Obser  =  162 from 1994.001
  SEE+1 =       0.24 RBSQ  = 0.9979 DurH = -3.57 DoFree =  158 to   2007.006
  MAPE  =       0.65
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce7                  - - - - - - - - - - - - - - - - -     30.48 - - -
  1 intercept                0.29504     1.1   0.01  476.40      1.00
  2 pce7[1]                  0.80189    55.0   0.80    2.74     30.35  0.798
  3 cdfur                    0.11347    59.1   1.14    1.65    306.14  1.219
  4 cdfur[1]                -0.09478    28.5  -0.95    1.00    304.81 -1.018

#8 23 cdfur E1VAM1 C "Video and audio goods, including musical instruments (92)"
ti 8 Video and audio goods, including musical instruments

r pce8 = pce8[1],cdfur,cdfur[1]
:            8 Video and audio goods, including musical instruments
  SEE   =       0.41 RSQ   = 0.9988 RHO =  -0.28 Obser  =  162 from 1994.001
  SEE+1 =       0.40 RBSQ  = 0.9987 DurH = -3.73 DoFree =  158 to   2007.006
  MAPE  =       0.45
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce8                  - - - - - - - - - - - - - - - - -     71.15 - - -
  1 intercept                0.59440     1.0   0.01  803.75      1.00
  2 pce8[1]                  0.94841   199.3   0.95    3.33     70.90  0.949
  3 cdfur                    0.22551    81.0   0.97    2.66    306.14  1.137
```

```
  4 cdfur[1]                -0.21561    63.1  -0.92    1.00    304.81 -1.087

#9 32 cdfur E1CPP1 D "Computers and peripherals"
ti 9 Computers and peripherals

r pce9 = !pce9[1],cdfur,cdfur[1]
:                         9 Computers and peripherals
  SEE   =       0.34 RSQ   = 0.9987 RHO =  -0.23 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9987 DurH = -2.91 DoFree =  159 to   2007.006
  MAPE  =       0.81
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce9                  - - - - - - - - - - - - - - - - -     31.93 - - -
  1 pce9[1]                 0.98606   855.1   0.98    1.80     31.70
  2 cdfur                   0.10535    31.7   1.01    1.69    306.14  0.666
  3 cdfur[1]               -0.10360    30.1  -0.99    1.00    304.81 -0.655

#10 33 cdfur E1CPS1 D "Software"
ti 10 Software

r pce10 = pce10[1],cdfur,cdfur[1]
:                                 10 Software
  SEE   =       0.11 RSQ   = 0.9987 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.11 RBSQ  = 0.9987 DurH = -2.71 DoFree =  158 to   2007.006
  MAPE  =       0.86
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce10                 - - - - - - - - - - - - - - - - -      9.74 - - -
  1 intercept              -0.68115     3.0  -0.07  789.92      1.00
  2 pce10[1]                0.88163   117.9   0.88    1.73      9.67  0.881
  3 cdfur                   0.03262    30.1   1.03    1.37    306.14  0.634
  4 cdfur[1]               -0.02655    16.9  -0.83    1.00    304.81 -0.516

#11 35 cdfur E1FLR1 D "Floor coverings"
ti 11 Floor coverings

r pce11 = pce11[1],cdfur,cdfur[1],crude
:                             11 Floor coverings
  SEE   =       0.30 RSQ   = 0.9921 RHO =  -0.27 Obser  =  162 from 1994.001
  SEE+1 =       0.28 RBSQ  = 0.9919 DurH = -5.03 DoFree =  157 to   2007.006
  MAPE  =       1.40
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce11                 - - - - - - - - - - - - - - - - -     16.49 - - -
  1 intercept               0.42137     1.3   0.03  126.71      1.00
  2 pce11[1]                0.73318    43.6   0.73    1.24     16.43  0.730
  3 cdfur                   0.03608     5.5   0.67    1.13    306.14  0.637
  4 cdfur[1]               -0.02443     2.4  -0.45    1.06    304.81 -0.431
  5 crude                   0.01518     3.1   0.03    1.00     28.35  0.068

#12 36 cdfur E1DHF1 D "Durable house furnishings, n.e.c."
ti 12 Durable house furnishings, n.e.c.

r pce12 = !pce12[1],cdfur,cdfur[1]
:                    12 Durable house furnishings, n.e.c.
  SEE   =       0.26 RSQ   = 0.9986 RHO =  -0.28 Obser  =  162 from 1994.001
  SEE+1 =       0.25 RBSQ  = 0.9986 DurH = -3.95 DoFree =  159 to   2007.006
  MAPE  =       0.58
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce12                 - - - - - - - - - - - - - - - - -     35.92 - - -
  1 pce12[1]                0.90812   139.9   0.90    3.05     35.75
  2 cdfur                   0.13068    70.3   1.11    2.15    306.14  1.091
  3 cdfur[1]               -0.11991    46.7  -1.02    1.00    304.81 -1.000
```

```
#13 39 cdfur E1WTR1 D "Writing equipment"
ti 13 Writing equipment

r pce13 = !pce13[1],pce13[2],cdfur,cdfur[1]
:                              13 Writing equipment
  SEE   =       0.03 RSQ   = 0.9947 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.03 RBSQ  = 0.9946 DurH = -1.52 DoFree =  158 to   2007.006
  MAPE  =       0.77
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce13                 - - - - - - - - - - - - - - - - -      2.93 - - -
  1 pce13[1]                0.79182    35.0   0.79    1.43      2.92
  2 pce13[2]                0.17263     2.0   0.17    1.37      2.91  0.169
  3 cdfur                   0.00597    15.0   0.62    1.28    306.14  0.880
  4 cdfur[1]               -0.00562    13.3  -0.58    1.00    304.81 -0.828

#14 40 cdfur E1TOO1 D "Hand tools"
ti 14 Hand tools

r pce14 = pce14[1],cdfur,cdfur[1],gdp
:                                  14 Hand tools
  SEE   =       0.15 RSQ   = 0.9969 RHO =  -0.23 Obser  =  162 from 1994.001
  SEE+1 =       0.15 RBSQ  = 0.9968 DurH = -3.90 DoFree =  157 to   2007.006
  MAPE  =       0.90
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce14                 - - - - - - - - - - - - - - - - -     11.15 - - -
  1 intercept              -0.53973     4.1  -0.05  325.53      1.00
  2 pce14[1]                0.78918    59.9   0.79    1.41     11.10  0.788
  3 cdfur                   0.02938    12.4   0.81    1.28    306.14  0.636
  4 cdfur[1]               -0.02831    11.9  -0.77    1.05    304.81 -0.612
  5 gdp                     0.00026     2.6   0.23    1.00   9935.29  0.187

#15 44 cdoth E1OPT1 C "Ophthalmic products and orthopedic appliances (46)"
ti 15 Ophthalmic products and orthopedic appliances

r pce15 = pce15[1],cdoth,cdoth[1]
:               15 Ophthalmic products and orthopedic appliances
  SEE   =       0.51 RSQ   = 0.9808 RHO =  -0.26 Obser  =  162 from 1994.001
  SEE+1 =       0.49 RBSQ  = 0.9804 DurH = -3.97 DoFree =  158 to   2007.006
  MAPE  =       1.67
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce15                 - - - - - - - - - - - - - - - - -     20.79 - - -
  1 intercept               0.51892     1.3   0.02   52.03      1.00
  2 pce15[1]                0.84632    83.8   0.84    1.28     20.70  0.842
  3 cdoth                   0.10290    10.5   0.79    1.15    160.33  0.924
  4 cdoth[1]               -0.08611     7.1  -0.66    1.00    159.60 -0.772

#16 47 cdoth E1GUN1 D "Guns"
ti 16 Guns

r pce16 = !pce16[1],cdoth,cdoth[1]
:                                     16 Guns
  SEE   =       0.02 RSQ   = 0.9962 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.02 RBSQ  = 0.9962 DurH = -2.46 DoFree =  159 to   2007.006
  MAPE  =       0.87
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce16                 - - - - - - - - - - - - - - - - -      2.08 - - -
  1 pce16[1]                0.95678   353.6   0.95    1.93      2.07
  2 cdoth                   0.00987    38.0   0.76    1.77    160.33  0.825
  3 cdoth[1]               -0.00930    32.9  -0.71    1.00    159.60 -0.776

#17 48 cdoth E1SPT1 D "Sporting equipment
```

```
ti 17 Sporting equipment

r pce17 = !pce17[1],cdoth,cdoth[1]
:                              17 Sporting equipment
  SEE   =       0.29 RSQ   = 0.9972 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.29 RBSQ  = 0.9971 DurH = -2.70 DoFree =  159 to   2007.006
  MAPE  =       0.84
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce17                 - - - - - - - - - - - - - - - - -     25.55 - - -
  1 pce17[1]                0.92469   134.2   0.92    1.95     25.42
  2 cdoth                   0.12232    39.2   0.77    1.61    160.33  0.731
  3 cdoth[1]               -0.11005    27.0  -0.69    1.00    159.60 -0.657

#18 49 cdoth E1CAM1 D "Photographic equipment"
ti 18 Photographic equipment

r pce18 = pce18[1],cdoth
:                            18 Photographic equipment
  SEE   =       0.06 RSQ   = 0.9900 RHO =   0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.06 RBSQ  = 0.9899 DurH =  1.40 DoFree =  159 to   2007.006
  MAPE  =       1.07
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce18                 - - - - - - - - - - - - - - - - -      3.68 - - -
  1 intercept               0.34905    13.6   0.09  100.05      1.00
  2 pce18[1]                0.58431    30.1   0.58    1.35      3.67  0.584
  3 cdoth                   0.00742    16.0   0.32    1.00    160.33  0.413

#19 50 cdoth E1BCY1 D "Bicycles"
ti 19 Bicycles

r pce19 = !pce19[1],cdoth,cdoth[1]
:                                   19 Bicycles
  SEE   =       0.04 RSQ   = 0.9968 RHO =  -0.20 Obser  =  162 from 1994.001
  SEE+1 =       0.04 RBSQ  = 0.9968 DurH = -2.65 DoFree =  159 to   2007.006
  MAPE  =       0.86
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce19                 - - - - - - - - - - - - - - - - -      3.85 - - -
  1 pce19[1]                0.94122   199.8   0.94    1.94      3.83
  2 cdoth                   0.01836    38.8   0.77    1.70    160.33  0.770
  3 cdoth[1]               -0.01692    30.4  -0.70    1.00    159.60 -0.709

#20 51 cdoth E1MCY1 D "Motorcycles"
ti 20 Motorcycles
#con 50 0.3 = a3
#con 20 0 = a3 + a4
#con 50 0.9 = a2
r pce20 = pce20[1],cdoth,cdoth[2]
:                                 20 Motorcycles
  SEE   =       0.46 RSQ   = 0.9797 RHO =  -0.27 Obser  =  162 from 1994.001
  SEE+1 =       0.44 RBSQ  = 0.9793 DurH = -4.25 DoFree =  158 to   2007.006
  MAPE  =       4.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce20                 - - - - - - - - - - - - - - - - -      7.72 - - -
  1 intercept              -1.48536     4.6  -0.19   49.28      1.00
  2 pce20[1]                0.80197    74.1   0.80    1.22      7.67  0.804
  3 cdoth                   0.07176     6.1   1.49    1.07    160.33  0.731
  4 cdoth[2]               -0.05319     3.3  -1.09    1.00    158.87 -0.540

#21 53 cdoth E1BOA1 D "Pleasure boats"
ti 21 Pleasure boats
```

```
r pce21 = pce21[1],cdoth,cdoth[2],crude
:                               21 Pleasure boats
  SEE   =       0.73 RSQ   = 0.9571 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.73 RBSQ  = 0.9560 DurH =  0.50 DoFree =  157 to   2007.006
  MAPE  =       4.41
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce21                 - - - - - - - - - - - - - - - - -     13.31 - - -
  1 intercept               -3.38918    13.7  -0.25   23.29      1.00
  2 pce21[1]                 0.30059     6.1   0.30    1.88     13.23  0.302
  3 cdoth                    0.17056    13.3   2.05    1.19    160.33  1.592
  4 cdoth[2]                -0.08680     3.3  -1.04    1.09    158.87 -0.808
  5 crude                   -0.02949     4.2  -0.06    1.00     28.35 -0.125

#22 54 cdoth E1AIR1 D "Pleasure aircraft"
ti 22 Pleasure aircraft

r pce22 = !pce22[1],pce22[2],cdoth,cdoth[2]
:                             22 Pleasure aircraft
  SEE   =       0.06 RSQ   = 0.9417 RHO =   0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.06 RBSQ  = 0.9406 DurH =  3.49 DoFree =  158 to   2007.006
  MAPE  =       4.20
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce22                 - - - - - - - - - - - - - - - - -      1.18 - - -
  1 pce22[1]                 0.25150     4.2   0.25    2.03      1.17
  2 pce22[2]                 0.28120     4.4   0.28    1.66      1.17  0.279
  3 cdoth                    0.01710    16.7   2.33    1.20    160.33  2.165
  4 cdoth[2]                -0.01376     9.5  -1.86    1.00    158.87 -1.738

#23 55 cdoth E1JRY1 C "Jewelry and watches (18)"
ti 23 Jewelry and watches

r pce23 = pce23[1],cdoth,cdoth[1]
:                            23 Jewelry and watches
  SEE   =       0.58 RSQ   = 0.9948 RHO =  -0.25 Obser  =  162 from 1994.001
  SEE+1 =       0.56 RBSQ  = 0.9947 DurH = -4.43 DoFree =  158 to   2007.006
  MAPE  =       0.95
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce23                 - - - - - - - - - - - - - - - - -     48.97 - - -
  1 intercept                2.51352     6.1   0.05  193.54      1.00
  2 pce23[1]                 0.73150    46.3   0.73    2.13     48.78  0.730
  3 cdoth                    0.25156    41.2   0.82    1.38    160.33  1.015
  4 cdoth[1]                -0.18524    17.4  -0.60    1.00    159.60 -0.746

#24 56 cdoth E1BKS1 C "Books and maps (87)"
ti 24 Books and maps

r pce24 = !pce24[1],pce24[2],cdoth[1]
:                               24 Books and maps
  SEE   =       0.63 RSQ   = 0.9926 RHO =  -0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.63 RBSQ  = 0.9925 DurH = -2.58 DoFree =  159 to   2007.006
  MAPE  =       1.44
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce24                 - - - - - - - - - - - - - - - - -     33.22 - - -
  1 pce24[1]                 0.49170    11.7   0.49    1.27     33.06
  2 pce24[2]                 0.35913     7.4   0.36    1.06     32.91  0.361
  3 cdoth[1]                 0.03219     2.8   0.15    1.00    159.60  0.145

#25 61 cnfood E1#grA1 D "Cereals"
ti 25 Cereals

r pce25 = ! pce25[1],cnfood,gdp
```

```
:                                  25 Cereals
  SEE   =       0.23 RSQ   = 0.9891 RHO =  -0.12 Obser  =  162 from 1994.001
  SEE+1 =       0.23 RBSQ  = 0.9890 DurH = -1.58 DoFree =  159 to   2007.006
  MAPE  =       0.55
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce25                 - - - - - - - - - - - - - - - - -     27.18 - - -
  1 pce25[1]                0.99098  1181.5   0.99    1.05     27.13
  2 cnfood                  0.00314     2.4   0.11    1.04    954.45  0.258
  3 gdp                    -0.00027     2.2  -0.10    1.00   9935.29 -0.245

#26 62 cnfood E1BAK1 D "Bakery products"
ti 26 Bakery products

r pce26 = pce26[1],pce26[2],pce26[3],cnfood
:                              26 Bakery products
  SEE   =       0.28 RSQ   = 0.9979 RHO =   0.03 Obser  =  162 from 1994.001
  SEE+1 =       0.28 RBSQ  = 0.9979 DurH =  0.97 DoFree =  157 to   2007.006
  MAPE  =       0.46
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce26                 - - - - - - - - - - - - - - - - -     45.49 - - -
  1 intercept               1.54810     5.7   0.03  477.39      1.00
  2 pce26[1]                0.47427    12.2   0.47    1.41     45.34  0.472
  3 pce26[2]                0.13635     0.9   0.14    1.25     45.19  0.135
  4 pce26[3]                0.26378     4.2   0.26    1.16     45.05  0.260
  5 cnfood                  0.00460     7.8   0.10    1.00    954.45  0.133

#27 63 cnfood E1BEE1 D "Beef and veal"
ti 27 Beef and veal

r pce27 = !pce27[1],cnfood,cnfood[1]
:                               27 Beef and veal
  SEE   =       0.17 RSQ   = 0.9973 RHO =   0.38 Obser  =  162 from 1994.001
  SEE+1 =       0.16 RBSQ  = 0.9973 DurH =  4.85 DoFree =  159 to   2007.006
  MAPE  =       0.48
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce27                 - - - - - - - - - - - - - - - - -     26.43 - - -
  1 pce27[1]                0.98421  1131.8   0.98    1.95     26.38
  2 cnfood                  0.02709    36.2   0.98    1.81    954.45  1.458
  3 cnfood[1]              -0.02671    34.5  -0.96    1.00    950.60 -1.427

#28 64 cnfood E1POR1 D "Pork"
ti 28 Pork

r pce28 = ! pce28[1],cnfood,cnfood[1]
:                                    28 Pork
  SEE   =       0.14 RSQ   = 0.9980 RHO =   0.28 Obser  =  162 from 1994.001
  SEE+1 =       0.13 RBSQ  = 0.9980 DurH =  3.53 DoFree =  159 to   2007.006
  MAPE  =       0.44
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce28                 - - - - - - - - - - - - - - - - -     21.83 - - -
  1 pce28[1]                1.00469   955.0   1.00    1.94     21.77
  2 cnfood                  0.02268    39.2   0.99    1.92    954.45  1.329
  3 cnfood[1]              -0.02282    38.4  -0.99    1.00    950.60 -1.327

#29 65 cnfood E1MEA1 D "Other meats"
ti 29 Other meats

r pce29 = pce29[1],cnfood,cnfood[1]
:                                29 Other meats
  SEE   =       0.08 RSQ   = 0.9993 RHO =  -0.23 Obser  =  162 from 1994.001
  SEE+1 =       0.08 RBSQ  = 0.9992 DurH = -3.30 DoFree =  158 to   2007.006
```

```
  MAPE  =       0.32
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce29                 - - - - - - - - - - - - - - - - -     17.66 - - -
  1 intercept               0.19474     2.0   0.01 1350.24      1.00
  2 pce29[1]                0.90422   132.9   0.90    2.75     17.60  0.897
  3 cnfood                  0.01766    63.4   0.95    2.05    954.45  1.075
  4 cnfood[1]              -0.01609    43.2  -0.87    1.00    950.60 -0.972

#30 66 cnfood E1POU1 D "Poultry"
ti 30 Poultry

r pce30 = pce30[1],cnfood,cnfood[1]
:                                 30 Poultry
  SEE   =       0.18 RSQ   = 0.9982 RHO =   0.20 Obser  =  162 from 1994.001
  SEE+1 =       0.17 RBSQ  = 0.9982 DurH =  2.58 DoFree =  158 to   2007.006
  MAPE  =       0.42
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce30                 - - - - - - - - - - - - - - - - -     32.01 - - -
  1 intercept               0.41255     2.3   0.01  564.40      1.00
  2 pce30[1]                0.97687   507.4   0.97    2.14     31.91  0.977
  3 cnfood                  0.03186    44.7   0.95    2.02    954.45  1.347
  4 cnfood[1]              -0.03155    42.3  -0.94    1.00    950.60 -1.323

#31 67 cnfood E1FIS1 D "Fish and seafood"
ti 31 Fish and seafood

r pce31 = !pce31[1],cnfood,cnfood[1]
:                             31 Fish and seafood
  SEE   =       0.07 RSQ   = 0.9992 RHO =   0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.07 RBSQ  = 0.9992 DurH =  2.46 DoFree =  159 to   2007.006
  MAPE  =       0.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce31                 - - - - - - - - - - - - - - - - -     10.54 - - -
  1 pce31[1]                0.99457   874.5   0.99    1.84     10.50
  2 cnfood                  0.01046    35.7   0.95    1.83    954.45  0.799
  3 cnfood[1]              -0.01040    35.1  -0.94    1.00    950.60 -0.788

#32 68 cnfood E1GGS1 D "Eggs"
ti 32 Eggs

r pce32 = !pce32[1]
:                                   32 Eggs
  SEE   =       0.07 RSQ   = 0.9955 RHO =   0.47 Obser  =  162 from 1994.001
  SEE+1 =       0.06 RBSQ  = 0.9955 DurH =  5.95 DoFree =  161 to   2007.006
  MAPE  =       0.79
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce32                 - - - - - - - - - - - - - - - - -      5.59 - - -
  1 pce32[1]                1.00336  8006.1   1.00    1.00      5.57

#33 69 cnfood E1MIL1 D "Fresh milk and cream"
ti 33 Fresh milk and cream
#con 50 1 = a2
r pce33 = !pce33[1],cnfood
:                           33 Fresh milk and cream
  SEE   =       0.12 RSQ   = 0.9971 RHO =  -0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.12 RBSQ  = 0.9970 DurH = -0.16 DoFree =  160 to   2007.006
  MAPE  =       0.57
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce33                 - - - - - - - - - - - - - - - - -     14.58 - - -
  1 pce33[1]                0.96448   832.1   0.96    1.14     14.54
  2 cnfood                  0.00058     6.6   0.04    1.00    954.45  0.049
```

```
#34 70 cnfood E1DAI1 D "Processed dairy products"
ti 34 Processed dairy products
#con 20 -0.3 = a3
r pce34 = !pce34[1],cnfood
:                          34 Processed dairy products
  SEE   =       0.27 RSQ   = 0.9982 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.27 RBSQ  = 0.9982 DurH = -0.77 DoFree =  160 to   2007.006
  MAPE  =       0.55
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce34                 - - - - - - - - - - - - - - - - -     31.72 - - -
  1 pce34[1]                0.95497   244.9   0.95    1.03     31.59
  2 cnfood                  0.00164     1.4   0.05    1.00    954.45  0.047

#35 71 cnfood E1FRU1 D "Fresh fruits"
ti 35 Fresh fruits

r pce35 = pce35[1],cnfood
:                                35 Fresh fruits
  SEE   =       0.15 RSQ   = 0.9979 RHO =   0.14 Obser  =  162 from 1994.001
  SEE+1 =       0.15 RBSQ  = 0.9979 DurH =  1.84 DoFree =  159 to   2007.006
  MAPE  =       0.59
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce35                 - - - - - - - - - - - - - - - - -     17.25 - - -
  1 intercept              -0.07057     0.4  -0.00  482.70      1.00
  2 pce35[1]                0.90603   192.8   0.90    1.09     17.18  0.900
  3 cnfood                  0.00184     4.5   0.10    1.00    954.45  0.100

#36 72 cnfood E1VEG1 D "Fresh vegetables"
ti 36 Fresh vegetables

r pce36 = !pce36[1],cnfood,cnfood[1]
:                              36 Fresh vegetables
  SEE   =       0.16 RSQ   = 0.9992 RHO =   0.10 Obser  =  162 from 1994.001
  SEE+1 =       0.15 RBSQ  = 0.9992 DurH =  1.33 DoFree =  159 to   2007.006
  MAPE  =       0.42
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce36                 - - - - - - - - - - - - - - - - -     25.49 - - -
  1 pce36[1]                0.97941   709.9   0.97    1.83     25.38
  2 cnfood                  0.02353    34.0   0.88    1.75    954.45  0.765
  3 cnfood[1]              -0.02296    32.1  -0.86    1.00    950.60 -0.740

#37 73 cnfood E1PFV1 D "Processed fruits and vegetables"
ti 37 Processed fruits and vegetables

r pce37 = !pce37[1]
:                      37 Processed fruits and vegetables
  SEE   =       0.18 RSQ   = 0.9957 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9957 DurH =  0.18 DoFree =  161 to   2007.006
  MAPE  =       0.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce37                 - - - - - - - - - - - - - - - - -     19.13 - - -
  1 pce37[1]                1.00314 10888.0   1.00    1.00     19.07

#38 74 cnfood E1JNB1 D "Juices and nonalcoholic drinks"
ti 38 Juices and nonalcoholic drinks

r pce38 = pce38[1],cnfood
:                       38 Juices and nonalcoholic drinks
  SEE   =       0.40 RSQ   = 0.9984 RHO =  -0.16 Obser  =  162 from 1994.001
  SEE+1 =       0.40 RBSQ  = 0.9984 DurH = -2.11 DoFree =  159 to   2007.006
```

```
  MAPE  =       0.52
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce38                 - - - - - - - - - - - - - - - - -     52.92 - - -
  1 intercept              -0.52460     2.8  -0.01  616.68      1.00
  2 pce38[1]                0.96674   452.0   0.96    1.07     52.73  0.954
  3 cnfood                  0.00259     3.5   0.05    1.00    954.45  0.047

#39 75 cnfood E1CTM1 D "Coffee, tea and beverage materials"
ti 39 Coffee, tea and beverage materials

r pce39 = pce39[1],cnfood
:                     39 Coffee, tea and beverage materials
  SEE   =       0.10 RSQ   = 0.9989 RHO =  -0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.09 RBSQ  = 0.9989 DurH = -1.03 DoFree =  159 to   2007.006
  MAPE  =       0.56
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce39                 - - - - - - - - - - - - - - - - -     12.14 - - -
  1 intercept              -0.18382     2.2  -0.02  932.11      1.00
  2 pce39[1]                0.94007   336.1   0.93    1.08     12.07  0.937
  3 cnfood                  0.00102     4.0   0.08    1.00    954.45  0.063

#40 76 cnfood E1FAT1 D "Fats and oils"
ti 40 Fats and oils

r pce40 = ! pce40[1],cnfood,cnfood[1]
:                               40 Fats and oils
  SEE   =       0.05 RSQ   = 0.9978 RHO =  -0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.05 RBSQ  = 0.9977 DurH = -0.13 DoFree =  159 to   2007.006
  MAPE  =       0.37
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce40                 - - - - - - - - - - - - - - - - -      9.86 - - -
  1 pce40[1]                0.99205  1293.1   0.99    2.25      9.83
  2 cnfood                  0.01007    47.9   0.97    2.14    954.45  1.575
  3 cnfood[1]              -0.01000    46.1  -0.96    1.00    950.60 -1.553

#41 77 cnfood E1SWE1 D "Sugar and sweets"
ti 41 Sugar and sweets

r pce41 = pce41[1],cnfood,cnfood[1]
:                              41 Sugar and sweets
  SEE   =       0.17 RSQ   = 0.9986 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.17 RBSQ  = 0.9985 DurH = -0.74 DoFree =  158 to   2007.006
  MAPE  =       0.37
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce41                 - - - - - - - - - - - - - - - - -     32.44 - - -
  1 intercept               0.46669     1.4   0.01  697.87      1.00
  2 pce41[1]                0.95627   246.7   0.95    2.23     32.35  0.951
  3 cnfood                  0.03093    47.6   0.91    2.00    954.45  1.257
  4 cnfood[1]              -0.02995    41.5  -0.88    1.00    950.60 -1.208

#42 78 cnfood E1OFD1 D "Other foods"
ti 42 Other foods

r pce42 = pce42[1],cnfood
:                                42 Other foods
  SEE   =       0.68 RSQ   = 0.9992 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.68 RBSQ  = 0.9991 DurH =  0.25 DoFree =  159 to   2007.006
  MAPE  =       0.51
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce42                 - - - - - - - - - - - - - - - - -     87.30 - - -
  1 intercept              -4.19337     5.4  -0.05 1179.60      1.00
```

```
  2 pce42[1]                 0.89808   188.7   0.89    1.11     86.80  0.891
  3 cnfood                   0.01419     5.3   0.16    1.00    954.45  0.109

#43 79 cnfood E1PEF1 D "Pet food"
ti 43 Pet food

r pce43 = pce43[1],cnfood
:                                  43 Pet food
  SEE   =       0.25 RSQ   = 0.9972 RHO =  -0.12 Obser  =  162 from 1994.001
  SEE+1 =       0.25 RBSQ  = 0.9972 DurH = -1.60 DoFree =  159 to   2007.006
  MAPE  =       0.94
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce43                 - - - - - - - - - - - - - - - - -     21.82 - - -
  1 intercept               -0.47003     2.9  -0.02  357.79      1.00
  2 pce43[1]                 0.86420   142.3   0.86    1.13     21.71  0.862
  3 cnfood                   0.00370     6.1   0.16    1.00    954.45  0.138

#44 81 cnfood E1MLT1 D "Beer and ale, at home"
ti 44 Beer and ale, at home

r pce44 = !pce44[1],pce44[2],cnfood,cnfood[1],oildf
:                           44 Beer and ale, at home
  SEE   =       0.42 RSQ   = 0.9984 RHO =  -0.15 Obser  =  162 from 1994.001
  SEE+1 =       0.42 RBSQ  = 0.9983 DurH = -2.66 DoFree =  157 to   2007.006
  MAPE  =       0.65
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce44                 - - - - - - - - - - - - - - - - -     44.88 - - -
  1 pce44[1]                 1.10634    96.3   1.10    2.42     44.64
  2 pce44[2]                -0.12863     1.8  -0.13    2.41     44.40 -0.126
  3 cnfood                   0.05792    26.6   1.23    2.37    954.45  0.985
  4 cnfood[1]               -0.05693    25.8  -1.21    1.51    950.60 -0.961
  5 oildf                    0.14136    23.0   0.00    1.00      0.32  0.030

#45 82 cnfood E1WIN1 D "Wine and brandy, at home"
ti 45 Wine and brandy, at home

r pce45 = !pce45[1],cnfood,cnfood[1]
:                          45 Wine and brandy, at home
  SEE   =       0.11 RSQ   = 0.9985 RHO =  -0.20 Obser  =  162 from 1994.001
  SEE+1 =       0.10 RBSQ  = 0.9985 DurH = -2.65 DoFree =  159 to   2007.006
  MAPE  =       0.57
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce45                 - - - - - - - - - - - - - - - - -     14.73 - - -
  1 pce45[1]                 0.93639   236.4   0.93    1.52     14.67
  2 cnfood                   0.01231    21.0   0.80    1.36    954.45  0.792
  3 cnfood[1]               -0.01131    16.8  -0.73    1.00    950.60 -0.722

#46 83 cnfood E1LIQ1 D "Distilled spirits, at home"
ti 46 Distilled spirits, at home

r pce46 = !pce46[1],cnfood,cnfood[2],oildf
:                         46 Distilled spirits, at home
  SEE   =       0.15 RSQ   = 0.9956 RHO =  -0.28 Obser  =  162 from 1994.001
  SEE+1 =       0.14 RBSQ  = 0.9955 DurH = -3.71 DoFree =  158 to   2007.006
  MAPE  =       0.81
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce46                 - - - - - - - - - - - - - - - - -     13.59 - - -
  1 pce46[1]                 0.92446   199.9   0.92    1.17     13.54
  2 cnfood                   0.00571     3.3   0.40    1.06    954.45  0.464
  3 cnfood[2]               -0.00462     2.0  -0.32    1.02    946.75 -0.370
  4 oildf                    0.00915     0.9   0.00    1.00      0.32  0.009
```

```
#47 84 cnfood E1PMB1 C "Purchased meals and beverages (4)"
ti 47 Purchased meals and beverages

r pce47 = pce47[1],cnfood
:                        47 Purchased meals and beverages
  SEE   =       2.37 RSQ   = 0.9989 RHO =   0.21 Obser  =  162 from 1994.001
  SEE+1 =       2.33 RBSQ  = 0.9989 DurH =  3.73 DoFree =  159 to   2007.006
  MAPE  =       0.51
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce47                 - - - - - - - - - - - - - - - - -    359.65 - - -
  1 intercept              -16.65154    30.4  -0.05  920.10      1.00
  2 pce47[1]                 0.30200     9.0   0.30    2.02    358.13  0.300
  3 cnfood                   0.28094    42.1   0.75    1.00    954.45  0.700

#48 93 cnfood E1PIF1 C "Food furnished to employees or home grown"
ti 48 Food furnished to employees or home grown

r pce48 = !pce48[1],pce48[2]
:                  48 Food furnished to employees or home grown
  SEE   =       0.04 RSQ   = 0.9996 RHO =  -0.22 Obser  =  162 from 1994.001
  SEE+1 =       0.04 RBSQ  = 0.9996 DurH = -3.94 DoFree =  160 to   2007.006
  MAPE  =       0.24
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce48                 - - - - - - - - - - - - - - - - -     10.21 - - -
  1 pce48[1]                 1.74011   173.4   1.73    2.16     10.17
  2 pce48[2]                -0.73906    46.9  -0.73    1.00     10.13 -0.722

#49 99 cncloth E1SHU1 C "Shoes (12)"
ti 49 Shoes

r pce49 = pce49[1],cncloth,cncloth[1]
:                                    49 Shoes
  SEE   =       0.34 RSQ   = 0.9975 RHO =  -0.18 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9975 DurH = -2.84 DoFree =  158 to   2007.006
  MAPE  =       0.58
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce49                 - - - - - - - - - - - - - - - - -     46.81 - - -
  1 intercept               -0.71989     1.8  -0.02  401.19      1.00
  2 pce49[1]                 0.81268    69.3   0.81    4.27     46.67  0.812
  3 cncloth                  0.16509   105.9   1.04    1.98    293.63  0.941
  4 cncloth[1]              -0.13276    40.7  -0.83    1.00    292.79 -0.754

#50 100 cncloth E1WCL1 C "Women's and children's clothing and accessories
except shoes (14)"
ti 50 Women's and children's clothing and accessories except shoes

r pce50 = !pce50[1],cncloth,cncloth[1]
:         50 Women's and children's clothing and accessories except shoes
  SEE   =       0.34 RSQ   = 0.9997 RHO =  -0.29 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9997 DurH = -3.75 DoFree =  159 to   2007.006
  MAPE  =       0.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce50                 - - - - - - - - - - - - - - - - -    154.72 - - -
  1 pce50[1]                 0.94225   306.0   0.94   34.29    154.30
  2 cncloth                  0.52801   483.7   1.00   10.80    293.63  1.032
  3 cncloth[1]              -0.49765   228.6  -0.94    1.00    292.79 -0.969

#51 106 cncloth E1MMC1 C "Men's and boys' clothing and accessories except shoes
(15+16)"
ti 51  Men's and boys' clothing and accessories except shoes
```

```
r pce51 = !pce51[1],cncloth,cncloth[1]
:          51  Men's and boys' clothing and accessories except shoes
  SEE   =       0.27 RSQ   = 0.9995 RHO =  -0.24 Obser  =  162 from 1994.001
  SEE+1 =       0.26 RBSQ  = 0.9995 DurH = -3.12 DoFree =  159 to   2007.006
  MAPE  =       0.22
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce51                 - - - - - - - - - - - - - - - - -     92.10 - - -
  1 pce51[1]                0.94644   273.5   0.94   18.67     91.82
  2 cncloth                 0.30845   332.0   0.98    8.19    293.63  0.977
  3 cncloth[1]             -0.29160   186.2  -0.93    1.00    292.79 -0.920

#52 114 cngas E1GAO1 B "Gasoline and oil (75)"
ti 52 Gasoline and oil

r pce52 = cngas
:                              52 Gasoline and oil
  SEE   =       1.38 RSQ   = 0.9996 RHO =   0.51 Obser  =  162 from 1994.001
  SEE+1 =       1.20 RBSQ  = 0.9996 DW  =   0.99 DoFree =  160 to   2007.006
  MAPE  =       0.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce52                 - - - - - - - - - - - - - - - - -    182.08 - - -
  1 intercept              -6.29561    84.9  -0.03 2452.52      1.00
  2 cngas                   0.95223  4852.3   1.03    1.00    197.83  1.000

#53 117 cngas E1FUL1 B "Fuel oil and coal (40)"
ti 53 Fuel oil and coal

r pce53 = pce53[1],cngas,oildf
:                             53 Fuel oil and coal
  SEE   =       1.15 RSQ   = 0.9029 RHO =  -0.11 Obser  =  162 from 1994.001
  SEE+1 =       1.14 RBSQ  = 0.9011 DurH = -3.15 DoFree =  158 to   2007.006
  MAPE  =       4.75
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce53                 - - - - - - - - - - - - - - - - -     15.75 - - -
  1 intercept               2.67014     8.2   0.17   10.30      1.00
  2 pce53[1]                0.58228    19.9   0.58    1.21     15.68  0.577
  3 cngas                   0.01987     9.3   0.25    1.01    197.83  0.386
  4 oildf                   0.03981     0.3   0.00    1.00      0.32  0.024

#54 123 cnoth E1TOB1 C "Tobacco products (7)"
ti 54 Tobacco products

r pce54 = !pce54[1],pce54[2],cnoth,cnoth[1]
:                              54 Tobacco products
  SEE   =       1.44 RSQ   = 0.9931 RHO =  -0.03 Obser  =  162 from 1994.001
  SEE+1 =       1.44 RBSQ  = 0.9930 DurH = -0.94 DoFree =  158 to   2007.006
  MAPE  =       1.22
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce54                 - - - - - - - - - - - - - - - - -     73.28 - - -
  1 pce54[1]                0.61559    20.6   0.61    1.23     72.97
  2 pce54[2]                0.36730     7.7   0.36    1.07     72.67  0.369
  3 cnoth                   0.08196     3.3   0.60    1.06    536.51  0.605
  4 cnoth[1]               -0.07931     3.1  -0.58    1.00    533.91 -0.584

#55 124 cnoth E1TLG1 C "Toilet articles and preparations (21)"
ti 55 Toilet articles and preparations

r pce55 = pce55[1],cnoth,cnoth[1]
:                      55 Toilet articles and preparations
  SEE   =       0.40 RSQ   = 0.9955 RHO =  -0.08 Obser  =  162 from 1994.001
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```
  SEE+1 =       0.40 RBSQ  = 0.9954 DurH = -0.98 DoFree =  158 to   2007.006
  MAPE  =       0.55
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce55                 - - - - - - - - - - - - - - - - -     54.25 - - -
  1 intercept               0.91110     0.9   0.02  220.48      1.00
  2 pce55[1]                0.97078   367.4   0.97    1.71     54.09  0.969
  3 cnoth                   0.07306    30.2   0.72    1.66    536.51  1.577
  4 cnoth[1]               -0.07187    29.0  -0.71    1.00    533.91 -1.548

#56 128 cnoth E1SDH1 C "Semidurable house furnishings (33)"
ti 56 Semidurable house furnishings

r pce56 = pce56[1],cnoth,cnoth[1]
:                        56 Semidurable house furnishings
  SEE   =       0.36 RSQ   = 0.9956 RHO =  -0.25 Obser  =  162 from 1994.001
  SEE+1 =       0.35 RBSQ  = 0.9955 DurH = -3.73 DoFree =  158 to   2007.006
  MAPE  =       0.73
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce56                 - - - - - - - - - - - - - - - - -     36.33 - - -
  1 intercept               1.99449     3.6   0.05  225.25      1.00
  2 pce56[1]                0.85533    91.1   0.85    1.25     36.22  0.853
  3 cnoth                   0.03433     8.9   0.51    1.12    536.51  0.807
  4 cnoth[1]               -0.02820     5.8  -0.41    1.00    533.91 -0.662

#57 129 cnoth E1CLP1 C "Cleaning, polishing preparations, misc. supplies and
paper products"
ti 57 Cleaning, polishing, misc. supplies and paper products

r pce57 = !pce57[1],gdp
:            57 Cleaning, polishing, misc. supplies and paper products
  SEE   =       0.46 RSQ   = 0.9983 RHO =  -0.36 Obser  =  162 from 1994.001
  SEE+1 =       0.43 RBSQ  = 0.9983 DurH = -4.81 DoFree =  160 to   2007.006
  MAPE  =       0.51
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce57                 - - - - - - - - - - - - - - - - -     62.96 - - -
  1 pce57[1]                0.95014   209.0   0.95    1.03     62.72
  2 gdp                     0.00034     1.4   0.05    1.00   9935.29  0.060

#58 133 cnoth E1DRG1 C "Drug preparations and sundries (45)"
ti 58 Drug preparations and sundries

r pce58 = pce58[1],cnoth
:                        58 Drug preparations and sundries
  SEE   =       2.89 RSQ   = 0.9983 RHO =  -0.10 Obser  =  162 from 1994.001
  SEE+1 =       2.88 RBSQ  = 0.9983 DurH = -1.46 DoFree =  159 to   2007.006
  MAPE  =       1.21
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce58                 - - - - - - - - - - - - - - - - -    179.71 - - -
  1 intercept             -30.20938    14.4  -0.17  588.69      1.00
  2 pce58[1]                0.73389    87.4   0.73    1.34    178.39  0.732
  3 cnoth                   0.14725    15.7   0.44    1.00    536.51  0.268

#59 139 cnoth E1DOL1 D "Toys, dolls, and games"
ti 59 Toys, dolls, and games

r pce59 = !pce59[1],cnoth,cnoth[1],gdp
:                            59 Toys, dolls, and games
  SEE   =       0.61 RSQ   = 0.9906 RHO =  -0.28 Obser  =  162 from 1994.001
  SEE+1 =       0.59 RBSQ  = 0.9904 DurH = -3.84 DoFree =  158 to   2007.006
  MAPE  =       0.99
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 pce59                - - - - - - - - - - - - - - - - - -     40.99 - - -
  1 pce59[1]                0.90261   154.2   0.90    1.26     40.84
  2 cnoth                   0.05307     7.3   0.69    1.25    536.51  1.075
  3 cnoth[1]               -0.05959     9.4  -0.78    1.06    533.91 -1.204
  4 gdp                     0.00075     2.9   0.18    1.00   9935.29  0.234

#60 140 cnoth E1AMM1 D "Sport supplies, including ammunition"
ti 60 Sport supplies, including ammunition

r pce60 = pce60[1],gdp
:                     60 Sport supplies, including ammunition
  SEE   =       0.17 RSQ   = 0.9955 RHO =  -0.16 Obser  =  162 from 1994.001
  SEE+1 =       0.17 RBSQ  = 0.9954 DurH = -3.67 DoFree =  159 to   2007.006
  MAPE  =       1.10
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce60                - - - - - - - - - - - - - - - - - -     11.91 - - -
  1 intercept              -0.33672     5.0  -0.03  220.67      1.00
  2 pce60[1]                0.57771    22.3   0.57    1.27     11.86  0.573
  3 gdp                     0.00054    12.8   0.45    1.00   9935.29  0.425

#61 141 cnoth E1FLM1 D "Film and photo supplies"
ti 61 Film and photo supplies

r pce61 = !pce61[1],cnoth
:                           61 Film and photo supplies
  SEE   =       0.06 RSQ   = 0.9712 RHO =  -0.15 Obser  =  162 from 1994.001
  SEE+1 =       0.06 RBSQ  = 0.9711 DurH = -1.90 DoFree =  160 to   2007.006
  MAPE  =       1.18
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce61                - - - - - - - - - - - - - - - - - -      3.36 - - -
  1 pce61[1]                0.97516   778.9   0.97    1.06      3.35
  2 cnoth                   0.00016     2.7   0.03    1.00    536.51  0.058

#62 142 cnoth E1STY1 C "Stationery and writing supplies (35)"
ti 62 Stationery and writing supplies

r pce62 = pce62[1],cnoth,cnoth[1],gdp
:                       62 Stationery and writing supplies
  SEE   =       0.19 RSQ   = 0.9855 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9852 DurH = -2.65 DoFree =  157 to   2007.006
  MAPE  =       0.77
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce62                - - - - - - - - - - - - - - - - - -     18.25 - - -
  1 intercept               0.44326     0.6   0.02   69.18      1.00
  2 pce62[1]                0.92715   178.7   0.93    1.27     18.21  0.916
  3 cnoth                   0.01631     7.2   0.48    1.24    536.51  1.340
  4 cnoth[1]               -0.01896     9.9  -0.55    1.05    533.91 -1.555
  5 gdp                     0.00023     2.4   0.13    1.00   9935.29  0.293

#63 145 cnoth E1NFR1 C "Net foreign remittances"
ti 63 Net foreign remittances

r pce63 = pce63[1],cnoth,oildf
:                           63 Net foreign remittances
  SEE   =       0.19 RSQ   = 0.9791 RHO =   0.41 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9787 DurH =  5.81 DoFree =  158 to   2007.006
  MAPE  =       3.89
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce63                - - - - - - - - - - - - - - - - - -      3.50 - - -
  1 intercept              -0.11216     0.5  -0.03   47.74      1.00
  2 pce63[1]                0.91274   134.2   0.90    1.06      3.47  0.914
```

```
  3 cnoth                     0.00082     1.6   0.13    1.02    536.51  0.078
  4 oildf                     0.01148     0.8   0.00    1.00      0.32  0.019

#64 150 cnoth E1MAG1 C "Magazines, newspapers, and sheet music (88)"
ti 64 Magazines, newspapers, and sheet music

r pce64 = pce64[1],pce64[2],pce64[3],gdp,oildf
:                   64 Magazines, newspapers, and sheet music
  SEE   =       0.38 RSQ   = 0.9956 RHO =  -0.07 Obser  =  162 from 1994.001
  SEE+1 =       0.38 RBSQ  = 0.9955 DurH = -2.65 DoFree =  156 to   2007.006
  MAPE  =       0.84
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce64                 - - - - - - - - - - - - - - - - -     34.87 - - -
  1 intercept                 0.39385     0.7   0.01  228.55      1.00
  2 pce64[1]                  0.70141    25.1   0.70    1.28     34.72  0.698
  3 pce64[2]                  0.08318     0.3   0.08    1.21     34.58  0.082
  4 pce64[3]                  0.15756     1.4   0.16    1.17     34.44  0.155
  5 gdp                       0.00018     1.0   0.05    1.13   9935.29  0.062
  6 oildf                     0.06296     6.2   0.00    1.00      0.32  0.024

#65 153 cnoth E1FLO1 C "Flowers, seeds, and potted plants (95)"
ti 65 Flowers, seeds, and potted plants

r pce65 = !pce65[1],cnoth,cnoth[1],gdp
:                     65 Flowers, seeds, and potted plants
  SEE   =       0.25 RSQ   = 0.9846 RHO =  -0.39 Obser  =  162 from 1994.001
  SEE+1 =       0.23 RBSQ  = 0.9843 DurH = -5.07 DoFree =  158 to   2007.006
  MAPE  =       1.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce65                 - - - - - - - - - - - - - - - - -     17.10 - - -
  1 pce65[1]                  0.97421   360.8   0.97    1.06     17.06
  2 cnoth                     0.00967     1.6   0.30    1.06    536.51  0.623
  3 cnoth[1]                 -0.01178     2.3  -0.37    1.02    533.91 -0.757
  4 gdp                       0.00016     1.1   0.09    1.00   9935.29  0.158

#66 155 cshous E1HOS1 B "Housing"
ti 66 Housing

r pce66 = !pce66[1]
:                                  66 Housing
  SEE   =       1.57 RSQ   = 0.9999 RHO =   0.20 Obser  =  162 from 1994.001
  SEE+1 =       1.54 RBSQ  = 0.9999 DurH =  2.60 DoFree =  161 to   2007.006
  MAPE  =       0.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce66                 - - - - - - - - - - - - - - - - -   1034.87 - - -
  1 pce66[1]                  1.00457 67319.6   1.00    1.00   1030.18

stack
#67 173 csho E1ELC1 C "Electricity (37)"
ti 67 Electricity
r pce67 = pce67[1],csho

#68 174 csho E1NGS1 C "Gas (38)"
ti 68 Gas
r pce68 = pce68[1],csho,gdp
do
:                                    68 Gas
  SEE   =       5.34 RSQ   = 0.9249 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       5.34 RBSQ  = 0.9240 DurH =  1.04 DoFree =  159 to   2007.006
  MAPE  =       3.69
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 pce67               - - - - - - - - - - - - - - - - - -    109.40 - - -
  1 intercept              1.72470     0.2   0.02   13.32      1.00
  2 pce67[1]               0.41840    15.3   0.42    1.62    108.99  0.412
  3 csho                   0.15858    27.4   0.57    1.00    391.48  0.567

:                                   68 Gas
  SEE   =       3.56 RSQ   = 0.9243 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       3.55 RBSQ  = 0.9229 DurH =  0.99 DoFree =  158 to   2007.006
  MAPE  =       6.48
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce68               - - - - - - - - - - - - - - - - - -     44.58 - - -
  1 intercept            -18.63937    20.3  -0.42   13.22      1.00
  2 pce68[1]               0.57729    39.3   0.58    1.76     44.41  0.573
  3 csho                   0.30804    23.7   2.71    1.33    391.48  1.660
  4 gdp                   -0.00836    15.5  -1.86    1.00   9935.29 -1.270


The Sigma Matrix

 0   28.53391    0.00000

 1    0.00000   12.67309


The Sigma Inverse Matrix

 0  0.0350  0.0000

 1  0.0000  0.0789


Calculating ...:                                 68 Gas
Regression number 1, pce67
  SEE   =       5.34 RSQ   = 0.9249 RHO =   0.06 Obser  =  324 from 1994.001
  SEE+1 =       5.34 RBSQ  = 0.9240 DurH = 999.00 DoFree =  317 to   2007.006
  MAPE  =       3.69 SEESUR =      1.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce67               - - - - - - - - - - - - - - - - - -    109.40 - - -
  1 intercept              1.72470     0.1   0.02    1.07      1.00
  2 pce67[1]               0.41840     7.9   0.42    1.00    108.99  0.412
  3 csho                   0.15858    14.5   0.57    1.00    391.48  0.567

:                                   68 Gas
Regression number 2, pce68
  SEE   =       3.56 RSQ   = 0.9243 RHO =   0.06 Obser  =  324 from 1994.001
  SEE+1 =       3.55 RBSQ  = 0.9229 DurH = 999.00 DoFree =  317 to   2007.006
  MAPE  =       6.48 SEESUR =      1.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  4 pce68               - - - - - - - - - - - - - - - - - -     44.58 - - -
  1 intercept            -18.63937    10.6  -0.42    7.11      1.00
  2 pce68[1]               0.57729    21.2   0.58    1.38     44.41  0.573
  3 csho                   0.30804    12.5   2.71    1.17    391.48  1.660
  4 gdp                   -0.00836     8.0  -1.86    1.00   9935.29 -1.270

#69 176 csho E1WAT1 C "Water and other sanitary services (39)"
ti 69 Water and other sanitary services

r pce69 = pce69[1]
:                     69 Water and other sanitary services
  SEE   =       0.14 RSQ   = 0.9998 RHO =   0.16 Obser  =  162 from 1994.001
```

```
  SEE+1 =       0.14 RBSQ  = 0.9998 DurH =  2.01 DoFree =  160 to   2007.006
  MAPE  =       0.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce69                 - - - - - - - - - - - - - - - - -     51.74 - - -
  1 intercept               0.14189     1.6   0.00 4278.67      1.00
  2 pce69[1]                1.00138  6441.2   1.00    1.00     51.52  1.000

stack
#70 181 csho E1CEL1 D "Cellular telephone"
ti 70 Cellular telephone
r pce70 = pce70[1],gdp

#71 182 csho E1OLC1 D "Local telephone"
ti 71 Local telephone
r pce71 = !pce71[1],pce70[1]

#72 183 csho E1LDT1 D "Long distance telephone"
ti 72 Long distance telephone
r pce72 = !pce72[1],csho,pce70[1]

do
:                         72 Long distance telephone
  SEE   =       0.26 RSQ   = 0.9998 RHO =   0.30 Obser  =  162 from 1994.001
  SEE+1 =       0.25 RBSQ  = 0.9998 DurH =  3.79 DoFree =  159 to   2007.006
  MAPE  =       0.67
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce70                 - - - - - - - - - - - - - - - - -     33.89 - - -
  1 intercept              -1.57216     2.3  -0.05 5675.14      1.00
  2 pce70[1]                0.97867   762.4   0.97    1.06     33.49  0.973
  3 gdp                     0.00027     2.9   0.08    1.00   9935.29  0.028

:                         72 Long distance telephone
  SEE   =       0.34 RSQ   = 0.9969 RHO =   0.15 Obser  =  162 from 1994.001
  SEE+1 =       0.34 RBSQ  = 0.9969 DurH =  1.92 DoFree =  160 to   2007.006
  MAPE  =       0.53
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce71                 - - - - - - - - - - - - - - - - -     45.75 - - -
  1 pce71[1]                1.00646  5296.2   1.00    1.07     45.65
  2 pce70[1]               -0.00590     3.5  -0.00    1.00     33.49 -0.018

:                         72 Long distance telephone
  SEE   =       0.58 RSQ   = 0.9957 RHO =   0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.58 RBSQ  = 0.9956 DurH =  1.01 DoFree =  159 to   2007.006
  MAPE  =       1.20
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce72                 - - - - - - - - - - - - - - - - -     37.36 - - -
  1 pce72[1]                0.96332   622.8   0.97    1.16     37.44
  2 csho                    0.00745     4.4   0.08    1.11    391.48  0.059
  3 pce70[1]               -0.04859     5.6  -0.04    1.00     33.49 -0.106


The Sigma Matrix

 0    0.06584    0.00000    0.00000

 1    0.00000    0.11878    0.00000

 2    0.00000    0.00000    0.33565
```

```
The Sigma Inverse Matrix

 0 15.1892  0.0000  0.0000

 1  0.0000  8.4188  0.0000

 2  0.0000  0.0000  2.9793


Calculating ...:                          72 Long distance telephone
Regression number 1, pce70
  SEE   =       0.26 RSQ   = 0.9998 RHO =   0.30 Obser  =  486 from 1994.001
  SEE+1 =       0.25 RBSQ  = 0.9998 DurH =  3.77 DoFree =  478 to   2007.006
  MAPE  =       0.67 SEESUR =       1.00
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce70                - - - - - - - - - - - - - - - - -     33.89 - - -
  1 intercept              -1.57216     0.8  -0.05    1.25      1.00
  2 pce70[1]                0.97867   404.5   0.97    1.00     33.49  0.973
  3 gdp                     0.00027     1.0   0.08    1.00   9935.29  0.028

:                          72 Long distance telephone
Regression number 2, pce71
  SEE   =       0.34 RSQ   = 0.9969 RHO =   0.15 Obser  =  486 from 1994.001
  SEE+1 =       0.34 RBSQ  = 0.9969 DurH =  1.92 DoFree =  478 to   2007.006
  MAPE  =       0.53 SEESUR =       1.00
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  4 pce71                - - - - - - - - - - - - - - - - -     45.75 - - -
  1 pce71[1]                1.00646  3016.6   1.00    1.00     45.65
  2 pce70[1]               -0.00590     1.2  -0.00    1.00     33.49 -0.018

:                          72 Long distance telephone
Regression number 3, pce72
  SEE   =       0.58 RSQ   = 0.9957 RHO =   0.08 Obser  =  486 from 1994.001
  SEE+1 =       0.58 RBSQ  = 0.9956 DurH =  1.01 DoFree =  478 to   2007.006
  MAPE  =       1.20 SEESUR =       1.00
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  7 pce72                - - - - - - - - - - - - - - - - -     37.36 - - -
  1 pce72[1]                0.96332   325.2   0.97    1.05     37.44
  2 csho                    0.00745     1.5   0.08    1.04    391.48  0.059
  3 pce70[1]               -0.04859     1.9  -0.04    1.00     33.49 -0.106

#73 186 csho E1DMS1 C "Domestic service (42)"
ti 73 Domestic service

r pce73 = pce73[1],csho,csho[1]
:                              73 Domestic service
  SEE   =       0.15 RSQ   = 0.9964 RHO =   0.55 Obser  =  162 from 1994.001
  SEE+1 =       0.13 RBSQ  = 0.9964 DurH =  7.23 DoFree =  158 to   2007.006
  MAPE  =       0.61
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce73                - - - - - - - - - - - - - - - - -     16.92 - - -
  1 intercept               0.11043     0.5   0.01  280.56      1.00
  2 pce73[1]                0.98043   356.6   0.98    1.01     16.86  0.980
  3 csho                   -0.00075     0.1  -0.02    1.01    391.48 -0.021
  4 csho[1]                 0.00146     0.4   0.03    1.00    389.99  0.040

#74 189 csho E1OPO1 C "Other (43)"
ti 74 Other Household Services

r pce74 = pce74[1],pce74[2],pce74[3],csho,csho[1]
:                          74 Other Household Services
```

```
  SEE   =       0.20 RSQ   = 0.9996 RHO =   0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.20 RBSQ  = 0.9996 DurH = 999.00 DoFree =  156 to   2007.006
  MAPE  =       0.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce74                - - - - - - - - - - - - - - - - -     51.85 - - -
  1 intercept               0.21395     1.2   0.00 2391.71      1.00
  2 pce74[1]                1.25851    61.5   1.25    1.12     51.63  1.262
  3 pce74[2]               -0.14343     0.4  -0.14    1.02     51.40 -0.144
  4 pce74[3]               -0.12012     0.7  -0.12    1.01     51.18 -0.121
  5 csho                    0.00254     0.6   0.02    1.01    391.48  0.018
  6 csho[1]                -0.00208     0.4  -0.02    1.00    389.99 -0.014

#75 202 cstr E1ARP1 D "Motor vehicle repair"
ti 75 Motor vehicle repair

r pce75 = !pce75[1],cstr
:                            75 Motor vehicle repair
  SEE   =       0.27 RSQ   = 0.9998 RHO =   0.16 Obser  =  162 from 1994.001
  SEE+1 =       0.27 RBSQ  = 0.9998 DurH =  2.10 DoFree =  160 to   2007.006
  MAPE  =       0.18
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce75                - - - - - - - - - - - - - - - - -    118.60 - - -
  1 pce75[1]                0.98423  1491.6   0.98    1.10    118.11
  2 cstr                    0.00850     5.0   0.02    1.00    275.95  0.018

#76 203 cstr E1RLO1 D "Motor vehicle rental, leasing, and other"
ti 76 Motor vehicle rental, leasing, and other

r pce76 = pce76[1],oildf
:                  76 Motor vehicle rental, leasing, and other
  SEE   =       0.60 RSQ   = 0.9963 RHO =   0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.59 RBSQ  = 0.9962 DurH =  2.36 DoFree =  159 to   2007.006
  MAPE  =       0.88
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce76                - - - - - - - - - - - - - - - - -     52.78 - - -
  1 intercept               1.24298     7.2   0.02  268.35      1.00
  2 pce76[1]                0.98054  1538.1   0.98    1.01     52.55  0.998
  3 oildf                   0.01963     0.3   0.00    1.00      0.32  0.004

#77 210 cstr E1TOL1 C "Bridge, tunnel, ferry, and road tolls"
ti 77 Bridge, tunnel, ferry, and road tolls

r pce77 = !pce77[1]
:                   77 Bridge, tunnel, ferry, and road tolls
  SEE   =       0.06 RSQ   = 0.9972 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.06 RBSQ  = 0.9972 DurH = -0.62 DoFree =  161 to   2007.006
  MAPE  =       0.86
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce77                - - - - - - - - - - - - - - - - -      5.08 - - -
  1 pce77[1]                1.00473  8991.6   1.00    1.00      5.06

#78 211 cstr E1AIN1 C "Insurance"
ti 78 Insurance (Automobiles)

r pce78 = pce78[1],cstr,gdp
:                          78 Insurance (Automobiles)
  SEE   =       0.26 RSQ   = 0.9991 RHO =   0.15 Obser  =  162 from 1994.001
  SEE+1 =       0.25 RBSQ  = 0.9991 DurH =  2.02 DoFree =  158 to   2007.006
  MAPE  =       0.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce78                - - - - - - - - - - - - - - - - -     45.19 - - -
```

```
  1 intercept                0.19525     0.5   0.00 1161.13      1.00
  2 pce78[1]                 0.99968   296.3   1.00    1.01     45.02  0.997
  3 cstr                    -0.00225     0.4  -0.01    1.00    275.95 -0.012
  4 gdp                      0.00006     0.1   0.01    1.00   9935.29  0.014

#79 213 cstr E1IMT1 C "Mass transit systems (79)"
ti 79 Mass transit systems (79)

r pce79 = !pce79[1],gdp
:                          79 Mass transit systems (79)
  SEE   =       0.15 RSQ   = 0.9882 RHO =  -0.30 Obser  =  162 from 1994.001
  SEE+1 =       0.14 RBSQ  = 0.9881 DurH = -4.02 DoFree =  160 to   2007.006
  MAPE  =       1.30
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce79                 - - - - - - - - - - - - - - - - -      9.03 - - -
  1 pce79[1]                 0.93549   198.9   0.93    1.04      9.00
  2 gdp                      0.00006     2.1   0.07    1.00   9935.29  0.086

#80 214 cstr E1TAX1 C "Taxicab (80)"
ti 80 Taxicab

r pce80 = !pce80[1],pce80[2],gdp,cstr[1]
:                                   80 Taxicab
  SEE   =       0.04 RSQ   = 0.9911 RHO =  -0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.04 RBSQ  = 0.9909 DurH = 999.00 DoFree =  158 to   2007.006
  MAPE  =       0.55
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce80                 - - - - - - - - - - - - - - - - -      3.42 - - -
  1 pce80[1]                 1.09614    48.8   1.09    1.03      3.41
  2 pce80[2]                -0.09385     0.4  -0.09    1.02      3.40 -0.093
  3 gdp                      0.00001     1.0   0.03    1.01   9935.29  0.047
  4 cstr[1]                 -0.00034     0.7  -0.03    1.00    274.86 -0.039

#81 216 cstr E1IRR1 C "Railway (82)"
ti 81 Railway

r pce81 = !pce81[1],cstr,oildf
:                                   81 Railway
  SEE   =       0.01 RSQ   = 0.9749 RHO =  -0.22 Obser  =  162 from 1994.001
  SEE+1 =       0.01 RBSQ  = 0.9746 DurH = -2.99 DoFree =  159 to   2007.006
  MAPE  =       1.97
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce81                 - - - - - - - - - - - - - - - - -      0.51 - - -
  1 pce81[1]                 0.91936   179.8   0.92    1.06      0.51
  2 cstr                     0.00016     2.8   0.08    1.00    275.95  0.082
  3 oildf                    0.00023     0.1   0.00    1.00      0.32  0.006

#82 217 cstr E1IBU1 C "Bus (83)"
ti 82 Bus

r pce82 = pce82[1]
:                                     82 Bus
  SEE   =       0.09 RSQ   = 0.8233 RHO =  -0.37 Obser  =  162 from 1994.001
  SEE+1 =       0.09 RBSQ  = 0.8222 DurH = -5.17 DoFree =  160 to   2007.006
  MAPE  =       2.96
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce82                 - - - - - - - - - - - - - - - - -      2.16 - - -
  1 intercept                0.22763     3.1   0.11    5.66      1.00
  2 pce82[1]                 0.89560   137.9   0.89    1.00      2.16  0.907

#83 218 cstr E1IAI1 C "Airline (84)"
```

```
ti 83 Airline

r pce83 = pce83[1],cstr
:                                  83 Airline
  SEE   =       1.25 RSQ   = 0.9070 RHO =  -0.17 Obser  =  162 from 1994.001
  SEE+1 =       1.24 RBSQ  = 0.9058 DurH = -2.58 DoFree =  159 to   2007.006
  MAPE  =       2.67
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce83                 - - - - - - - - - - - - - - - - -     31.08 - - -
  1 intercept               1.80871     1.8   0.06   10.75      1.00
  2 pce83[1]                0.84033    88.7   0.84    1.06     31.00  0.845
  3 cstr                    0.01169     2.9   0.10    1.00    275.95  0.128

#84 219 cstr E1TRO1 C "Other mass transportation(85)"
ti 84 Other transportation

r pce84 = pce84[1],oildf
:                            84 Other transportation
  SEE   =       0.12 RSQ   = 0.9942 RHO =   0.09 Obser  =  162 from 1994.001
  SEE+1 =       0.12 RBSQ  = 0.9942 DurH =  1.17 DoFree =  159 to   2007.006
  MAPE  =       1.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce84                 - - - - - - - - - - - - - - - - -      8.09 - - -
  1 intercept              -0.07789     0.7  -0.01  173.13      1.00
  2 pce84[1]                1.01502  1207.9   1.01    1.00      8.05  0.997
  3 oildf                  -0.00180     0.1  -0.00    1.00      0.32 -0.002

#85 221 csmc E1PHY1 C "Physicians (47)"
ti 85 Physicians

r pce85 = pce85[1],csmc
:                                 85 Physicians
  SEE   =       0.94 RSQ   = 0.9998 RHO =   0.25 Obser  =  162 from 1994.001
  SEE+1 =       0.92 RBSQ  = 0.9998 DurH =  3.79 DoFree =  159 to   2007.006
  MAPE  =       0.23
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce85                 - - - - - - - - - - - - - - - - -    257.60 - - -
  1 intercept              -1.16651     3.9  -0.00 4914.71      1.00
  2 pce85[1]                0.78774    76.6   0.78    1.16    256.22  0.782
  3 csmc                    0.05091     7.9   0.22    1.00   1118.22  0.218


#86 222 csmc E1DEN1 C "Dentists (48)"
ti 86 Dentists

r pce86 = pce86[1],csmc
:                                  86 Dentists
  SEE   =       0.15 RSQ   = 0.9999 RHO =   0.37 Obser  =  162 from 1994.001
  SEE+1 =       0.14 RBSQ  = 0.9999 DurH =  4.69 DoFree =  159 to   2007.006
  MAPE  =       0.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce86                 - - - - - - - - - - - - - - - - -     64.89 - - -
  1 intercept               0.07429     0.7   0.00 9999.99      1.00
  2 pce86[1]                1.01094   876.0   1.01    1.00     64.55  1.007
  3 csmc                   -0.00040     0.2  -0.01    1.00   1118.22 -0.007

#87 223 csmc E1OPS1 C "Other professional services (49)"
ti 87 Other professional services

r pce87 = pce87[1],csmc
:                         87 Other professional services
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  SEE   =       0.47 RSQ   = 0.9999 RHO =   0.34 Obser  =  162 from 1994.001
  SEE+1 =       0.44 RBSQ  = 0.9999 DurH =  4.48 DoFree =  159 to   2007.006
  MAPE  =       0.20
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce87                 - - - - - - - - - - - - - - - - -    175.65 - - -
  1 intercept              0.66587     3.4   0.00 8253.35      1.00
  2 pce87[1]               0.92531   373.1   0.92    1.16    174.73  0.921
  3 csmc                   0.01190     7.7   0.08    1.00   1118.22  0.079

#88 229 csmc E1HSP1 C "Hospitals"
ti 88 Hospitals

r pce88 = !pce88[1],csmc
:                                  88 Hospitals
  SEE   =       1.91 RSQ   = 0.9997 RHO =  -0.15 Obser  =  162 from 1994.001
  SEE+1 =       1.89 RBSQ  = 0.9997 DurH = -2.21 DoFree =  160 to   2007.006
  MAPE  =       0.37
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce88                 - - - - - - - - - - - - - - - - -    435.95 - - -
  1 pce88[1]               0.82141   104.2   0.82    1.16    433.73
  2 csmc                   0.07126     7.6   0.18    1.00   1118.22  0.184

#89 233 csmc E1NRS1 C "Nursing homes"
ti 89 Nursing homes

r pce89 = pce89[1],csmc
:                                89 Nursing homes
  SEE   =       0.26 RSQ   = 0.9998 RHO =   0.60 Obser  =  162 from 1994.001
  SEE+1 =       0.21 RBSQ  = 0.9998 DurH =  7.63 DoFree =  159 to   2007.006
  MAPE  =       0.22
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce89                 - - - - - - - - - - - - - - - - -     89.70 - - -
  1 intercept              0.64368     5.3   0.01 4702.34      1.00
  2 pce89[1]               0.98086  1124.3   0.98    1.07     89.30  0.979
  3 csmc                   0.00131     3.4   0.02    1.00   1118.22  0.021

#90 236 csmc E1HIN1 C "Health insurance (56)"
ti 90 Health insurance

r pce90 = pce90[1],csmc,csmc[1]
:                               90 Health insurance
  SEE   =       0.35 RSQ   = 0.9999 RHO =   0.80 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9999 DurH = 10.21 DoFree =  158 to   2007.006
  MAPE  =       0.28
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce90                 - - - - - - - - - - - - - - - - -     94.43 - - -
  1 intercept             -1.08819     4.9  -0.01 8209.40      1.00
  2 pce90[1]               0.97680   906.7   0.97    1.19     93.81  0.969
  3 csmc                   0.03343     3.0   0.40    1.05   1118.22  0.295
  4 csmc[1]               -0.03011     2.4  -0.35    1.00   1112.34 -0.264

#91 241 csrec E1SSA1 C "Admissions to specified spectator amusements (96)"
ti 91 Admissions to specified spectator amusements

r pce91 = pce91[1],csrec,csrec[1],oildf
:                 91 Admissions to specified spectator amusements
  SEE   =       0.78 RSQ   = 0.9870 RHO =  -0.15 Obser  =  162 from 1994.001
  SEE+1 =       0.77 RBSQ  = 0.9866 DurH = -2.79 DoFree =  157 to   2007.006
  MAPE  =       1.95
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce91                 - - - - - - - - - - - - - - - - -     30.69 - - -
```

```
  1 intercept               0.97615     2.8   0.03   76.73      1.00
  2 pce91[1]                0.70533    40.6   0.70    1.84     30.55  0.708
  3 csrec                   0.31648    24.0   2.83    1.42    274.40  3.147
  4 csrec[1]               -0.28819    18.7  -2.56    1.02    272.95 -2.858
  5 oildf                  -0.05468     1.1  -0.00    1.00      0.32 -0.017

#92 246 csrec E1RTV1 C "Radio and television repair"
ti 92 Radio and television repair

r pce92 = pce92[1],pce92[2],csrec
:                        92 Radio and television repair
  SEE   =       0.02 RSQ   = 0.9987 RHO =  -0.14 Obser  =  162 from 1994.001
  SEE+1 =       0.02 RBSQ  = 0.9987 DurH = -2.91 DoFree =  158 to   2007.006
  MAPE  =       0.36
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce92                 - - - - - - - - - - - - - - - - -      4.18 - - -
  1 intercept               0.02132     0.5   0.01  767.74      1.00
  2 pce92[1]                1.61556   129.5   1.61    1.64      4.17  1.604
  3 pce92[2]               -0.62562    27.8  -0.62    1.01      4.15 -0.617
  4 csrec                   0.00009     0.7   0.01    1.00    274.40  0.011

#93 247 csrec E1CLU1 C "Clubs and fraternal organizations"
ti 93 Clubs and fraternal organizations

r pce93 = !pce93[1],gdp
:                     93 Clubs and fraternal organizations
  SEE   =       0.16 RSQ   = 0.9967 RHO =   0.28 Obser  =  162 from 1994.001
  SEE+1 =       0.15 RBSQ  = 0.9967 DurH =  3.61 DoFree =  160 to   2007.006
  MAPE  =       0.54
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce93                 - - - - - - - - - - - - - - - - -     19.83 - - -
  1 pce93[1]                0.98631   888.1   0.98    1.03     19.78
  2 gdp                     0.00003     1.3   0.02    1.00   9935.29  0.023

#94 248 csrec E1COM1 C "Commercial participant amusements"
ti 94 Commercial participant amusements

r pce94 = pce94[1],csrec,csrec[1]
:                     94 Commercial participant amusements
  SEE   =       0.83 RSQ   = 0.9987 RHO =  -0.14 Obser  =  162 from 1994.001
  SEE+1 =       0.82 RBSQ  = 0.9987 DurH = -2.20 DoFree =  158 to   2007.006
  MAPE  =       0.86
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce94                 - - - - - - - - - - - - - - - - -     77.78 - - -
  1 intercept              -3.03012     4.8  -0.04  772.36      1.00
  2 pce94[1]                0.80843    67.4   0.80    3.17     77.28  0.807
  3 csrec                   0.61391    66.2   2.17    2.01    274.40  1.811
  4 csrec[1]               -0.55001    41.8  -1.93    1.00    272.95 -1.618

#95 254 csrec E1PAR1 C "Pari-mutual net receipts"
ti 95 Pari-mutual net receipts

r pce95 = pce95[1],pce95[2],csrec,gdp
:                        95 Pari-mutual net receipts
  SEE   =       0.02 RSQ   = 0.9994 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.02 RBSQ  = 0.9994 DurH = -1.43 DoFree =  157 to   2007.006
  MAPE  =       0.30
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce95                 - - - - - - - - - - - - - - - - -      4.95 - - -
  1 intercept              -0.05623     1.1  -0.01 1611.57      1.00
  2 pce95[1]                1.33692    76.6   1.33    1.32      4.92  1.331
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  3 pce95[2]               -0.39265     9.3  -0.39    1.09      4.90 -0.389
  4 csrec                  -0.00086     1.4  -0.05    1.06    274.40 -0.061
  5 gdp                     0.00006     3.2   0.12    1.00   9935.29  0.119

#96 255 csrec E1REO1 C "Other Recreation Services"
ti 96 Other Recreation Services

r pce96 = pce96[1],csrec
:                          96 Other Recreation Services
  SEE   =       0.48 RSQ   = 0.9998 RHO =   0.09 Obser  =  162 from 1994.001
  SEE+1 =       0.47 RBSQ  = 0.9998 DurH =  1.34 DoFree =  159 to   2007.006
  MAPE  =       0.24
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce96                 - - - - - - - - - - - - - - - - -    136.98 - - -
  1 intercept               0.08001     0.1   0.00 5211.73      1.00
  2 pce96[1]                0.90540   129.9   0.90    1.05    136.24  0.902
  3 csrec                   0.04935     2.5   0.10    1.00    274.40  0.098

#97 270 csoth E1CRC1 C "Cleaning, storage, and repair of clothing and shoes
(17)"
ti 97 Cleaning, storage, and repair of clothing and shoes

r pce97 = !pce97[1],pce97[2]
:             97 Cleaning, storage, and repair of clothing and shoes
  SEE   =       0.05 RSQ   = 0.9992 RHO =  -0.13 Obser  =  162 from 1994.001
  SEE+1 =       0.04 RBSQ  = 0.9992 DurH = -2.59 DoFree =  160 to   2007.006
  MAPE  =       0.22
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce97                 - - - - - - - - - - - - - - - - -     14.75 - - -
  1 pce97[1]                1.64907   136.9   1.65    1.71     14.71
  2 pce97[2]               -0.64832    30.8  -0.65    1.00     14.68 -0.656

#98 275 csoth E1BBB1 C "Barbershops, beauty parlors, and health clubs (22)"
ti 98 Barbershops, beauty parlors, and health clubs

r pce98 = pce98[1],gdp
:               98 Barbershops, beauty parlors, and health clubs
  SEE   =       0.13 RSQ   = 0.9998 RHO =   0.34 Obser  =  162 from 1994.001
  SEE+1 =       0.12 RBSQ  = 0.9998 DurH =  4.40 DoFree =  159 to   2007.006
  MAPE  =       0.25
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce98                 - - - - - - - - - - - - - - - - -     38.77 - - -
  1 intercept               0.22554     2.0   0.01 5034.09      1.00
  2 pce98[1]                1.01177   689.6   1.01    1.01     38.59  1.011
  3 gdp                    -0.00005     0.4  -0.01    1.00   9935.29 -0.011

#99 278 csoth E1COT1 C "Other Personal Care(19)"
ti 99 Other Personal Care

r pce99 = !pce99[1],pce99[2]
:                           99 Other Personal Care
  SEE   =       0.16 RSQ   = 0.9998 RHO =  -0.07 Obser  =  162 from 1994.001
  SEE+1 =       0.16 RBSQ  = 0.9998 DurH = -2.35 DoFree =  160 to   2007.006
  MAPE  =       0.34
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce99                 - - - - - - - - - - - - - - - - -     34.69 - - -
  1 pce99[1]                1.44993    88.9   1.44    1.24     34.45
  2 pce99[2]               -0.44588    11.3  -0.44    1.00     34.20 -0.438

#100 282 csoth E1BRO1 C "Brokerage charges and investment counseling (61)"
ti 100 Brokerage charges and investment counseling
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```
r pce100 = pce100[1],djia
:                100 Brokerage charges and investment counseling
  SEE   =       3.51 RSQ   = 0.9736 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       3.50 RBSQ  = 0.9733 DurH =  0.89 DoFree =  159 to   2007.006
  MAPE  =       3.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce100                - - - - - - - - - - - - - - - - -     75.55 - - -
  1 intercept               0.78405     0.2   0.01   37.86      1.00
  2 pce100[1]               0.83978    90.8   0.83    1.09     75.05  0.836
  3 djia                    0.00134     4.6   0.16    1.00   8771.94  0.157

#101 290 csoth E1BNK1 C "Bank service charges, trust services, and safe deposit
box rental"
ti 101 Bank, trust services, and safe deposit box rental

r pce101 = !pce101[1],csoth,csoth[1]
:             101 Bank, trust services, and safe deposit box rental
  SEE   =       0.61 RSQ   = 0.9994 RHO =   0.17 Obser  =  162 from 1994.001
  SEE+1 =       0.60 RBSQ  = 0.9994 DurH =  2.21 DoFree =  159 to   2007.006
  MAPE  =       0.66
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce101                - - - - - - - - - - - - - - - - -     67.36 - - -
  1 pce101[1]               1.00687  1215.9   1.00    1.06     66.85
  2 csoth                   0.02306     3.0   0.32    1.06    933.88  0.217
  3 csoth[1]               -0.02312     3.0  -0.32    1.00    928.97 -0.217

#102 295 csoth E1IMP1 C "Services furnished w/out payment by intermediaries
except life ins. carriers"
ti 102 Services furnished w/out payment by intermediaries except life ins.
carriers

r pce102 = pce102[1],csoth,djia
 102 Services furnished w/out payment by intermediaries except life ins. carrier
  SEE   =       1.01 RSQ   = 0.9991 RHO =   0.69 Obser  =  162 from 1994.001
  SEE+1 =       0.75 RBSQ  = 0.9991 DurH =  8.89 DoFree =  158 to   2007.006
  MAPE  =       0.47
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce102                - - - - - - - - - - - - - - - - -    164.08 - - -
  1 intercept               2.00803     4.2   0.01 1125.32      1.00
  2 pce102[1]               0.94777   410.8   0.94    1.15    163.38  0.947
  3 csoth                   0.00510     1.8   0.03    1.12    933.88  0.035
  4 djia                    0.00028     5.6   0.01    1.00   8771.94  0.021

#103 298 csoth E1LIF1 C "Expense of handling life insurance and pension plans
(64)"
ti 103 Expense of handling life insurance and pension plans

r pce103 = pce103[1],csmc,gdp,oildf[6],oildf[9]
:           103 Expense of handling life insurance and pension plans
  SEE   =       3.58 RSQ   = 0.9387 RHO =  -0.21 Obser  =  162 from 1994.001
  SEE+1 =       3.50 RBSQ  = 0.9368 DurH = -3.94 DoFree =  156 to   2007.006
  MAPE  =       1.97
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce103                - - - - - - - - - - - - - - - - -     89.41 - - -
  1 intercept               0.85311     0.0   0.01   16.32      1.00
  2 pce103[1]               0.67094    37.2   0.67    1.22     89.13  0.664
  3 csmc                   -0.02157     2.0  -0.27    1.12   1118.22 -0.422
  4 gdp                     0.00531     4.3   0.59    1.04   9935.29  0.722
  5 oildf[6]                0.12589     0.3   0.00    1.03      0.24  0.018
  6 oildf[9]                0.31839     1.6   0.00    1.00      0.25  0.046
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#104 299 csoth E1GAL1 C "Legal services (65)"
ti 104 Legal services

r pce104 = !pce104[1],pce104[2],csoth
:                              104 Legal services
  SEE   =       0.30 RSQ   = 0.9996 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.30 RBSQ  = 0.9996 DurH = -1.37 DoFree =  159 to   2007.006
  MAPE  =       0.30
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce104                - - - - - - - - - - - - - - - - -     67.21 - - -
  1 pce104[1]               1.37063    78.1   1.36    1.21     66.89
  2 pce104[2]              -0.39001     8.5  -0.39    1.03     66.57 -0.384
  3 csoth                   0.00159     1.6   0.02    1.00    933.88  0.024

#105 300 csoth E1FUN1 C "Funeral and burial expenses (66)"
ti 105 Funeral and burial expenses

r pce105 = pce105[1],pce105[2],oildf,gdp
:                        105 Funeral and burial expenses
  SEE   =       0.38 RSQ   = 0.9481 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.38 RBSQ  = 0.9468 DurH = 999.00 DoFree =  157 to   2007.006
  MAPE  =       2.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce105                - - - - - - - - - - - - - - - - -     14.39 - - -
  1 intercept               2.33271     7.1   0.16   19.27      1.00
  2 pce105[1]               0.53690    13.5   0.54    1.27     14.35  0.534
  3 pce105[2]               0.09041     0.4   0.09    1.17     14.31  0.090
  4 oildf                  -0.01633     0.4  -0.00    1.17      0.32 -0.022
  5 gdp                     0.00031     8.0   0.21    1.00   9935.29  0.364

#106 301 csoth E1PBO1 C "Other Personal Service(67)"
ti 106 Other Personal Service(67)

r pce106 = pce106[1]
:                        106 Other Personal Service(67)
  SEE   =       0.13 RSQ   = 0.9998 RHO =   0.32 Obser  =  162 from 1994.001
  SEE+1 =       0.13 RBSQ  = 0.9998 DurH =  4.09 DoFree =  160 to   2007.006
  MAPE  =       0.28
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce106                - - - - - - - - - - - - - - - - -     34.18 - - -
  1 intercept               0.13000     2.8   0.00 4167.40      1.00
  2 pce106[1]               1.00118  6355.5   1.00    1.00     34.01  1.000

#107 310 csoth E1HED1 C "Higher education (105)"
ti 107 Higher education

r pce107 = pce107[1],csoth
:                              107 Higher education
  SEE   =       0.26 RSQ   = 0.9999 RHO =   0.57 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9999 DurH =  7.29 DoFree =  159 to   2007.006
  MAPE  =       0.21
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce107                - - - - - - - - - - - - - - - - -     93.36 - - -
  1 intercept              -0.09998     0.3  -0.00 9546.32      1.00
  2 pce107[1]               0.99047  1348.9   0.98    1.05     92.84  0.986
  3 csoth                   0.00161     2.3   0.02    1.00    933.88  0.015

#108 313 csoth E1EED1 C "Nursery, elementary, and secondary schools (106)"
ti 108 Nursery, elementary, and secondary schools
```

```
r pce108 = pce108[1],csoth
:                108 Nursery, elementary, and secondary schools
  SEE   =       0.07 RSQ   = 0.9999 RHO =   0.35 Obser  =  162 from 1994.001
  SEE+1 =       0.07 RBSQ  = 0.9999 DurH =  4.48 DoFree =  159 to   2007.006
  MAPE  =       0.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce108                - - - - - - - - - - - - - - - - -     35.62 - - -
  1 intercept               0.17186     1.7   0.00 8596.67      1.00
  2 pce108[1]               0.98681   789.0   0.98    1.02     35.47  0.984
  3 csoth                   0.00047     1.0   0.01    1.00    933.88  0.016

#109 316 csoth E1OED1 C "Other Education (107)"
ti 109 Other Education

r pce109 = !pce109[1],pce109[2],csoth
:                              109 Other Education
  SEE   =       0.27 RSQ   = 0.9995 RHO =  -0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.27 RBSQ  = 0.9995 DurH = -0.09 DoFree =  159 to   2007.006
  MAPE  =       0.40
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce109                - - - - - - - - - - - - - - - - -     41.68 - - -
  1 pce109[1]               1.36701    78.0   1.36    1.22     41.41
  2 pce109[2]              -0.38281     8.3  -0.38    1.03     41.14 -0.379
  3 csoth                   0.00089     1.5   0.02    1.00    933.88  0.017

#110 320 csoth E1POL1 D "Political organizations"
ti 110 Political organizations

r pce110 = !pce110[8],pce110[4],csoth
:                          110 Political organizations
  SEE   =       1.21 RSQ   = 0.5307 RHO =   0.81 Obser  =  162 from 1994.001
  SEE+1 =       0.72 RBSQ  = 0.5248 DurH = 16.22 DoFree =  159 to   2007.006
  MAPE  =      96.24
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce110                - - - - - - - - - - - - - - - - -      2.27 - - -
  1 pce110[8]              -0.69327    34.5  -0.66    4.39      2.17
  2 pce110[4]               0.64745    31.0   0.64    2.07      2.25  0.652
  3 csoth                   0.00242    43.8   1.00    1.00    933.88  0.317

#111 321 csoth E1MUS1 D "Museums and libraries"
ti 111 Museums and libraries

r pce111 = !pce111[1],pce111[2],csoth[1]
:                           111 Museums and libraries
  SEE   =       0.04 RSQ   = 0.9996 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.04 RBSQ  = 0.9995 DurH = -1.13 DoFree =  159 to   2007.006
  MAPE  =       0.39
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce111                - - - - - - - - - - - - - - - - -      7.58 - - -
  1 pce111[1]               1.61217   132.4   1.60    1.75      7.54
  2 pce111[2]              -0.63850    30.5  -0.63    1.05      7.50 -0.635
  3 csoth[1]                0.00023     2.4   0.03    1.00    928.97  0.029

#112 322 csoth E1FOU1 D "Foundations to religion and welfare"
ti 112 Foundations to religion and welfare

r pce112 = ! pce112[1],csoth
:                    112 Foundations to religion and welfare
  SEE   =       0.08 RSQ   = 0.9991 RHO =   0.54 Obser  =  162 from 1994.001
  SEE+1 =       0.07 RBSQ  = 0.9991 DurH =  6.92 DoFree =  160 to   2007.006
  MAPE  =       0.60
```

```
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce112               - - - - - - - - - - - - - - - - -     10.09 - - -
  1 pce112[1]              0.97152   801.6   0.97    1.09     10.05
  2 csoth                  0.00035     4.5   0.03    1.00    933.88  0.031

#113 323 csoth E1WEL1 D "Social welfare"
ti 113 Social welfare

r pce113 = !pce113[1],pce113[2],csoth
:                               113 Social welfare
  SEE   =       0.22 RSQ   = 0.9999 RHO =   0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9999 DurH =  0.99 DoFree =  159 to   2007.006
  MAPE  =       0.16
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce113               - - - - - - - - - - - - - - - - -    108.72 - - -
  1 pce113[1]              1.63506   136.7   1.63    2.15    108.10
  2 pce113[2]             -0.64554    32.2  -0.64    1.07    107.49 -0.642
  3 csoth                  0.00146     3.3   0.01    1.00    933.88  0.011

#114 326 csoth E1REL1 D "Religion"
ti 114 Religion

r pce114 = pce114[1],csoth
:                                  114 Religion
  SEE   =       0.14 RSQ   = 0.9997 RHO =   0.64 Obser  =  162 from 1994.001
  SEE+1 =       0.11 RBSQ  = 0.9997 DurH =  8.23 DoFree =  159 to   2007.006
  MAPE  =       0.22
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce114               - - - - - - - - - - - - - - - - -     47.41 - - -
  1 intercept              0.49758     2.6   0.01 3741.53      1.00
  2 pce114[1]              0.97031   557.9   0.97    1.05     47.23  0.967
  3 csoth                  0.00117     2.4   0.02    1.00    933.88  0.033

#115 328 csoth E1FTR1 C "Foreign travel by U.S. residents (110)"
ti 115 Foreign travel by U.S. residents

r pce115 = pce115[1],csoth,csoth[1],oildf
:                     115 Foreign travel by U.S. residents
  SEE   =       2.60 RSQ   = 0.9788 RHO =   0.14 Obser  =  162 from 1994.001
  SEE+1 =       2.57 RBSQ  = 0.9782 DurH =  2.13 DoFree =  157 to   2007.006
  MAPE  =       2.23
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce115               - - - - - - - - - - - - - - - - -     78.51 - - -
  1 intercept              1.30359     0.6   0.02   47.11      1.00
  2 pce115[1]              0.85808    94.9   0.85    1.20     78.11  0.853
  3 csoth                  0.13071     5.2   1.55    1.10    933.88  1.702
  4 csoth[1]              -0.12049     4.3  -1.43    1.02    928.97 -1.562
  5 oildf                  0.14693     0.8   0.00    1.00      0.32  0.018

#116 332 csoth E1EXF1 C "Less: Expenditures in the United States by
nonresidents (112)"
ti 116 Less: Expenditures in the United States by nonresidents

r pce116 = !pce116[1],csoth,gdp
:          116 Less: Expenditures in the United States by nonresidents
  SEE   =       3.93 RSQ   = 0.8953 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       3.92 RBSQ  = 0.8940 DurH = -0.75 DoFree =  159 to   2007.006
  MAPE  =       3.02
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pce116               - - - - - - - - - - - - - - - - -     91.75 - - -
  1 pce116[1]              0.82472    78.6   0.82    1.10     91.44
```

```
  2 csoth                    -0.02918     2.7  -0.30    1.08    933.88 -0.557
  3 gdp                       0.00439     3.7   0.48    1.00   9935.29  0.710
```

Price index equations

```
#1 3 cdmv E1NEW1 B "New autos (70)"
ti 1 New autos (70)

r cqp1 = cqp1[1],time,gdpi
:                               1 New autos (70)
  SEE   =       0.22 RSQ   = 0.9856 RHO =   0.21 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9854 DurH =  2.75 DoFree =  158 to   2007.006
  MAPE  =       0.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp1                  - - - - - - - - - - - - - - - - -     98.89 - - -
  1 intercept               3.06750     1.5   0.03   69.58      1.00
  2 cqp1[1]                 0.95401   518.0   0.95    1.21     98.89  0.958
  3 time                   -0.16709     5.3  -0.01    1.08      7.79 -0.347
  4 gdpi                    2.68918     3.8   0.03    1.00      1.04  0.295

#2 6 cdmv E1NPU1 B "Net purchases of used autos (71)"
ti 2 Net purchases of used autos (71)

r cqp2 = cqp2[1],crude,crude[1]
:                      2 Net purchases of used autos (71)
  SEE   =       0.89 RSQ   = 0.9547 RHO =   0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.89 RBSQ  = 0.9539 DurH =  0.71 DoFree =  158 to   2007.006
  MAPE  =       0.62
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp2                  - - - - - - - - - - - - - - - - -     98.59 - - -
  1 intercept               6.38240     4.2   0.06   22.08      1.00
  2 cqp2[1]                 0.93508   321.6   0.93    1.01     98.49  0.971
  3 crude                   0.02427     0.2   0.01    1.00     28.35  0.087
  4 crude[1]               -0.02049     0.1  -0.01    1.00     28.03 -0.072

#3 10 cdmv E1OAU1 C "Other motor vehicles (72)"
ti 3 Other motor vehicles (72)

r cqp3 = cqp3[1],time,oildf
:                          3 Other motor vehicles (72)
  SEE   =       0.32 RSQ   = 0.9803 RHO =   0.10 Obser  =  162 from 1994.001
  SEE+1 =       0.31 RBSQ  = 0.9800 DurH =  1.33 DoFree =  158 to   2007.006
  MAPE  =       0.26
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp3                  - - - - - - - - - - - - - - - - -     97.47 - - -
  1 intercept               3.83319     4.0   0.04   50.83      1.00
  2 cqp3[1]                 0.96306   608.7   0.96    1.13     97.44  0.987
  3 time                   -0.02585     4.9  -0.00    1.02      7.79 -0.045
  4 oildf                  -0.01932     0.9  -0.00    1.00      0.32 -0.019

#4 13 cdmv E1TBA1 C "Tires, tubes, accessories, and other parts (73)"
ti 4 Tires, tubes, accessories, and other parts

r cqp4 = cqp4[1],crude
:                  4 Tires, tubes, accessories, and other parts
  SEE   =       0.28 RSQ   = 0.9957 RHO =  -0.11 Obser  =  162 from 1994.001
  SEE+1 =       0.28 RBSQ  = 0.9956 DurH = -1.44 DoFree =  159 to   2007.006
```

```
  MAPE  =       0.20
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp4                 - - - - - - - - - - - - - - - - -    103.84 - - -
  1 intercept              1.77061     0.7   0.02  231.10      1.00
  2 cqp4[1]                0.98026   540.8   0.98    1.09    103.75  0.956
  3 crude                  0.01289     4.5   0.00    1.00     28.35  0.046

#5 17 cdfur E1FNR1 C "Furniture, including mattresses and bedsprings (29)"
ti 5 Furniture, including mattresses and bedsprings

r cqp5 = cqp5[1],oildf
:              5 Furniture, including mattresses and bedsprings
  SEE   =       0.54 RSQ   = 0.9611 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.54 RBSQ  = 0.9606 DurH =  0.25 DoFree =  159 to   2007.006
  MAPE  =       0.43
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp5                 - - - - - - - - - - - - - - - - -     97.82 - - -
  1 intercept              1.28593     0.2   0.01   25.68      1.00
  2 cqp5[1]                0.98663   403.5   0.99    1.00     97.84  0.982
  3 oildf                  0.01644     0.2   0.00    1.00      0.32  0.013

#6 18 cdfur E1APP1 C "Kitchen and other household appliances (30)"
ti 6 Kitchen and other household appliances

r cqp6 = cqp6[1],gdpi
:                  6 Kitchen and other household appliances
  SEE   =       0.53 RSQ   = 0.9872 RHO =   0.10 Obser  =  162 from 1994.001
  SEE+1 =       0.53 RBSQ  = 0.9871 DurH =  1.36 DoFree =  159 to   2007.006
  MAPE  =       0.42
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp6                 - - - - - - - - - - - - - - - - -     99.93 - - -
  1 intercept             -1.05275     0.1  -0.01   78.28      1.00
  2 cqp6[1]                1.00590   345.4   1.01    1.01     99.97  1.009
  3 gdpi                   0.41180     0.3   0.00    1.00      1.04  0.018

#7 21 cdfur E1CHN1 C "China, glassware, tableware, and utensils (31)"
ti 7 China, glassware, tableware, and utensils

r cqp7 = !cqp7[1],cqp7[2]
:                 7 China, glassware, tableware, and utensils
  SEE   =       1.09 RSQ   = 0.9751 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       1.09 RBSQ  = 0.9749 DurH = -5.45 DoFree =  160 to   2007.006
  MAPE  =       0.88
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp7                 - - - - - - - - - - - - - - - - -     96.82 - - -
  1 cqp7[1]                0.86441    32.8   0.87    1.02     96.95
  2 cqp7[2]                0.13406     0.9   0.13    1.00     97.09  0.133

#8 23 cdfur E1VAM1 C "Video and audio goods, including musical instruments (92)"
ti 8 Video and audio goods, including musical instruments

r cqp8 = !cqp8[1],time
:            8 Video and audio goods, including musical instruments
  SEE   =       0.64 RSQ   = 0.9990 RHO =  -0.12 Obser  =  162 from 1994.001
  SEE+1 =       0.64 RBSQ  = 0.9990 DurH = -1.48 DoFree =  160 to   2007.006
  MAPE  =       0.39
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp8                 - - - - - - - - - - - - - - - - -     97.91 - - -
  1 cqp8[1]                0.99773  9596.3   1.00    1.05     98.34
  2 time                  -0.02670     2.5  -0.00    1.00      7.79 -0.005
```

```
#9 32 cdfur E1CPP1 D "Computers and peripherals"
ti 9 Computers and peripherals

r cqp9 = !cqp9[1],cqp9[2]
:                          9 Computers and peripherals
  SEE   =       4.94 RSQ   = 0.9996 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       4.93 RBSQ  = 0.9996 DurH = -1.44 DoFree =  160 to   2007.006
  MAPE  =       1.06
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp9                  - - - - - - - - - - - - - - - - -    209.02 - - -
  1 cqp9[1]                 1.31230    72.7   1.34    1.13    213.87
  2 cqp9[2]                -0.32579     6.2  -0.34    1.00    218.76 -0.337

#10 33 cdfur E1CPS1 D "Software"
ti 10 Software

r cqp10 = !cqp10[1],cqp10[2]
:                                  10 Software
  SEE   =       2.49 RSQ   = 0.9993 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       2.48 RBSQ  = 0.9992 DurH = -1.68 DoFree =  160 to   2007.006
  MAPE  =       1.10
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp10                 - - - - - - - - - - - - - - - - -    134.75 - - -
  1 cqp10[1]                1.33541    74.8   1.36    1.14    136.73
  2 cqp10[2]               -0.34628     6.9  -0.36    1.00    138.74 -0.361

#11 35 cdfur E1FLR1 D "Floor coverings"
ti 11 Floor coverings

r cqp11 = cqp11[1],gdpi
:                              11 Floor coverings
  SEE   =       0.81 RSQ   = 0.9841 RHO =   0.11 Obser  =  162 from 1994.001
  SEE+1 =       0.81 RBSQ  = 0.9839 DurH =  1.63 DoFree =  159 to   2007.006
  MAPE  =       0.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp11                 - - - - - - - - - - - - - - - - -    100.51 - - -
  1 intercept               9.09872     3.7   0.09   62.78      1.00
  2 cqp11[1]                0.86782   107.5   0.87    1.08    100.36  0.864
  3 gdpi                    4.15998     3.8   0.04    1.00      1.04  0.132

#12 36 cdfur E1DHF1 D "Durable house furnishings, n.e.c."
ti 12 Durable house furnishings, n.e.c.

r cqp12 = !cqp12[1],time
:                     12 Durable house furnishings, n.e.c.
  SEE   =       0.97 RSQ   = 0.9943 RHO =  -0.16 Obser  =  162 from 1994.001
  SEE+1 =       0.96 RBSQ  = 0.9943 DurH = -2.07 DoFree =  160 to   2007.006
  MAPE  =       0.74
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp12                 - - - - - - - - - - - - - - - - -     95.27 - - -
  1 cqp12[1]                0.99979  5439.1   1.00    1.02     95.52
  2 time                   -0.03081     1.2  -0.00    1.00      7.79 -0.009

#13 39 cdfur E1WTR1 D "Writing equipment"
ti 13 Writing equipment

r cqp13 = !cqp13[1]
:                             13 Writing equipment
  SEE   =       0.82 RSQ   = 0.9986 RHO =  -0.07 Obser  =  162 from 1994.001
  SEE+1 =       0.82 RBSQ  = 0.9986 DurH = -0.84 DoFree =  161 to   2007.006
  MAPE  =       0.38
```

```
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp13               - - - - - - - - - - - - - - - - -    104.47 - - -
  1 cqp13[1]               1.00455 12910.9   1.00    1.00    104.01
```

```
#14 40 cdfur E1TOO1 D "Hand tools"
ti 14 Hand tools

r cqp14 = !cqp14[1],cqp14[3],time,gdpi
:                                 14 Hand tools
  SEE   =       0.45 RSQ   = 0.9633 RHO =   0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.45 RBSQ  = 0.9626 DurH =  0.75 DoFree =  158 to   2007.006
  MAPE  =       0.34
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp14               - - - - - - - - - - - - - - - - -    100.47 - - -
  1 cqp14[1]               0.87065    54.5   0.87    1.06    100.47
  2 cqp14[3]               0.09888     1.0   0.10    1.05    100.48  0.099
  3 time                  -0.25570     1.9  -0.02    1.04      7.79 -0.423
  4 gdpi                   4.87029     2.0   0.05    1.00      1.04  0.424
```

```
#15 44 cdoth E1OPT1 C "Ophthalmic products and orthopedic appliances (46)"
ti 15 Ophthalmic products and orthopedic appliances

r cqp15 = cqp15[1],time
:               15 Ophthalmic products and orthopedic appliances
  SEE   =       0.49 RSQ   = 0.9955 RHO =   0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.49 RBSQ  = 0.9954 DurH =  0.52 DoFree =  159 to   2007.006
  MAPE  =       0.34
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp15               - - - - - - - - - - - - - - - - -    100.57 - - -
  1 intercept             10.24180     3.0   0.10  220.80      1.00
  2 cqp15[1]               0.88264   109.6   0.88    1.06    100.41  0.881
  3 time                   0.21919     3.0   0.02    1.00      7.79  0.117
```

```
#16 47 cdoth E1GUN1 D "Guns"
ti 16 Guns

r cqp16 = !cqp16[1]
:                                    16 Guns
  SEE   =       0.65 RSQ   = 0.9945 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.64 RBSQ  = 0.9945 DurH = -0.61 DoFree =  161 to   2007.006
  MAPE  =       0.47
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp16               - - - - - - - - - - - - - - - - -    101.81 - - -
  1 cqp16[1]               0.99864 15739.8   1.00    1.00    101.95
```

```
#17 48 cdoth E1SPT1 D "Sporting equipment
ti 17 Sporting equipment

r cqp17 = !cqp17[1]
:                            17 Sporting equipment
  SEE   =       0.65 RSQ   = 0.9945 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.64 RBSQ  = 0.9945 DurH = -0.61 DoFree =  161 to   2007.006
  MAPE  =       0.47
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp17               - - - - - - - - - - - - - - - - -    101.81 - - -
  1 cqp17[1]               0.99864 15739.8   1.00    1.00    101.95
```

```
#18 49 cdoth E1CAM1 D "Photographic equipment"
ti 18 Photographic equipment

r cqp18 = !cqp18[1],crude,gdpi
```

```
:                           18 Photographic equipment
  SEE   =       0.59 RSQ   = 0.9991 RHO =   0.16 Obser  =  162 from 1994.001
  SEE+1 =       0.58 RBSQ  = 0.9991 DurH =  2.03 DoFree =  159 to   2007.006
  MAPE  =       0.56
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp18                 - - - - - - - - - - - - - - - - -     90.41 - - -
  1 cqp18[1]                1.00840  3755.9   1.01    1.38     90.81
  2 crude                   0.01439     1.2   0.00    1.11     28.35  0.011
  3 gdpi                   -1.52046     5.4  -0.02    1.00      1.04 -0.016

#19 50 cdoth E1BCY1 D "Bicycles"
ti 19 Bicycles

r cqp19 = cqp19[1],gdpi
:                                  19 Bicycles
  SEE   =       0.61 RSQ   = 0.9649 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.61 RBSQ  = 0.9645 DurH =  0.31 DoFree =  159 to   2007.006
  MAPE  =       0.46
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp19                 - - - - - - - - - - - - - - - - -     99.19 - - -
  1 intercept               7.98514     2.7   0.08   28.53      1.00
  2 cqp19[1]                0.90659   148.4   0.91    1.04     99.12  0.909
  3 gdpi                    1.29568     2.1   0.01    1.00      1.04  0.082

#20 51 cdoth E1MCY1 D "Motorcycles"
ti 20 Motorcycles

r cqp20 = !cqp20[2]
:                                20 Motorcycles
  SEE   =       0.85 RSQ   = 0.9712 RHO =   0.45 Obser  =  162 from 1994.001
  SEE+1 =       0.76 RBSQ  = 0.9712 DurH =  5.73 DoFree =  161 to   2007.006
  MAPE  =       0.58
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp20                 - - - - - - - - - - - - - - - - -     97.96 - - -
  1 cqp20[2]                1.00219 11379.0   1.00    1.00     97.73

#21 53 cdoth E1BOA1 D "Pleasure boats"
ti 21 Pleasure boats

r cqp21 = cqp21[1],gdpi
:                               21 Pleasure boats
  SEE   =       0.61 RSQ   = 0.9648 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.61 RBSQ  = 0.9644 DurH =  0.31 DoFree =  159 to   2007.006
  MAPE  =       0.46
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp21                 - - - - - - - - - - - - - - - - -     99.20 - - -
  1 intercept               7.98910     2.7   0.08   28.44      1.00
  2 cqp21[1]                0.90658   148.4   0.91    1.04     99.12  0.909
  3 gdpi                    1.29332     2.1   0.01    1.00      1.04  0.082

#22 54 cdoth E1AIR1 D "Pleasure aircraft"
ti 22 Pleasure aircraft

r cqp22 = cqp22[1],gdpi
:                             22 Pleasure aircraft
  SEE   =       0.61 RSQ   = 0.9648 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.61 RBSQ  = 0.9644 DurH =  0.31 DoFree =  159 to   2007.006
  MAPE  =       0.46
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp22                 - - - - - - - - - - - - - - - - -     99.20 - - -
  1 intercept               7.98910     2.7   0.08   28.44      1.00
```

```
  2 cqp22[1]                 0.90658   148.4   0.91    1.04     99.12  0.909
  3 gdpi                     1.29332     2.1   0.01    1.00      1.04  0.082

#23 55 cdoth E1JRY1 C "Jewelry and watches (18)"
ti 23 Jewelry and watches

r cqp23 = !cqp23[1],gdpi
:                            23 Jewelry and watches
  SEE   =       1.25 RSQ   = 0.9797 RHO =  -0.22 Obser  =  162 from 1994.001
  SEE+1 =       1.21 RBSQ  = 0.9796 DurH = -2.75 DoFree =  160 to   2007.006
  MAPE  =       0.92
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp23                 - - - - - - - - - - - - - - - - -    103.14 - - -
  1 cqp23[1]                 0.99370  2133.7   0.99    1.01    103.23
  2 gdpi                     0.53439     0.7   0.01    1.00      1.04  0.013

#24 56 cdoth E1BKS1 C "Books and maps (87)"
ti 24 Books and maps

r cqp24 = !cqp24[1],time
:                               24 Books and maps
  SEE   =       0.63 RSQ   = 0.9660 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.63 RBSQ  = 0.9658 DurH = -0.80 DoFree =  160 to   2007.006
  MAPE  =       0.45
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp24                 - - - - - - - - - - - - - - - - -    100.46 - - -
  1 cqp24[1]                 1.00183  6663.5   1.00    1.01    100.39
  2 time                    -0.01465     0.4  -0.00    1.00      7.79 -0.017

#25 61 cnfood E1GRA1 D "Cereals"
ti 25 Cereals

r cqp25 = !cqp25[1],cqp25[2]
:                                  25 Cereals
  SEE   =       0.50 RSQ   = 0.9870 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.50 RBSQ  = 0.9869 DurH =  0.84 DoFree =  160 to   2007.006
  MAPE  =       0.38
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp25                 - - - - - - - - - - - - - - - - -    101.09 - - -
  1 cqp25[1]                 0.72677    25.3   0.73    1.08    100.98
  2 cqp25[2]                 0.27462     4.0   0.27    1.00    100.87  0.273

#26 62 cnfood E1BAK1 D "Bakery products"
ti 26 Bakery products

r cqp26 = !cqp26[1],cqp26[2]
:                              26 Bakery products
  SEE   =       0.40 RSQ   = 0.9985 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.40 RBSQ  = 0.9985 DurH = -3.33 DoFree =  160 to   2007.006
  MAPE  =       0.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp26                 - - - - - - - - - - - - - - - - -    101.56 - - -
  1 cqp26[1]                 0.75409    26.3   0.75    1.06    101.32
  2 cqp26[2]                 0.24885     3.2   0.25    1.00    101.08  0.248

#27 63 cnfood E1BEE1 D "Beef and veal"
ti 27 Beef and veal

r cqp27 = !cqp27[1],gdpi
:                               27 Beef and veal
  SEE   =       1.17 RSQ   = 0.9958 RHO =   0.39 Obser  =  162 from 1994.001
```

```
  SEE+1 =       1.07 RBSQ  = 0.9958 DurH =  5.04 DoFree =  160 to   2007.006
  MAPE  =       0.63
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp27                 - - - - - - - - - - - - - - - - -    108.39 - - -
  1 cqp27[1]                0.96950   522.8   0.97    1.05    108.08
  2 gdpi                    3.47808     2.2   0.03    1.00      1.04  0.039

#28 64 cnfood E1POR1 D "Pork"
ti 28 Pork

r cqp28 = !cqp28[1],cqp28[2]
:                                   28 Pork
  SEE   =       0.82 RSQ   = 0.9915 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.82 RBSQ  = 0.9915 DurH = 999.00 DoFree =  160 to   2007.006
  MAPE  =       0.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp28                 - - - - - - - - - - - - - - - - -    101.41 - - -
  1 cqp28[1]                1.06482    46.2   1.06    1.00    101.23
  2 cqp28[2]               -0.06312     0.2  -0.06    1.00    101.05 -0.063

#29 65 cnfood E1MEA1 D "Other meats"
ti 29 Other meats

r cqp29 = !cqp29[1],gdpi
:                               29 Other meats
  SEE   =       1.03 RSQ   = 0.9881 RHO =  -0.39 Obser  =  162 from 1994.001
  SEE+1 =       0.95 RBSQ  = 0.9880 DurH = -5.01 DoFree =  160 to   2007.006
  MAPE  =       0.74
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp29                 - - - - - - - - - - - - - - - - -    103.74 - - -
  1 cqp29[1]                0.99362   997.3   0.99    1.01    103.55
  2 gdpi                    0.80866     0.4   0.01    1.00      1.04  0.018

#30 66 cnfood E1POU1 D "Poultry"
ti 30 Poultry

r cqp30 = !cqp30[1],cqp30[2]
:                                 30 Poultry
  SEE   =       0.95 RSQ   = 0.9873 RHO =   0.07 Obser  =  162 from 1994.001
  SEE+1 =       0.95 RBSQ  = 0.9872 DurH =  8.30 DoFree =  160 to   2007.006
  MAPE  =       0.73
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp30                 - - - - - - - - - - - - - - - - -    102.84 - - -
  1 cqp30[1]                0.75577    26.0   0.75    1.06    102.65
  2 cqp30[2]                0.24657     3.1   0.25    1.00    102.47  0.243

#31 67 cnfood E1FIS1 D "Fish and seafood"
ti 31 Fish and seafood

r cqp31 = cqp31[1],gdpi
:                             31 Fish and seafood
  SEE   =       0.76 RSQ   = 0.9855 RHO =  -0.19 Obser  =  162 from 1994.001
  SEE+1 =       0.75 RBSQ  = 0.9853 DurH = -2.76 DoFree =  159 to   2007.006
  MAPE  =       0.60
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp31                 - - - - - - - - - - - - - - - - -     98.80 - - -
  1 intercept               6.01194     1.8   0.06   68.85      1.00
  2 cqp31[1]                0.90922   123.0   0.91    1.05     98.62  0.898
  3 gdpi                    3.01316     2.3   0.03    1.00      1.04  0.098

#32 68 cnfood E1GGS1 D "Eggs"
```

```
ti 32 Eggs

r cqp32 = !cqp32[1],cqp32[2],cqp32[3]
:                                    32 Eggs
  SEE   =       3.27 RSQ   = 0.9359 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       3.27 RBSQ  = 0.9351 DurH = 999.00 DoFree =  159 to   2007.006
  MAPE  =       2.33
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp32                 - - - - - - - - - - - - - - - - -    106.58 - - -
  1 cqp32[1]                0.79854    28.7   0.80    1.08    106.24
  2 cqp32[2]                0.36391     4.1   0.36    1.02    105.89  0.352
  3 cqp32[3]               -0.15929     1.2  -0.16    1.00    105.62 -0.153

#33 69 cnfood E1MIL1 D "Fresh milk and cream"
ti 33 Fresh milk and cream

r cqp33 = cqp33[1]
:                            33 Fresh milk and cream
  SEE   =       1.96 RSQ   = 0.9725 RHO =   0.31 Obser  =  162 from 1994.001
  SEE+1 =       1.87 RBSQ  = 0.9723 DurH =  4.03 DoFree =  160 to   2007.006
  MAPE  =       1.04
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp33                 - - - - - - - - - - - - - - - - -    101.25 - - -
  1 intercept               0.73778     0.1   0.01   36.36      1.00
  2 cqp33[1]                0.99540   503.0   0.99    1.00    100.97  0.986

#34 70 cnfood E1DAI1 D "Processed dairy products"
ti 34 Processed dairy products

r cqp34 = cqp34[1],time,crude
:                          34 Processed dairy products
  SEE   =       0.68 RSQ   = 0.9954 RHO =   0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.68 RBSQ  = 0.9953 DurH =  0.65 DoFree =  158 to   2007.006
  MAPE  =       0.52
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp34                 - - - - - - - - - - - - - - - - -     99.32 - - -
  1 intercept               7.34185     3.0   0.07  216.36      1.00
  2 cqp34[1]                0.91179   165.4   0.91    1.06     99.12  0.914
  3 time                    0.27442     2.8   0.02    1.04      7.79  0.107
  4 crude                  -0.01879     1.8  -0.01    1.00     28.35 -0.028

#35 71 cnfood E1FRU1 D "Fresh fruits"
ti 35 Fresh fruits

r cqp35 = cqp35[1],gdpi
:                                35 Fresh fruits
  SEE   =       1.67 RSQ   = 0.9777 RHO =   0.08 Obser  =  162 from 1994.001
  SEE+1 =       1.66 RBSQ  = 0.9774 DurH =  1.24 DoFree =  159 to   2007.006
  MAPE  =       1.19
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp35                 - - - - - - - - - - - - - - - - -    103.01 - - -
  1 intercept               8.72200     4.2   0.08   44.77      1.00
  2 cqp35[1]                0.81899    71.3   0.82    1.09    102.74  0.814
  3 gdpi                    9.77841     4.6   0.10    1.00      1.04  0.180

#36 72 cnfood E1VEG1 D "Fresh vegetables"
ti 36 Fresh vegetables

r cqp36 = cqp36[1],gdpi
:                              36 Fresh vegetables
  SEE   =       3.17 RSQ   = 0.9612 RHO =   0.11 Obser  =  162 from 1994.001
```

```
  SEE+1 =       3.15 RBSQ  = 0.9607 DurH =  2.21 DoFree =  159 to   2007.006
  MAPE  =       2.18
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp36                 - - - - - - - - - - - - - - - - -    104.43 - - -
  1 intercept               8.88688     5.9   0.09   25.78      1.00
  2 cqp36[1]                0.65931    33.0   0.66    1.19    104.13  0.657
  3 gdpi                   25.93037     9.3   0.26    1.00      1.04  0.331

#37 73 cnfood E1PFV1 D "Processed fruits and vegetables"
ti 37 Processed fruits and vegetables

r cqp37 = cqp37[1],cqp37[2],gdpi
:                      37 Processed fruits and vegetables
  SEE   =       0.57 RSQ   = 0.9962 RHO =  -0.10 Obser  =  162 from 1994.001
  SEE+1 =       0.56 RBSQ  = 0.9961 DurH = -3.20 DoFree =  158 to   2007.006
  MAPE  =       0.41
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp37                 - - - - - - - - - - - - - - - - -    102.05 - - -
  1 intercept               4.37025     1.3   0.04  261.34      1.00
  2 cqp37[1]                0.48236    13.2   0.48    1.33    101.85  0.480
  3 cqp37[2]                0.43972    11.0   0.44    1.03    101.65  0.436
  4 gdpi                    3.71884     1.5   0.04    1.00      1.04  0.083

#38 74 cnfood E1JNB1 D "Juices and nonalcoholic drinks"
ti 38 Juices and nonalcoholic drinks

r cqp38 = cqp38[1],gdpi
:                       38 Juices and nonalcoholic drinks
  SEE   =       0.66 RSQ   = 0.9778 RHO =  -0.25 Obser  =  162 from 1994.001
  SEE+1 =       0.63 RBSQ  = 0.9776 DurH = -3.59 DoFree =  159 to   2007.006
  MAPE  =       0.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp38                 - - - - - - - - - - - - - - - - -    100.10 - - -
  1 intercept               7.80945     2.3   0.08   45.13      1.00
  2 cqp38[1]                0.89788   122.1   0.90    1.06    100.00  0.882
  3 gdpi                    2.41324     3.1   0.03    1.00      1.04  0.112

#39 75 cnfood E1CTM1 D "Coffee, tea and beverage materials"
ti 39 Coffee, tea and beverage materials
#lim 2000.001 2007.001 2006.012
r cqp39 = cqp39[1],cqp39[2],gdpi
:                     39 Coffee, tea and beverage materials
  SEE   =       1.64 RSQ   = 0.9544 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       1.63 RBSQ  = 0.9535 DurH =  1.33 DoFree =  158 to   2007.006
  MAPE  =       0.85
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp39                 - - - - - - - - - - - - - - - - -     98.99 - - -
  1 intercept               7.73683     6.8   0.08   21.92      1.00
  2 cqp39[1]                1.45147   103.5   1.45    1.50     98.73  1.513
  3 cqp39[2]               -0.54702    21.8  -0.54    1.03     98.46 -0.594
  4 gdpi                    1.75147     1.6   0.02    1.00      1.04  0.047

#40 76 cnfood E1FAT1 D "Fats and oils"
ti 40 Fats and oils

r cqp40 = !cqp40[1]
:                               40 Fats and oils
  SEE   =       0.90 RSQ   = 0.9859 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.90 RBSQ  = 0.9859 DurH =  0.29 DoFree =  161 to   2007.006
  MAPE  =       0.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 cqp40                - - - - - - - - - - - - - - - - - -    103.57 - - -
  1 cqp40[1]                1.00153 11493.6   1.00    1.00    103.41

#41 77 cnfood E1SWE1 D "Sugar and sweets"
ti 41 Sugar and sweets

r cqp41 = cqp41[1],gdpi
:                            41 Sugar and sweets
  SEE   =       0.52 RSQ   = 0.9942 RHO =  -0.39 Obser  =  162 from 1994.001
  SEE+1 =       0.48 RBSQ  = 0.9941 DurH = -5.53 DoFree =  159 to   2007.006
  MAPE  =       0.36
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp41                - - - - - - - - - - - - - - - - - -    100.51 - - -
  1 intercept               6.31980     2.5   0.06  172.40      1.00
  2 cqp41[1]                0.90528   137.9   0.90    1.05    100.35  0.902
  3 gdpi                    3.22647     2.6   0.03    1.00      1.04  0.097

#42 78 cnfood E1OFD1 D "Other foods"
ti 42 Other foods

r cqp42 = !cqp42[1],oildf,oildf[1]
:                              42 Other foods
  SEE   =       0.46 RSQ   = 0.9953 RHO =  -0.41 Obser  =  162 from 1994.001
  SEE+1 =       0.42 RBSQ  = 0.9952 DurH = -5.22 DoFree =  159 to   2007.006
  MAPE  =       0.35
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp42                - - - - - - - - - - - - - - - - - -     98.94 - - -
  1 cqp42[1]                1.00136 21172.7   1.00    1.05     98.79
  2 oildf                   0.04707     2.4   0.00    1.00      0.32  0.015
  3 oildf[1]               -0.01417     0.2  -0.00    1.00      0.29 -0.005

#43 79 cnfood E1PEF1 D "Pet food"
ti 43 Pet food

r cqp43 = !cqp43[1]
:                                43 Pet food
  SEE   =       0.55 RSQ   = 0.9927 RHO =  -0.03 Obser  =  162 from 1994.001
  SEE+1 =       0.55 RBSQ  = 0.9927 DurH = -0.32 DoFree =  161 to   2007.006
  MAPE  =       0.44
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp43                - - - - - - - - - - - - - - - - - -    101.75 - - -
  1 cqp43[1]                1.00151 18498.0   1.00    1.00    101.60

#44 81 cnfood E1MLT1 D "Beer and ale, at home"
ti 44 Beer and ale, at home

r cqp44 = !cqp44[1],gdpi
:                         44 Beer and ale, at home
  SEE   =       0.35 RSQ   = 0.9982 RHO =  -0.07 Obser  =  162 from 1994.001
  SEE+1 =       0.35 RBSQ  = 0.9981 DurH = -0.89 DoFree =  160 to   2007.006
  MAPE  =       0.26
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp44                - - - - - - - - - - - - - - - - - -    101.79 - - -
  1 cqp44[1]                0.99620  3350.9   0.99    1.04    101.63
  2 gdpi                    0.52605     1.8   0.01    1.00      1.04  0.013

#45 82 cnfood E1WIN1 D "Wine and brandy, at home"
ti 45 Wine and brandy, at home

r cqp45 = cqp45[1]
:                        45 Wine and brandy, at home
```

```
  SEE   =       0.37 RSQ   = 0.9948 RHO =  -0.11 Obser  =  162 from 1994.001
  SEE+1 =       0.37 RBSQ  = 0.9947 DurH = -1.46 DoFree =  160 to   2007.006
  MAPE  =       0.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp45                 - - - - - - - - - - - - - - - - -      98.33 - - -
  1 intercept               0.41204     0.2   0.00  191.59      1.00
  2 cqp45[1]                0.99686  1284.2   1.00    1.00     98.23  0.997

#46 83 cnfood E1LIQ1 D "Distilled spirits, at home"
ti 46 Distilled spirits, at home

r cqp46 = !cqp46[1]
:                         46 Distilled spirits, at home
  SEE   =       0.28 RSQ   = 0.9987 RHO =  -0.09 Obser  =  162 from 1994.001
  SEE+1 =       0.28 RBSQ  = 0.9987 DurH = -1.16 DoFree =  161 to   2007.006
  MAPE  =       0.20
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp46                 - - - - - - - - - - - - - - - - -     100.21 - - -
  1 cqp46[1]                1.00144 35948.6   1.00    1.00    100.07

#47 84 cnfood E1PMB1 C "Purchased meals and beverages (4)"
ti 47 Purchased meals and beverages

r cqp47 = cqp47[1],gdpi
:                       47 Purchased meals and beverages
  SEE   =       0.08 RSQ   = 0.9999 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.08 RBSQ  = 0.9999 DurH = -0.54 DoFree =  159 to   2007.006
  MAPE  =       0.06
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp47                 - - - - - - - - - - - - - - - - -     101.73 - - -
  1 intercept               1.11047     1.7   0.01 9999.99      1.00
  2 cqp47[1]                0.97620   704.1   0.97    1.06    101.51  0.971
  3 gdpi                    1.47978     2.7   0.02    1.00      1.04  0.029

#48 93 cnfood E1PIF1 C "Food furnished to employees or home #grown"
ti 48 Food furnished to employees or home #grown

r cqp48 = !cqp48[1],crude
:                 48 Food furnished to employees or home #grown
  SEE   =       0.27 RSQ   = 0.9992 RHO =   0.11 Obser  =  162 from 1994.001
  SEE+1 =       0.27 RBSQ  = 0.9992 DurH =  1.35 DoFree =  160 to   2007.006
  MAPE  =       0.19
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp48                 - - - - - - - - - - - - - - - - -     101.92 - - -
  1 cqp48[1]                1.00098 14713.3   1.00    1.03    101.72
  2 crude                   0.00374     1.5   0.00    1.00     28.35  0.006

#49 99 cncloth E1SHU1 C "Shoes (12)"
ti 49 Shoes

r cqp49 = !cqp49[1],crude,crude[11]
:                                 49 Shoes
  SEE   =       0.72 RSQ   = 0.9632 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.72 RBSQ  = 0.9627 DurH = -0.73 DoFree =  159 to   2007.006
  MAPE  =       0.56
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp49                 - - - - - - - - - - - - - - - - -     101.41 - - -
  1 cqp49[1]                0.99869  6410.7   1.00    1.01    101.48
  2 crude                   0.01197     0.6   0.00    1.01     28.35  0.048
  3 crude[11]              -0.01082     0.4  -0.00    1.00     25.51 -0.037
```

```
#50 100 cncloth E1WCL1 C "Women's and children's clothing and accessories
except shoes (14)"
ti 50 Women's and children's clothing and accessories except shoes

r cqp50 = !cqp50[1],crude,crude[11]
:        50 Women's and children's clothing and accessories except shoes
  SEE   =       0.70 RSQ   = 0.9903 RHO =  -0.11 Obser  =  162 from 1994.001
  SEE+1 =       0.69 RBSQ  = 0.9902 DurH = -1.43 DoFree =  159 to   2007.006
  MAPE  =       0.53
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp50                 - - - - - - - - - - - - - - - - -     99.77 - - -
  1 cqp50[1]                0.99784  6966.3   1.00    1.01     99.93
  2 crude                   0.01123     0.6   0.00    1.01     28.35  0.024
  3 crude[11]              -0.01038     0.4  -0.00    1.00     25.51 -0.019

#51 106 cncloth E1MMC1 C "Men's and boys' clothing and accessories except shoes
(15+16)"
ti 51  Men's and boys' clothing and accessories except shoes

r cqp51 = !cqp51[1]
:           51  Men's and boys' clothing and accessories except shoes
  SEE   =       0.55 RSQ   = 0.9907 RHO =  -0.09 Obser  =  162 from 1994.001
  SEE+1 =       0.55 RBSQ  = 0.9907 DurH = -1.13 DoFree =  161 to   2007.006
  MAPE  =       0.45
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp51                 - - - - - - - - - - - - - - - - -     96.67 - - -
  1 cqp51[1]                0.99887 17374.4   1.00    1.00     96.78

#52 114 cngas E1GAO1 B "Gasoline and oil (75)"
ti 52 Gasoline and oil

r cqp52 = !cqp52[1],oildf,oildf[1]
:                               52 Gasoline and oil
  SEE   =       4.12 RSQ   = 0.9848 RHO =   0.07 Obser  =  162 from 1994.001
  SEE+1 =       4.11 RBSQ  = 0.9846 DurH =  0.83 DoFree =  159 to   2007.006
  MAPE  =       2.60
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp52                 - - - - - - - - - - - - - - - - -    103.34 - - -
  1 cqp52[1]                0.99859  2467.8   0.99    2.36    102.59
  2 oildf                   1.51676    27.4   0.00    1.42      0.32  0.100
  3 oildf[1]                1.25764    19.2   0.00    1.00      0.29  0.083

#53 117 cngas E1FUL1 B "Fuel oil and coal (40)"
ti 53 Fuel oil and coal

r cqp53 = !cqp53[1],cqp53[2],oildf,oildf[1]
:                              53 Fuel oil and coal
  SEE   =       2.94 RSQ   = 0.9938 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       2.94 RBSQ  = 0.9936 DurH = -1.77 DoFree =  158 to   2007.006
  MAPE  =       1.60
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp53                 - - - - - - - - - - - - - - - - -    103.70 - - -
  1 cqp53[1]                1.10510    57.6   1.10    1.66    102.97
  2 cqp53[2]               -0.10250     0.6  -0.10    1.56    102.26 -0.100
  3 oildf                   0.70990    12.0   0.00    1.14      0.32  0.042
  4 oildf[1]                0.59923     6.7   0.00    1.00      0.29  0.035

#54 123 cnoth E1TOB1 C "Tobacco products (7)"
ti 54 Tobacco products

r cqp54 = cqp54[1]
```

```
:                              54 Tobacco products
  SEE   =       2.03 RSQ   = 0.9951 RHO =  -0.35 Obser  =  162 from 1994.001
  SEE+1 =       1.90 RBSQ  = 0.9950 DurH = -4.50 DoFree =  160 to   2007.006
  MAPE  =       1.34
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp54                 - - - - - - - - - - - - - - - - -     95.41 - - -
  1 intercept               0.61963     0.4   0.01  202.48      1.00
  2 cqp54[1]                0.99899  1323.0   0.99    1.00     94.89  0.998
```

```
#55 124 cnoth E1TLG1 C "Toilet articles and preparations (21)"
ti 55 Toilet articles and preparations

r cqp55 = cqp55[1],gdpi
:                      55 Toilet articles and preparations
  SEE   =       0.40 RSQ   = 0.9679 RHO =  -0.21 Obser  =  162 from 1994.001
  SEE+1 =       0.39 RBSQ  = 0.9675 DurH = -2.89 DoFree =  159 to   2007.006
  MAPE  =       0.31
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp55                 - - - - - - - - - - - - - - - - -     98.72 - - -
  1 intercept               6.83524     2.2   0.07   31.11      1.00
  2 cqp55[1]                0.92349   174.6   0.92    1.03     98.67  0.925
  3 gdpi                    0.73821     1.7   0.01    1.00      1.04  0.067
```

```
#56 128 cnoth E1SDH1 C "Semidurable house furnishings (33)"
ti 56 Semidurable house furnishings

r cqp56 = cqp56[1],crude,crude[1],gdpi
:                       56 Semidurable house furnishings
  SEE   =       1.30 RSQ   = 0.9887 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       1.30 RBSQ  = 0.9885 DurH = -1.06 DoFree =  157 to   2007.006
  MAPE  =       0.99
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp56                 - - - - - - - - - - - - - - - - -     96.58 - - -
  1 intercept              36.53039     6.2   0.38   88.85      1.00
  2 cqp56[1]                0.76494    53.1   0.77    1.14     96.85  0.759
  3 crude                  -0.05352     0.4  -0.02    1.12     28.35 -0.065
  4 crude[1]                0.03707     0.2   0.01    1.12     28.03  0.045
  5 gdpi                  -13.07027     5.8  -0.14    1.00      1.04 -0.219
```

```
#57 129 cnoth E1CLP1 C "Cleaning, polishing preparations, misc. supplies and
paper products"
ti 57 Cleaning, polishing, misc. supplies and paper products

r cqp57 = cqp57[1],gdpi
:           57 Cleaning, polishing, misc. supplies and paper products
  SEE   =       0.40 RSQ   = 0.9969 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.40 RBSQ  = 0.9969 DurH = -0.30 DoFree =  159 to   2007.006
  MAPE  =       0.30
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp57                 - - - - - - - - - - - - - - - - -     98.91 - - -
  1 intercept               2.20005     1.5   0.02  321.87      1.00
  2 cqp57[1]                0.96681   407.1   0.97    1.03     98.76  0.966
  3 gdpi                    1.18430     1.5   0.01    1.00      1.04  0.034
```

```
#58 133 cnoth E1DRG1 C "Drug preparations and sundries (45)"
ti 58 Drug preparations and sundries

r cqp58 = !cqp58[1],cqp58[2]
:                       58 Drug preparations and sundries
  SEE   =       0.23 RSQ   = 0.9997 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.23 RBSQ  = 0.9997 DurH =  3.69 DoFree =  160 to   2007.006
```

```
  MAPE  =       0.16
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp58                - - - - - - - - - - - - - - - - -    102.75 - - -
  1 cqp58[1]               1.22069    58.7   1.22    1.05    102.51
  2 cqp58[2]              -0.21888     2.4  -0.22    1.00    102.27 -0.217

#59 139 cnoth E1DOL1 D "Toys, dolls, and games"
ti 59 Toys, dolls, and games

r cqp59 = cqp59[1]
:                         59 Toys, dolls, and games
  SEE   =       0.68 RSQ   = 0.9988 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.68 RBSQ  = 0.9988 DurH = -0.20 DoFree =  160 to   2007.006
  MAPE  =       0.50
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp59                - - - - - - - - - - - - - - - - -     98.61 - - -
  1 intercept             -0.61275     1.5  -0.01  819.23      1.00
  2 cqp59[1]               1.00268  2762.2   1.01    1.00     98.95  0.999

#60 140 cnoth E1AMM1 D "Sport supplies, including ammunition"
ti 60 Sport supplies, including ammunition

r cqp60 = !cqp60[1],oildf[1]
:                  60 Sport supplies, including ammunition
  SEE   =       0.64 RSQ   = 0.9945 RHO =  -0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.64 RBSQ  = 0.9945 DurH = -0.57 DoFree =  160 to   2007.006
  MAPE  =       0.46
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp60                - - - - - - - - - - - - - - - - -    101.81 - - -
  1 cqp60[1]               0.99859 15655.8   1.00    1.00    101.95
  2 oildf[1]               0.02040     0.2   0.00    1.00      0.29  0.005

#61 141 cnoth E1FLM1 D "Film and photo supplies"
ti 61 Film and photo supplies

r cqp61 = !cqp61[1],oildf,oildf[1]
:                        61 Film and photo supplies
  SEE   =       0.71 RSQ   = 0.9888 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.71 RBSQ  = 0.9887 DurH =  0.13 DoFree =  159 to   2007.006
  MAPE  =       0.54
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp61                - - - - - - - - - - - - - - - - -     99.07 - - -
  1 cqp61[1]               0.99861 13764.6   1.00    1.02     99.19
  2 oildf                  0.01878     0.2   0.00    1.01      0.32  0.006
  3 oildf[1]               0.03971     0.7   0.00    1.00      0.29  0.013

#62 142 cnoth E1STY1 C "Stationery and writing supplies (35)"
ti 62 Stationery and writing supplies

r cqp62 = cqp62[1]
:                     62 Stationery and writing supplies
  SEE   =       0.55 RSQ   = 0.9826 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.55 RBSQ  = 0.9825 DurH = -0.32 DoFree =  160 to   2007.006
  MAPE  =       0.45
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp62                - - - - - - - - - - - - - - - - -     97.21 - - -
  1 intercept              2.65021     2.2   0.03   57.47      1.00
  2 cqp62[1]               0.97343   658.1   0.97    1.00     97.14  0.991

#63 145 cnoth E1NFR1 C "Net foreign remittances (111 less 113)"
ti 63 Net foreign remittances
```

```
r cqp63 = !cqp63[1],cqp63[2]
:                           63 Net foreign remittances
  SEE   =       7.60 RSQ   = 0.9626 RHO =   0.06 Obser  =  162 from 1994.001
  SEE+1 =       7.60 RBSQ  = 0.9623 DurH =  2.28 DoFree =  160 to   2007.006
  MAPE  =       2.24
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp63                 - - - - - - - - - - - - - - - - -    141.61 - - -
  1 cqp63[1]                1.38292    79.7   1.38    1.17    141.06
  2 cqp63[2]               -0.38182     8.1  -0.38    1.00    140.61 -0.371

#64 150 cnoth E1MAG1 C "Magazines, newspapers, and sheet music (88)"
ti 64 Magazines, newspapers, and sheet music

r cqp64 = !cqp64[1]
:                    64 Magazines, newspapers, and sheet music
  SEE   =       0.41 RSQ   = 0.9976 RHO =  -0.17 Obser  =  162 from 1994.001
  SEE+1 =       0.41 RBSQ  = 0.9976 DurH = -2.13 DoFree =  161 to   2007.006
  MAPE  =       0.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp64                 - - - - - - - - - - - - - - - - -    100.74 - - -
  1 cqp64[1]                1.00175 24360.1   1.00    1.00    100.56

#65 153 cnoth E1FLO1 C "Flowers, seeds, and potted plants (95)"
ti 65 Flowers, seeds, and potted plants

r cqp65 = cqp65[1],gdpi
:                      65 Flowers, seeds, and potted plants
  SEE   =       1.40 RSQ   = 0.8729 RHO =   0.04 Obser  =  162 from 1994.001
  SEE+1 =       1.40 RBSQ  = 0.8713 DurH =  0.52 DoFree =  159 to   2007.006
  MAPE  =       1.01
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp65                 - - - - - - - - - - - - - - - - -    101.98 - - -
  1 intercept              11.00643     3.2   0.11    7.87      1.00
  2 cqp65[1]                0.87494   107.8   0.87    1.04    101.93  0.872
  3 gdpi                    1.72284     1.8   0.02    1.00      1.04  0.090

#66 155 csho E1HOS1 B "Housing"
ti 66 Housing

r cqp66 = !cqp66[1]
:                                   66 Housing
  SEE   =       0.09 RSQ   = 0.9999 RHO =   0.33 Obser  =  162 from 1994.001
  SEE+1 =       0.08 RBSQ  = 0.9999 DurH =  4.18 DoFree =  161 to   2007.006
  MAPE  =       0.07
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp66                 - - - - - - - - - - - - - - - - -    101.82 - - -
  1 cqp66[1]                1.00258 119334.6   1.00    1.00    101.56

#67 173 cshoelg E1ELC1 C "Electricity (37)"
ti 67 Electricity

r cqp67 = cqp67[1],crude,crude[1],oildf[9]
:                                 67 Electricity
  SEE   =       1.02 RSQ   = 0.9910 RHO =  -0.23 Obser  =  162 from 1994.001
  SEE+1 =       1.00 RBSQ  = 0.9908 DurH = -3.00 DoFree =  157 to   2007.006
  MAPE  =       0.57
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp67                 - - - - - - - - - - - - - - - - -    107.91 - - -
  1 intercept               4.74349     2.4   0.04  110.93      1.00
  2 cqp67[1]                0.94344   302.8   0.94    1.13    107.68  0.924
```

```
  3 crude                    -0.04279     0.4  -0.01    1.05     28.35 -0.059
  4 crude[1]                  0.09951     2.1   0.03    1.00     28.03  0.136
  5 oildf[9]                  0.02240     0.1   0.00    1.00      0.25  0.004

#68 174 cshoelg E1NGS1 C "Gas (38)"
ti 68 Gas

r cqp68 = !cqp68[1],cqp68[2],oildf[1]
:                                    68 Gas
  SEE   =       4.16 RSQ   = 0.9829 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       4.16 RBSQ  = 0.9826 DurH =  0.64 DoFree =  159 to   2007.006
  MAPE  =       2.00
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp68                 - - - - - - - - - - - - - - - - -    109.61 - - -
  1 cqp68[1]                  1.27830    68.4   1.27    1.12    109.09
  2 cqp68[2]                 -0.27667     4.2  -0.27    1.04    108.56 -0.272
  3 oildf[1]                  0.37714     2.0   0.00    1.00      0.29  0.026

#69 176 cshoelg E1WAT1 C "Water and other sanitary services (39)"
ti 69 Water and other sanitary services

r cqp69 = cqp69[1],cqp69[2]
:                     69 Water and other sanitary services
  SEE   =       0.27 RSQ   = 0.9997 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.27 RBSQ  = 0.9996 DurH = 999.00 DoFree =  159 to   2007.006
  MAPE  =       0.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp69                 - - - - - - - - - - - - - - - - -    103.90 - - -
  1 intercept                -0.39190     1.8  -0.00 2875.53      1.00
  2 cqp69[1]                  1.11479    49.9   1.11    1.01    103.58  1.106
  3 cqp69[2]                 -0.10821     0.6  -0.11    1.00    103.25 -0.107

#70 181 cshoelg E1CEL1 D "Cellular telephone"
ti 70 Cellular telephone

r cqp70 = cqp70[1],cqp70[2],gdpi
:                              70 Cellular telephone
  SEE   =       0.57 RSQ   = 0.9996 RHO =  -0.03 Obser  =  162 from 1994.001
  SEE+1 =       0.57 RBSQ  = 0.9995 DurH = -0.82 DoFree =  158 to   2007.006
  MAPE  =       0.39
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp70                 - - - - - - - - - - - - - - - - -    111.06 - - -
  1 intercept                -0.72664     0.2  -0.01 2254.50      1.00
  2 cqp70[1]                  1.54662   110.0   1.55    1.49    111.52  1.558
  3 cqp70[2]                 -0.54687    19.2  -0.55    1.01    111.99 -0.555
  4 gdpi                      0.52499     0.3   0.00    1.00      1.04  0.004

#71 182 cshoelg E1OLC1 D "Local telephone"
ti 71 Local telephone

r cqp71 = !cqp71[1]
:                               71 Local telephone
  SEE   =       0.55 RSQ   = 0.9979 RHO =  -0.10 Obser  =  162 from 1994.001
  SEE+1 =       0.55 RBSQ  = 0.9979 DurH = -1.26 DoFree =  161 to   2007.006
  MAPE  =       0.33
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp71                 - - - - - - - - - - - - - - - - -    104.11 - - -
  1 cqp71[1]                  1.00221 19024.3   1.00    1.00    103.88

#72 183 cshoelg E1LDT1 D "Long distance telephone"
ti 72 Long distance telephone
```

```
r cqp72 = !cqp72[1],cqp72[2],cqp72[3]
:                         72 Long distance telephone
  SEE   =       1.08 RSQ   = 0.9945 RHO =  -0.01 Obser  =  162 from 1994.001
  SEE+1 =       1.08 RBSQ  = 0.9944 DurH = -1.89 DoFree =  159 to   2007.006
  MAPE  =       0.81
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp72                 - - - - - - - - - - - - - - - - -     95.26 - - -
  1 cqp72[1]                0.90901    36.5   0.91    1.05     95.43
  2 cqp72[2]                0.28984     2.4   0.29    1.04     95.60  0.288
  3 cqp72[3]               -0.20043     2.0  -0.20    1.00     95.78 -0.198

#73 186 cshoelg E1DMS1 C "Domestic service (42)"
ti 73 Domestic service

r cqp73 = cqp73[1],gdpi
:                             73 Domestic service
  SEE   =       0.37 RSQ   = 0.9991 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.37 RBSQ  = 0.9991 DurH = -0.22 DoFree =  159 to   2007.006
  MAPE  =       0.22
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp73                 - - - - - - - - - - - - - - - - -    101.53 - - -
  1 intercept               1.94178     1.7   0.02 1167.37      1.00
  2 cqp73[1]                0.94960   262.1   0.95    1.04    101.27  0.946
  3 gdpi                    3.30563     2.0   0.03    1.00      1.04  0.054

#74 189 cshooth E1OPO1 C "Other (43)"
ti 74 Other Household Services

r cqp74 = cqp74[1],time,crude
:                         74 Other Household Services
  SEE   =       0.40 RSQ   = 0.9993 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.40 RBSQ  = 0.9992 DurH =  0.14 DoFree =  158 to   2007.006
  MAPE  =       0.21
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp74                 - - - - - - - - - - - - - - - - -    103.64 - - -
  1 intercept               3.27657     1.2   0.03 1346.86      1.00
  2 cqp74[1]                0.95870   255.7   0.96    1.03    103.34  0.956
  3 time                    0.15403     1.3   0.01    1.00      7.79  0.041
  4 crude                   0.00319     0.1   0.00    1.00     28.35  0.003

#75 202 cstr E1ARP1 D "Motor vehicle repair"
ti 75 Motor vehicle repair

r cqp75 = cqp75[1],cqp75[2],time,crude
:                           75 Motor vehicle repair
  SEE   =       0.16 RSQ   = 0.9998 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.16 RBSQ  = 0.9998 DurH = -1.56 DoFree =  157 to   2007.006
  MAPE  =       0.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp75                 - - - - - - - - - - - - - - - - -    102.27 - - -
  1 intercept               2.23202     1.4   0.02 5403.16      1.00
  2 cqp75[1]                0.82356    30.5   0.82    1.07    102.02  0.819
  3 cqp75[2]                0.14977     1.2   0.15    1.05    101.77  0.148
  4 time                    0.07894     1.4   0.01    1.05      7.79  0.026
  5 crude                   0.00587     2.3   0.00    1.00     28.35  0.007

#76 203 cstr E1RLO1 D "Motor vehicle rental, leasing, and other"
ti 76 Motor vehicle rental, leasing, and other

r cqp76 = !cqp76[1],cqp76[2],oildf[1],oildf[2]
```

```
:                  76 Motor vehicle rental, leasing, and other
  SEE   =       0.65 RSQ   = 0.9730 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.65 RBSQ  = 0.9725 DurH = 999.00 DoFree =  158 to   2007.006
  MAPE  =       0.48
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp76                - - - - - - - - - - - - - - - - -   100.27 - - -
  1 cqp76[1]               1.03160    44.5   1.03    1.01    100.17
  2 cqp76[2]              -0.03057     0.0  -0.03    1.01    100.08 -0.031
  3 oildf[1]              -0.01837     0.2  -0.00    1.00      0.29 -0.010
  4 oildf[2]              -0.01534     0.1  -0.00    1.00      0.28 -0.009

#77 210 cstr E1TOL1 C "Bridge, tunnel, ferry, and road tolls"
ti 77 Bridge, tunnel, ferry, and road tolls

r cqp77 = cqp77[1],gdpi
:                   77 Bridge, tunnel, ferry, and road tolls
  SEE   =       1.07 RSQ   = 0.9956 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       1.07 RBSQ  = 0.9955 DurH = -0.39 DoFree =  159 to   2007.006
  MAPE  =       0.76
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp77                - - - - - - - - - - - - - - - - -   102.70 - - -
  1 intercept              5.08496     5.5   0.05  226.08      1.00
  2 cqp77[1]               0.76930    55.4   0.77    1.13    102.36  0.767
  3 gdpi                  18.19516     6.3   0.18    1.00      1.04  0.232

#78 211 cstr E1AIN1 C "Insurance"
ti 78 Automobile Insurance

r cqp78 = !cqp78[1],cqp78[2]
:                           78 Automobile Insurance
  SEE   =       0.61 RSQ   = 0.9987 RHO =   0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.61 RBSQ  = 0.9987 DurH =  0.45 DoFree =  160 to   2007.006
  MAPE  =       0.48
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp78                - - - - - - - - - - - - - - - - -   105.31 - - -
  1 cqp78[1]               1.13473    52.3   1.13    1.02    104.97
  2 cqp78[2]              -0.13191     0.9  -0.13    1.00    104.63 -0.131

#79 213 cstr E1IMT1 C "Mass transit systems (79)"
ti 79 Mass transit systems (79)

r cqp79 = !cqp79[1],gdpi
:                         79 Mass transit systems (79)
  SEE   =       0.84 RSQ   = 0.9957 RHO =   0.05 Obser  =  162 from 1994.001
  SEE+1 =       0.84 RBSQ  = 0.9956 DurH =  0.61 DoFree =  160 to   2007.006
  MAPE  =       0.34
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp79                - - - - - - - - - - - - - - - - -   106.57 - - -
  1 cqp79[1]               0.99623  1023.7   0.99    1.01    106.30
  2 gdpi                   0.64364     0.3   0.01    1.00      1.04  0.010

#80 214 cstr E1TAX1 C "Taxicab (80)"
ti 80 Taxicab

r cqp80 = !cqp80[1],gdpi
:                                  80 Taxicab
  SEE   =       1.06 RSQ   = 0.9935 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       1.06 RBSQ  = 0.9935 DurH =  0.24 DoFree =  160 to   2007.006
  MAPE  =       0.37
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp80                - - - - - - - - - - - - - - - - -   106.31 - - -
```

```
  1 cqp80[1]                 0.99503   758.0   0.99    1.00    106.02
  2 gdpi                     0.77194     0.2   0.01    1.00      1.04  0.012

#81 216 cstr E1IRR1 C "Railway (82)"
ti 81 Railway

r cqp81 = cqp81[1],cqp81[2]
:                                  81 Railway
  SEE   =       2.56 RSQ   = 0.9186 RHO =   0.20 Obser  =  162 from 1994.001
  SEE+1 =       2.53 RBSQ  = 0.9176 DurH = 13.68 DoFree =  159 to   2007.006
  MAPE  =       1.40
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp81                - - - - - - - - - - - - - - - - -     97.80 - - -
  1 intercept                6.23471     2.4   0.06   12.28      1.00
  2 cqp81[1]                 1.29357    65.3   1.29    1.13     97.62  1.298
  3 cqp81[2]                -0.35597     6.5  -0.35    1.00     97.49 -0.361

#82 217 cstr E1IBU1 C "Bus (83)"
ti 82 Bus

r cqp82 = cqp82[1],gdpi
:                                    82 Bus
  SEE   =       1.11 RSQ   = 0.9932 RHO =   0.26 Obser  =  162 from 1994.001
  SEE+1 =       1.08 RBSQ  = 0.9931 DurH =  3.66 DoFree =  159 to   2007.006
  MAPE  =       0.73
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp82                - - - - - - - - - - - - - - - - -    102.78 - - -
  1 intercept                3.09271     1.9   0.03  147.79      1.00
  2 cqp82[1]                 0.91401   146.5   0.91    1.05    102.51  0.911
  3 gdpi                     5.77051     2.3   0.06    1.00      1.04  0.088

#83 218 cstr E1IAI1 C "Airline (84)"
ti 83 Airline

r cqp83 = cqp83[1],cqp83[2]
:                                  83 Airline
  SEE   =       2.03 RSQ   = 0.8733 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       2.03 RBSQ  = 0.8717 DurH =  4.03 DoFree =  159 to   2007.006
  MAPE  =       1.70
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp83                - - - - - - - - - - - - - - - - -     90.33 - - -
  1 intercept                6.59431     2.0   0.07    7.90      1.00
  2 cqp83[1]                 1.02277    43.6   1.02    1.01     90.35  1.024
  3 cqp83[2]                -0.09587     0.5  -0.10    1.00     90.40 -0.096

#84 219 cstr E1TRO1 C "Other mass transportation(85)"
ti 84 Other transportation

r cqp84 = cqp84[1],gdpi
:                            84 Other transportation
  SEE   =       1.15 RSQ   = 0.9742 RHO =   0.09 Obser  =  162 from 1994.001
  SEE+1 =       1.15 RBSQ  = 0.9739 DurH =  1.36 DoFree =  159 to   2007.006
  MAPE  =       0.93
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp84                - - - - - - - - - - - - - - - - -     96.37 - - -
  1 intercept                8.55763     3.8   0.09   38.75      1.00
  2 cqp84[1]                 0.86071   102.8   0.86    1.08     96.24  0.856
  3 gdpi                     4.79595     3.9   0.05    1.00      1.04  0.137

#85 221 csmc E1PHY1 C "Physicians (47)"
ti 85 Physicians
```

```
r cqp85 = !cqp85[1],cqp85[2]
:                                 85 Physicians
  SEE   =       0.33 RSQ   = 0.9976 RHO =   0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9976 DurH =  4.21 DoFree =  160 to   2007.006
  MAPE  =       0.16
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp85                 - - - - - - - - - - - - - - - - -    100.27 - - -
  1 cqp85[1]                1.14132    52.6   1.14    1.02    100.10
  2 cqp85[2]               -0.13989     1.0  -0.14    1.00     99.93 -0.140

#86 222 csmc E1DEN1 C "Dentists (48)"
ti 86 Dentists

r cqp86 = !cqp86[1]
:                                  86 Dentists
  SEE   =       0.17 RSQ   = 0.9999 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.17 RBSQ  = 0.9999 DurH = -0.80 DoFree =  161 to   2007.006
  MAPE  =       0.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp86                 - - - - - - - - - - - - - - - - -    102.59 - - -
  1 cqp86[1]                1.00385 62566.7   1.00    1.00    102.19

#87 223 csmc E1OPS1 C "Other professional services (49)"
ti 87 Other professional services

r cqp87 = cqp87[1],time
:                        87 Other professional services
  SEE   =       0.21 RSQ   = 0.9995 RHO =   0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.21 RBSQ  = 0.9995 DurH =  0.02 DoFree =  159 to   2007.006
  MAPE  =       0.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp87                 - - - - - - - - - - - - - - - - -    101.35 - - -
  1 intercept               6.62244     2.1   0.07 2025.09      1.00
  2 cqp87[1]                0.92208   156.2   0.92    1.04    101.15  0.922
  3 time                    0.18750     2.0   0.01    1.00      7.79  0.078

#88 229 csmc E1HSP1 C "Hospitals"
ti 88 Hospitals

r cqp88 = !cqp88[1],crude
:                                 88 Hospitals
  SEE   =       0.18 RSQ   = 0.9998 RHO =  -0.09 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9998 DurH = -1.10 DoFree =  160 to   2007.006
  MAPE  =       0.14
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp88                 - - - - - - - - - - - - - - - - -    104.29 - - -
  1 cqp88[1]                1.00182 21306.2   1.00    1.06    104.00
  2 crude                   0.00361     2.7   0.00    1.00     28.35  0.004

#89 233 csmc E1NRS1 C "Nursing homes"
ti 89 Nursing homes

r cqp89 = cqp89[1],cqp89[2],time,crude
:                               89 Nursing homes
  SEE   =       0.18 RSQ   = 0.9999 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9999 DurH = 31.87 DoFree =  157 to   2007.006
  MAPE  =       0.14
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp89                 - - - - - - - - - - - - - - - - -    102.29 - - -
  1 intercept               2.95081     1.7   0.03 7342.94      1.00
```

```
  2 cqp89[1]                 0.88556    33.7   0.88    1.04    101.96  0.885
  3 cqp89[2]                 0.07707     0.3   0.08    1.03    101.64  0.077
  4 time                     0.15172     1.5   0.01    1.00      7.79  0.038
  5 crude                    0.00088     0.1   0.00    1.00     28.35  0.001

#90 236 csmc E1HIN1 C "Health insurance (56)"
ti 90 Health insurance

r cqp90 = !cqp90[1],cqp90[2],gdpi
:                              90 Health insurance
  SEE   =       0.24 RSQ   = 0.9998 RHO =  -0.25 Obser  =  162 from 1994.001
  SEE+1 =       0.23 RBSQ  = 0.9998 DurH = -4.36 DoFree =  159 to   2007.006
  MAPE  =       0.16
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp90                - - - - - - - - - - - - - - - - -    105.40 - - -
  1 cqp90[1]                 1.76739   187.7   1.76    2.37    104.97
  2 cqp90[2]                -0.76974    52.6  -0.76    1.00    104.55 -0.766
  3 gdpi                     0.33077     0.2   0.00    1.00      1.04  0.004

#91 241 csrec E1SSA1 C "Admissions to specified spectator amusements (96)"
ti 91 Admissions to specified spectator amusements

r cqp91 = cqp91[1],time,crude
:                 91 Admissions to specified spectator amusements
  SEE   =       0.56 RSQ   = 0.9988 RHO =  -0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.56 RBSQ  = 0.9988 DurH = -0.13 DoFree =  158 to   2007.006
  MAPE  =       0.41
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp91                - - - - - - - - - - - - - - - - -    101.41 - - -
  1 intercept                7.17389     2.8   0.07  842.86      1.00
  2 cqp91[1]                 0.89833   127.4   0.90    1.06    101.07  0.896
  3 time                     0.40178     2.9   0.03    1.01      7.79  0.096
  4 crude                    0.01091     0.7   0.00    1.00     28.35  0.010

#92 246 csrec E1RTV1 C "Radio and television repair"
ti 92 Radio and television repair

r cqp92 = cqp92[1]
:                        92 Radio and television repair
  SEE   =       0.31 RSQ   = 0.9931 RHO =  -0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.31 RBSQ  = 0.9930 DurH = -0.03 DoFree =  160 to   2007.006
  MAPE  =       0.21
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp92                - - - - - - - - - - - - - - - - -     99.68 - - -
  1 intercept                2.07626     3.2   0.02  144.42      1.00
  2 cqp92[1]                 0.97988  1101.7   0.98    1.00     99.61  0.997

#93 247 csrec E1CLU1 C "Clubs and fraternal organizations"
ti 93 Clubs and fraternal organizations

r cqp93 = !cqp93[1],cqp93[2]
:                     93 Clubs and fraternal organizations
  SEE   =       0.30 RSQ   = 0.9989 RHO =  -0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.30 RBSQ  = 0.9989 DurH = 999.00 DoFree =  160 to   2007.006
  MAPE  =       0.21
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp93                - - - - - - - - - - - - - - - - -     99.30 - - -
  1 cqp93[1]                 1.05649    45.6   1.05    1.00     99.11
  2 cqp93[2]                -0.05461     0.1  -0.05    1.00     98.91 -0.054

#94 248 csrec E1COM1 C "Commercial participant amusements"
```

```
ti 94 Commercial participant amusements

r cqp94 = cqp94[1],time,crude
:                      94 Commercial participant amusements
  SEE   =       0.18 RSQ   = 0.9997 RHO =   0.17 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9997 DurH =  2.26 DoFree =  158 to   2007.006
  MAPE  =       0.13
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp94                 - - - - - - - - - - - - - - - - -    101.13 - - -
  1 intercept               12.05457    10.4   0.12 3441.37      1.00
  2 cqp94[1]                 0.84998   180.2   0.85    1.28    100.90  0.846
  3 time                     0.35725     9.7   0.03    1.27      7.79  0.131
  4 crude                    0.01867    12.6   0.01    1.00     28.35  0.026

#95 254 csrec E1PAR1 C "Pari-mutual net receipts"
ti 95 Pari-mutual net receipts

r cqp95 = !cqp95[1],oildf,oildf[1]
:                           95 Pari-mutual net receipts
  SEE   =       0.18 RSQ   = 0.9996 RHO =   0.14 Obser  =  162 from 1994.001
  SEE+1 =       0.18 RBSQ  = 0.9996 DurH =  1.79 DoFree =  159 to   2007.006
  MAPE  =       0.13
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp95                 - - - - - - - - - - - - - - - - -    101.14 - - -
  1 cqp95[1]                 1.00183 54199.4   1.00    1.85    100.93
  2 oildf                    0.05072    16.1   0.00    1.31      0.32  0.012
  3 oildf[1]                 0.04781    14.3   0.00    1.00      0.29  0.011

#96 255 csrec E1REO1 C "Other Recreation Services"
ti 96 Other Recreation Services

r cqp96 = cqp96[1],time,oildf,oildf[1]
:                           96 Other Recreation Services
  SEE   =       0.22 RSQ   = 0.9996 RHO =   0.30 Obser  =  162 from 1994.001
  SEE+1 =       0.21 RBSQ  = 0.9996 DurH =  4.01 DoFree =  157 to   2007.006
  MAPE  =       0.16
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp96                 - - - - - - - - - - - - - - - - -    101.20 - - -
  1 intercept                3.10360     1.1   0.03 2689.52      1.00
  2 cqp96[1]                 0.96293   273.0   0.96    1.10    100.98  0.963
  3 time                     0.10861     0.9   0.01    1.07      7.79  0.036
  4 oildf                    0.02065     1.9   0.00    1.02      0.32  0.004
  5 oildf[1]                 0.01364     0.8   0.00    1.00      0.29  0.003

#97 270 csoth E1CRC1 C "Cleaning, storage, and repair of clothing and shoes
(17)"
ti 97 Cleaning, storage, and repair of clothing and shoes

r cqp97 = cqp97[1],gdpi
:             97 Cleaning, storage, and repair of clothing and shoes
  SEE   =       0.22 RSQ   = 0.9996 RHO =  -0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9996 DurH = -0.47 DoFree =  159 to   2007.006
  MAPE  =       0.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp97                 - - - - - - - - - - - - - - - - -    103.11 - - -
  1 intercept                1.03040     0.6   0.01 2275.57      1.00
  2 cqp97[1]                 0.97578   445.8   0.97    1.03    102.88  0.969
  3 gdpi                     1.62840     1.5   0.02    1.00      1.04  0.031

#98 275 csoth E1BBB1 C "Barbershops, beauty parlors, and health clubs (22)"
ti 98 Barbershops, beauty parlors, and health clubs
```

```
r cqp98 = cqp98[1],time,crude
:               98 Barbershops, beauty parlors, and health clubs
  SEE   =       0.22 RSQ   = 0.9996 RHO =   0.04 Obser  =  162 from 1994.001
  SEE+1 =       0.22 RBSQ  = 0.9996 DurH =  0.58 DoFree =  158 to   2007.006
  MAPE  =       0.16
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp98                - - - - - - - - - - - - - - - - -    100.75 - - -
  1 intercept              7.09851     3.2   0.07 2600.42      1.00
  2 cqp98[1]               0.91119   173.8   0.91    1.07    100.52  0.909
  3 time                   0.25262     3.2   0.02    1.01      7.79  0.088
  4 crude                  0.00336     0.6   0.00    1.00     28.35  0.004
```

```
#99 278 csoth E1COT1 C "Other Personal Care(19)"
ti 99 Other Personal Care
```

```
r cqp99 = cqp99[1],crude,gdpi
:                            99 Other Personal Care
  SEE   =       0.31 RSQ   = 0.9993 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.31 RBSQ  = 0.9993 DurH =  0.14 DoFree =  158 to   2007.006
  MAPE  =       0.20
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp99                - - - - - - - - - - - - - - - - -    103.55 - - -
  1 intercept              1.84569     1.4   0.02 1387.87      1.00
  2 cqp99[1]               0.95892   348.6   0.96    1.05    103.30  0.950
  3 crude                  0.00680     0.9   0.00    1.04     28.35  0.009
  4 gdpi                   2.36655     2.2   0.02    1.00      1.04  0.042
```

```
#100 282 csoth E1BRO1 C "Brokerage charges and investment counseling (61)"
ti 100 Brokerage charges and investment counseling
```

```
r cqp100 = cqp100[1],time,crude
:                100 Brokerage charges and investment counseling
  SEE   =       2.79 RSQ   = 0.9893 RHO =  -0.16 Obser  =  162 from 1994.001
  SEE+1 =       2.73 RBSQ  = 0.9891 DurH = -2.15 DoFree =  158 to   2007.006
  MAPE  =       1.33
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp100               - - - - - - - - - - - - - - - - -    114.96 - - -
  1 intercept              6.25085     0.8   0.05   93.48      1.00
  2 cqp100[1]              0.95325   234.1   0.96    1.03    115.37  0.962
  3 time                  -0.44230     1.0  -0.03    1.03      7.79 -0.064
  4 crude                  0.07707     1.4   0.02    1.00     28.35  0.043
```

```
#101 290 csoth E1BNK1 C "Bank service charges, trust services, and safe deposit
box rental"
ti 101 Bank, trust services, and safe deposit box rental
```

```
r cqp101 = cqp101[1],cqp101[2]
:             101 Bank, trust services, and safe deposit box rental
  SEE   =       0.65 RSQ   = 0.9979 RHO =   0.03 Obser  =  162 from 1994.001
  SEE+1 =       0.65 RBSQ  = 0.9978 DurH = 999.00 DoFree =  159 to   2007.006
  MAPE  =       0.43
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp101               - - - - - - - - - - - - - - - - -     97.80 - - -
  1 intercept              0.71114     1.2   0.01  465.92      1.00
  2 cqp101[1]              1.09569    48.6   1.09    1.01     97.48  1.100
  3 cqp101[2]             -0.10003     0.5  -0.10    1.00     97.17 -0.101
```

```
#102 295 csoth E1IMP1 C "Services furnished w/out payment by intermediaries
except life ins. carriers"
```

```
ti 102 Services furnished w/out payment by intermediaries except life ins.
carriers

r cqp102 = cqp102[1],gdpi
 102 Services furnished w/out payment by intermediaries except life ins. carrier
  SEE   =       0.68 RSQ   = 0.9943 RHO =   0.56 Obser  =  162 from 1994.001
  SEE+1 =       0.56 RBSQ  = 0.9942 DurH =  7.46 DoFree =  159 to   2007.006
  MAPE  =       0.46
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp102                - - - - - - - - - - - - - - - - -    100.15 - - -
  1 intercept               2.37422     1.2   0.02  175.54      1.00
  2 cqp102[1]               0.96756   273.0   0.97    1.01     99.96  0.975
  3 gdpi                    1.01557     0.4   0.01    1.00      1.04  0.023

#103 298 csoth E1LIF1 C "Expense of handling life insurance and pension plans
(64)"
ti 103 Expense of handling life insurance and pension plans

r cqp103 = gdpi
:           103 Expense of handling life insurance and pension plans
  SEE   =       3.55 RSQ   = 0.9583 RHO =   0.25 Obser  =  162 from 1994.001
  SEE+1 =       3.44 RBSQ  = 0.9581 DW  =   1.50 DoFree =  160 to   2007.006
  MAPE  =       2.18
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp103                - - - - - - - - - - - - - - - - -     99.02 - - -
  1 intercept              12.93481    22.5   0.13   24.01      1.00
  2 gdpi                   83.00659   390.0   0.87    1.00      1.04  0.979

#104 299 csoth E1GAL1 C "Legal services (65)"
ti 104 Legal services

r cqp104 = !cqp104[1],gdpi
:                               104 Legal services
  SEE   =       0.33 RSQ   = 0.9997 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.33 RBSQ  = 0.9997 DurH =  0.07 DoFree =  160 to   2007.006
  MAPE  =       0.24
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp104                - - - - - - - - - - - - - - - - -    103.43 - - -
  1 cqp104[1]               0.99248   803.6   0.99    1.01    103.06
  2 gdpi                    1.10367     0.5   0.01    1.00      1.04  0.012

#105 300 csoth E1FUN1 C "Funeral and burial expenses (66)"
ti 105 Funeral and burial expenses

r cqp105 = !cqp105[1],cqp105[2]
:                         105 Funeral and burial expenses
  SEE   =       0.21 RSQ   = 0.9998 RHO =   0.01 Obser  =  162 from 1994.001
  SEE+1 =       0.21 RBSQ  = 0.9998 DurH = 999.00 DoFree =  160 to   2007.006
  MAPE  =       0.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp105                - - - - - - - - - - - - - - - - -    102.77 - - -
  1 cqp105[1]               1.14374    52.7   1.14    1.02    102.41
  2 cqp105[2]              -0.14072     1.0  -0.14    1.00    102.04 -0.140

#106 301 csoth E1PBO1 C "Other Personal Service(67)"
ti 106 Other Personal Service(67)

r cqp106 = cqp106[1],time,crude
:                         106 Other Personal Service(67)
  SEE   =       0.24 RSQ   = 0.9997 RHO =  -0.14 Obser  =  162 from 1994.001
  SEE+1 =       0.23 RBSQ  = 0.9997 DurH = -1.97 DoFree =  158 to   2007.006
```

```
  MAPE  =       0.16
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp106                - - - - - - - - - - - - - - - - -    101.65 - - -
  1 intercept               5.99394     2.6   0.06 3637.55      1.00
  2 cqp106[1]               0.92106   174.1   0.92    1.06    101.34  0.920
  3 time                    0.27739     2.3   0.02    1.03      7.79  0.076
  4 crude                   0.00535     1.4   0.00    1.00     28.35  0.006

#107 310 csoth E1HED1 C "Higher education (105)"
ti 107 Higher education

r cqp107 = !cqp107[1],cqp107[2],oildf,oildf[1]
:                             107 Higher education
  SEE   =       0.13 RSQ   = 1.0000 RHO =  -0.06 Obser  =  162 from 1994.001
  SEE+1 =       0.13 RBSQ  = 1.0000 DurH = -2.92 DoFree =  158 to   2007.006
  MAPE  =       0.09
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp107                - - - - - - - - - - - - - - - - -    105.82 - - -
  1 cqp107[1]               1.32370    71.1   1.32    1.17    105.40
  2 cqp107[2]              -0.32101     5.5  -0.32    1.06    104.99 -0.317
  3 oildf                   0.01567     3.1   0.00    1.00      0.32  0.002
  4 oildf[1]               -0.00209     0.1  -0.00    1.00      0.29 -0.000

#108 313 csoth E1EED1 C "Nursery, elementary, and secondary schools (106)"
ti 108 Nursery, elementary, and secondary schools

r cqp108 = cqp108[1],time,crude
:                108 Nursery, elementary, and secondary schools
  SEE   =       0.13 RSQ   = 0.9999 RHO =   0.12 Obser  =  162 from 1994.001
  SEE+1 =       0.13 RBSQ  = 0.9999 DurH =  1.61 DoFree =  158 to   2007.006
  MAPE  =       0.10
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp108                - - - - - - - - - - - - - - - - -    101.86 - - -
  1 intercept               4.02898     4.5   0.04 9999.99      1.00
  2 cqp108[1]               0.94878   440.7   0.95    1.09    101.58  0.946
  3 time                    0.17125     4.3   0.01    1.04      7.79  0.050
  4 crude                   0.00409     2.0   0.00    1.00     28.35  0.005

#109 316 csoth E1OED1 C "Other Education (107)"
ti 109 Other Education

r cqp109 = !cqp109[1],gdpi,crude
:                              109 Other Education
  SEE   =       0.43 RSQ   = 0.9995 RHO =  -0.02 Obser  =  162 from 1994.001
  SEE+1 =       0.43 RBSQ  = 0.9995 DurH = -0.24 DoFree =  159 to   2007.006
  MAPE  =       0.28
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp109                - - - - - - - - - - - - - - - - -    104.05 - - -
  1 cqp109[1]               0.97216   351.7   0.97    1.02    103.64
  2 gdpi                    3.13519     1.0   0.03    1.00      1.04  0.032
  3 crude                   0.00176     0.1   0.00    1.00     28.35  0.001

#110 320 csoth E1POL1 D "Political organizations"
ti 110 Political organizations

r cqp110 = !cqp110[1],cqp110[2],oildf,oildf[1]
:                          110 Political organizations
  SEE   =       0.19 RSQ   = 0.9996 RHO =  -0.10 Obser  =  162 from 1994.001
  SEE+1 =       0.19 RBSQ  = 0.9996 DurH = -2.98 DoFree =  158 to   2007.006
  MAPE  =       0.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 cqp110              - - - - - - - - - - - - - - - - - -    100.14 - - -
  1 cqp110[1]              1.46874    93.9   1.47    1.32     99.93
  2 cqp110[2]             -0.46764    13.1  -0.47    1.05     99.71 -0.466
  3 oildf                  0.02010     2.5   0.00    1.00      0.32  0.004
  4 oildf[1]              -0.00501     0.2  -0.00    1.00      0.29 -0.001

#111 321 csoth E1MUS1 D "Museums and libraries"
ti 111 Museums and libraries

r cqp111 = cqp111[1],time
:                           111 Museums and libraries
  SEE   =       0.38 RSQ   = 0.9987 RHO =  -0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.38 RBSQ  = 0.9986 DurH = -1.04 DoFree =  159 to   2007.006
  MAPE  =       0.29
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp111              - - - - - - - - - - - - - - - - - -     99.23 - - -
  1 intercept              4.33280     1.4   0.04  744.84      1.00
  2 cqp111[1]              0.94673   199.9   0.94    1.03     99.01  0.944
  3 time                   0.14997     1.4   0.01    1.00      7.79  0.056

#112 322 csoth E1FOU1 D "Foundations to religion and welfare"
ti 112 Foundations to religion and welfare

r cqp112 = !cqp112[1],cqp112[2]
:                    112 Foundations to religion and welfare
  SEE   =       0.41 RSQ   = 0.9992 RHO =  -0.00 Obser  =  162 from 1994.001
  SEE+1 =       0.41 RBSQ  = 0.9992 DurH = 999.00 DoFree =  160 to   2007.006
  MAPE  =       0.24
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp112              - - - - - - - - - - - - - - - - - -    101.22 - - -
  1 cqp112[1]              1.01835    42.7   1.02    1.00    100.94
  2 cqp112[2]             -0.01561     0.0  -0.02    1.00    100.66 -0.016

#113 323 csoth E1WEL1 D "Social welfare"
ti 113 Social welfare

r cqp113 = cqp113[1],time,crude
:                              113 Social welfare
  SEE   =       0.15 RSQ   = 0.9998 RHO =  -0.08 Obser  =  162 from 1994.001
  SEE+1 =       0.15 RBSQ  = 0.9998 DurH = -1.05 DoFree =  158 to   2007.006
  MAPE  =       0.11
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp113              - - - - - - - - - - - - - - - - - -    100.74 - - -
  1 intercept              5.35417     3.8   0.05 6615.15      1.00
  2 cqp113[1]              0.93198   283.7   0.93    1.10    100.48  0.929
  3 time                   0.19294     3.7   0.01    1.09      7.79  0.062
  4 crude                  0.00829     4.3   0.00    1.00     28.35  0.010

#114 326 csoth E1REL1 D "Religion"
ti 114 Religion

r cqp114 = !cqp114[1],gdpi
:                                 114 Religion
  SEE   =       0.17 RSQ   = 0.9999 RHO =   0.38 Obser  =  162 from 1994.001
  SEE+1 =       0.15 RBSQ  = 0.9999 DurH =  4.83 DoFree =  160 to   2007.006
  MAPE  =       0.13
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp114              - - - - - - - - - - - - - - - - - -    101.32 - - -
  1 cqp114[1]              0.99998  3161.5   1.00    1.01    101.01
  2 gdpi                   0.29792     0.5   0.00    1.00      1.04  0.004
```

```
#115 328 csoth E1FTR1 C "Foreign travel by U.S. residents (110)"
ti 115 Foreign travel by U.S. residents

r cqp115 = !cqp115[1],oildf,oildf[1],oildf[2]
:                      115 Foreign travel by U.S. residents
  SEE   =       0.60 RSQ   = 0.9976 RHO =   0.57 Obser  =  162 from 1994.001
  SEE+1 =       0.49 RBSQ  = 0.9976 DurH =  7.22 DoFree =  158 to   2007.006
  MAPE  =       0.42
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp115                - - - - - - - - - - - - - - - - -    106.35 - - -
  1 cqp115[1]                1.00202 17373.5   1.00    1.16    106.09
  2 oildf                    0.07265     3.2   0.00    1.07      0.32  0.013
  3 oildf[1]                 0.05375     1.7   0.00    1.02      0.29  0.010
  4 oildf[2]                 0.03879     0.9   0.00    1.00      0.28  0.007

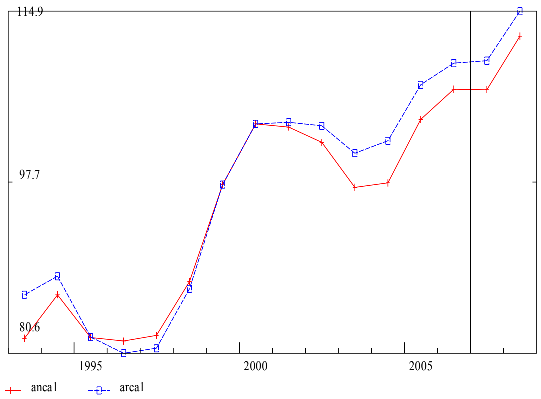
#116 332 csoth E1EXF1 C "Less: Expenditures in the United States by
nonresidents (112)"
ti 116 Less: Expenditures in the United States by nonresidents

r cqp116 = cqp116[1],time,crude
:           116 Less: Expenditures in the United States by nonresidents
  SEE   =       0.41 RSQ   = 0.9985 RHO =   0.23 Obser  =  162 from 1994.001
  SEE+1 =       0.40 RBSQ  = 0.9985 DurH =  3.22 DoFree =  158 to   2007.006
  MAPE  =       0.30
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 cqp116                - - - - - - - - - - - - - - - - -    100.18 - - -
  1 intercept               14.55249    10.7   0.15  666.22      1.00
  2 cqp116[1]                0.81495   132.5   0.81    1.29     99.95  0.806
  3 time                     0.33698     9.4   0.03    1.29      7.79  0.124
  4 crude                    0.05490    13.6   0.02    1.00     28.35  0.078
```

Appendix 3.4: Plots of Detailed Annual PCE Forecast 2007-2008

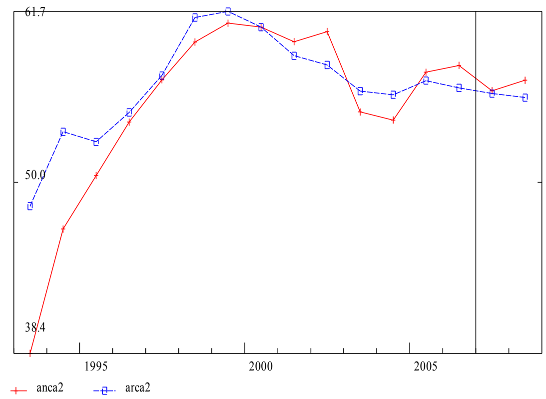
1 New autos (70)

Forecast 2007-2008



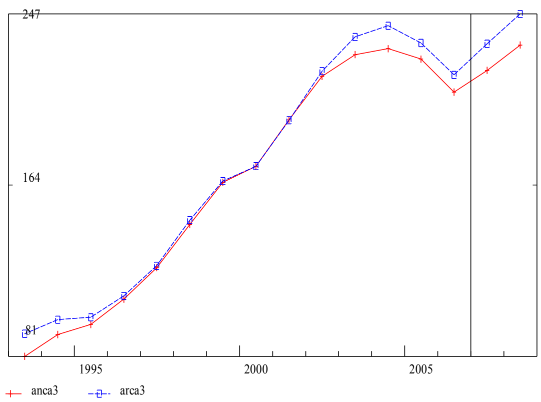
2 Net purchases of used autos (71)

Forecast 2007-2008



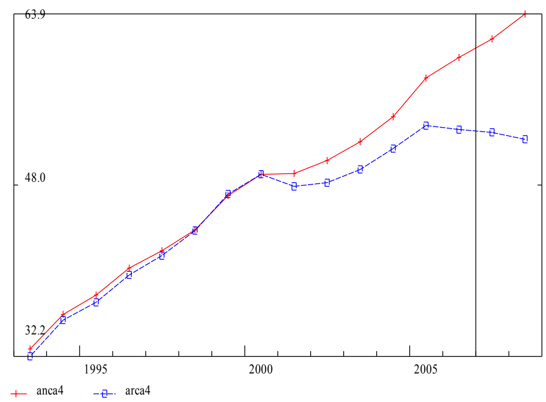
3 Other motor vehicles (72)

Forecast 2007-2008



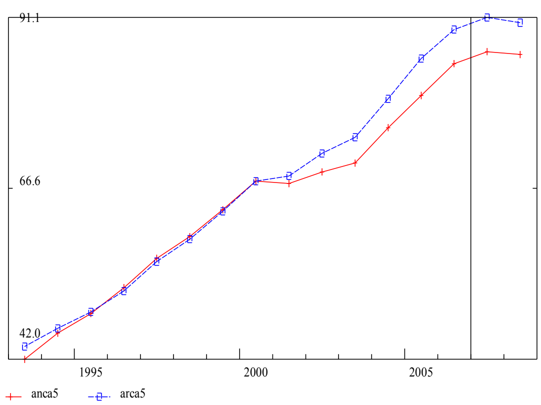
4 Tires, tubes, accessories, and other

Forecast 2007-2008



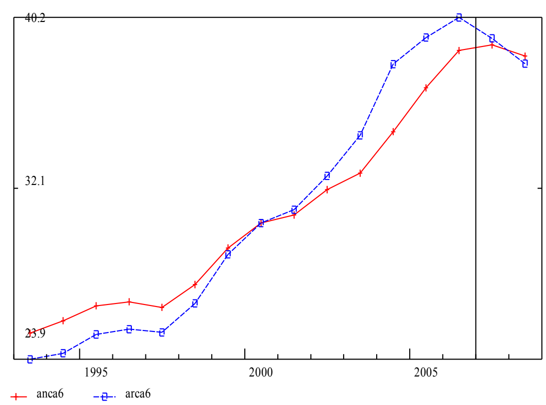
5 Furniture, including mattresses and b

Forecast 2007-2008



6 Kitchen and other household appliance

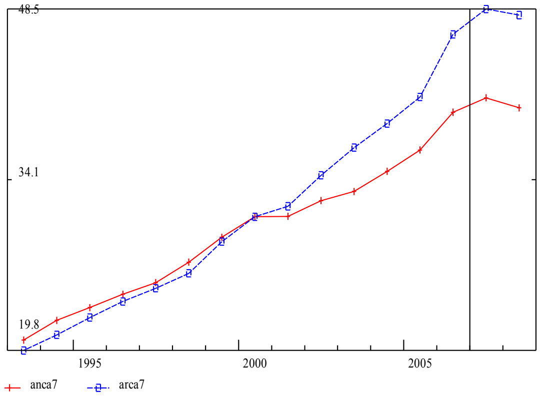
Forecast 2007-2008



Appendix 3.4 (cont.)

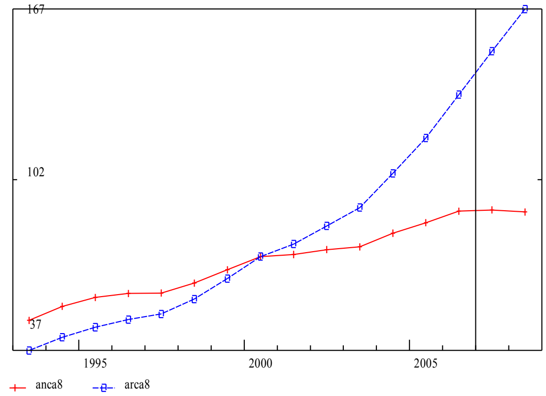
7 China, glassware, tableware, and uten

Forecast 2007-2008



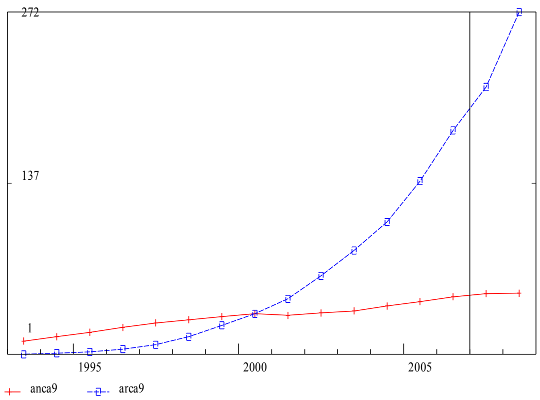
8 Video and audio goods, including musi

Forecast 2007-2008



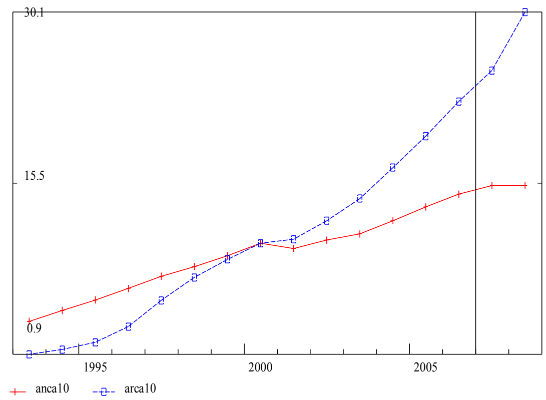
9 Computers and peripherals

Forecast 2007-2008



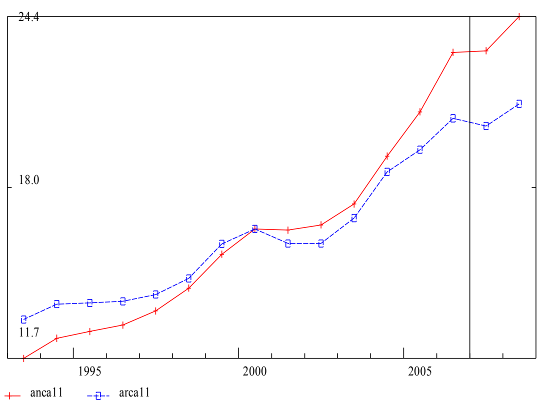
10 Software

Forecast 2007-2008



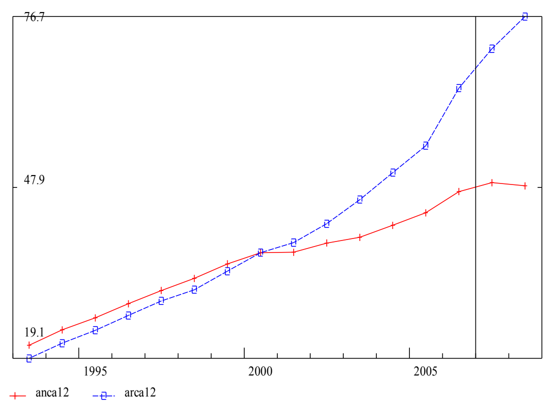
11 Floor coverings

Forecast 2007-2008



12 Durable house furnishings, n.e.c.

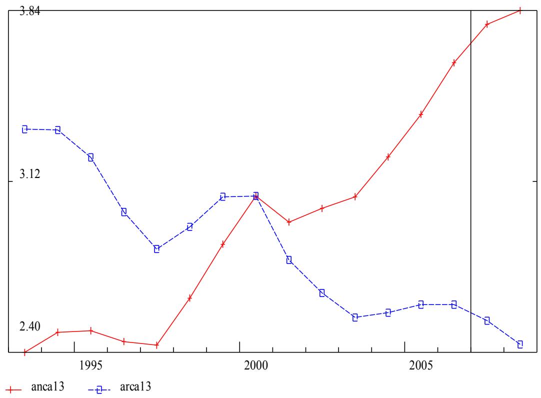
Forecast 2007-2008



Appendix 3.4 (cont.)

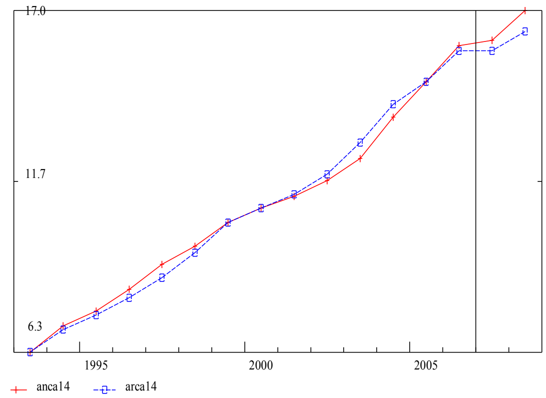
13 Writing equipment

Forecast 2007-2008



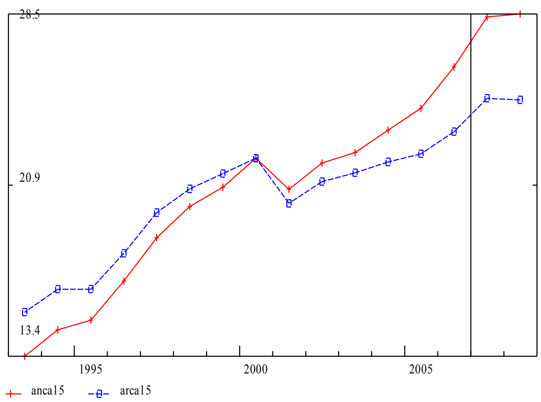
14 Hand tools

Forecast 2007-2008



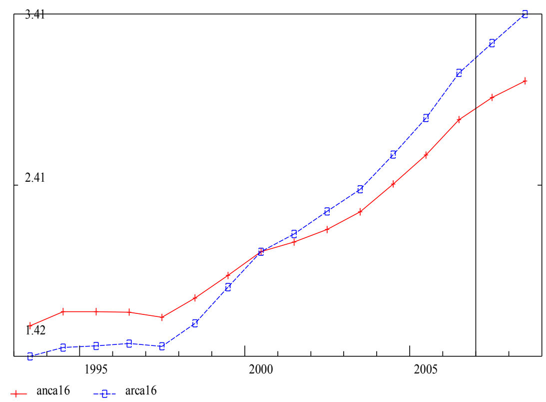
15 Ophthalmic products and orthopedic ap

Forecast 2007-2008



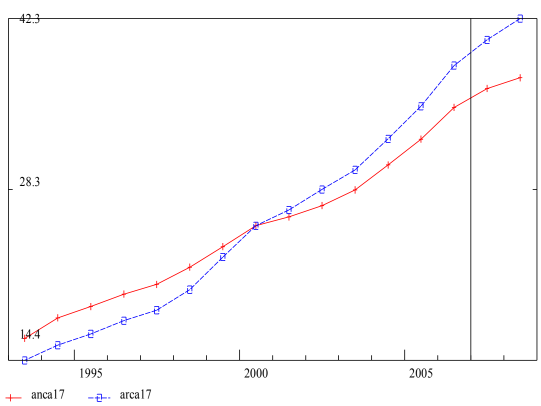
16 Guns

Forecast 2007-2008



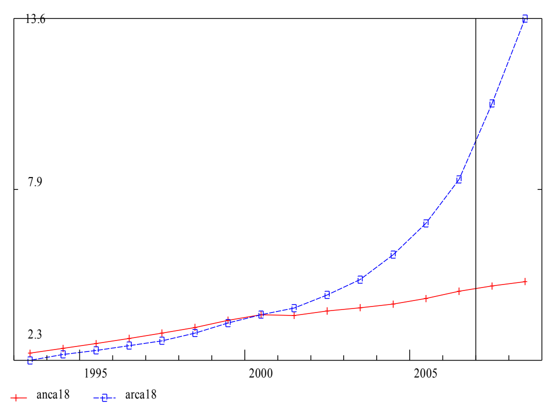
17 Sporting equipment

Forecast 2007-2008



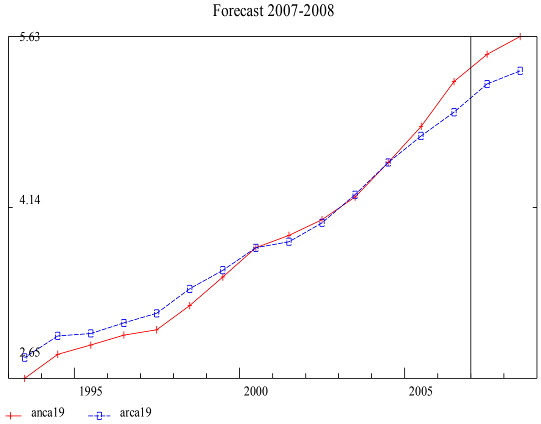
18 Photographic equipment

Forecast 2007-2008

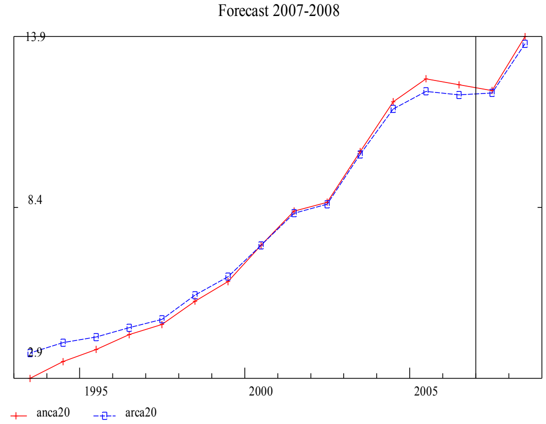


Appendix 3.4 (cont.)

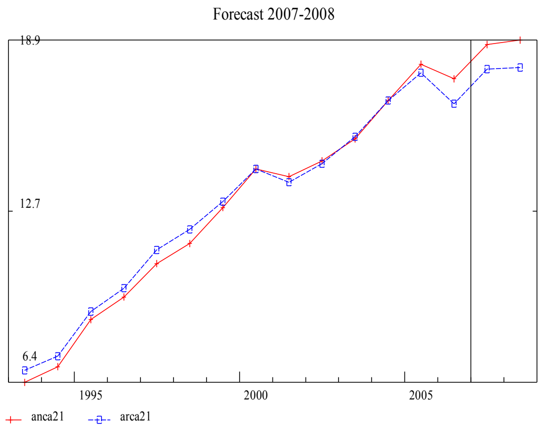
19 Bicycles



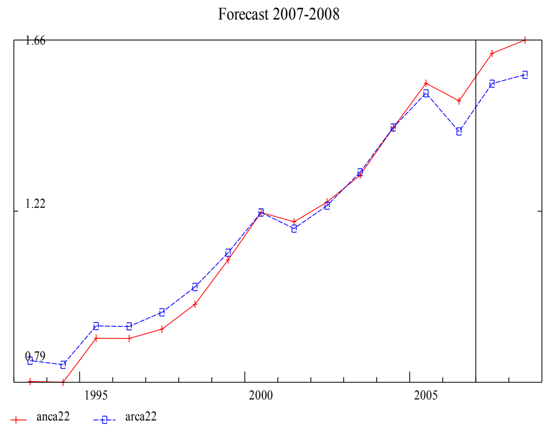
20 Motorcycles



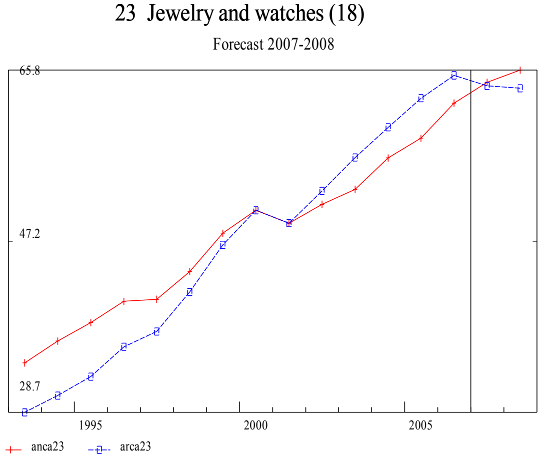
21 Pleasure boats



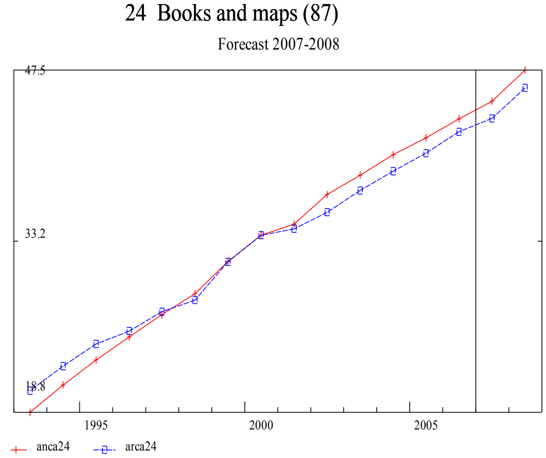
22 Pleasure aircraft



23 Jewelry and watches (18)



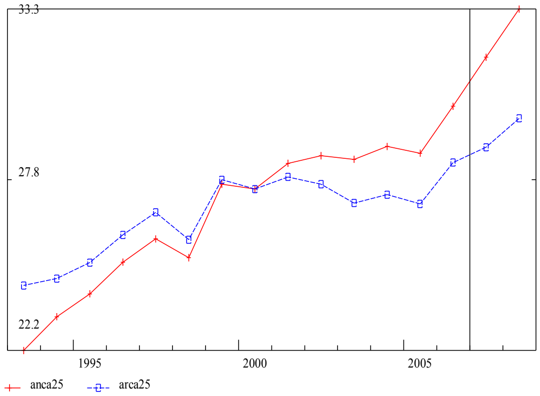
24 Books and maps (87)



Appendix 3.4 (cont.)

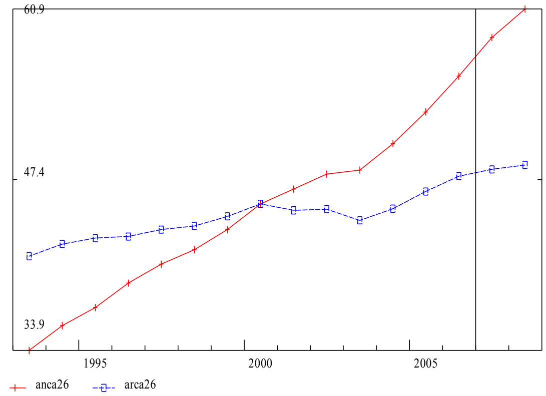
25 Cereals

Forecast 2007-2008



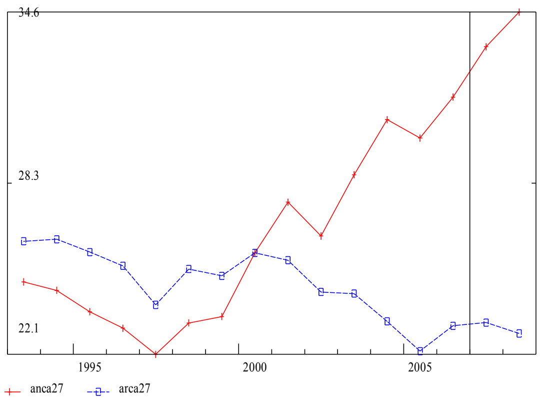
26 Bakery products

Forecast 2007-2008



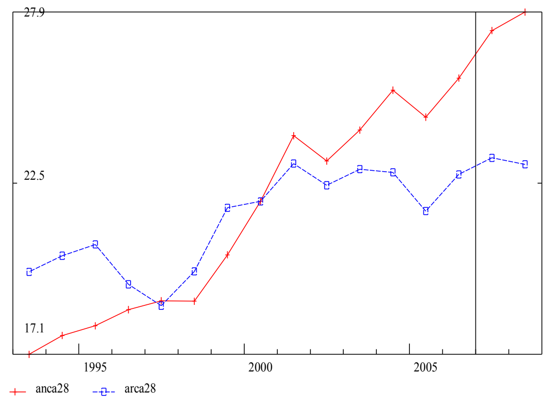
27 Beef and veal

Forecast 2007-2008



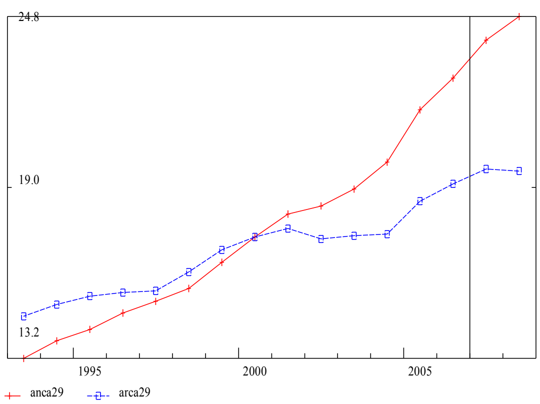
28 Pork

Forecast 2007-2008



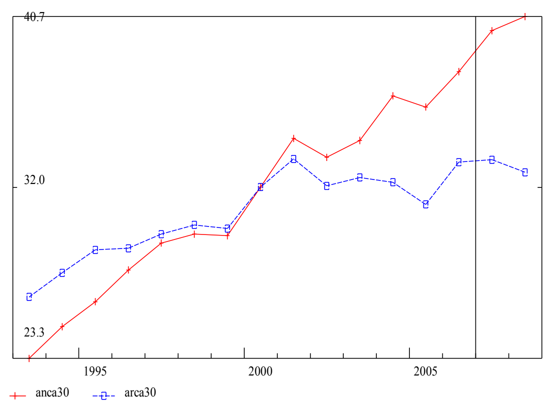
29 Other meats

Forecast 2007-2008

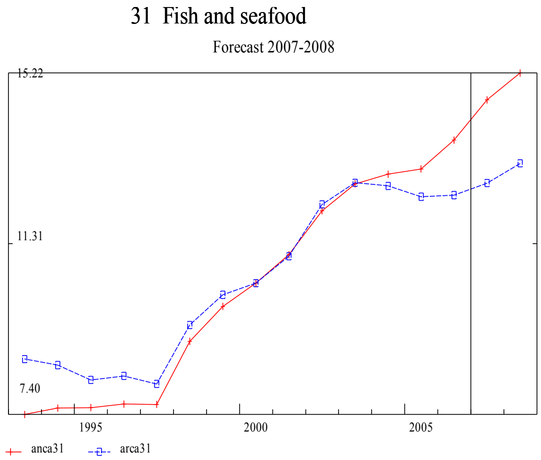


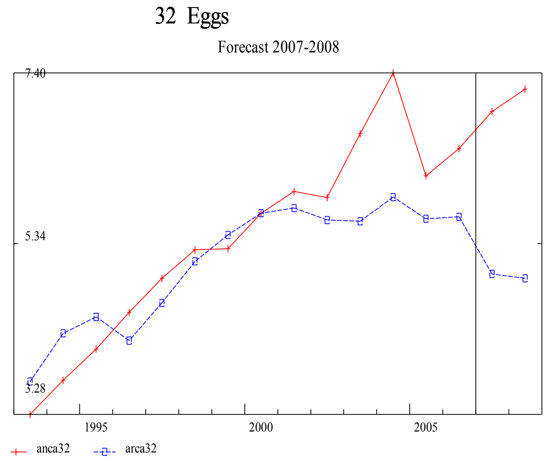
30 Poultry

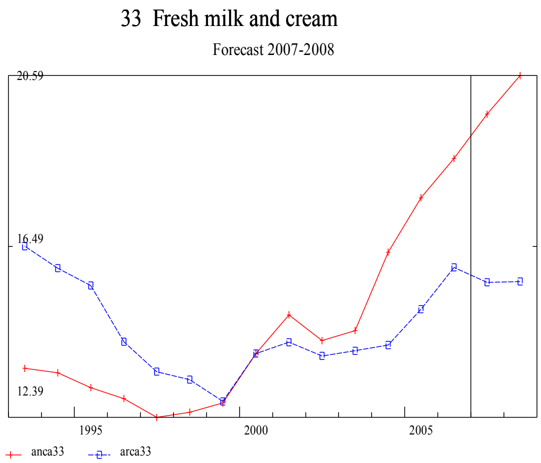
Forecast 2007-2008

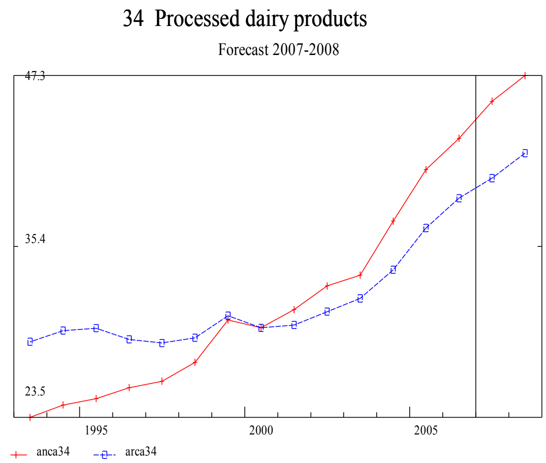


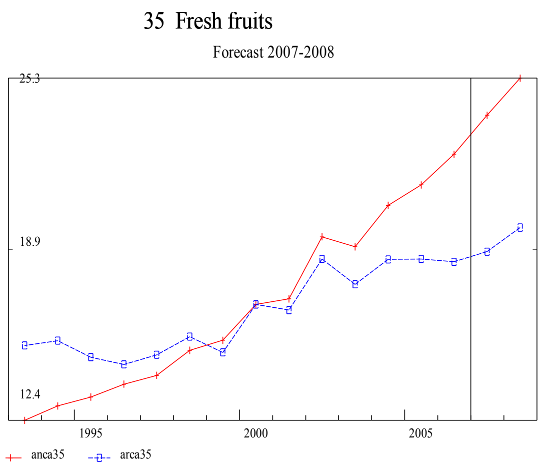
Appendix 3.4 (cont.)

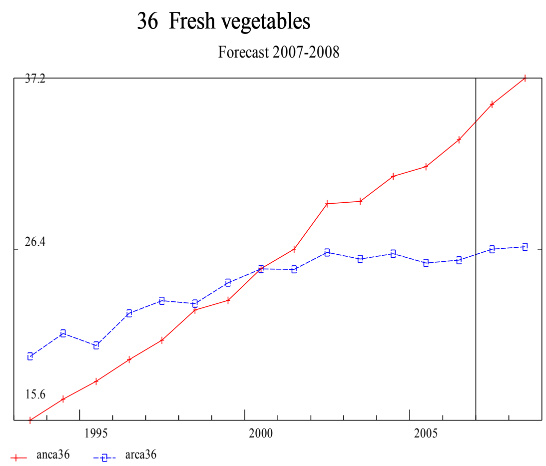








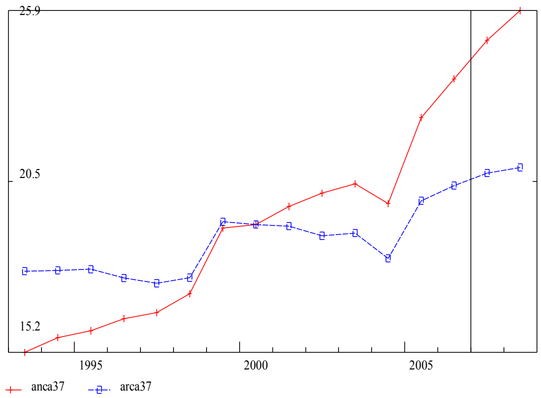




Appendix 3.4 (cont.)

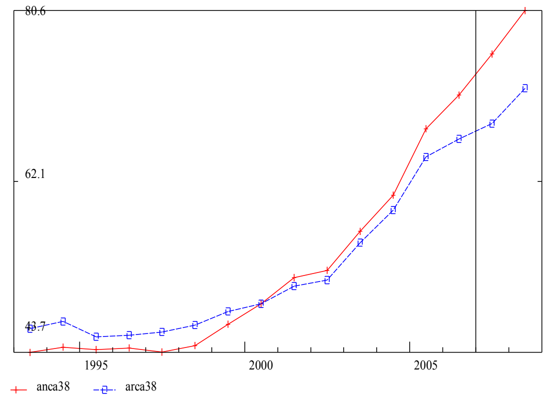
37 Processed fruits and vegetables

Forecast 2007-2008



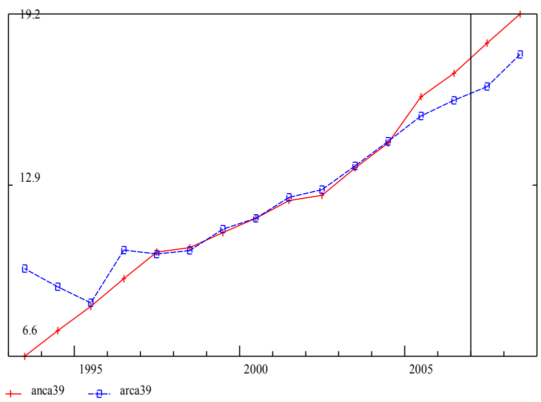
38 Juices and nonalcoholic drinks

Forecast 2007-2008



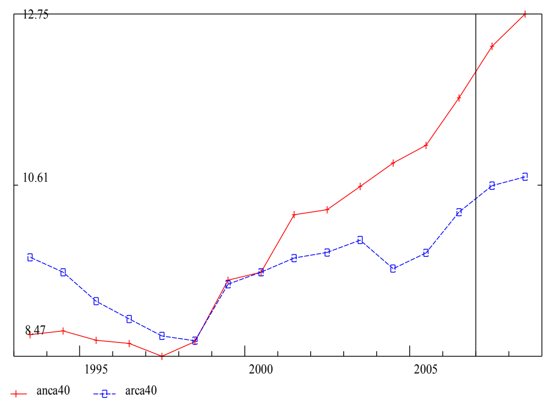
39 Coffee, tea and beverage materials

Forecast 2007-2008



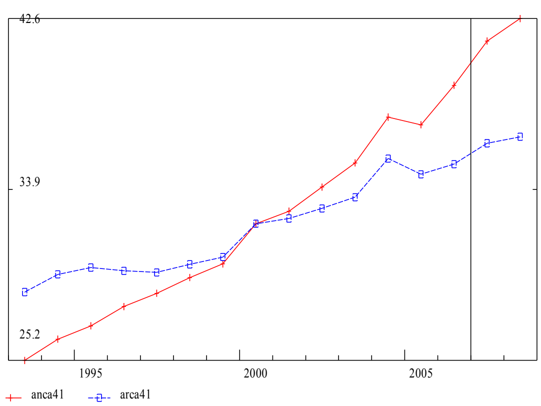
40 Fats and oils

Forecast 2007-2008



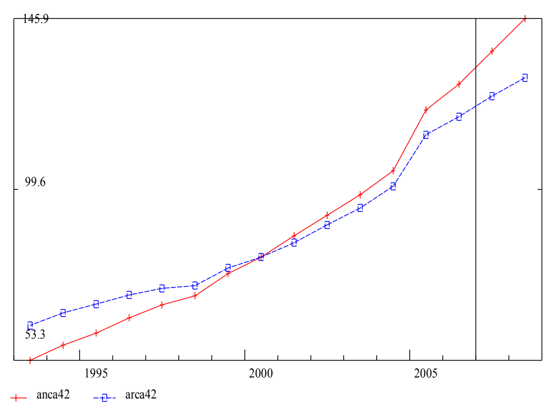
41 Sugar and sweets

Forecast 2007-2008



42 Other foods

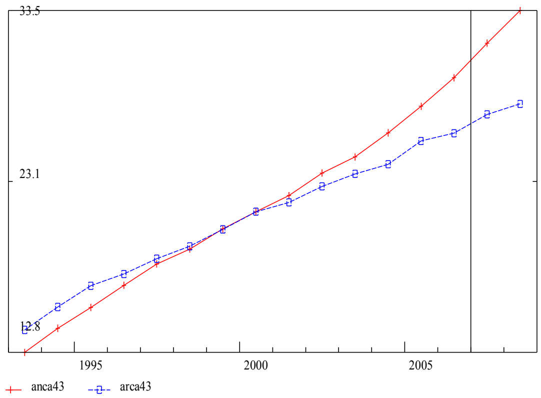
Forecast 2007-2008



Appendix 3.4 (cont.)

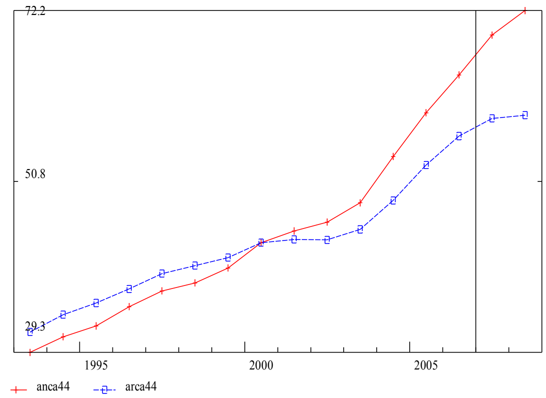
43 Pet food

Forecast 2007-2008



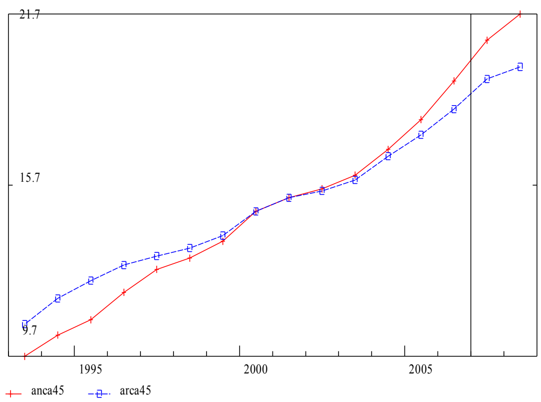
44 Beer and ale, at home

Forecast 2007-2008



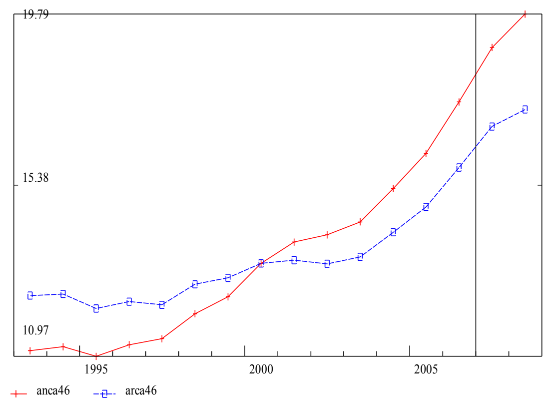
45 Wine and brandy, at home

Forecast 2007-2008



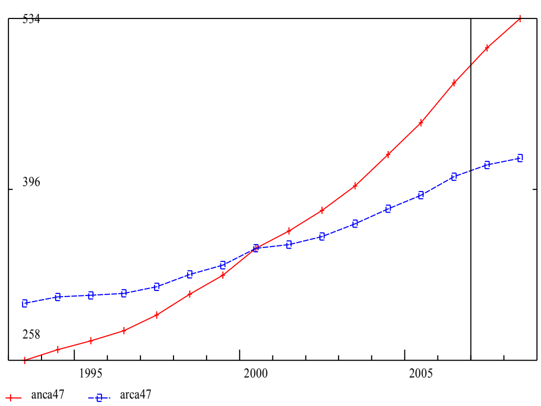
46 Distilled spirits, at home

Forecast 2007-2008



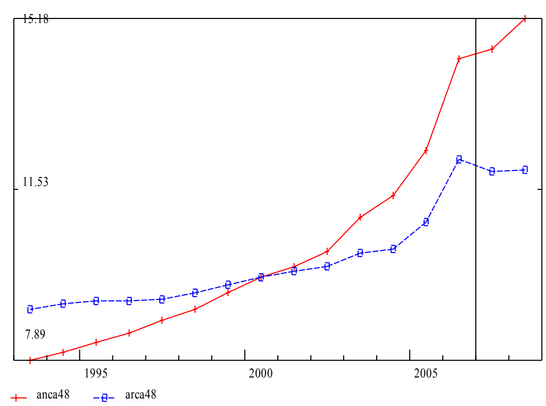
47 Purchased meals and beverages (4)

Forecast 2007-2008



48 Food furnished to employees or home g

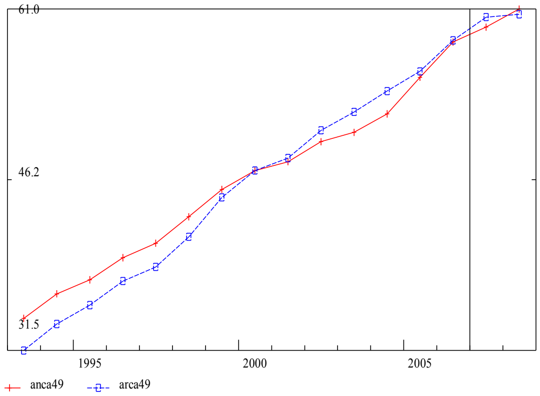
Forecast 2007-2008



Appendix 3.4 (cont.)

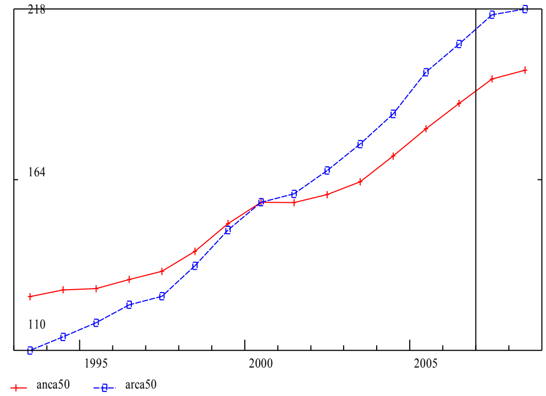
49 Shoes (12)

Forecast 2007-2008



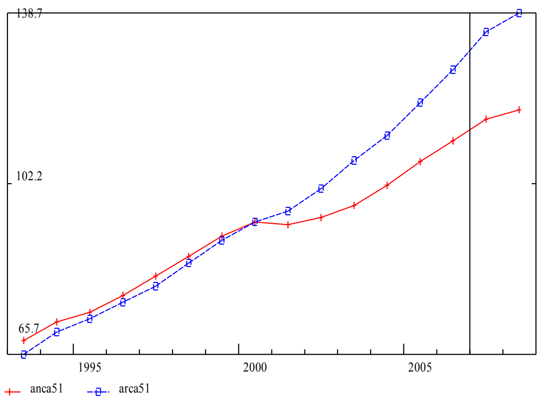
50 Women's and children's clothing and a

Forecast 2007-2008



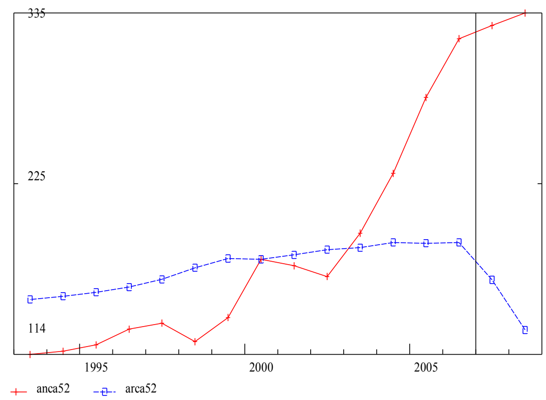
51 Men's and boys' clothing and accessor

Forecast 2007-2008



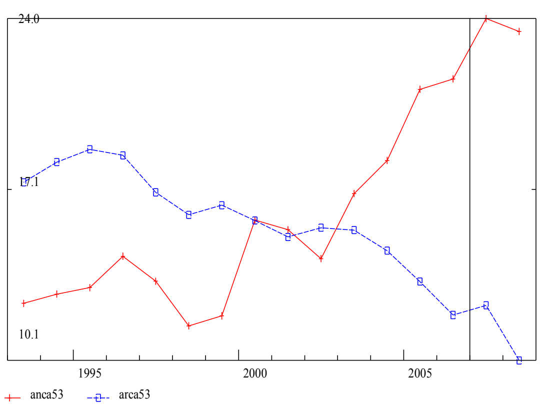
52 Gasoline and oil (75)

Forecast 2007-2008



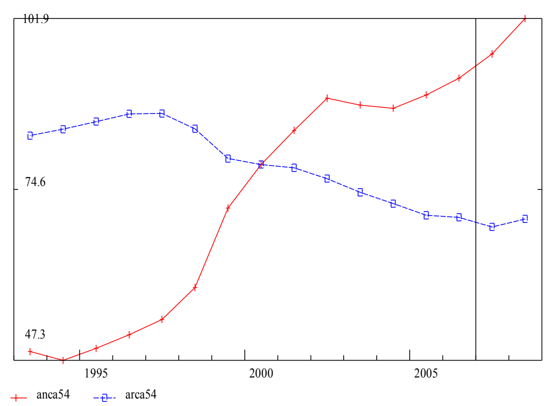
53 Fuel oil and coal (40)

Forecast 2007-2008



54 Tobacco products (7)

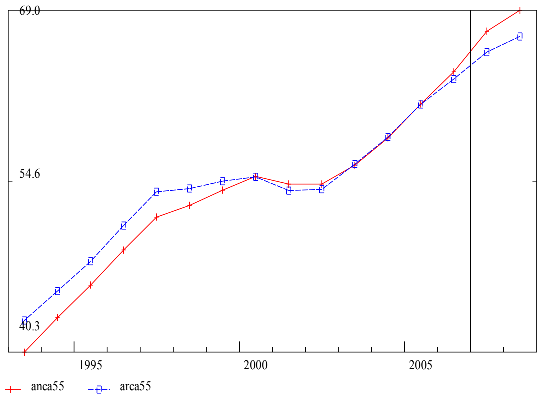
Forecast 2007-2008



Appendix 3.4 (cont.)

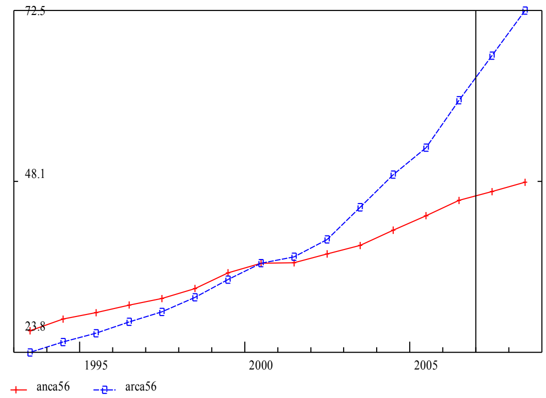
55 Toilet articles and preparations (21)

Forecast 2007-2008



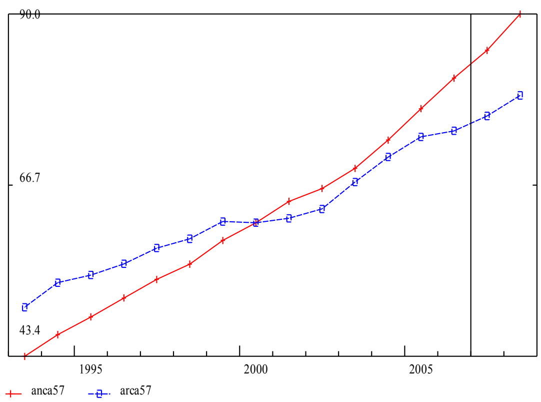
56 Semidurable house furnishings (33)

Forecast 2007-2008



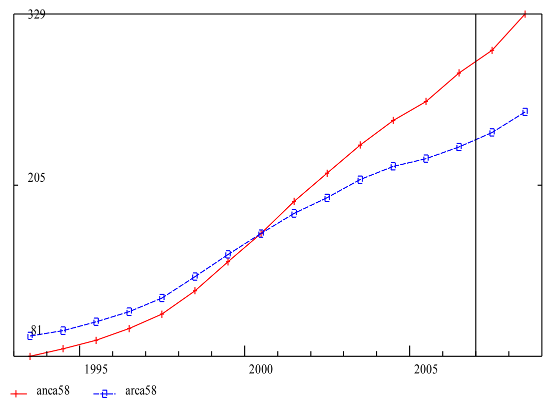
57 Cleaning, polishing preparations, mis

Forecast 2007-2008



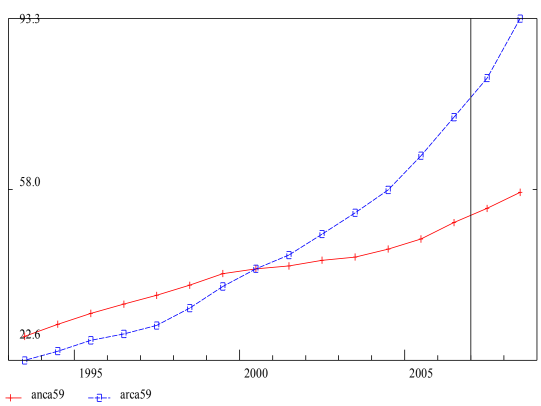
58 Drug preparations and sundries (45)

Forecast 2007-2008



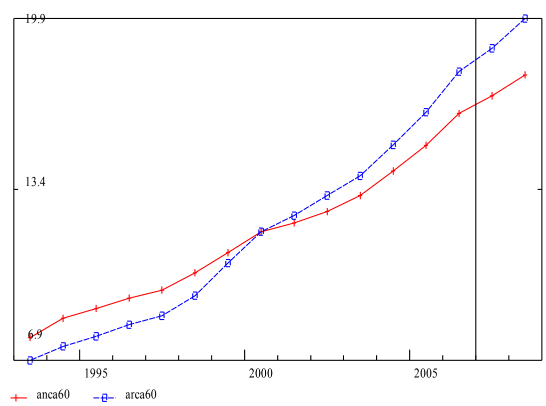
59 Toys, dolls, and games

Forecast 2007-2008



60 Sport supplies, including ammunition

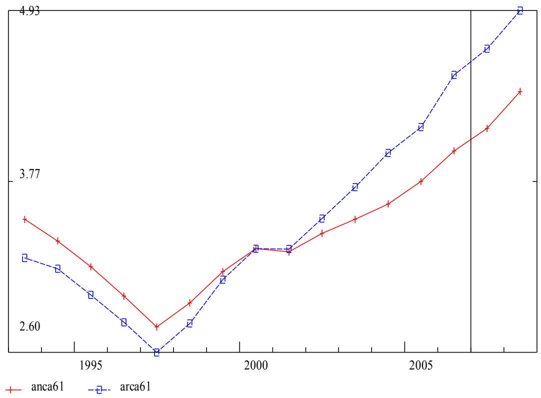
Forecast 2007-2008



Appendix 3.4 (cont.)

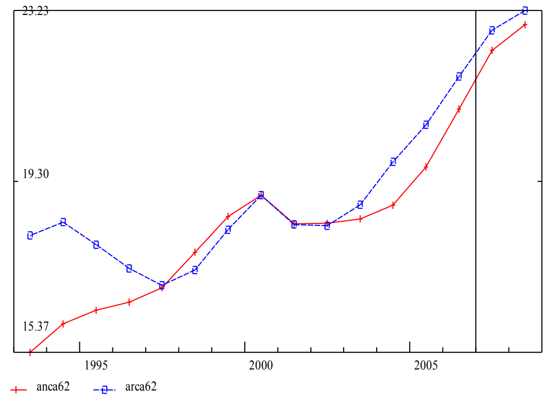
61 Film and photo supplies

Forecast 2007-2008



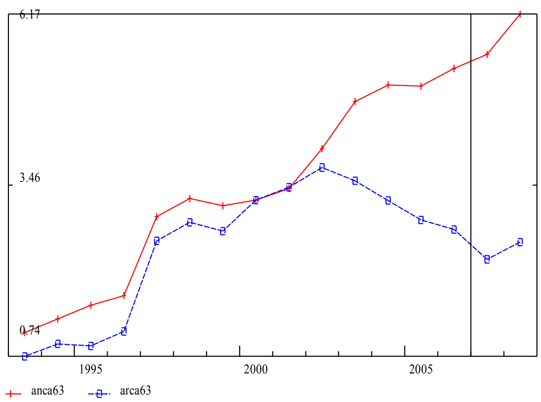
62 Stationery and writing supplies (35)

Forecast 2007-2008



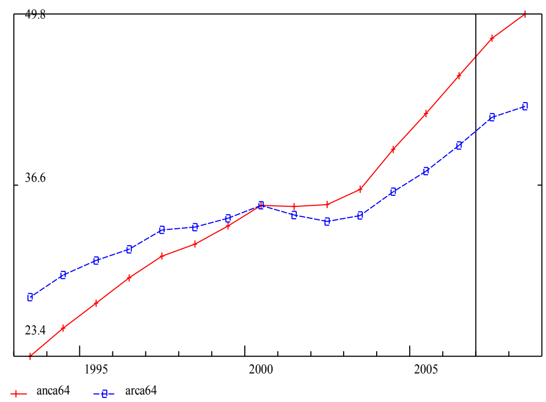
63 Net foreign remittances (111 less 113

Forecast 2007-2008



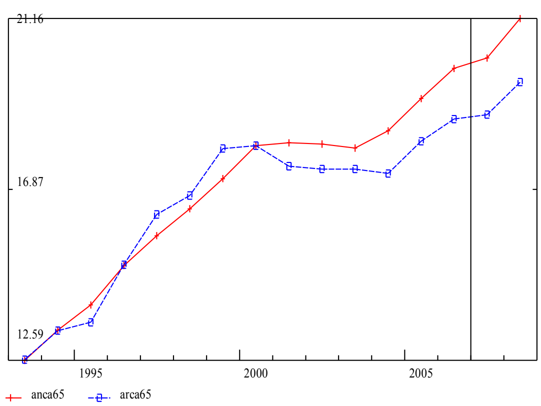
64 Magazines, newspapers, and sheet musi

Forecast 2007-2008



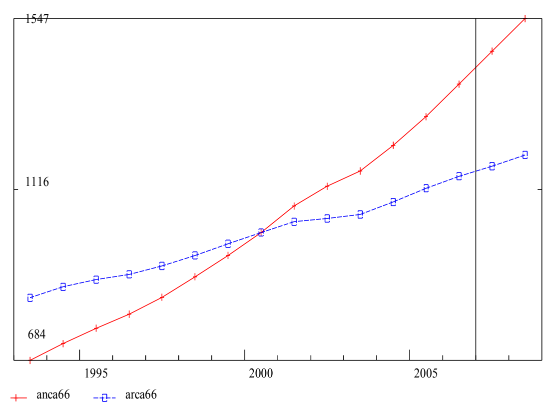
65 Flowers, seeds, and potted plants (95

Forecast 2007-2008



66 Housing

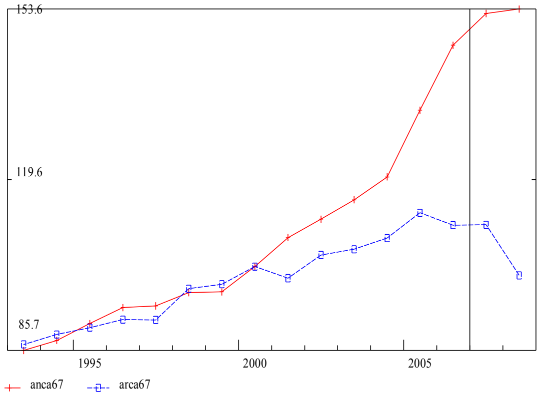
Forecast 2007-2008



Appendix 3.4 (cont.)

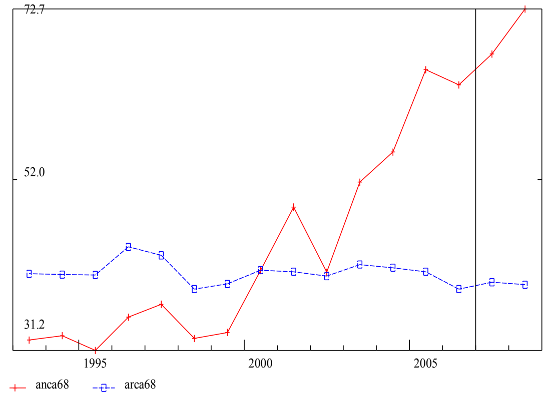
67 Electricity (37)

Forecast 2007-2008



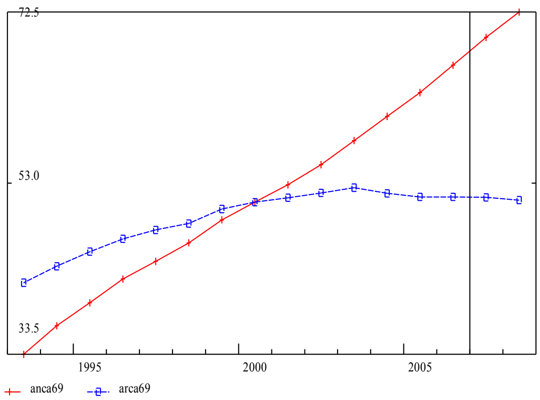
68 Gas (38)

Forecast 2007-2008



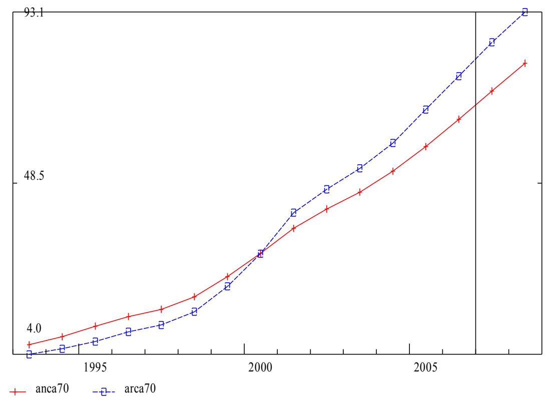
69 Water and other sanitary services (39

Forecast 2007-2008



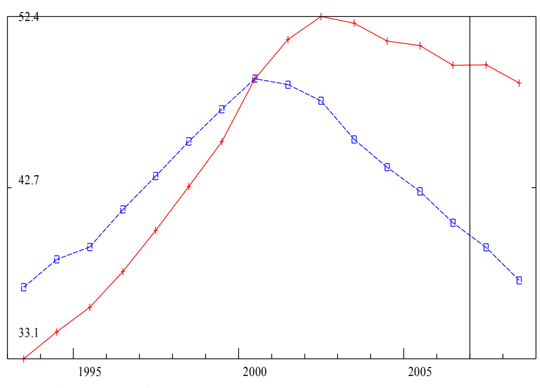
70 Cellular telephone

Forecast 2007-2008



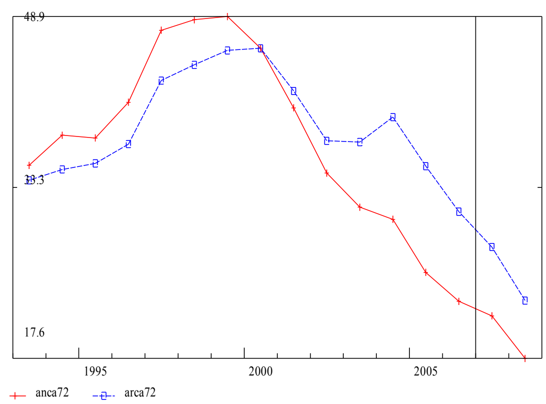
71 Local telephone

Forecast 2007-2008



72 Long distance telephone

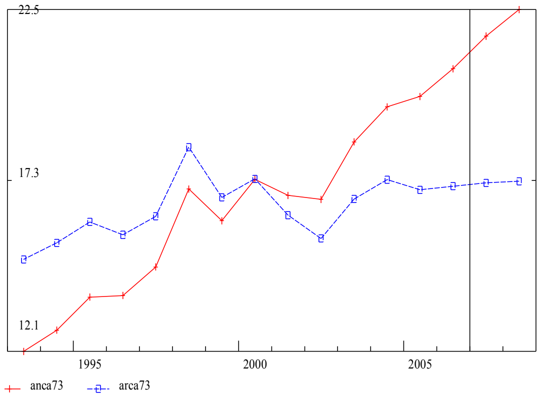
Forecast 2007-2008



Appendix 3.4 (cont.)

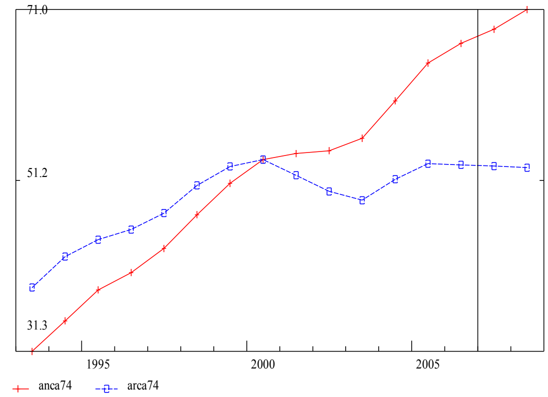
73 Domestic service (42)

Forecast 2007-2008



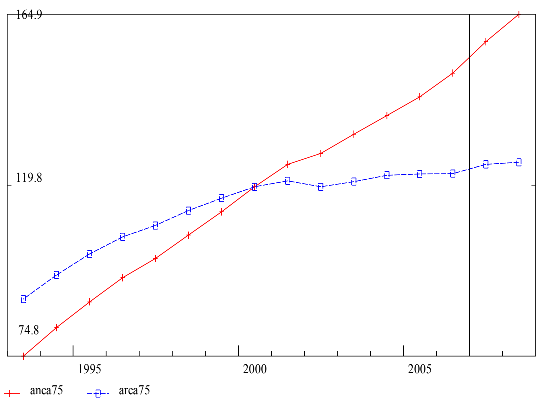
74 Other (43)

Forecast 2007-2008



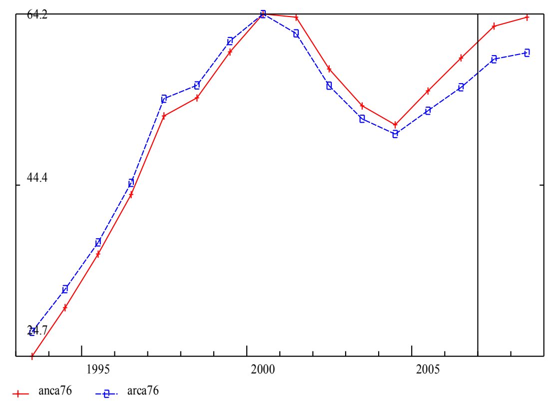
75 Motor vehicle repair

Forecast 2007-2008



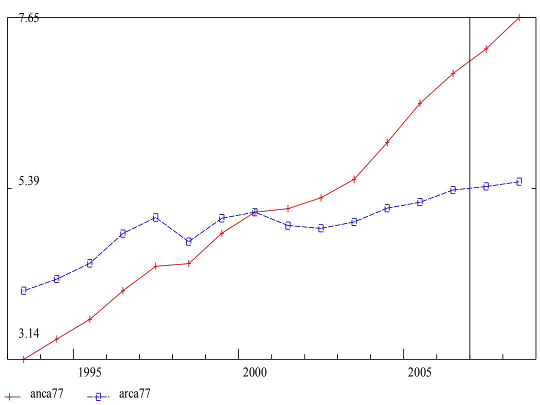
76 Motor vehicle rental, leasing, and ot

Forecast 2007-2008



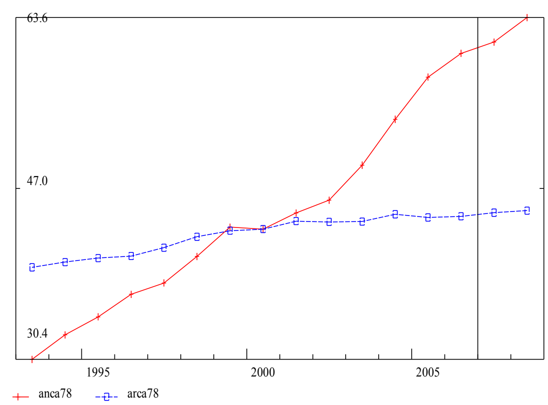
77 Bridge, tunnel, ferry, and road tolls

Forecast 2007-2008



78 Insurance

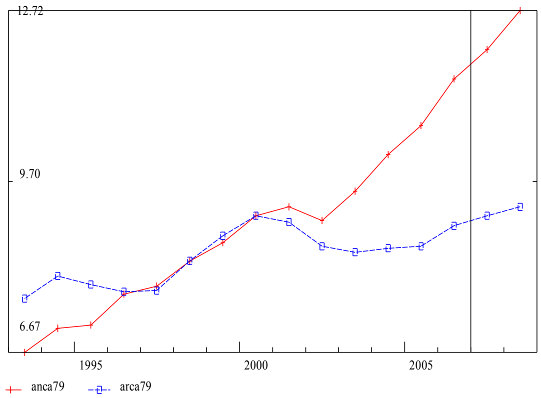
Forecast 2007-2008



Appendix 3.4 (cont.)

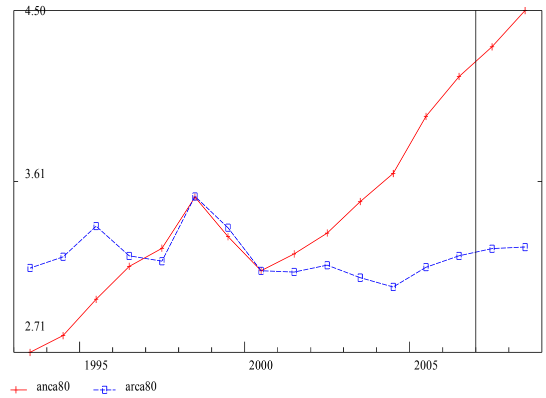
79 Mass transit systems (79)

Forecast 2007-2008



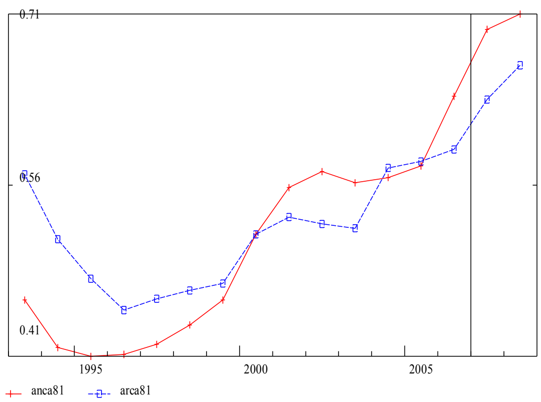
80 Taxicab (80)

Forecast 2007-2008



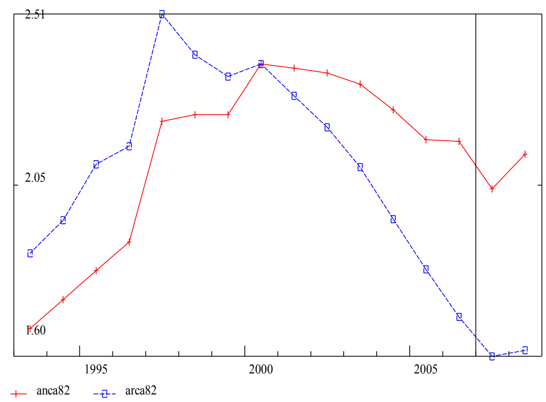
81 Railway (82)

Forecast 2007-2008



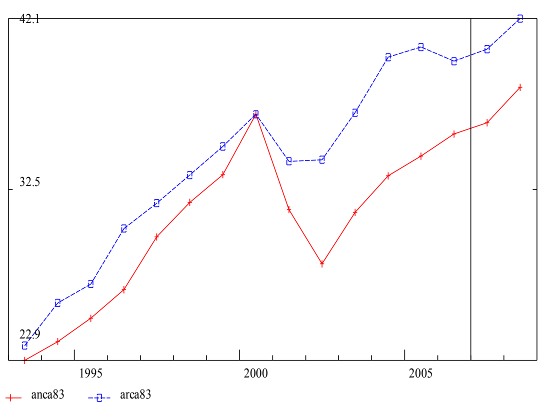
82 Bus (83)

Forecast 2007-2008



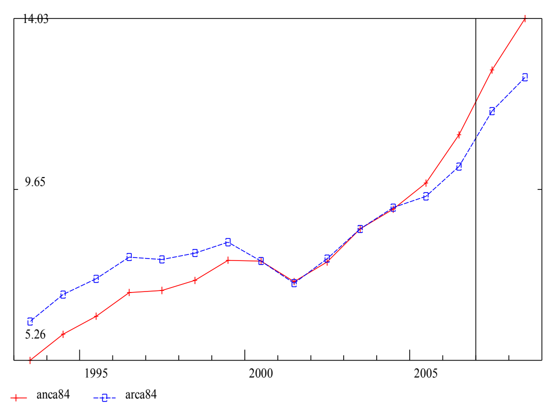
83 Airline (84)

Forecast 2007-2008



84 Other (85)

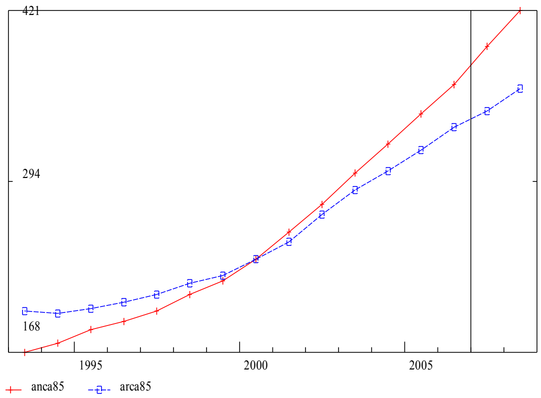
Forecast 2007-2008



Appendix 3.4 (cont.)

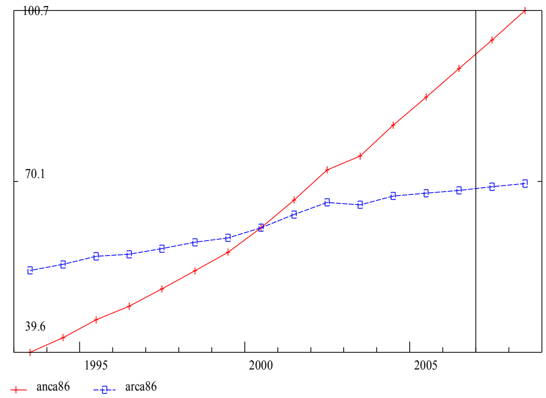
85 Physicians (47)

Forecast 2007-2008



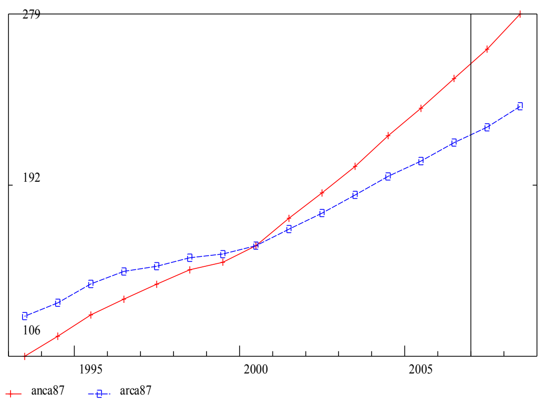
86 Dentists (48)

Forecast 2007-2008



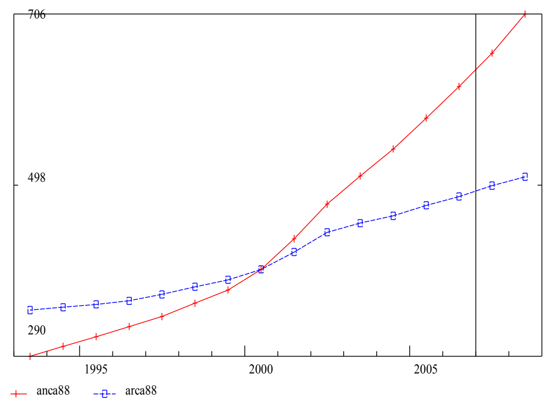
87 Other professional services (49)

Forecast 2007-2008



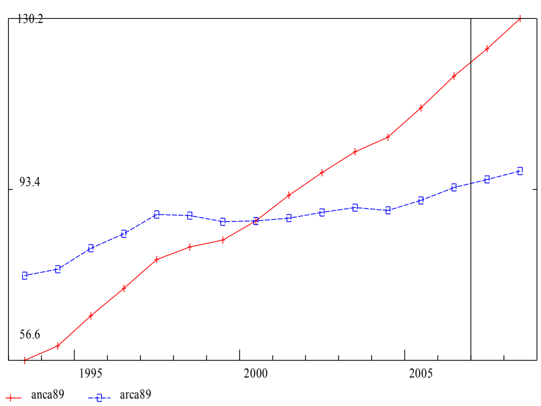
88 Hospitals

Forecast 2007-2008



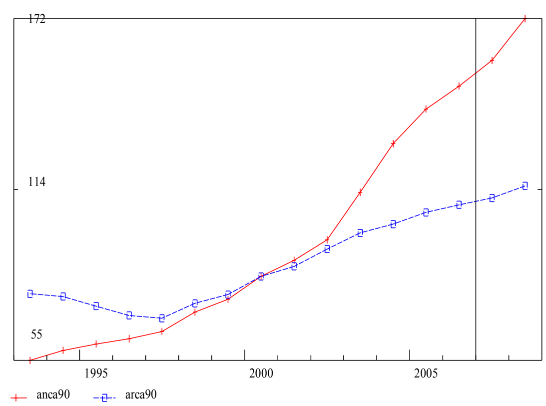
89 Nursing homes

Forecast 2007-2008



90 Health insurance (56)

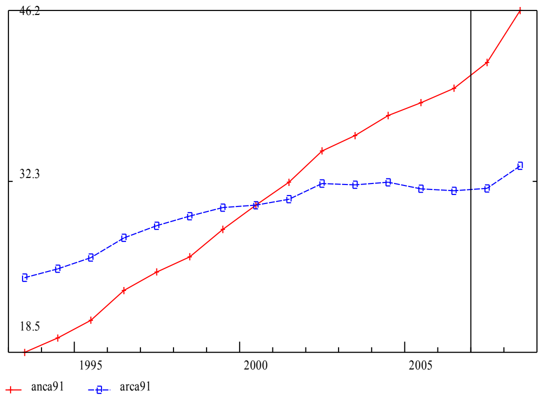
Forecast 2007-2008



Appendix 3.4 (cont.)

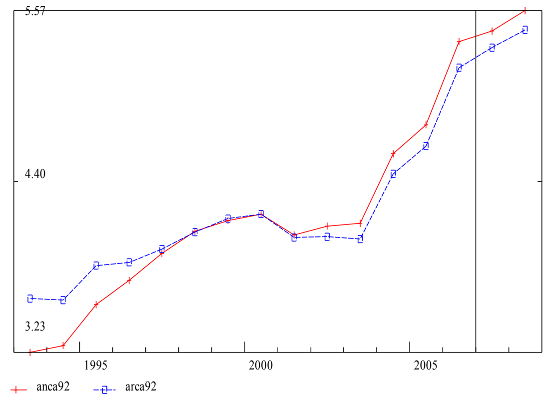
91 Admissions to specified spectator amu

Forecast 2007-2008



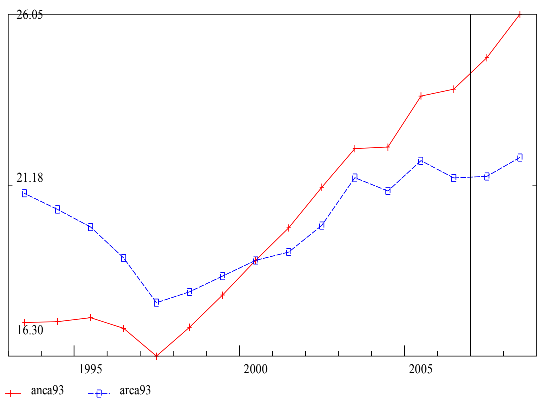
92 Radio and television repair

Forecast 2007-2008



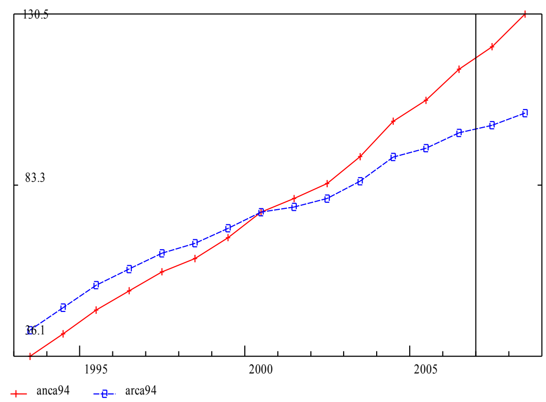
93 Clubs and fraternal organizations

Forecast 2007-2008



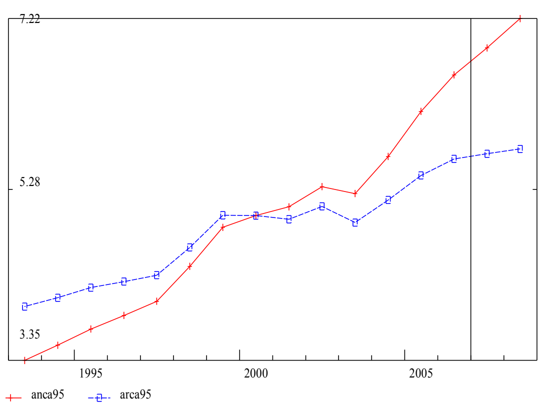
94 Commercial participant amusements

Forecast 2007-2008



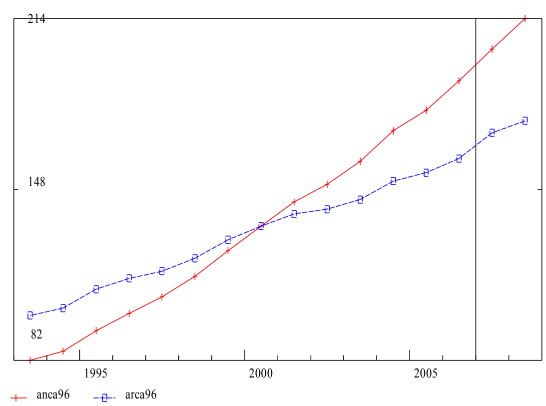
95 Pari-mutuel net receipts

Forecast 2007-2008



96 Other Recreation Services

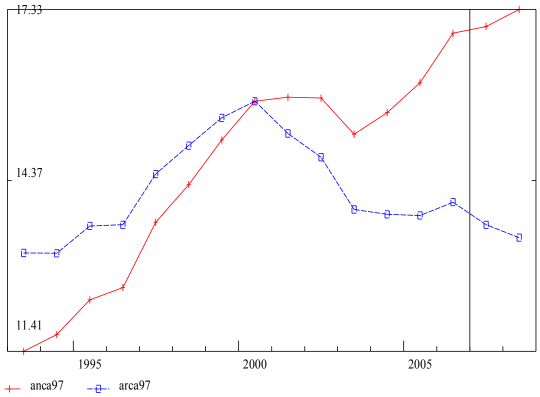
Forecast 2007-2008



Appendix 3.4 (cont.)

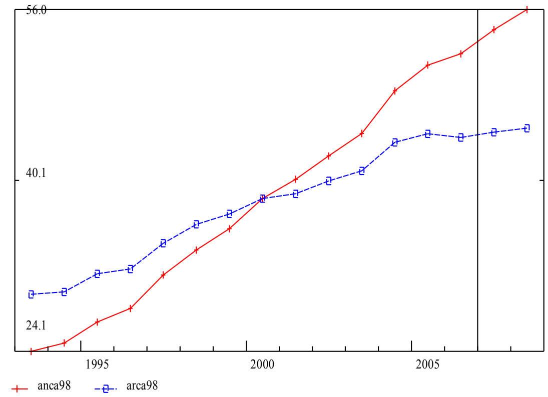
97 Cleaning, storage, and repair of clot

Forecast 2007-2008



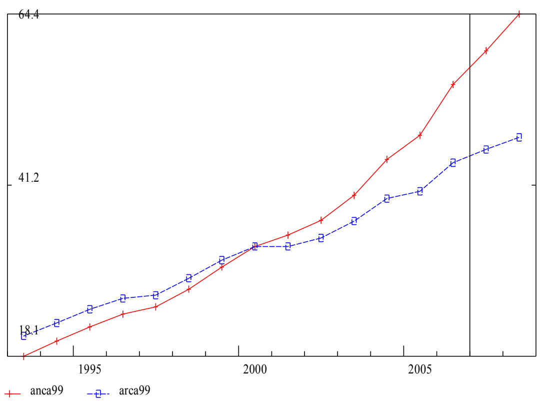
98 Barbershops, beauty parlors, and heal

Forecast 2007-2008



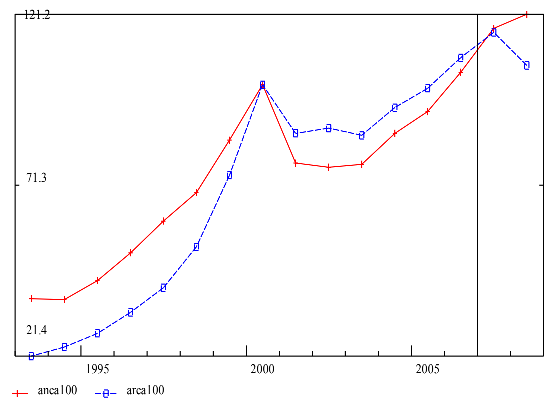
99 Other Personal Care(19)

Forecast 2007-2008



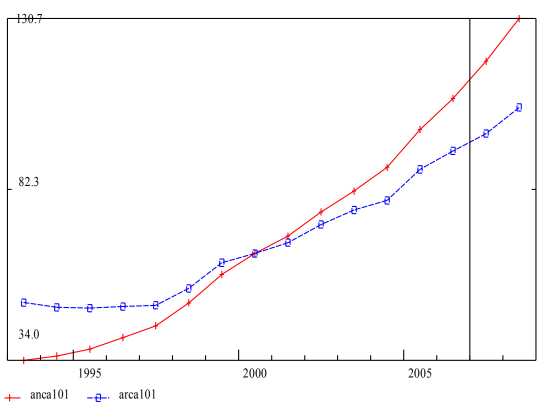
100 Brokerage charges and investment coun

Forecast 2007-2008



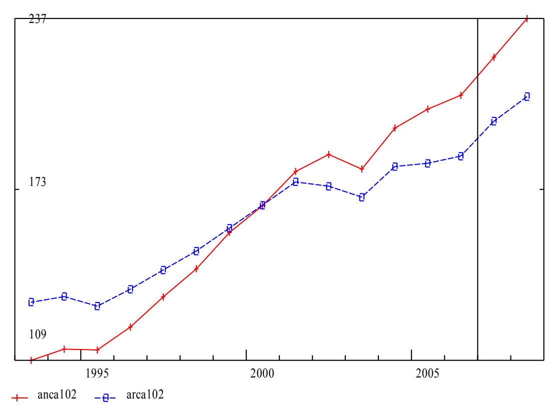
101 Bank service charges, trust services,

Forecast 2007-2008



102 Services furnished w/out payment by i

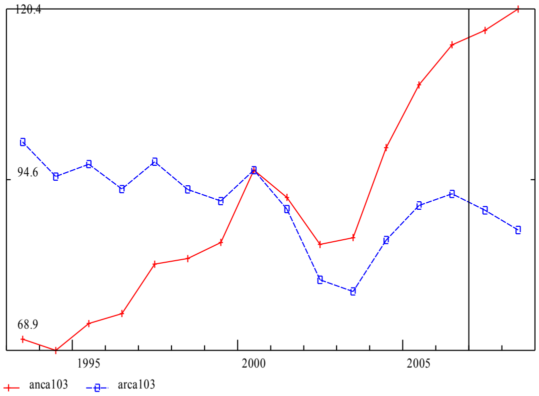
Forecast 2007-2008



Appendix 3.4 (cont.)

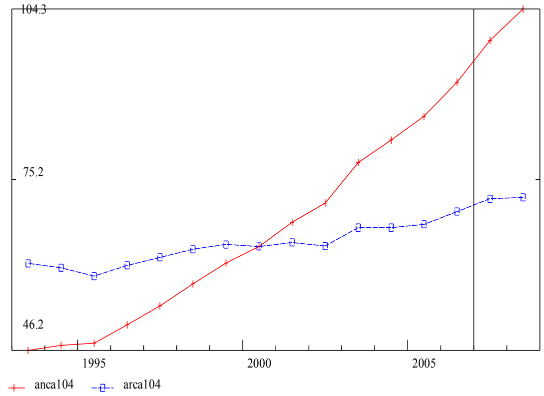
103 Expense of handling life insurance an

Forecast 2007-2008



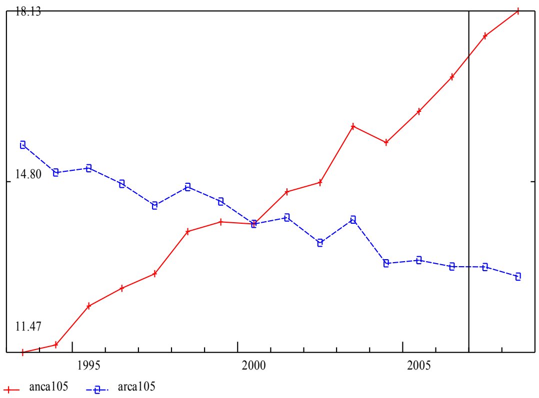
104 Legal services (65)

Forecast 2007-2008



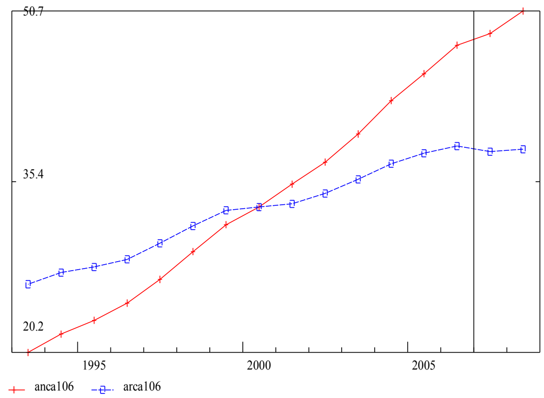
105 Funeral and burial expenses (66)

Forecast 2007-2008



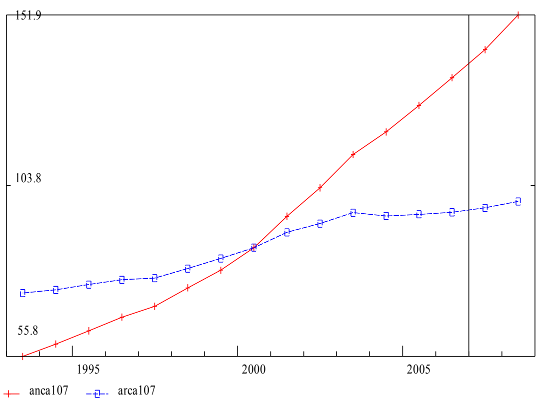
106 Other Personal Service(67)

Forecast 2007-2008



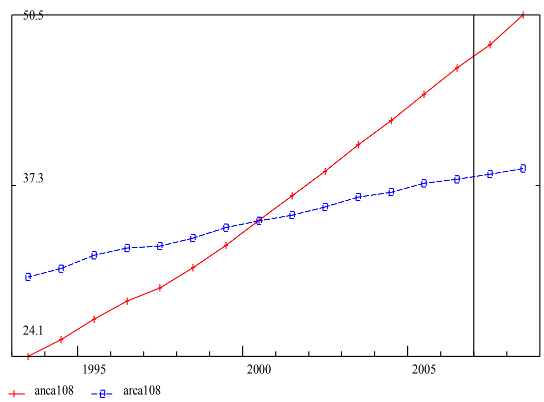
107 Higher education (105)

Forecast 2007-2008



108 Nursery, elementary, and secondary sc

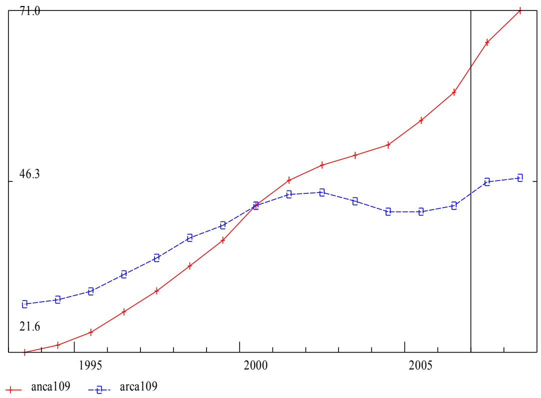
Forecast 2007-2008



Appendix 3.4 (cont.)

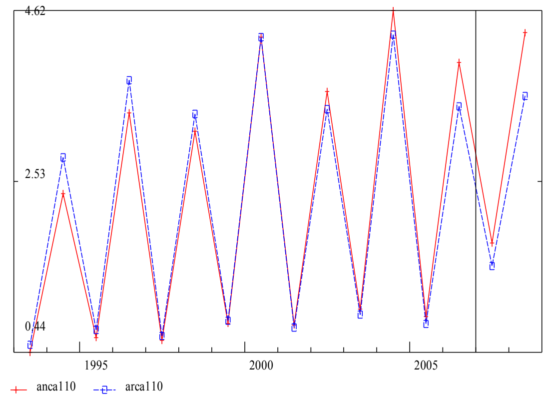
109 Other Education (107)

Forecast 2007-2008



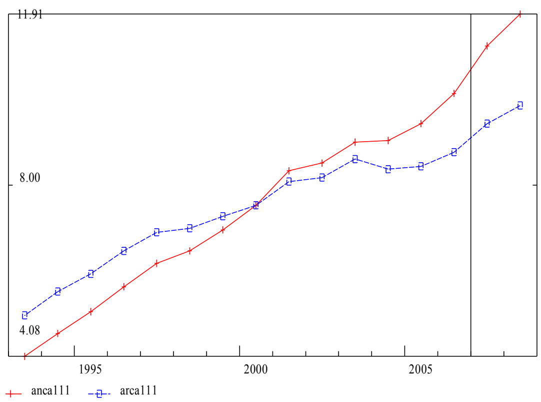
110 Political organizations

Forecast 2007-2008



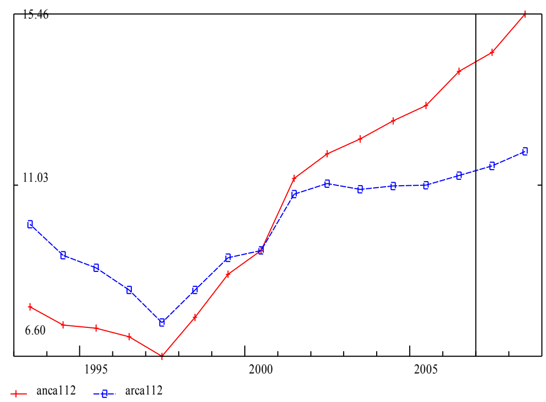
111 Museums and libraries

Forecast 2007-2008



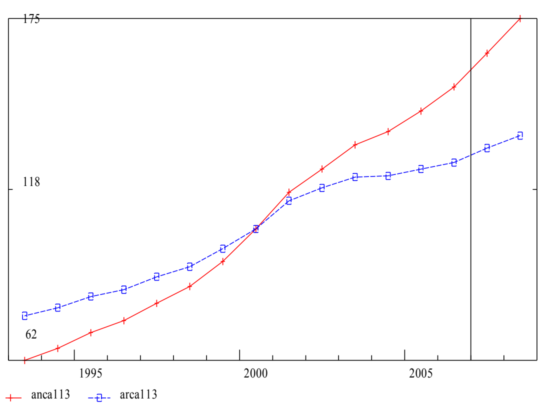
112 Foundations to religion and welfare

Forecast 2007-2008



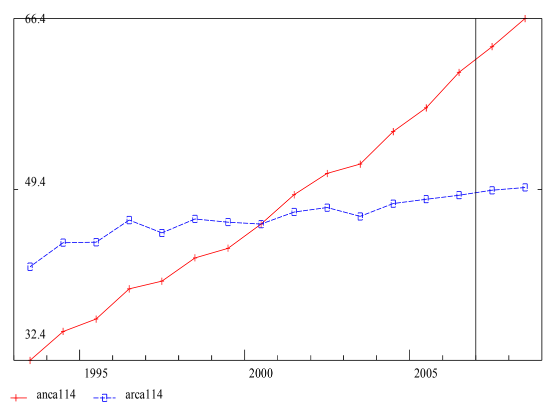
113 Social welfare

Forecast 2007-2008

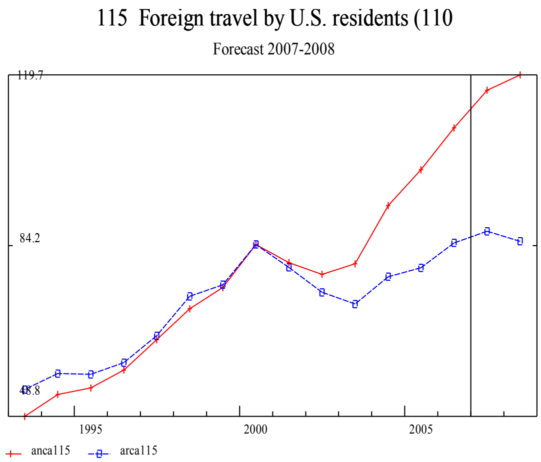


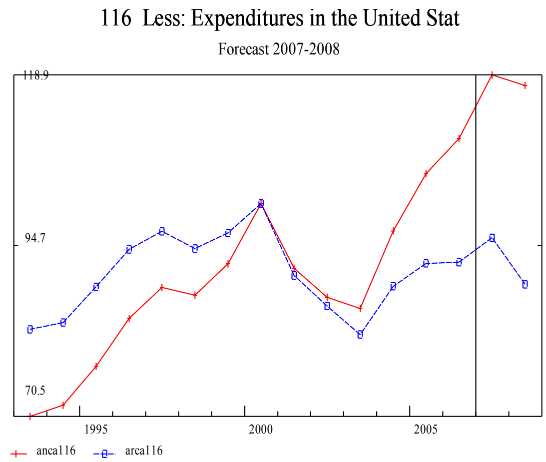
114 Religion

Forecast 2007-2008



Appendix 3.4 (cont.)





Appendix 3.5: Results

	Nominal in Billion dollars	1995	2000	2005	2006	2007	2008
1	New autos (70)	82.129	103.582	104.007	107.060	107.028	112.399
2	Net purchases of used autos (71)	50.505	60.650	57.553	58.044	56.308	57.019
3	Other motor vehicles (72)	96.231	173.248	225.431	209.255	219.981	232.204
4	Tires, tubes, accessories, and other parts (73)	37.826	49.037	57.941	59.844	61.566	63.905
5	Furniture, including mattresses and bedsprings (29)	48.525	67.596	79.871	84.478	86.185	85.800
6	Kitchen and other household appliances (30)	26.465	30.410	36.830	38.623	38.889	38.351
7	China, glassware, tableware, and utensils (31)	23.371	30.993	36.613	39.768	40.988	40.137
8	Video and audio goods, including musical instruments (92)	57.199	72.764	85.776	90.094	90.653	89.812
9	Computers and peripherals	18.801	33.514	43.062	46.899	49.330	49.584
10	Software	5.501	10.319	13.421	14.521	15.250	15.243
11	Floor coverings	12.683	16.483	20.823	23.025	23.085	24.353
12	Durable house furnishings, n.e.c.	25.969	36.934	43.652	47.184	48.732	48.154
13	Writing equipment	2.496	3.061	3.403	3.619	3.782	3.840
14	Hand tools	7.617	10.830	14.776	15.914	16.072	17.009
15	Ophthalmic products and orthopedic appliances (46)	14.979	22.116	24.312	26.134	28.352	28.476
16	Guns	1.674	2.023	2.587	2.795	2.923	3.019
17	Sporting equipment	18.748	25.352	32.415	35.014	36.541	37.424
18	Photographic equipment	2.856	3.808	4.336	4.576	4.747	4.899
19	Bicycles	2.941	3.789	4.845	5.233	5.469	5.626
20	Motorcycles	3.850	7.182	12.501	12.312	12.125	13.854
21	Pleasure boats	8.701	14.187	18.003	17.476	18.722	18.899
22	Pleasure aircraft	0.902	1.220	1.549	1.503	1.624	1.658
23	Jewelry and watches (18)	38.421	50.568	58.366	62.155	64.439	65.756
24	Books and maps (87)	23.212	33.655	41.808	43.394	44.891	47.502
25	Cereals	24.018	27.448	28.615	30.150	31.747	33.334
26	Bakery products	37.275	45.467	52.771	55.603	58.660	60.928
27	Beef and veal	23.617	25.770	30.001	31.509	33.363	34.637
28	Pork	18.024	21.923	24.567	25.799	27.282	27.873
29	Other meats	14.153	17.297	21.632	22.718	24.005	24.825
30	Poultry	26.173	32.013	36.102	37.916	39.998	40.730
31	Fish and seafood	7.550	10.401	13.019	13.675	14.601	15.218
32	Eggs	4.066	5.705	6.157	6.488	6.933	7.206
33	Fresh milk and cream	13.096	13.916	17.656	18.603	19.660	20.593
34	Processed dairy products	24.807	29.712	40.710	42.895	45.473	47.266
35	Fresh fruits	13.289	16.789	21.310	22.454	23.941	25.341
36	Fresh vegetables	18.037	25.146	31.574	33.268	35.504	37.175
37	Processed fruits and vegetables	15.857	19.179	22.533	23.742	24.958	25.890
38	Juices and nonalcoholic drinks	43.969	48.932	67.819	71.459	75.857	80.579
39	Coffee, tea and beverage materials	8.394	11.647	16.142	17.008	18.126	19.205
40	Fats and oils	8.664	9.519	11.106	11.702	12.348	12.752
41	Sugar and sweets	26.949	32.153	37.189	39.185	41.434	42.600
42	Other foods	60.596	81.186	121.125	128.056	137.033	145.864
43	Pet food	15.517	21.315	27.688	29.408	31.489	33.477
44	Beer and ale, at home	32.629	43.053	59.354	64.099	69.106	72.201
45	Wine and brandy, at home	10.966	14.763	17.981	19.336	20.765	21.685
46	Distilled spirits, at home	10.966	13.363	16.198	17.525	18.929	19.791
47	Purchased meals and beverages (4)	273.969	348.809	450.221	482.364	510.549	534.394
48	Food furnished to employees or home grown	8.271	9.659	12.356	14.315	14.523	15.175
49	Shoes (12)	37.582	47.026	55.092	58.153	59.431	61.026
50	Women's and children's clothing and accessories except shoes (14)	129.484	156.692	179.757	187.730	195.526	198.273
51	Men's and boys' clothing and accessories except shoes (15+16)	74.656	93.993	106.898	111.350	116.008	117.918
52	Gasoline and oil (75)	120.213	175.656	280.688	318.570	327.261	335.460
53	Fuel oil and coal (40)	13.074	15.826	21.144	21.565	24.039	23.500
54	Tobacco products (7)	49.205	78.543	89.693	92.362	96.201	101.891
55	Toilet articles and preparations (21)	45.934	55.016	61.097	63.804	67.216	68.973
56	Semidurable house furnishings (33)	29.410	36.465	43.216	45.401	46.651	47.994
57	Cleaning, polishing preparations, misc. supplies and paper products	48.794	61.587	77.087	81.255	85.017	89.976
58	Drug preparations and sundries (45)	92.133	169.412	265.213	285.979	302.269	328.674
59	Toys, dolls, and games	32.298	41.510	47.685	51.110	54.019	57.357
60	Sport supplies, including ammunition	8.867	11.793	15.078	16.287	16.956	17.756
61	Film and photo supplies	3.186	3.308	3.766	3.975	4.129	4.380
62	Stationery and writing supplies (35)	16.330	18.982	19.629	20.959	22.307	22.907
63	Net foreign remittances (111 less 113)	1.554	3.220	5.025	5.308	5.529	6.171
64	Magazines, newspapers, and sheet music (88)	27.525	35.048	42.132	45.043	47.908	49.791
65	Flowers, seeds, and potted plants (95)	13.970	17.974	19.154	19.903	20.165	21.163
66	Housing	764.386	1006.456	1298.688	1381.341	1465.163	1547.478
67	Electricity (37)	90.958	102.348	133.409	146.341	152.657	153.568
68	Gas (38)	31.245	40.953	65.334	63.494	67.245	72.745
69	Water and other sanitary services (39)	39.337	50.816	63.295	66.397	69.559	72.495
70	Cellular telephone	11.274	30.187	58.052	65.121	72.530	79.708
71	Local telephone	35.988	48.893	50.771	49.639	49.665	48.636
72	Long distance telephone	37.765	45.988	25.505	22.818	21.504	17.628
73	Domestic service (42)	13.767	17.350	19.854	20.696	21.685	22.502
74	Other (43)	38.413	53.576	64.799	67.111	68.747	71.044
75	Motor vehicle repair	89.030	119.334	143.124	149.346	157.610	164.861
76	Motor vehicle rental, leasing, and other	36.444	64.160	55.247	59.074	62.765	63.773
77	Bridge, tunnel, ferry, and road tolls	3.663	5.076	6.513	6.910	7.233	7.648
78	Insurance	34.495	43.033	57.803	60.131	61.209	63.617
79	Mass transit systems (79)	7.148	9.087	10.679	11.507	12.030	12.723
80	Taxicab (80)	2.989	3.139	3.947	4.156	4.311	4.502

Nominal in Billion dollars (cont.)

		1995	2000	2005	2006	2007	2008
81	Railway (82)	0.410	0.518	0.578	0.639	0.698	0.712
82	Bus (83)	1.826	2.376	2.175	2.170	2.043	2.136
83	Airline (84)	25.278	36.724	34.374	35.624	36.246	38.243
84	Other (85)	6.390	7.807	9.803	11.040	12.710	14.030
85	Physicians (47)	184.635	236.836	344.570	366.337	394.594	421.266
86	Dentists (48)	45.389	61.827	85.186	90.303	95.419	100.682
87	Other professional services (49)	126.596	161.577	230.928	246.131	260.973	278.801
88	Hospitals	314.344	395.998	579.725	618.012	658.959	706.468
89	Nursing homes	66.171	86.599	110.936	117.800	123.638	130.209
90	Health insurance (56)	60.716	83.975	141.277	149.150	158.026	172.433
91	Admissions to specified spectator amusements (96)	21.099	30.400	38.704	39.877	41.959	46.160
92	Radio and television repair	3.553	4.172	4.782	5.353	5.424	5.566
93	Clubs and fraternal organizations	17.394	19.026	23.714	23.907	24.803	26.052
94	Commercial participant amusements	48.815	75.812	106.759	115.302	121.539	130.546
95	Pari-mutuel net receipts	3.702	4.986	6.164	6.580	6.882	7.218
96	Other Recreation Services	93.357	133.868	178.687	189.966	202.372	214.221
97	Cleaning, storage, and repair of clothing and shoes (17)	12.297	15.737	16.057	16.919	17.032	17.330
98	Barbershops, beauty parlors, and health clubs (22)	26.847	38.356	50.812	51.875	54.130	56.022
99	Other Personal Care(19)	22.053	32.936	47.945	54.815	59.371	64.374
100	Brokerage charges and investment counseling (61)	43.464	100.582	92.712	104.177	117.008	121.192
101	Bank service charges, trust services, and safe deposit box rental	37.190	64.244	99.244	108.034	118.532	130.668
102	Services furnished w/out payment by intermediaries except life ins. carriers	113.260	167.223	203.446	208.512	222.873	237.366
103	Expense of handling life insurance and pension plans (64)	72.890	96.078	108.867	114.923	117.127	120.373
104	Legal services (65)	47.354	63.854	85.985	91.832	98.980	104.323
105	Funeral and burial expenses (66)	12.377	13.977	16.174	16.847	17.646	18.135
106	Other Personal Service(67)	23.026	33.140	45.048	47.583	48.640	50.650
107	Higher education (105)	62.906	86.358	126.422	134.117	142.089	151.866
108	Nursery, elementary, and secondary schools (106)	26.995	34.618	44.360	46.382	48.179	50.497
109	Other Education (107)	24.445	42.795	55.095	59.141	66.359	70.978
110	Political organizations	0.615	4.290	0.873	3.982	1.770	4.344
111	Museums and libraries	5.103	7.533	9.398	10.094	11.178	11.909
112	Foundations to religion and welfare	7.324	9.334	13.088	13.976	14.463	15.458
113	Social welfare	70.862	105.218	144.267	152.281	163.544	175.053
114	Religion	36.453	45.909	57.485	61.001	63.533	66.364
115	Foreign travel by U.S. residents (110)	54.711	84.415	99.985	108.650	116.469	119.671
116	Less: Expenditures in the United States by nonresidents (112)	77.626	100.658	104.883	109.862	118.911	117.404

Chained Real 2000 in Billion dollars

		1995	2000	2005	2006	2007	2008
1	New autos (70)	82.165	103.583	107.508	109.673	109.917	114.913
2	Net purchases of used autos (71)	52.814	60.638	56.976	56.494	56.104	55.827
3	Other motor vehicles (72)	99.823	173.261	233.248	217.693	232.805	247.466
4	Tires, tubes, accessories, and other parts (73)	37.157	49.038	53.553	53.174	52.918	52.255
5	Furniture, including mattresses and bedsprings (29)	48.735	67.595	85.238	89.408	91.146	90.345
6	Kitchen and other household appliances (30)	25.105	30.413	39.226	40.196	39.198	37.987
7	China, glassware, tableware, and utensils (31)	22.534	30.992	41.058	46.299	48.451	47.929
8	Video and audio goods, including musical instruments (92)	45.924	72.771	117.976	134.646	151.117	167.295
9	Computers and peripherals	3.065	33.504	138.431	178.353	213.081	272.402
10	Software	1.890	10.319	19.460	22.413	25.062	30.054
11	Floor coverings	13.746	16.483	19.422	20.577	20.293	21.108
12	Durable house furnishings, n.e.c.	23.868	36.947	54.919	64.632	71.299	76.729
13	Writing equipment	3.223	3.061	2.605	2.605	2.537	2.438
14	Hand tools	7.497	10.830	14.778	15.741	15.753	16.347
15	Ophthalmic products and orthopedic appliances (46)	16.350	22.116	22.302	23.279	24.756	24.684
16	Guns	1.475	2.023	2.802	3.065	3.241	3.410
17	Sporting equipment	16.525	25.352	35.108	38.404	40.504	42.268
18	Photographic equipment	2.631	3.808	6.825	8.276	10.782	13.593
19	Bicycles	3.042	3.789	4.761	4.965	5.211	5.327
20	Motorcycles	4.247	7.182	12.103	11.980	12.049	13.613
21	Pleasure boats	8.999	14.187	17.703	16.574	17.840	17.895
22	Pleasure aircraft	0.933	1.220	1.523	1.426	1.547	1.570
23	Jewelry and watches (18)	32.571	50.565	62.683	65.162	64.034	63.756
24	Books and maps (87)	24.547	33.654	40.529	42.338	43.446	46.014
25	Cereals	25.050	27.448	26.963	28.316	28.814	29.755
26	Bakery products	42.782	45.467	46.448	47.680	48.218	48.564
27	Beef and veal	25.799	25.770	22.166	23.093	23.220	22.821
28	Pork	20.578	21.923	21.630	22.772	23.292	23.093
29	Other meats	15.287	17.297	18.528	19.113	19.613	19.546
30	Poultry	28.811	32.011	31.145	33.297	33.422	32.779
31	Fish and seafood	8.188	10.401	12.384	12.421	12.696	13.143
32	Eggs	4.458	5.704	5.638	5.664	4.974	4.922
33	Fresh milk and cream	15.546	13.915	14.979	15.979	15.629	15.649
34	Processed dairy products	29.705	29.712	36.654	38.730	40.135	41.858
35	Fresh fruits	14.802	16.786	18.512	18.401	18.785	19.690
36	Fresh vegetables	20.312	25.139	25.511	25.678	26.367	26.517
37	Processed fruits and vegetables	17.790	19.179	19.921	20.405	20.795	20.968
38	Juices and nonalcoholic drinks	45.381	48.933	64.768	66.699	68.369	72.200
39	Coffee, tea and beverage materials	8.531	11.647	15.434	16.006	16.512	17.703
40	Fats and oils	9.155	9.519	9.762	10.269	10.602	10.715
41	Sugar and sweets	29.922	32.154	34.668	35.185	36.248	36.575
42	Other foods	68.453	81.187	114.315	119.248	124.757	129.795
43	Pet food	16.832	21.315	25.591	26.051	27.181	27.818
44	Beer and ale, at home	35.504	43.053	52.778	56.436	58.633	59.080
45	Wine and brandy, at home	12.324	14.763	17.448	18.351	19.403	19.825
46	Distilled spirits, at home	12.194	13.363	14.815	15.829	16.889	17.330
47	Purchased meals and beverages (4)	310.774	348.812	391.544	406.654	416.042	421.577
48	Food furnished to employees or home grown	9.150	9.659	10.831	12.166	11.913	11.944
49	Shoes (12)	35.372	47.026	55.623	58.282	60.303	60.572
50	Women's and children's clothing and accessories except shoes (14)	118.690	156.695	197.672	206.523	215.672	217.549
51	Men's and boys' clothing and accessories except shoes (15+16)	73.314	94.006	119.530	126.546	134.596	138.691
52	Gasoline and oil (75)	154.454	175.666	186.188	186.762	162.342	129.780
53	Fuel oil and coal (40)	18.700	15.799	13.306	11.958	12.342	10.108
54	Tobacco products (7)	85.453	78.543	70.452	70.164	68.609	69.902
55	Toilet articles and preparations (21)	47.933	55.016	61.051	63.203	65.460	66.762
56	Semidurable house furnishings (33)	26.484	36.461	52.891	59.640	65.994	72.457
57	Cleaning, polishing preparations, misc. supplies and paper products	54.505	61.594	73.230	74.090	76.107	78.890
58	Drug preparations and sundries (45)	105.602	169.342	223.810	232.195	242.796	257.715
59	Toys, dolls, and games	26.733	41.509	64.874	72.842	80.932	93.255
60	Sport supplies, including ammunition	7.815	11.793	16.331	17.864	18.757	19.897
61	Film and photo supplies	2.992	3.308	4.137	4.493	4.669	4.932
62	Stationery and writing supplies (35)	17.838	18.982	20.595	21.712	22.775	23.231
63	Net foreign remittances (111 less 113)	0.908	3.219	2.907	2.750	2.277	2.551
64	Magazines, newspapers, and sheet music (88)	30.791	35.047	37.689	39.663	41.828	42.689
65	Flowers, seeds, and potted plants (95)	13.541	17.970	18.080	18.635	18.750	19.560
66	Housing	887.505	1006.385	1118.238	1148.264	1174.386	1202.516
67	Electricity (37)	90.172	102.338	112.998	110.563	110.616	100.525
68	Gas (38)	40.394	40.987	40.802	38.700	39.529	39.248
69	Water and other sanitary services (39)	45.153	50.815	51.430	51.417	51.391	51.039
70	Cellular telephone	7.228	30.180	67.629	76.327	85.181	93.094
71	Local telephone	39.397	48.892	42.537	40.747	39.376	37.492
72	Long distance telephone	35.480	45.991	35.211	31.044	27.797	22.904
73	Domestic service (42)	16.049	17.352	17.024	17.133	17.232	17.279
74	Other (43)	44.285	53.578	53.097	52.975	52.856	52.647
75	Motor vehicle repair	101.722	119.334	122.712	122.878	125.266	125.836
76	Motor vehicle rental, leasing, and other	37.784	64.161	52.987	55.699	58.946	59.690
77	Bridge, tunnel, ferry, and road tolls	4.404	5.076	5.207	5.367	5.416	5.477
78	Insurance	40.213	43.034	44.152	44.268	44.620	44.816
79	Mass transit systems (79)	7.865	9.087	8.545	8.906	9.085	9.246
80	Taxicab (80)	3.372	3.139	3.158	3.217	3.255	3.262

Chained Real 2000 in Billion dollars

		1995	2000	2005	2006	2007	2008
81	Railway (82)	0.478	0.518	0.582	0.592	0.637	0.667
82	Bus (83)	2.109	2.376	1.829	1.702	1.598	1.614
83	Airline (84)	27.182	36.730	40.502	39.696	40.393	42.113
84	Other (85)	7.352	7.806	9.471	10.229	11.652	12.519
85	Physicians (47)	200.126	236.837	317.668	334.740	346.453	363.358
86	Dentists (48)	56.689	61.828	67.975	68.492	69.142	69.742
87	Other professional services (49)	142.259	161.565	204.402	213.694	221.403	232.123
88	Hospitals	353.295	395.951	473.488	484.599	497.875	508.681
89	Nursing homes	80.733	86.598	91.009	93.782	95.548	97.329
90	Health insurance (56)	73.734	83.966	105.829	108.441	110.857	115.035
91	Admissions to specified spectator amusements (96)	26.150	30.397	31.732	31.566	31.758	33.587
92	Radio and television repair	3.818	4.172	4.638	5.173	5.312	5.432
93	Clubs and fraternal organizations	19.972	19.026	21.871	21.374	21.427	21.958
94	Commercial participant amusements	55.677	75.799	93.484	97.719	99.800	103.114
95	Pari-mutuel net receipts	4.172	4.986	5.443	5.629	5.688	5.742
96	Other Recreation Services	109.400	133.858	154.562	160.048	169.972	174.560
97	Cleaning, storage, and repair of clothing and shoes (17)	13.583	15.738	13.765	13.993	13.603	13.377
98	Barbershops, beauty parlors, and health clubs (22)	31.331	38.354	44.404	44.080	44.565	44.932
99	Other Personal Care(19)	24.434	32.934	40.399	44.252	46.058	47.703
100	Brokerage charges and investment counseling (61)	28.088	100.571	99.483	108.466	115.896	106.274
101	Bank service charges, trust services, and safe deposit box rental	48.732	64.239	88.009	93.184	98.038	105.442
102	Services furnished w/out payment by intermediaries except life ins. carriers	129.716	167.396	183.064	185.743	198.836	208.161
103	Expense of handling life insurance and pension plans (64)	96.991	96.078	90.701	92.476	89.971	87.012
104	Legal services (65)	58.807	63.854	67.626	69.821	71.975	72.206
105	Funeral and burial expenses (66)	15.068	13.977	13.275	13.149	13.139	12.948
106	Other Personal Service(67)	27.784	33.139	37.925	38.594	38.097	38.296
107	Higher education (105)	75.962	86.350	95.743	96.307	97.525	99.308
108	Nursery, elementary, and secondary schools (106)	31.930	34.616	37.500	37.811	38.205	38.647
109	Other Education (107)	30.380	42.782	41.867	42.780	46.189	46.770
110	Political organizations	0.710	4.291	0.782	3.444	1.490	3.572
111	Museums and libraries	5.960	7.533	8.421	8.745	9.399	9.811
112	Foundations to religion and welfare	8.886	9.334	11.017	11.270	11.523	11.895
113	Social welfare	82.865	105.197	125.059	127.220	132.100	136.234
114	Religion	44.130	45.909	48.387	48.799	49.264	49.552
115	Foreign travel by U.S. residents (110)	57.545	84.418	79.617	84.784	87.170	85.119
116	Less: Expenditures in the United States by nonresidents (112)	88.903	100.667	92.200	92.339	95.811	89.214

Chained 2000 Price index [2000=100]

		1995	2000	2005	2006	2007	2008
1	New autos (70)	99.95	100.00	96.75	97.62	97.37	97.81
2	Net purchases of used autos (71)	95.64	100.00	101.04	102.75	100.37	102.13
3	Other motor vehicles (72)	96.38	100.00	96.64	96.13	94.49	93.83
4	Tires, tubes, accessories, and other parts (73)	101.80	100.00	108.19	112.56	116.35	122.30
5	Furniture, including mattresses and bedsprings (29)	99.56	100.00	93.71	94.49	94.56	94.97
6	Kitchen and other household appliances (30)	105.42	100.00	93.89	96.09	99.22	100.96
7	China, glassware, tableware, and utensils (31)	103.74	100.00	89.21	85.91	84.60	83.74
8	Video and audio goods, including musical instruments (92)	124.62	100.00	72.76	66.97	60.02	53.74
9	Computers and peripherals	621.82	100.00	31.23	26.36	23.24	18.29
10	Software	295.02	100.00	69.00	64.84	60.93	50.88
11	Floor coverings	92.27	100.00	107.19	111.93	113.75	115.37
12	Durable house furnishings, n.e.c.	108.79	100.00	79.56	73.04	68.38	62.80
13	Writing equipment	77.43	100.00	130.62	138.93	149.11	157.55
14	Hand tools	101.59	100.00	99.98	101.10	102.03	104.04
15	Ophthalmic products and orthopedic appliances (46)	91.62	100.00	109.00	112.27	114.53	115.36
16	Guns	113.47	100.00	92.33	91.18	90.22	88.54
17	Sporting equipment	113.47	100.00	92.33	91.18	90.22	88.54
18	Photographic equipment	108.56	100.00	63.58	55.51	44.16	36.23
19	Bicycles	96.69	100.00	101.76	105.42	104.96	105.60
20	Motorcycles	90.65	100.00	103.30	102.77	100.62	101.76
21	Pleasure boats	96.70	100.00	101.76	105.42	104.96	105.60
22	Pleasure aircraft	96.70	100.00	101.76	105.42	104.96	105.60
23	Jewelry and watches (18)	117.97	100.00	93.12	95.40	100.64	103.13
24	Books and maps (87)	94.56	100.00	103.16	102.49	103.32	103.24
25	Cereals	95.88	100.00	106.13	106.47	110.18	112.02
26	Bakery products	87.13	100.00	113.61	116.61	121.66	125.46
27	Beef and veal	91.54	100.00	135.36	136.45	143.71	151.78
28	Pork	87.61	100.00	113.59	113.29	117.14	120.70
29	Other meats	92.59	100.00	116.74	118.86	122.39	127.01
30	Poultry	90.84	100.00	115.92	113.87	119.73	124.26
31	Fish and seafood	92.22	100.00	105.13	110.08	115.01	115.79
32	Eggs	91.47	100.00	109.32	114.55	139.44	146.41
33	Fresh milk and cream	84.24	100.00	117.87	116.45	125.92	131.59
34	Processed dairy products	83.51	100.00	111.06	110.76	113.30	112.92
35	Fresh fruits	89.82	100.00	115.12	122.03	127.46	128.69
36	Fresh vegetables	88.91	100.00	123.86	129.56	134.65	140.19
37	Processed fruits and vegetables	89.13	100.00	113.08	116.35	120.02	123.47
38	Juices and nonalcoholic drinks	96.89	100.00	104.69	107.13	110.95	111.60
39	Coffee, tea and beverage materials	98.54	100.00	104.57	106.25	109.78	108.48
40	Fats and oils	94.65	100.00	113.76	113.96	116.47	119.00
41	Sugar and sweets	90.07	100.00	107.28	111.36	114.31	116.47
42	Other foods	88.52	100.00	105.94	107.39	109.83	112.37
43	Pet food	92.19	100.00	108.19	112.88	115.84	120.34
44	Beer and ale, at home	91.90	100.00	112.46	113.58	117.83	122.22
45	Wine and brandy, at home	88.98	100.00	103.04	105.36	107.01	109.38
46	Distilled spirits, at home	89.93	100.00	109.33	110.71	112.06	114.20
47	Purchased meals and beverages (4)	88.16	100.00	114.98	118.61	122.71	126.76
48	Food furnished to employees or home grown	90.40	100.00	114.06	117.64	121.91	127.05
49	Shoes (12)	106.25	100.00	99.04	99.78	98.56	100.75
50	Women's and children's clothing and accessories except shoes (14)	109.10	100.00	90.95	90.90	90.67	91.14
51	Men's and boys' clothing and accessories except shoes (15+16)	101.83	100.00	89.45	87.99	86.19	85.03
52	Gasoline and oil (75)	77.83	100.00	150.84	170.50	207.26	258.68
53	Fuel oil and coal (40)	69.90	100.00	159.61	180.35	196.95	232.54
54	Tobacco products (7)	57.58	100.00	127.31	131.64	140.21	145.75
55	Toilet articles and preparations (21)	95.83	100.00	100.07	100.95	102.68	103.31
56	Semidurable house furnishings (33)	111.05	100.00	81.77	76.17	70.74	66.26
57	Cleaning, polishing preparations, misc. supplies and paper products	89.52	100.00	105.26	109.67	111.70	114.05
58	Drug preparations and sundries (45)	87.24	100.00	118.50	123.15	124.49	127.52
59	Toys, dolls, and games	120.83	100.00	73.53	70.18	66.80	61.57
60	Sport supplies, including ammunition	113.47	100.00	92.33	91.18	90.40	89.25
61	Film and photo supplies	106.48	100.00	91.04	88.49	88.43	88.82
62	Stationery and writing supplies (35)	91.55	100.00	95.31	96.52	97.95	98.60
63	Net foreign remittances (111 less 113)	173.90	100.00	173.35	196.79	247.52	241.89
64	Magazines, newspapers, and sheet music (88)	89.39	100.00	111.78	113.56	114.53	116.63
65	Flowers, seeds, and potted plants (95)	103.17	100.00	105.93	106.80	107.55	108.19
66	Housing	86.12	100.00	116.13	120.29	124.75	128.68
67	Electricity (37)	100.86	100.00	118.02	132.35	138.06	152.82
68	Gas (38)	77.40	100.00	160.34	164.48	170.20	185.34
69	Water and other sanitary services (39)	87.12	100.00	123.07	129.14	135.35	142.04
70	Cellular telephone	156.31	100.00	85.85	85.32	85.15	85.61
71	Local telephone	91.35	100.00	119.37	121.82	126.14	129.74
72	Long distance telephone	106.44	100.00	72.42	73.53	77.39	76.94
73	Domestic service (42)	85.78	100.00	116.63	120.80	125.84	130.23
74	Other (43)	86.74	100.00	122.03	126.69	130.07	134.95
75	Motor vehicle repair	87.51	100.00	116.64	121.53	125.82	131.01
76	Motor vehicle rental, leasing, and other	96.45	100.00	104.25	106.06	106.49	106.84
77	Bridge, tunnel, ferry, and road tolls	83.17	100.00	125.06	128.73	133.54	139.64
78	Insurance	85.78	100.00	130.92	135.83	137.18	141.95
79	Mass transit systems (79)	90.89	100.00	124.96	129.19	132.41	137.60
80	Taxicab (80)	88.66	100.00	124.96	129.20	132.47	137.98

Chained 2000 Price index [2000=100]

		1995	2000	2005	2006	2007	2008
81	Railway (82)	85.83	100.00	99.76	108.03	109.91	106.85
82	Bus (83)	86.56	100.00	118.93	127.57	127.86	132.35
83	Airline (84)	92.99	100.00	84.89	89.75	89.72	90.81
84	Other (85)	86.91	100.00	103.49	107.94	109.06	112.05
85	Physicians (47)	92.26	100.00	108.46	109.43	113.89	115.93
86	Dentists (48)	80.07	100.00	125.32	131.84	138.00	144.36
87	Other professional services (49)	88.99	100.00	112.97	115.17	117.87	120.10
88	Hospitals	88.97	100.00	122.42	127.53	132.35	138.87
89	Nursing homes	81.95	100.00	121.88	125.61	129.39	133.78
90	Health insurance (56)	82.37	100.00	133.48	137.54	142.53	149.87
91	Admissions to specified spectator amusements (96)	80.65	100.00	121.97	126.34	132.11	137.42
92	Radio and television repair	93.02	100.00	103.11	103.49	102.10	102.46
93	Clubs and fraternal organizations	87.10	100.00	108.42	111.85	115.75	118.64
94	Commercial participant amusements	87.66	100.00	114.19	117.98	121.78	126.59
95	Pari-mutuel net receipts	88.75	100.00	113.23	116.89	121.00	125.71
96	Other Recreation Services	85.33	100.00	115.60	118.69	119.05	122.71
97	Cleaning, storage, and repair of clothing and shoes (17)	90.53	100.00	116.65	120.91	125.22	129.56
98	Barbershops, beauty parlors, and health clubs (22)	85.68	100.00	114.43	117.69	121.46	124.68
99	Other Personal Care(19)	90.25	100.00	118.66	123.83	128.90	134.93
100	Brokerage charges and investment counseling (61)	154.64	100.00	93.18	96.04	100.98	114.08
101	Bank service charges, trust services, and safe deposit box rental	76.31	100.00	112.76	115.93	120.87	123.91
102	Services furnished w/out payment by intermediaries except life ins. carriers	87.31	100.00	111.14	112.25	112.09	114.02
103	Expense of handling life insurance and pension plans (64)	75.15	100.00	119.99	124.28	130.32	138.36
104	Legal services (65)	80.52	100.00	127.15	131.50	137.53	144.47
105	Funeral and burial expenses (66)	82.14	100.00	121.85	128.11	134.32	140.06
106	Other Personal Service(67)	82.87	100.00	118.77	123.29	127.68	132.25
107	Higher education (105)	82.81	100.00	132.04	139.25	145.69	152.91
108	Nursery, elementary, and secondary schools (106)	84.54	100.00	118.29	122.66	126.10	130.66
109	Other Education (107)	80.46	100.00	131.60	138.22	143.64	151.76
110	Political organizations	86.81	100.00	112.10	115.30	118.39	121.75
111	Museums and libraries	85.60	100.00	111.60	115.40	118.92	121.37
112	Foundations to religion and welfare	82.43	100.00	118.80	124.00	125.51	129.94
113	Social welfare	85.51	100.00	115.35	119.69	123.79	128.49
114	Religion	82.60	100.00	118.80	125.00	128.96	133.93
115	Foreign travel by U.S. residents (110)	95.09	100.00	125.59	128.14	133.62	140.59
116	Less: Expenditures in the United States by nonresidents (112)	87.29	100.00	113.77	118.97	124.15	131.60

Appendix 4.1: Estimation Results for Nominal Value of annual Fixed Asset Accounts by Purchasing Industries

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:                                    Farms
  SEE   =    1716.01 RSQ   = 0.9213 RHO =   0.29 Obser  =   32 from 1975.000
  SEE+1 =    1651.39 RBSQ  = 0.9158 DurH =  2.68 DoFree =   29 to   2006.000
  MAPE  =      10.00
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein1                - - - - - - - - - - - - - - - - -  16385.84 - - -
  1 intercept            1297.25037     3.2   0.08   12.70      1.00
  2 vein1[1]                0.67477    34.1   0.65    1.21  15756.44  0.646
  3 vennot                  0.05031    10.0   0.27    1.00  88589.03  0.331

:                  Forestry, fishing, and related activities
  SEE   =     232.05 RSQ   = 0.8695 RHO =  -0.24 Obser  =   32 from 1975.000
  SEE+1 =     224.55 RBSQ  = 0.8555 DurH = -1.54 DoFree =   28 to   2006.000
  MAPE  =       9.76
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein2                - - - - - - - - - - - - - - - - -   1984.97 - - -
  1 intercept             241.97384     4.8   0.12    7.66      1.00
  2 vein2[1]                0.78192    99.0   0.75    1.66   1891.81  0.749
  3 vennot                  0.01774    28.3   0.79    1.53  88589.03  1.113
  4 venntr                 -0.01429    23.9  -0.66    1.00  91518.56 -0.971

:                           Oil and gas extraction
  SEE   =    1285.42 RSQ   = 0.5967 RHO =   0.05 Obser  =   32 from 1975.000
  SEE+1 =    1284.10 RBSQ  = 0.5688 DurH =  0.35 DoFree =   29 to   2006.000
  MAPE  =      21.68
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein3                - - - - - - - - - - - - - - - - -   4719.94 - - -
  1 vein3[1]                0.75240    70.2   0.73    1.27   4565.69
  2 venn1                  -0.06457     7.8  -0.66    1.22  48312.88 -0.978
  3 venntr                  0.04787    10.6   0.93    1.00  91518.56  1.032

:                         Mining, except oil and gas
  SEE   =     696.75 RSQ   = 0.8776 RHO =   0.03 Obser  =   32 from 1975.000
  SEE+1 =     696.44 RBSQ  = 0.8595 DurH = 999.00 DoFree =   27 to   2006.000
  MAPE  =      11.88
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein4                - - - - - - - - - - - - - - - - -   4973.12 - - -
  1 vein4[1]                1.02771    56.1   0.97    1.99   4675.16
  2 vein4[2]               -0.59061    18.4  -0.52    1.71   4398.78 -0.437
  3 vennot                  0.06979    20.5   1.24    1.29  88589.03  1.412
  4 vennin                 -0.02242     4.9  -0.45    1.25  98784.19 -0.457
  5 venn2                  -0.01643    11.6  -0.24    1.00  73834.41 -0.552

:                        Support activities for mining
  SEE   =     713.61 RSQ   = 0.8448 RHO =   0.02 Obser  =   32 from 1975.000
  SEE+1 =     713.60 RBSQ  = 0.8341 DurH =  0.14 DoFree =   29 to   2006.000
  MAPE  =      16.94
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein5                - - - - - - - - - - - - - - - - -   3842.72 - - -
  1 vein5[1]                0.65554    51.1   0.61    1.88   3570.94
  2 vennoit                -0.03850    21.9  -1.02    1.75 101376.84 -1.096
  3 vennot                  0.06154    32.1   1.42    1.00  88589.03  1.369

:                                  Utilities
  SEE   =    2122.46 RSQ   = 0.9396 RHO =   0.03 Obser  =   32 from 1975.000
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 SEE+1 =    2122.62 RBSQ  = 0.9306 DurH =  0.35 DoFree =   27 to   2006.000
 MAPE  =       7.92
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein6                 - - - - - - - - - - - - - - - - -  24278.19 - - -
 1 intercept             1945.04855     2.9   0.08   16.54      1.00
 2 vein6[1]                 0.98572    48.2   0.95    1.41  23352.25  1.009
 3 vein6[2]                -0.29552     6.1  -0.27    1.33  22471.12 -0.311
 4 venn2                   -0.02275     1.8  -0.07    1.17  73834.41 -0.177
 5 vennoit                  0.07531     7.9   0.31    1.00 101376.84  0.450

:                                Construction
 SEE   =    2060.42 RSQ   = 0.9711 RHO =   0.24 Obser  =   32 from 1975.000
 SEE+1 =    2006.49 RBSQ  = 0.9680 DurH =  3.61 DoFree =   28 to   2006.000
 MAPE  =      16.57
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein7                 - - - - - - - - - - - - - - - - -  15947.72 - - -
 1 vein7[1]                 0.53009    17.1   0.49    1.52  14812.38
 2 venn2                    0.12943    17.4   0.60    1.48  73834.41  0.715
 3 vennoit                 -0.23962    15.0  -1.52    1.39 101376.84 -1.019
 4 vennin                   0.23283    17.9   1.44    1.00  98784.19  0.779

:                               Wood products
 SEE   =     164.76 RSQ   = 0.9285 RHO =  -0.00 Obser  =   32 from 1975.000
 SEE+1 =     164.76 RBSQ  = 0.9208 DurH = -0.04 DoFree =   28 to   2006.000
 MAPE  =       7.49
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein8                 - - - - - - - - - - - - - - - - -   1875.53 - - -
 1 vein8[1]                 0.44638    11.0   0.43    2.62   1819.00
 2 vein8[2]                -0.34171    12.4  -0.32    2.44   1759.47 -0.348
 3 vennoit                 -0.01874    35.6  -1.01    2.23 101376.84 -1.569
 4 vennin                   0.03605    49.5   1.90    1.00  98784.19  2.375

:                      Nonmetallic mineral products
 SEE   =     320.30 RSQ   = 0.9054 RHO =   0.31 Obser  =   32 from 1975.000
 SEE+1 =     305.04 RBSQ  = 0.8989 DurH =  2.43 DoFree =   29 to   2006.000
 MAPE  =       9.74
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein9                 - - - - - - - - - - - - - - - - -   3199.81 - - -
 1 intercept              426.04007     8.5   0.13   10.57      1.00
 2 vein9[1]                 0.52221    27.1   0.50    1.47   3089.38  0.522
 3 vennin                   0.01175    21.4   0.36    1.00  98784.19  0.458

:                              Primary metals
 SEE   =     608.36 RSQ   = 0.5813 RHO =   0.03 Obser  =   32 from 1975.000
 SEE+1 =     608.16 RBSQ  = 0.5524 DurH =  0.25 DoFree =   29 to   2006.000
 MAPE  =       9.33
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein10                - - - - - - - - - - - - - - - - -   4843.59 - - -
 1 intercept             1489.65143    11.4   0.31    2.39      1.00
 2 vein10[1]                0.62269    28.4   0.61    1.04   4778.50  0.652
 3 vennin                   0.00383     2.1   0.08    1.00  98784.19  0.165

:                         Fabricated metal products
 SEE   =     409.87 RSQ   = 0.9683 RHO =   0.05 Obser  =   32 from 1975.000
 SEE+1 =     409.76 RBSQ  = 0.9649 DurH =  0.56 DoFree =   28 to   2006.000
 MAPE  =       5.74
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein11                - - - - - - - - - - - - - - - - -   5847.19 - - -
 1 vein11[1]                0.59278    19.2   0.57    2.26   5639.84
 2 vein11[2]               -0.14732     1.7  -0.14    2.15   5442.59 -0.155
 3 vennoit                 -0.01800     9.4  -0.31    1.93 101376.84 -0.403
```

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  4 vennin                   0.05207    38.9   0.88    1.00  98784.19  0.919

:                                  Machinery
  SEE   =     892.00 RSQ   = 0.9741 RHO =   0.00 Obser  =   32 from 1975.000
  SEE+1 =     892.06 RBSQ  = 0.9714 DurH =  0.03 DoFree =   28 to   2006.000
  MAPE  =       8.42
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein12                - - - - - - - - - - - - - - - - -   8896.09 - - -
  1 vein12[1]                1.12009    68.7   1.06    2.15   8419.97
  2 vein12[2]               -0.54419    22.3  -0.49    1.69   7962.81 -0.531
  3 venn2                    0.01785     9.7   0.15    1.58  73834.41  0.216
  4 vennin                   0.02546    25.7   0.28    1.00  98784.19  0.186

:                       Computer and electronic products
  SEE   =    2285.66 RSQ   = 0.9513 RHO =   0.31 Obser  =   32 from 1975.000
  SEE+1 =    2190.37 RBSQ  = 0.9461 DurH =  2.16 DoFree =   28 to   2006.000
  MAPE  =      16.69
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein13                - - - - - - - - - - - - - - - - -  16035.47 - - -
  1 intercept             -7115.13817    22.2  -0.44   20.54      1.00
  2 vein13[1]                0.58715    46.6   0.56    1.94  15296.00  0.591
  3 vennin                   0.18203    38.3   1.12    1.29  98784.19  0.713
  4 venn2                   -0.05163    13.4  -0.24    1.00  73834.41 -0.334

:               Electrical equipment, appliances, and components
  SEE   =     275.75 RSQ   = 0.9058 RHO =   0.19 Obser  =   32 from 1975.000
  SEE+1 =     271.55 RBSQ  = 0.8919 DurH =  2.30 DoFree =   27 to   2006.000
  MAPE  =       8.58
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein14                - - - - - - - - - - - - - - - - -   2596.91 - - -
  1 vein14[1]                0.71244    28.1   0.70    1.99   2551.22
  2 vein14[2]               -0.28170     5.9  -0.27    1.90   2506.12 -0.312
  3 vennin                   0.03482    25.8   1.32    1.79  98784.19  1.573
  4 venn2                   -0.00657    18.3  -0.19    1.18  73834.41 -0.490
  5 vennot                  -0.01662     8.8  -0.57    1.00  88589.03 -0.745

:                Motor vehicles, bodies and trailers, and parts
  SEE   =    1196.08 RSQ   = 0.9208 RHO =   0.17 Obser  =   32 from 1975.000
  SEE+1 =    1179.03 RBSQ  = 0.9124 DurH =  1.50 DoFree =   28 to   2006.000
  MAPE  =      17.66
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein15                - - - - - - - - - - - - - - - - -   8180.03 - - -
  1 intercept             -2459.86585    10.2  -0.30   12.63      1.00
  2 vein15[1]                0.54037    26.0   0.52    1.56   7882.06  0.550
  3 venn2                   -0.02688    13.4  -0.24    1.56  73834.41 -0.424
  4 vennin                   0.08468    24.7   1.02    1.00  98784.19  0.809

:                       Other transportation equipment
  SEE   =     737.50 RSQ   = 0.9236 RHO =   0.18 Obser  =   32 from 1975.000
  SEE+1 =     725.05 RBSQ  = 0.9210 DurH =  1.36 DoFree =   30 to   2006.000
  MAPE  =      12.74
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein16                - - - - - - - - - - - - - - - - -   4765.72 - - -
  1 vein16[1]                0.63680    43.6   0.60    1.42   4524.75
  2 vennin                   0.01964    19.0   0.41    1.00  98784.19  0.299

:                       Furniture and related products
  SEE   =      99.99 RSQ   = 0.9699 RHO =   0.05 Obser  =   32 from 1975.000
  SEE+1 =      99.88 RBSQ  = 0.9678 DurH =  0.38 DoFree =   29 to   2006.000
  MAPE  =       9.27
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
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 0 vein17              - - - - - - - - - - - - - - - - -    917.53 - - -
 1 intercept          -153.98947     8.3  -0.17   33.17      1.00
 2 vein17[1]             0.61434    47.3   0.58    1.45    873.09  0.614
 3 vennin                0.00542    20.5   0.58    1.00  98784.19  0.382

:                      Miscellaneous manufacturing
 SEE   =      206.58 RSQ   = 0.9579 RHO =  -0.03 Obser  =   32 from 1975.000
 SEE+1 =      206.26 RBSQ  = 0.9550 DurH = -0.49 DoFree =   29 to   2006.000
 MAPE  =        5.91
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein18              - - - - - - - - - - - - - - - - -   2773.78 - - -
 1 intercept           294.49456    11.1   0.11   23.75      1.00
 2 vein18[1]             0.27712     4.8   0.27    1.67   2658.91  0.273
 3 vennin                0.01764    29.1   0.63    1.00  98784.19  0.711

:                 Food, beverage, and tobacco products
 SEE   =      466.24 RSQ   = 0.9767 RHO =   0.18 Obser  =   32 from 1975.000
 SEE+1 =      460.07 RBSQ  = 0.9751 DurH =  1.11 DoFree =   29 to   2006.000
 MAPE  =        4.34
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein19              - - - - - - - - - - - - - - - - -   8880.84 - - -
 1 vein19[1]             0.88258   130.5   0.85    1.53   8557.38
 2 vennoit              -0.03038    23.0  -0.35    1.45 101376.84 -0.513
 3 vennin                0.04452    20.6   0.50    1.00  98784.19  0.591

:                Textile mills and textile product mills
 SEE   =      271.06 RSQ   = 0.8781 RHO =   0.26 Obser  =   32 from 1975.000
 SEE+1 =      261.86 RBSQ  = 0.8651 DW   =   1.47 DoFree =   28 to   2006.000
 MAPE  =       11.67
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein20              - - - - - - - - - - - - - - - - -   1992.25 - - -
 1 intercept          -238.58019     1.5  -0.12    8.21      1.00
 2 vennin                0.06081   154.6   3.02    6.19  98784.19  3.179
 3 venn2                -0.01407    28.9  -0.52    1.60  73834.41 -1.214
 4 vennot               -0.03090    26.5  -1.37    1.00  88589.03 -1.603

:                Apparel and leather and allied products
 SEE   =       84.86 RSQ   = 0.9314 RHO =   0.01 Obser  =   32 from 1975.000
 SEE+1 =       84.86 RBSQ  = 0.9267 DurH =  0.04 DoFree =   29 to   2006.000
 MAPE  =        9.41
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein21              - - - - - - - - - - - - - - - - -    688.66 - - -
 1 vein21[1]             0.96999   113.0   0.95    1.72    674.59
 2 vennin                0.01063    30.7   1.52    1.61  98784.19  1.331
 3 vennin[1]            -0.01077    26.8  -1.48    1.00  94533.56 -1.342

:                            Paper products
 SEE   =      697.53 RSQ   = 0.8874 RHO =   0.27 Obser  =   32 from 1975.000
 SEE+1 =      672.25 RBSQ  = 0.8753 DurH =  1.71 DoFree =   28 to   2006.000
 MAPE  =        7.59
   Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein22              - - - - - - - - - - - - - - - - -   6326.09 - - -
 1 intercept           658.40758     4.4   0.10    8.88      1.00
 2 vein22[1]             0.91586   132.2   0.90    1.26   6194.62  0.972
 3 vennin                0.05413    11.8   0.85    1.26  98784.19  1.057
 4 vennin[1]            -0.05663    12.2  -0.85    1.00  94533.56 -1.100

:                Printing and related support activities
 SEE   =      252.60 RSQ   = 0.9619 RHO =  -0.01 Obser  =   32 from 1975.000
 SEE+1 =      252.56 RBSQ  = 0.9592 DurH = -0.12 DoFree =   29 to   2006.000
 MAPE  =        7.46
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  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein23               - - - - - - - - - - - - - - - - -   2890.72 - - -
 1 vein23[1]              0.43562    13.7   0.42    1.69   2756.00
 2 vennin                 0.01248     5.4   0.43    1.01  98784.19  0.392
 3 vennin[1]              0.00490     0.6   0.16    1.00  94533.56  0.153

:                          Petroleum and coal products
 SEE   =     888.98 RSQ   = 0.8402 RHO =   0.13 Obser  =   32 from 1975.000
 SEE+1 =     883.78 RBSQ  = 0.8231 DurH =  1.36 DoFree =   28 to   2006.000
 MAPE  =      11.72
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein24               - - - - - - - - - - - - - - - - -   5010.59 - - -
 1 intercept            -2171.01368     7.6  -0.43    6.26      1.00
 2 vein24[1]              0.77371    40.1   0.72    1.24   4694.50  0.672
 3 vennin                 0.08162    10.9   1.61    1.20  98784.19  1.490
 4 venn1                 -0.09341     9.7  -0.90    1.00  48312.88 -1.287

:                               Chemical products
 SEE   =     900.91 RSQ   = 0.9742 RHO =   0.19 Obser  =   32 from 1975.000
 SEE+1 =     889.75 RBSQ  = 0.9704 DurH =  1.27 DoFree =   27 to   2006.000
 MAPE  =       8.37
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein25               - - - - - - - - - - - - - - - - -  12605.88 - - -
 1 intercept            -2044.85088     6.4  -0.16   38.80      1.00
 2 vein25[1]              0.82267    92.9   0.79    1.45  12149.59  0.838
 3 vennin                 0.08259    13.7   0.65    1.38  98784.19  0.597
 4 venn1                 -0.04223     2.3  -0.16    1.25  48312.88 -0.231
 5 venn2                 -0.01982    11.9  -0.12    1.00  73834.41 -0.237

:                         Plastics and rubber products
 SEE   =     404.38 RSQ   = 0.9714 RHO =   0.26 Obser  =   32 from 1975.000
 SEE+1 =     391.87 RBSQ  = 0.9694 DurH =  2.21 DoFree =   29 to   2006.000
 MAPE  =       8.69
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein26               - - - - - - - - - - - - - - - - -   4597.03 - - -
 1 intercept            -342.71910     2.9  -0.07   34.95      1.00
 2 vennin                 0.02411    14.9   0.52    1.65  98784.19  0.409
 3 vein26[1]              0.58014    28.4   0.56    1.00   4409.28  0.583

:                                Wholesale trade
 SEE   =    3206.28 RSQ   = 0.9694 RHO =   0.56 Obser  =   32 from 1975.000
 SEE+1 =    2717.86 RBSQ  = 0.9661 DurH = 999.00 DoFree =   28 to   2006.000
 MAPE  =      10.03
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein27               - - - - - - - - - - - - - - - - -  32799.66 - - -
 1 vein27[1]              0.47805    11.5   0.45    1.47  30624.47
 2 venntr                 0.04832     0.9   0.13    1.14  91518.56  0.115
 3 venn1                  0.06767     1.0   0.10    1.14  48312.88  0.113
 4 vennot                 0.12330     6.9   0.33    1.00  88589.03  0.271

:                                 Retail trade
 SEE   =    1353.32 RSQ   = 0.9818 RHO =  -0.00 Obser  =   32 from 1975.000
 SEE+1 =    1353.32 RBSQ  = 0.9806 DurH = -0.00 DoFree =   29 to   2006.000
 MAPE  =       6.11
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 vein28               - - - - - - - - - - - - - - - - -  18927.47 - - -
 1 vein28[1]              0.66357    33.8   0.63    1.29  17857.44
 2 vennot                 0.05680    12.1   0.27    1.06  88589.03  0.228
 3 venn1                  0.04170     3.2   0.11    1.00  48312.88  0.127

:                              Air transportation
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  SEE   =    2200.78 RSQ   = 0.9432 RHO =  -0.02 Obser  =   32 from 1975.000
  SEE+1 =    2200.08 RBSQ  = 0.9348 DurH = -0.15 DoFree =   27 to   2006.000
  MAPE  =      20.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein29                - - - - - - - - - - - - - - - - -  11594.88 - - -
  1 intercept            -612.95837     0.5  -0.05   17.60      1.00
  2 vein29[1]               0.56285    43.3   0.55    2.02  11231.75  0.572
  3 venntr                  0.06378     2.8   0.50    1.81  91518.56  0.301
  4 venntr[1]               0.17218    15.1   1.29    1.67  86968.16  0.794
  5 vennot                 -0.16848    29.4  -1.29    1.00  88589.03 -0.735

:                           Railroad transportation
  SEE   =     458.26 RSQ   = 0.6855 RHO =   0.08 Obser  =   32 from 1975.000
  SEE+1 =     457.19 RBSQ  = 0.6638 DurH =  0.88 DoFree =   29 to   2006.000
  MAPE  =      21.47
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein30                - - - - - - - - - - - - - - - - -   1768.09 - - -
  1 intercept             740.62910    19.8   0.42    3.18      1.00
  2 vein30[1]               1.14203    71.5   1.13    1.49   1751.28  1.157
  3 vein30[2]              -0.56150    21.9  -0.55    1.00   1732.06 -0.579

:                            Water transportation
  SEE   =     481.15 RSQ   = 0.8687 RHO =   0.16 Obser  =   32 from 1975.000
  SEE+1 =     476.61 RBSQ  = 0.8596 DurH =  1.38 DoFree =   29 to   2006.000
  MAPE  =      14.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein31                - - - - - - - - - - - - - - - - -   2870.16 - - -
  1 vein31[1]               0.70956    40.2   0.68    1.23   2747.78
  2 venntr                  0.01922     6.2   0.61    1.04  91518.56  0.632
  3 vennoit                -0.00854     2.0  -0.30    1.00 101376.84 -0.332

:                            Truck transportation
  SEE   =    1543.55 RSQ   = 0.8586 RHO =   0.13 Obser  =   32 from 1975.000
  SEE+1 =    1537.20 RBSQ  = 0.8434 DurH =  2.33 DoFree =   28 to   2006.000
  MAPE  =      14.47
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein32                - - - - - - - - - - - - - - - - -   7788.06 - - -
  1 vein32[1]               0.59443    20.4   0.55    1.80   7252.69
  2 venntr                  0.13829    28.8   1.63    1.44  91518.56  1.470
  3 venntr[1]              -0.10802    20.1  -1.21    1.00  86968.16 -1.121
  4 venptr                  2.89262     0.1   0.03    1.00     83.21  0.014

:                  Transit and ground passenger transportation
  SEE   =     345.39 RSQ   = 0.9121 RHO =  -0.19 Obser  =   32 from 1975.000
  SEE+1 =     338.55 RBSQ  = 0.9027 DurH = -1.73 DoFree =   28 to   2006.000
  MAPE  =      21.82
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein33                - - - - - - - - - - - - - - - - -   1529.88 - - -
  1 intercept            -422.19874     6.9  -0.28   11.37      1.00
  2 vein33[1]               0.27483     6.7   0.26    2.03   1422.84  0.263
  3 vennin                 -0.01064     3.2  -0.69    1.42  98784.19 -0.371
  4 venntr                  0.02855    19.3   1.71    1.00  91518.56  1.069

:                           Pipeline transportation
  SEE   =     284.84 RSQ   = 0.8719 RHO =   0.40 Obser  =   32 from 1975.000
  SEE+1 =     261.52 RBSQ  = 0.8631 DurH =  3.00 DoFree =   29 to   2006.000
  MAPE  =      22.34
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein34                - - - - - - - - - - - - - - - - -   1660.66 - - -
  1 vein34[1]               0.66723    47.0   0.64    1.38   1587.22
  2 venntr                  0.00942    16.9   0.52    1.15  91518.56  0.516
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  3 venn2                   -0.00343     7.2  -0.15    1.00  73834.41 -0.289

:                 Other transportation and support activities
  SEE   =     567.86 RSQ   = 0.8850 RHO =  -0.06 Obser  =   32 from 1975.000
  SEE+1 =     565.54 RBSQ  = 0.8771 DurH = -0.40 DoFree =   29 to   2006.000
  MAPE  =       8.56
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein35                - - - - - - - - - - - - - - - - -   5004.56 - - -
  1 vein35[1]                0.49076    42.2   0.48    2.48   4921.12
  2 venntr                   0.04839    56.7   0.88    2.30  91518.56  1.261
  3 venn2                   -0.02463    51.5  -0.36    1.00  73834.41 -0.985

:                           Warehousing and storage
  SEE   =     211.52 RSQ   = 0.8788 RHO =   0.06 Obser  =   32 from 1975.000
  SEE+1 =     211.18 RBSQ  = 0.8658 DurH = 999.00 DoFree =   28 to   2006.000
  MAPE  =      23.64
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein36                - - - - - - - - - - - - - - - - -    858.16 - - -
  1 vein36[1]                0.44126     9.0   0.41    1.37    794.41
  2 vennoit                 -0.00497     3.3  -0.59    1.21 101376.84 -0.422
  3 vennot                   0.00880     6.7   0.91    1.15  88589.03  0.584
  4 venn2                    0.00321     7.1   0.28    1.00  73834.41  0.354

:                 Publishing industries (including software)
  SEE   =     523.83 RSQ   = 0.9364 RHO =  -0.14 Obser  =   32 from 1975.000
  SEE+1 =     518.30 RBSQ  = 0.9295 DurH = -1.31 DoFree =   28 to   2006.000
  MAPE  =       8.51
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein37                - - - - - - - - - - - - - - - - -   4343.28 - - -
  1 vein37[1]                0.58438    27.9   0.56    1.46   4163.06
  2 vennoit                  0.04226     5.6   0.99    1.26 101376.84  1.049
  3 venn2                   -0.01342     7.5  -0.23    1.03  73834.41 -0.433
  4 vennin                  -0.01399     1.2  -0.32    1.00  98784.19 -0.273

:               Motion picture and sound recording industries
  SEE   =     177.72 RSQ   = 0.9309 RHO =   0.07 Obser  =   32 from 1975.000
  SEE+1 =     177.36 RBSQ  = 0.9235 DurH =  1.01 DoFree =   28 to   2006.000
  MAPE  =      12.94
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein38                - - - - - - - - - - - - - - - - -   1153.91 - - -
  1 intercept             126.02656     5.2   0.11   14.46      1.00
  2 vein38[1]                1.44350    95.2   1.42    1.48   1134.00  1.472
  3 vein38[2]               -0.53047    17.6  -0.51    1.01   1115.84 -0.551
  4 venn2                   -0.00023     0.3  -0.01    1.00  73834.41 -0.023

:                     Broadcasting and telecommunications
  SEE   =    5686.40 RSQ   = 0.9387 RHO =   0.31 Obser  =   32 from 1975.000
  SEE+1 =    5432.63 RBSQ  = 0.9322 DurH =  2.25 DoFree =   28 to   2006.000
  MAPE  =      14.79
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein39                - - - - - - - - - - - - - - - - -  39062.50 - - -
  1 vein39[1]                0.28760    11.1   0.28    3.05  37615.38
  2 vennoit                  0.37765    12.7   0.98    2.08 101376.84  0.848
  3 venntr                   0.45619    25.1   1.07    1.89  91518.56  0.866
  4 vennot                  -0.59053    37.3  -1.34    1.00  88589.03 -1.036

:                  Information and data processing services
  SEE   =     268.32 RSQ   = 0.9893 RHO =   0.31 Obser  =   32 from 1975.000
  SEE+1 =     255.43 RBSQ  = 0.9886 DurH =  2.08 DoFree =   29 to   2006.000
  MAPE  =      12.76
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 vein40               - - - - - - - - - - - - - - - - -   2662.88 - - -
  1 vein40[1]               0.60085    51.6   0.55    1.91   2420.69
  2 venn2                   0.01816    25.1   0.50    1.03  73834.41  0.469
  3 vennoit                -0.00148     1.4  -0.06    1.00 101376.84 -0.029

:                            Federal Reserve banks
  SEE   =     225.92 RSQ   = 0.9241 RHO =  -0.07 Obser  =   32 from 1975.000
  SEE+1 =     225.01 RBSQ  = 0.9129 DurH = -1.21 DoFree =   27 to   2006.000
  MAPE  =      70.11
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein41               - - - - - - - - - - - - - - - - -    771.62 - - -
  1 intercept            -325.25690     5.8  -0.42   13.18      1.00
  2 vein41[1]               0.70451    29.1   0.67    1.33    729.28  0.707
  3 venn1                   0.00314     0.3   0.20    1.08  48312.88  0.117
  4 venn2                  -0.00254     2.1  -0.24    1.05  73834.41 -0.207
  5 venntr                  0.00676     2.7   0.80    1.00  91518.56  0.360

:                  Credit intermediation and related activities
  SEE   =    2712.35 RSQ   = 0.9818 RHO =  -0.10 Obser  =   32 from 1975.000
  SEE+1 =    2698.75 RBSQ  = 0.9799 DurH = -0.93 DoFree =   28 to   2006.000
  MAPE  =       6.44
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein42               - - - - - - - - - - - - - - - - -  35409.19 - - -
  1 vein42[1]               0.29087     7.2   0.28    2.54  33647.16
  2 venn1                   0.45569    24.1   0.62    1.73  48312.88  0.694
  3 venn2                  -0.05888    15.0  -0.12    1.22  73834.41 -0.196
  4 venntr                  0.08725    10.4   0.23    1.00  91518.56  0.189

:                Securities, commodity contracts, and investment
  SEE   =    1530.12 RSQ   = 0.8354 RHO =  -0.06 Obser  =   32 from 1975.000
  SEE+1 =    1526.66 RBSQ  = 0.8177 DurH = -0.57 DoFree =   28 to   2006.000
  MAPE  =      17.66
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein43               - - - - - - - - - - - - - - - - -   7038.31 - - -
  1 vein43[1]               0.49347    20.8   0.47    1.55   6708.88
  2 venn2                  -0.04057     9.0  -0.43    1.47  73834.41 -0.721
  3 vennoit                 0.14546     9.5   2.10    1.10 101376.84  1.989
  4 vennin                 -0.08153     5.1  -1.14    1.00  98784.19 -0.878

:                  Insurance carriers and related activities
  SEE   =    1553.99 RSQ   = 0.9395 RHO =  -0.03 Obser  =   32 from 1975.000
  SEE+1 =    1553.17 RBSQ  = 0.9353 DurH = -0.41 DoFree =   29 to   2006.000
  MAPE  =      14.79
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein44               - - - - - - - - - - - - - - - - -   9497.50 - - -
  1 vein44[1]               0.66258    25.2   0.63    1.22   8963.34
  2 venn2                   0.01088     1.3   0.08    1.21  73834.41  0.115
  3 venntr                  0.03007     9.8   0.29    1.00  91518.56  0.208

:                 Funds, trusts, and other financial vehicles
  SEE   =     254.53 RSQ   = 0.8383 RHO =   0.08 Obser  =   32 from 1975.000
  SEE+1 =     253.89 RBSQ  = 0.8210 DurH = 999.00 DoFree =   28 to   2006.000
  MAPE  =      25.79
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein45               - - - - - - - - - - - - - - - - -    882.81 - - -
  1 intercept            -174.13124     3.8  -0.20    6.18      1.00
  2 vein45[1]               0.53439    14.4   0.51    1.78    836.34  0.526
  3 venntr                  0.01483    12.2   1.54    1.05  91518.56  1.022
  4 venntr[1]              -0.00859     2.7  -0.85    1.00  86968.16 -0.578

:                                Real estate
```

```
SEE   =    1385.17 RSQ   = 0.9078 RHO =   0.16 Obser  =   32 from 1975.000
SEE+1 =    1367.59 RBSQ  = 0.9014 DW  =   1.68 DoFree =   29 to   2006.000
MAPE  =       8.68
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein46                - - - - - - - - - - - - - - - - -  10930.16 - - -
1 intercept            -1972.04229     8.5  -0.18   10.85      1.00
2 vennr                   2.61965    62.0   1.35    1.04   5634.66  1.125
3 vennot                 -0.02098     2.2  -0.17    1.00  88589.03 -0.185

:         Rental and leasing services and lessors of intangible assets
SEE   =    4586.91 RSQ   = 0.9684 RHO =   0.03 Obser  =   32 from 1975.000
SEE+1 =    4589.98 RBSQ  = 0.9638 DurH =  0.23 DoFree =   27 to   2006.000
MAPE  =      30.41
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein47                - - - - - - - - - - - - - - - - -  27668.12 - - -
1 intercept            -16200.26275    30.8  -0.59   31.68      1.00
2 vein47[1]               0.36690     8.2   0.34    2.42  25414.69  0.351
3 vein47[2]               0.13435     1.8   0.11    2.40  23307.72  0.123
4 venn1                  -0.15444     1.8  -0.27    1.48  48312.88 -0.183
5 venntr                  0.42477    21.6   1.41    1.00  91518.56  0.718

:                              Legal services
SEE   =     130.07 RSQ   = 0.9832 RHO =   0.08 Obser  =   32 from 1975.000
SEE+1 =     129.63 RBSQ  = 0.9814 DurH =  0.65 DoFree =   28 to   2006.000
MAPE  =       7.89
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein48                - - - - - - - - - - - - - - - - -   1468.56 - - -
1 intercept            -172.33111     5.6  -0.12   59.39      1.00
2 vein48[1]               0.57230    34.7   0.53    1.51   1371.38  0.558
3 vennot                  0.00612     9.1   0.37    1.18  88589.03  0.246
4 venn1                   0.00649     8.5   0.21    1.00  48312.88  0.198

:                 Computer systems design and related services
SEE   =    1076.98 RSQ   = 0.9761 RHO =   0.03 Obser  =   32 from 1975.000
SEE+1 =    1076.59 RBSQ  = 0.9726 DurH =  0.37 DoFree =   27 to   2006.000
MAPE  =      38.60
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein49                - - - - - - - - - - - - - - - - -   6714.06 - - -
1 intercept            1494.47182     3.6   0.22   41.90      1.00
2 vein49[1]               0.41973    12.6   0.38    2.18   6136.84  0.405
3 venn1                   0.12617    11.5   0.91    1.40  48312.88  0.555
4 venn2                   0.07018    15.6   0.77    1.20  73834.41  0.674
5 vennoit                -0.08516     9.6  -1.29    1.00 101376.84 -0.630

:       Miscellaneous professional, scientific, and technical services
SEE   =    1873.54 RSQ   = 0.9889 RHO =  -0.29 Obser  =   32 from 1975.000
SEE+1 =    1789.79 RBSQ  = 0.9877 DurH = -3.93 DoFree =   28 to   2006.000
MAPE  =      17.04
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein50                - - - - - - - - - - - - - - - - -  18171.09 - - -
1 vein50[1]               0.38666     9.8   0.35    1.74  16227.47
2 venn2                   0.13074    27.2   0.53    1.47  73834.41  0.494
3 vennin                 -0.23171    21.2  -1.26    1.47  98784.19 -0.530
4 vennot                  0.28477    21.0   1.39    1.00  88589.03  0.647

:                   Management of companies and enterprises
SEE   =    1632.77 RSQ   = 0.9402 RHO =  -0.04 Obser  =   32 from 1975.000
SEE+1 =    1630.94 RBSQ  = 0.9360 DurH = -0.37 DoFree =   29 to   2006.000
MAPE  =      10.38
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein51                - - - - - - - - - - - - - - - - -  10585.94 - - -
```

```
  1 intercept            1476.15129     9.2   0.14   16.71      1.00
  2 vein51[1]               0.67218    37.0   0.63    1.23   9920.88  0.652
  3 venn2                   0.03306    10.8   0.23    1.00  73834.41  0.332

:                    Administrative and support services
  SEE   =      601.57 RSQ   = 0.9939 RHO =   0.22 Obser  =   32 from 1975.000
  SEE+1 =      586.99 RBSQ  = 0.9930 DurH =  5.78 DoFree =   27 to   2006.000
  MAPE  =       12.42
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein52               - - - - - - - - - - - - - - - - -   8430.50 - - -
  1 vein52[1]               0.33758     6.9   0.31    2.58   7699.44
  2 venn1                   0.05245     8.3   0.30    1.77  48312.88  0.209
  3 venn2                   0.07205    19.0   0.63    1.29  73834.41  0.627
  4 vennoit                -0.04870    13.2  -0.59    1.26 101376.84 -0.326
  5 vennot                  0.03292    12.1   0.35    1.00  88589.03  0.172

:                 Waste management and remediation services
  SEE   =      289.19 RSQ   = 0.8891 RHO =   0.04 Obser  =   32 from 1975.000
  SEE+1 =      289.19 RBSQ  = 0.8772 DurH =  0.26 DoFree =   28 to   2006.000
  MAPE  =       14.16
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein53               - - - - - - - - - - - - - - - - -   2054.06 - - -
  1 intercept             260.08264     4.9   0.13    9.02      1.00
  2 vein53[1]               0.90762   128.1   0.87    1.16   1960.56  0.910
  3 vennin                 -0.00969     5.6  -0.47    1.16  98784.19 -0.453
  4 vennot                  0.01097     7.5   0.47    1.00  88589.03  0.509

:                           Educational services
  SEE   =      374.97 RSQ   = 0.9849 RHO =  -0.10 Obser  =   32 from 1975.000
  SEE+1 =      373.04 RBSQ  = 0.9833 DurH = 999.00 DoFree =   28 to   2006.000
  MAPE  =        6.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein54               - - - - - - - - - - - - - - - - -   3604.91 - - -
  1 vein54[1]               0.62725    16.1   0.58    1.35   3326.31
  2 venn2                   0.01720     5.8   0.35    1.06  73834.41  0.378
  3 vennoit                -0.00416     0.3  -0.12    1.02 101376.84 -0.070
  4 vennot                  0.00742     0.8   0.18    1.00  88589.03  0.098

:                      Ambulatory health care services
  SEE   =      814.34 RSQ   = 0.9915 RHO =   0.24 Obser  =   32 from 1975.000
  SEE+1 =      796.23 RBSQ  = 0.9910 DurH =  1.40 DoFree =   29 to   2006.000
  MAPE  =        5.61
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein55               - - - - - - - - - - - - - - - - -  12994.56 - - -
  1 vein55[1]               0.99562   275.1   0.92    1.39  11959.88
  2 vennot                  0.05982    17.0   0.41    1.38  88589.03  0.272
  3 venntr                 -0.04524    17.6  -0.32    1.00  91518.56 -0.223

:                                 Hospitals
  SEE   =      795.01 RSQ   = 0.9962 RHO =  -0.02 Obser  =   32 from 1975.000
  SEE+1 =      794.67 RBSQ  = 0.9958 DurH = -0.09 DoFree =   28 to   2006.000
  MAPE  =        4.62
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein56               - - - - - - - - - - - - - - - - -  16833.94 - - -
  1 intercept             725.06416     2.7   0.04  263.19      1.00
  2 vein56[1]               0.97361   227.2   0.89    1.11  15467.16  0.907
  3 venn2                   0.02232     4.5   0.10    1.01  73834.41  0.116
  4 vennoit                -0.00590     0.5  -0.04    1.00 101376.84 -0.024

:                  Nursing and residential care facilities
  SEE   =      106.30 RSQ   = 0.9842 RHO =   0.12 Obser  =   32 from 1975.000
```

```
SEE+1 =     105.58 RBSQ  = 0.9825 DurH =  1.05 DoFree =   28 to   2006.000
MAPE  =       6.77
  Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein57               - - - - - - - - - - - - - - - - -   1132.09 - - -
1 vein57[1]              0.82134    52.0   0.76    1.15   1047.09
2 venn2                  0.00179     2.7   0.12    1.12  73834.41  0.142
3 vennoit               -0.00041     0.1  -0.04    1.03 101376.84 -0.025
4 vennot                 0.00204     1.6   0.16    1.00  88589.03  0.097

:                          Social assistance
SEE   =      77.72 RSQ   = 0.9627 RHO =   0.24 Obser  =   32 from 1975.000
SEE+1 =      76.69 RBSQ  = 0.9601 DW  =   1.52 DoFree =   29 to   2006.000
MAPE  =      11.20
  Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein58               - - - - - - - - - - - - - - - - -    671.69 - - -
1 intercept            216.29035    14.3   0.32   26.80      1.00
2 venn2                  0.00563    51.6   0.62    1.00  73834.41  0.937
3 vennot                 0.00045     0.1   0.06    1.00  88589.03  0.045

:     Performing arts, spectator sports, museums, and related activities
SEE   =     175.45 RSQ   = 0.9411 RHO =   0.15 Obser  =   32 from 1975.000
SEE+1 =     174.16 RBSQ  = 0.9348 DurH =  5.26 DoFree =   28 to   2006.000
MAPE  =      13.63
  Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein59               - - - - - - - - - - - - - - - - -   1114.25 - - -
1 intercept            -60.42053     0.8  -0.05   16.99      1.00
2 vein59[1]              0.44746    11.0   0.42    1.38   1053.69  0.429
3 vein59[2]              0.40487     9.2   0.36    1.09    993.78  0.372
4 vennot                 0.00340     4.4   0.27    1.00  88589.03  0.189

:               Amusements, gambling, and recreation industries
SEE   =     207.82 RSQ   = 0.9874 RHO =   0.10 Obser  =   32 from 1975.000
SEE+1 =     207.05 RBSQ  = 0.9861 DurH =  0.99 DoFree =   28 to   2006.000
MAPE  =      10.10
  Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein60               - - - - - - - - - - - - - - - - -   2467.91 - - -
1 intercept           -231.40660     6.0  -0.09   79.55      1.00
2 vein60[1]              1.38015    96.9   1.29    1.80   2309.97  1.326
3 vein60[2]             -0.54197    21.8  -0.47    1.29   2153.19 -0.499
4 vennot                 0.00766    13.6   0.27    1.00  88589.03  0.166

:                             Accommodation
SEE   =     352.54 RSQ   = 0.9283 RHO =  -0.24 Obser  =   32 from 1975.000
SEE+1 =     340.58 RBSQ  = 0.9234 DurH = -2.52 DoFree =   29 to   2006.000
MAPE  =      15.32
  Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein61               - - - - - - - - - - - - - - - - -   2618.84 - - -
1 vein61[1]              0.40619    12.1   0.38    1.70   2462.72
2 vennot                 0.03263    24.3   1.10    1.20  88589.03  0.999
3 venntr                -0.01377     9.6  -0.48    1.00  91518.56 -0.456

:                      Food services and drinking places
SEE   =     756.59 RSQ   = 0.9818 RHO =  -0.03 Obser  =   32 from 1975.000
SEE+1 =     755.76 RBSQ  = 0.9791 DurH = 999.00 DoFree =   27 to   2006.000
MAPE  =       6.89
  Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 vein62               - - - - - - - - - - - - - - - - -   9363.22 - - -
1 intercept           -909.97689     4.4  -0.10   54.89      1.00
2 vein62[1]              0.31514     4.9   0.29    1.63   8686.31  0.288
3 vein62[2]              0.33602     5.5   0.29    1.26   8072.28  0.282
4 vennin                -0.03048     7.5  -0.32    1.25  98784.19 -0.221
```

```
  5 vennot                 0.08844    11.9   0.84    1.00  88589.03  0.636

:                      Other services, except government
  SEE   =     403.51 RSQ   = 0.9629 RHO =   0.18 Obser  =   32 from 1975.000
  SEE+1 =     398.62 RBSQ  = 0.9589 DurH =  7.09 DoFree =   28 to   2006.000
  MAPE  =       6.07
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vein63                - - - - - - - - - - - - - - - - -   6080.91 - - -
  1 intercept            730.22234    14.4   0.12   26.96      1.00
  2 vein63[1]              0.65936    19.6   0.64    1.41   5886.84  0.664
  3 vein63[2]             -0.28685     4.7  -0.27    1.41   5706.78 -0.292
  4 vennin                 0.03144    18.6   0.51    1.00  98784.19  0.609
```

Appendix 4.2: Detailed Forecast Results of NIPA Equipment and Software Investment

	1990	1995	2000	2005	2006	2007	2008	06-07	07-08
Nominal in Million of dollars									
Computer	38,643.00	66,110.00	101,442.00	88,987.00	91,338.00	96,217.78	101,186.00	5.34%	5.16%
Software	47,632.00	74,635.00	176,159.00	193,846.00	203,335.00	217,483.30	229,447.41	6.96%	5.50%
Other Information Equipment	90,923.00	122,257.00	190,018.00	174,558.00	186,191.00	195,041.00	203,445.30	4.75%	4.31%
Industrial Equipment	92,142.00	128,961.00	159,215.00	156,078.00	166,679.00	176,810.09	185,550.50	6.08%	4.94%
Transportation Equipment	69,960.00	116,077.00	160,846.00	159,467.00	171,892.00	156,259.30	159,049.09	-9.09%	1.79%
Other Nonresidential Equipment	83,071.00	99,858.00	134,581.00	169,823.00	180,047.00	176,089.59	181,561.30	-2.20%	3.11%
Residential Equipment	6,008.00	6,327.00	7,359.00	9,017.00	9,601.00	9,699.47	9,923.40	1.03%	2.31%
Real 2000 in Million of dollars									
Computer	5,478.77	19,548.07	101,442.01	172,985.13	203,683.97	241,396.63	302,338.81	18.52%	25.25%
Software	39,858.08	71,641.13	176,159.02	205,665.63	213,007.70	227,043.44	240,134.45	6.59%	5.77%
Other Information Equipment	80,072.40	106,980.24	190,018.03	191,485.33	204,841.88	213,245.44	220,427.97	4.10%	3.37%
Industrial Equipment	109,161.35	134,927.50	159,215.02	144,317.56	149,565.70	153,305.19	157,019.30	2.50%	2.42%
Transportation Equipment	81,004.10	120,573.18	160,846.02	145,099.28	155,194.63	138,486.61	138,941.48	-10.77%	0.33%
Other Nonresidential Equipment	98,792.91	105,884.98	134,581.02	154,661.53	159,322.36	151,494.22	152,755.70	-4.91%	0.83%
Residential Equipment	6,023.84	6,205.07	7,359.00	9,311.04	9,676.28	9,606.22	9,815.16	-0.72%	2.18%

Appendix 4.3: Detailed Forecast Results of FAA by Purchasing Industries

	1990	1995	2000	2005	2006	2007	2008	06-07	07-08
Nominal in Million of dollars									
Farms	14,714.00	19,104.00	20,781.00	28,579.00	28,644.00	28,911.59	29,811.27	0.93%	3.11%
Forestry, fishing, and related activities	2,658.00	2,156.00	1,627.00	3,552.00	3,609.00	3,956.47	4,275.79	9.63%	8.07%
Oil and gas extraction	3,711.00	4,508.00	6,070.00	5,371.00	5,864.00	5,638.71	5,345.37	-3.84%	-5.20%
Mining, except oil and gas	3,517.00	7,776.00	5,201.00	10,243.00	11,421.00	10,431.08	8,757.44	-8.67%	-16.04%
Support activites for mining	2,676.00	4,035.00	4,626.00	8,362.00	9,600.00	9,603.70	9,668.70	0.04%	0.68%
Utilities	26,776.00	26,158.00	35,022.00	34,468.00	36,695.00	38,174.90	39,119.02	4.03%	2.47%
Construction	8,982.00	19,433.00	31,714.00	38,395.00	41,293.00	44,639.81	48,145.30	8.11%	7.85%
Wood products	1,673.00	2,898.00	2,612.00	2,609.00	2,762.00	3,094.05	3,353.80	12.02%	8.40%
Nonmetallic mineral products	2,901.00	3,227.00	5,101.00	4,618.00	4,922.00	5,174.76	5,386.89	5.14%	4.10%
Primary metals	5,403.00	6,355.00	5,425.00	4,862.00	5,208.00	5,483.13	5,682.15	5.28%	3.63%
Fabricated metal products	5,354.00	8,447.00	9,612.00	7,891.00	8,454.00	9,654.01	10,618.64	14.19%	9.99%
Machinery	6,084.00	10,019.00	18,641.00	16,159.00	17,204.00	19,125.61	21,063.38	11.17%	10.13%
Computer and electronic products	12,421.00	24,289.00	37,494.00	25,034.00	26,460.00	29,493.71	32,542.95	11.47%	10.34%
Electrical equipment, appliances, and components	2,939.00	4,030.00	3,899.00	2,191.00	2,339.00	2,892.78	3,382.14	23.68%	16.92%
Motor vehicles, bodies and trailers, and parts	6,370.00	13,882.00	12,951.00	10,964.00	11,735.00	13,134.61	14,383.83	11.93%	9.51%
Other transportation equipment	4,231.00	4,584.00	7,942.00	7,931.00	8,394.00	8,951.40	9,488.22	6.64%	6.00%
Furniture and related products	697.00	1,222.00	1,831.00	1,511.00	1,607.00	1,811.03	1,987.62	12.70%	9.75%
Miscellaneous manufacturing	2,736.00	3,237.00	4,037.00	4,395.00	4,682.00	4,763.77	4,971.97	1.75%	4.37%
Food, beverage, and tobacco products	9,799.00	12,158.00	11,906.00	12,007.00	12,816.00	13,485.06	14,110.89	5.22%	4.64%
Textile mills and textile product mills	2,482.00	3,271.00	2,430.00	1,252.00	1,317.00	1,998.15	2,238.63	51.72%	12.04%
Apparel and leather and allied products	646.00	1,215.00	1,273.00	695.00	736.00	807.28	856.95	9.68%	6.15%
Paper products	10,529.00	8,472.00	7,692.00	5,941.00	6,286.00	6,636.50	6,820.93	5.58%	2.78%
Printing and related support activities	3,125.00	3,127.00	4,825.00	4,714.00	4,963.00	5,249.85	5,547.99	5.78%	5.68%
Petroleum and coal products	3,966.00	7,234.00	5,217.00	11,115.00	11,829.00	12,627.20	13,436.57	6.75%	6.41%
Chemical products	13,602.00	17,874.00	18,834.00	17,309.00	18,358.00	19,567.48	20,795.05	6.59%	6.27%
Plastics and rubber products	4,498.00	6,970.00	8,074.00	6,940.00	7,363.00	8,223.65	8,991.50	11.69%	9.34%
Wholesale trade	22,620.00	42,402.00	56,839.00	70,502.00	75,538.00	74,849.70	74,900.40	-0.91%	0.07%
Retail trade	16,677.00	24,731.00	31,707.00	35,246.00	37,504.00	38,834.28	40,520.97	3.55%	4.34%
Air transportation	6,569.00	14,668.00	31,713.00	12,268.00	13,248.00	16,752.79	15,366.78	26.46%	-8.27%
Railroad transportation	1,580.00	2,552.00	1,380.00	1,423.00	1,509.00	1,667.40	1,810.73	10.50%	8.60%
Water transportation	1,749.00	2,828.00	3,918.00	5,086.00	5,073.00	4,876.66	4,792.28	-3.87%	-1.73%
Truck transportation	5,126.00	13,121.00	10,476.00	17,569.00	19,647.00	15,306.81	14,654.93	-22.09%	-4.26%
Transit and ground passenger transportation	747.00	1,467.00	3,730.00	3,364.00	3,730.00	3,161.37	3,033.60	-15.24%	-4.04%
Pipeline transportation	1,480.00	2,641.00	2,823.00	2,373.00	2,557.00	2,454.73	2,373.54	-4.00%	-3.31%
Other transportation and support activites	4,792.00	7,409.00	9,155.00	4,487.00	4,762.00	4,602.39	4,345.19	-3.35%	-5.59%
Warehousing and storage	567.00	1,318.00	1,102.00	2,060.00	2,212.00	2,260.76	2,339.76	2.20%	3.49%
Publishing industries (including software)	5,640.00	4,892.00	7,369.00	6,045.00	6,387.00	6,662.94	6,935.12	4.32%	4.08%
Motion picture and sound recording industries	1,869.00	2,418.00	737.00	936.00	997.00	1,017.11	1,018.73	2.02%	0.16%
Broadcasting and telecommunications	31,606.00	48,614.00	107,363.00	51,312.00	55,344.00	56,310.89	58,610.60	1.75%	4.08%
Information and data processing services	1,538.00	2,106.00	6,280.00	7,471.00	7,927.00	8,514.87	9,121.06	7.42%	7.12%
Federal Reserve banks	179.00	1,328.00	2,155.00	1,331.00	1,377.00	1,469.24	1,539.68	6.70%	4.79%
Credit intermediation and related activities	34,118.00	42,440.00	64,750.00	58,900.00	60,858.00	62,589.82	65,429.16	2.85%	4.54%
Securities, commodity contracts, and investments	10,174.00	6,540.00	13,528.00	10,728.00	11,238.00	10,709.18	10,615.11	-4.71%	-0.88%
Insurance carriers and related activities	7,912.00	17,416.00	18,017.00	17,344.00	18,040.00	19,182.28	20,262.78	6.33%	5.63%
Funds, trusts, and other financial vehicles	746.00	696.00	2,343.00	1,661.00	1,743.00	1,594.04	1,714.38	-8.55%	7.55%
Real estate	12,734.00	10,360.00	13,554.00	18,186.00	19,293.00	20,122.36	20,684.19	4.30%	2.79%
Rental and leasing services and lessors of intangible assets	10,749.00	31,665.00	78,572.00	70,879.00	75,113.00	72,088.55	72,675.03	-4.03%	0.81%
Legal services	1,490.00	1,548.00	2,725.00	3,064.00	3,228.00	3,392.10	3,586.56	5.08%	5.73%
Computer systems design and related services	3,024.00	5,340.00	19,530.00	17,679.00	18,617.00	20,346.99	22,033.81	9.29%	8.29%
Miscellaneous professional, scientific, and technical services	10,642.00	15,027.00	36,851.00	60,234.00	63,337.00	62,704.93	64,335.31	-1.00%	2.60%
Management of companies and enterprises	9,088.00	10,225.00	15,489.00	21,807.00	22,882.00	24,304.40	25,813.18	6.22%	6.21%
Administrative and support services	5,227.00	8,773.00	19,202.00	22,533.00	23,752.00	25,070.61	26,625.23	5.55%	6.20%
Waste management and remediation services	2,690.00	2,544.00	2,143.00	3,209.00	3,480.00	3,656.01	3,800.18	5.06%	3.94%
Educational services	2,022.00	3,648.00	6,874.00	9,113.00	9,589.00	10,299.61	11,012.74	7.41%	6.92%
Ambulatory health care services	12,265.00	13,240.00	17,952.00	33,018.00	34,768.00	37,717.64	41,377.16	8.48%	9.70%
Hospitals	12,625.00	17,850.00	28,331.00	43,844.00	46,106.00	49,209.30	52,842.67	6.73%	7.38%
Nursing and residential care facilities	936.00	1,245.00	1,879.00	2,682.00	2,843.00	2,997.25	3,177.21	5.43%	6.00%
Social assistance	562.00	696.00	1,226.00	1,244.00	1,306.00	1,488.71	1,595.35	13.99%	7.16%
Performing arts, spectator sports, museums, and related activities	698.00	1,218.00	2,152.00	2,310.00	2,394.00	2,492.69	2,638.06	4.12%	5.83%
Amusements, gambling, and recreation industries	1,268.00	2,770.00	5,562.00	5,580.00	5,750.00	5,953.67	6,290.87	3.54%	5.66%
Accommodation	3,453.00	2,737.00	3,134.00	5,349.00	5,604.00	5,860.34	6,116.40	4.57%	4.37%
Food services and drinking places	7,254.00	10,652.00	14,840.00	21,624.00	23,620.00	23,774.82	24,855.29	0.66%	4.54%
Other services, except government	5,418.00	8,025.00	9,444.00	8,407.00	8,920.00	9,772.92	10,535.95	9.56%	7.81%

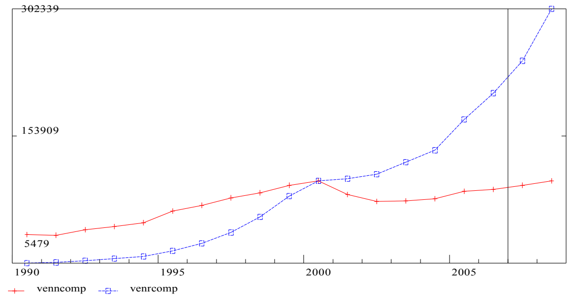
Appendix 4.3 (cont.)

	1990	1995	2000	2005	2006	2007	2008	06-07	07-08
Real 2000 in Million of dollars									
Farms	17,139.23	19,966.21	20,781.00	26,461.42	25,941.64	25,592.04	25,989.11	-1.35%	1.55%
Forestry, fishing, and related activities	3,033.36	2,218.75	1,627.00	3,346.54	3,343.53	3,597.28	3,848.10	7.59%	6.97%
Oil and gas extraction	3,981.47	4,500.97	6,070.00	5,266.79	5,709.51	5,441.95	5,171.80	-4.69%	-4.96%
Mining, except oil and gas	3,862.57	7,869.07	5,201.00	9,919.30	10,912.54	9,828.75	8,231.56	-9.93%	-16.25%
Support activites for mining	2,915.65	4,071.20	4,626.00	8,134.89	9,206.37	9,081.30	9,110.03	-1.36%	0.32%
Utilities	28,373.41	25,908.07	35,022.00	34,377.43	36,227.71	37,222.75	38,274.77	2.75%	2.83%
Construction	9,476.82	19,260.53	31,714.00	38,164.91	40,729.93	43,662.50	47,301.26	7.20%	8.33%
Wood products	1,846.41	2,919.30	2,612.00	2,543.47	2,654.82	2,923.69	3,164.15	10.13%	8.22%
Nonmetallic mineral products	3,112.90	3,210.33	5,101.00	4,579.08	4,826.95	5,007.15	5,226.05	3.73%	4.37%
Primary metals	5,793.19	6,336.89	5,425.00	4,810.77	5,090.40	5,282.94	5,480.78	3.78%	3.74%
Fabricated metal products	5,654.58	8,330.71	9,612.00	7,934.38	8,438.60	9,547.56	10,605.63	13.14%	11.08%
Machinery	5,901.90	9,572.95	18,641.00	16,956.80	18,060.68	20,090.05	22,583.94	11.24%	12.41%
Computer and electronic products	12,182.60	23,372.62	37,494.00	26,037.34	27,469.44	30,567.38	34,306.44	11.28%	12.23%
Electrical equipment, appliances, and components	3,017.47	3,920.86	3,899.00	2,240.30	2,382.86	2,931.37	3,476.39	23.02%	18.59%
Motor vehicles, bodies and trailers, and parts	6,715.27	13,779.74	12,951.00	10,941.09	11,581.53	12,804.51	14,077.05	10.56%	9.94%
Other transportation equipment	4,006.89	4,357.19	7,942.00	8,372.03	8,865.02	9,466.26	10,229.14	6.78%	8.06%
Furniture and related products	753.55	1,215.44	1,831.00	1,501.42	1,582.56	1,763.09	1,949.95	11.41%	10.60%
Miscellaneous manufacturing	2,765.94	3,124.98	4,037.00	4,539.10	4,829.65	4,901.34	5,207.33	1.48%	6.24%
Food, beverage, and tobacco products	10,439.03	12,045.56	11,906.00	11,984.13	12,682.56	13,206.47	13,916.97	4.13%	5.38%
Textile mills and textile product mills	2,761.58	3,319.72	2,430.00	1,208.99	1,250.10	1,858.98	2,070.21	48.71%	11.36%
Apparel and leather and allied products	688.32	1,200.03	1,273.00	696.50	732.69	796.32	854.05	8.68%	7.25%
Paper products	11,548.22	8,532.30	7,692.00	5,802.58	6,050.39	6,279.55	6,443.47	3.79%	2.61%
Printing and related support activities	3,264.81	3,044.05	4,825.00	4,817.89	5,066.61	5,340.61	5,754.21	5.41%	7.74%
Petroleum and coal products	4,158.78	7,118.98	5,217.00	11,173.19	11,793.53	12,456.83	13,335.14	5.62%	7.05%
Chemical products	13,216.34	16,950.63	18,834.00	18,249.63	19,407.03	20,721.34	22,508.60	6.77%	8.63%
Plastics and rubber products	5,058.88	7,100.80	8,074.00	6,661.93	6,929.96	7,562.67	8,187.71	9.13%	8.26%
Wholesale trade	21,957.55	39,120.70	56,839.01	76,185.30	83,313.67	84,025.37	87,888.38	0.85%	4.60%
Retail trade	16,395.92	23,071.84	31,707.01	37,796.11	40,837.34	42,937.18	46,667.35	5.14%	8.69%
Air transportation	5,979.96	13,215.18	31,713.01	13,322.46	14,501.37	18,380.60	17,056.79	26.75%	-7.20%
Railroad transportation	1,511.26	2,366.95	1,380.00	1,537.03	1,652.89	1,849.57	2,085.93	11.90%	12.78%
Water transportation	1,752.28	2,683.26	3,918.00	5,188.71	5,179.41	4,943.67	4,846.20	-4.55%	-1.97%
Truck transportation	5,543.43	13,022.40	10,476.00	17,147.15	19,180.85	14,846.06	14,286.80	-22.60%	-3.77%
Transit and ground passenger transportation	761.44	1,407.05	3,730.00	3,438.18	3,839.82	3,261.32	3,184.90	-15.07%	-2.34%
Pipeline transportation	1,309.14	2,357.98	2,823.00	2,611.09	2,838.98	2,738.29	2,687.61	-3.55%	-1.85%
Other transportation and support activites	4,626.75	6,990.30	9,155.00	4,731.34	5,076.17	4,952.47	4,812.22	-2.44%	-2.83%
Warehousing and storage	567.86	1,249.97	1,102.00	2,161.75	2,341.26	2,408.97	2,566.78	2.89%	6.55%
Publishing industries (including software)	4,848.38	4,440.34	7,369.00	6,742.64	7,220.60	7,647.59	8,265.90	5.91%	8.08%
Motion picture and sound recording industries	1,750.88	2,235.83	737.00	1,011.66	1,090.00	1,124.99	1,163.01	3.21%	3.38%
Broadcasting and telecommunications	26,678.04	41,800.10	107,363.01	58,692.44	64,586.98	66,756.99	71,762.65	3.36%	7.50%
Information and data processing services	1,282.10	1,888.63	6,280.00	8,380.61	8,994.45	9,786.31	10,803.10	8.80%	10.39%
Federal Reserve banks	140.73	1,063.33	2,155.00	1,662.78	1,822.01	2,049.37	2,357.73	12.48%	15.05%
Credit intermediation and related activities	29,341.85	36,041.80	64,750.00	69,506.78	75,210.88	80,670.63	91,168.87	7.26%	13.01%
Securities, commodity contracts, and investments	7,184.58	5,003.21	13,528.00	14,008.65	15,591.69	15,732.23	17,221.43	0.90%	9.47%
Insurance carriers and related activities	6,876.08	15,533.64	18,017.00	19,651.90	20,996.73	22,933.04	25,603.29	9.22%	11.64%
Funds, trusts, and other financial vehicles	697.97	643.11	2,343.00	1,801.72	1,933.43	1,805.40	2,034.71	-6.62%	12.70%
Real estate	12,076.61	9,667.56	13,554.00	19,710.57	20,970.82	21,980.63	23,286.61	4.82%	5.94%
Rental and leasing services and lessors of intangible assets	10,297.90	28,405.24	78,572.02	78,644.17	86,571.19	85,878.72	92,448.59	-0.80%	7.65%
Legal services	1,137.38	1,248.27	2,725.00	3,832.00	4,241.57	4,677.86	5,395.07	10.29%	15.33%
Computer systems design and related services	2,222.99	4,413.13	19,530.00	21,613.09	23,594.04	26,713.87	30,910.88	13.22%	15.71%
Miscellaneous professional, scientific, and technical services	8,728.85	13,403.32	36,851.00	68,578.50	73,345.70	74,026.25	79,259.89	0.93%	7.07%
Management of companies and enterprises	7,259.04	8,800.08	15,489.00	25,748.47	27,873.76	30,570.45	34,572.79	9.67%	13.09%
Administrative and support services	4,822.58	8,029.43	19,202.00	24,740.34	26,479.67	28,406.44	31,395.46	7.28%	10.52%
Waste management and remediation services	2,774.19	2,480.73	2,143.00	3,246.23	3,510.54	3,668.30	3,849.78	4.49%	4.95%
Educational services	1,769.29	3,255.90	6,874.00	10,239.70	10,974.88	12,012.21	13,381.24	9.45%	11.40%
Ambulatory health care services	10,703.51	11,599.66	17,952.00	36,809.50	39,208.30	42,799.77	47,691.78	9.16%	11.43%
Hospitals	10,959.00	15,619.51	28,331.00	48,914.43	51,997.65	55,806.55	60,780.61	7.33%	8.91%
Nursing and residential care facilities	900.12	1,159.39	1,879.00	2,860.53	3,055.28	3,243.34	3,521.52	6.16%	8.58%
Social assistance	536.53	652.64	1,226.00	1,335.33	1,418.30	1,640.12	1,824.90	15.64%	11.27%
Performing arts, spectator sports, museums, and related activities	694.07	1,133.01	2,152.00	2,484.38	2,620.27	2,778.48	3,076.02	6.04%	10.71%
Amusements, gambling, and recreation industries	1,420.98	2,810.33	5,562.00	5,404.76	5,513.28	5,658.39	6,019.78	2.63%	6.39%
Accommodation	3,730.70	2,735.23	3,134.00	5,286.10	5,497.70	5,715.85	6,023.91	3.97%	5.39%
Food services and drinking places	8,211.07	10,937.45	14,840.00	20,581.08	22,111.77	21,904.69	22,795.98	-0.94%	4.07%
Other services, except government	5,429.19	7,689.55	9,444.00	8,771.80	9,356.68	10,311.14	11,430.64	10.20%	10.86%

Appendix 4.4: Plots of NIPA Equipment and Software Fixed Investment Forecast

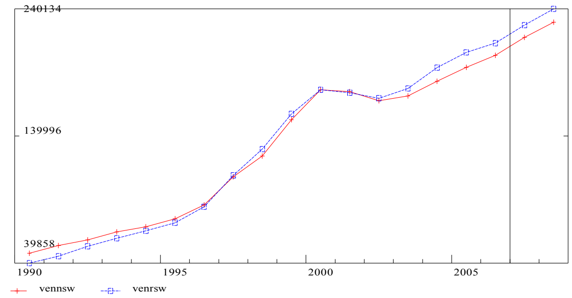
Computer

Nominal and Real (2000) in Million dollars



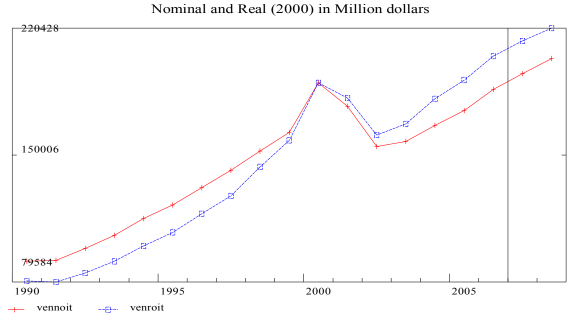
Software

Nominal and Real (2000) in Million dollars



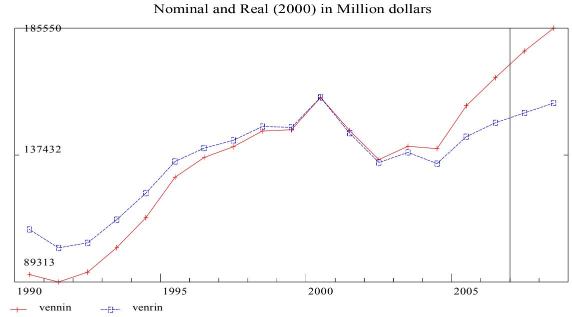
Other Information Processing Equipment

Nominal and Real (2000) in Million dollars



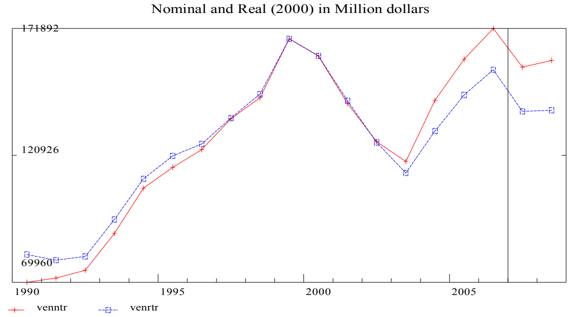
Industrial Equipment

Nominal and Real (2000) in Million dollars



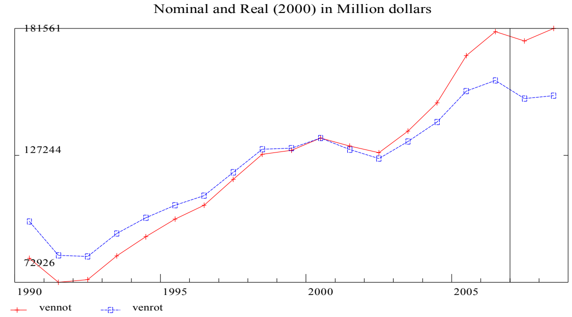
Transportation Equipment

Nominal and Real (2000) in Million dollars



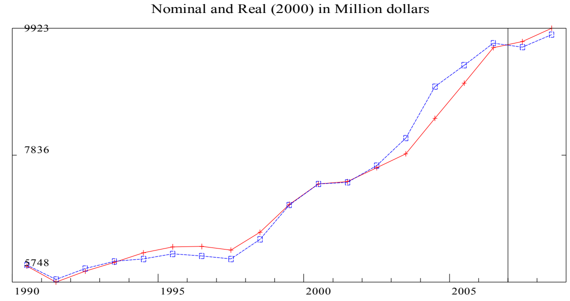
Other Nonresidential Equipment

Nominal and Real (2000) in Million dollars

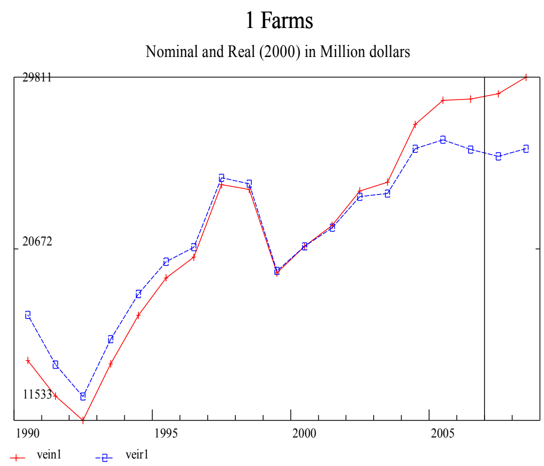


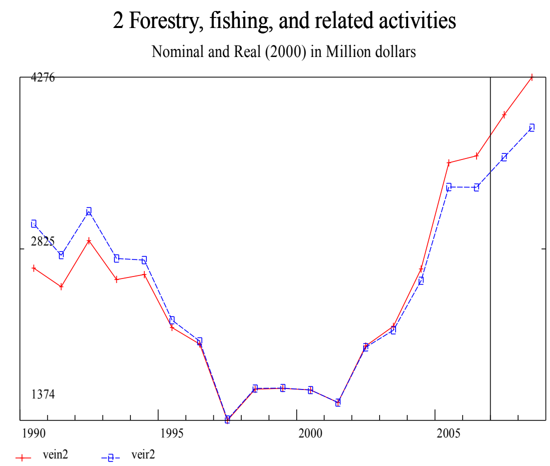
Residential Equipment

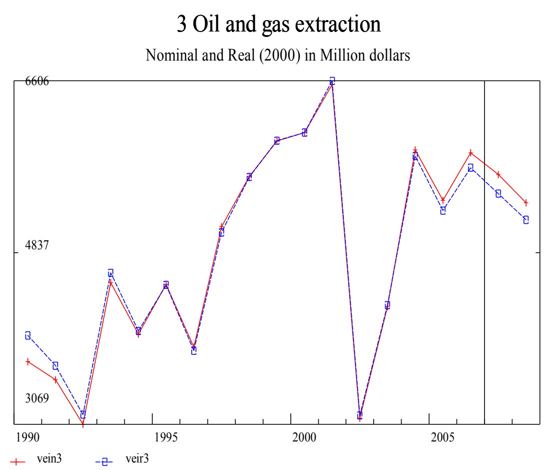
Nominal and Real (2000) in Million dollars

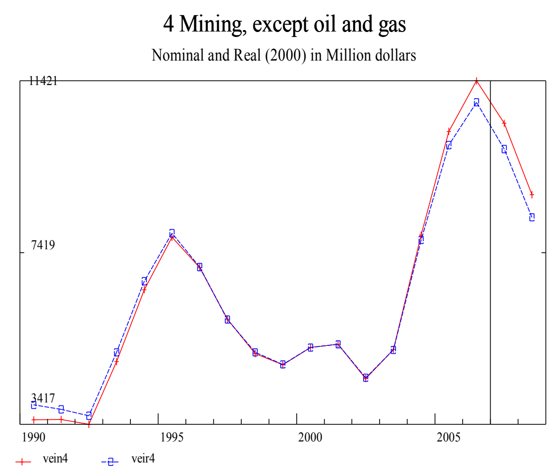


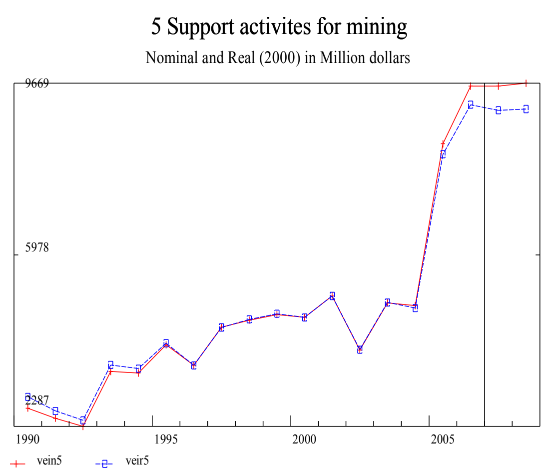
Appendix 4.5: Plots of FAA by Purchasing Industries Forecast

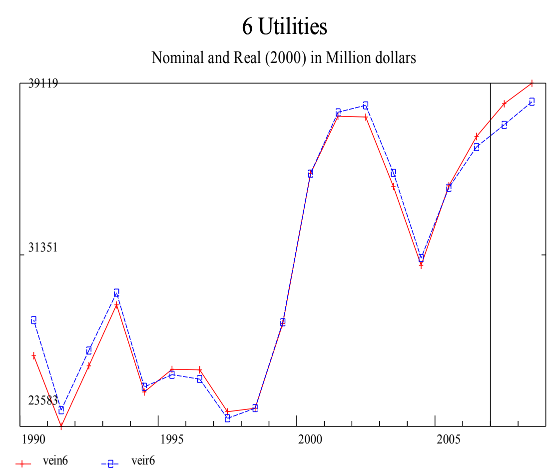








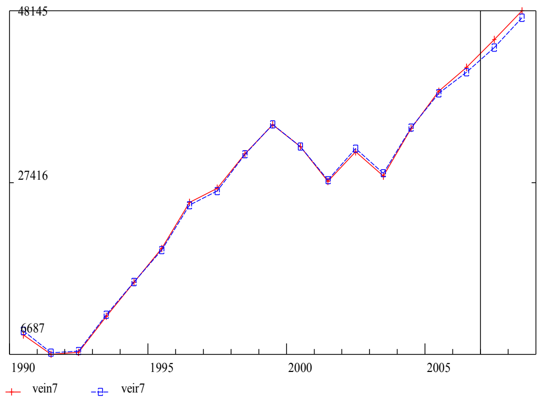




Appendix 4.5 (cont.)

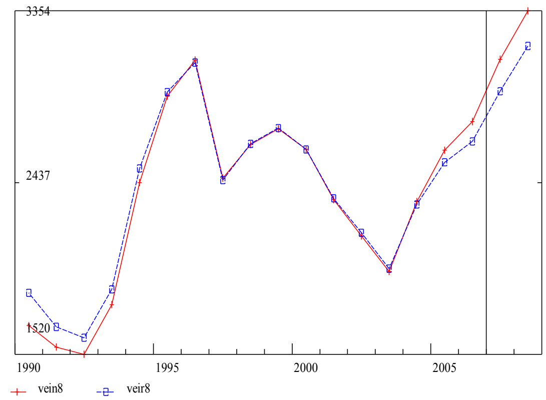
7 Construction

Nominal and Real (2000) in Million dollars



8 Wood products

Nominal and Real (2000) in Million dollars

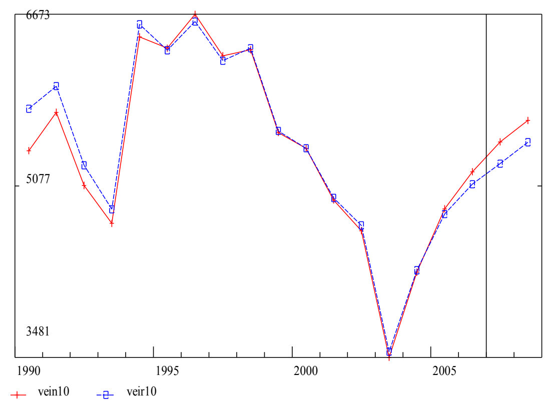


9 Nonmetallic mineral products

Nominal and Real (2000) in Million dollars

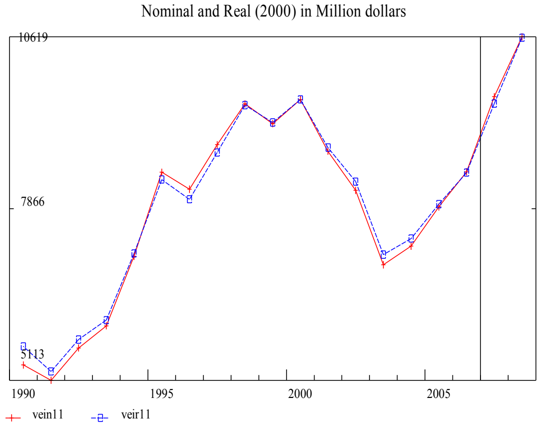
10 Primary metals

Nominal and Real (2000) in Million dollars



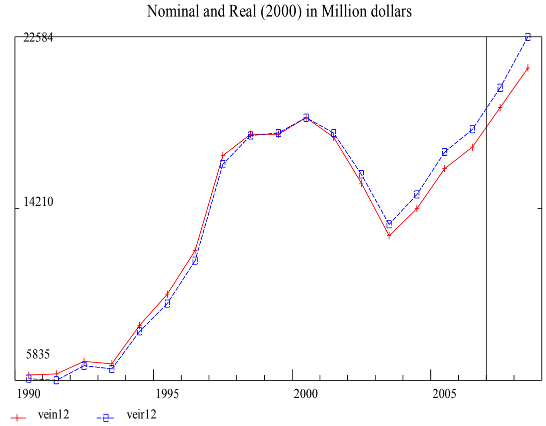
11 Fabricated metal products

Nominal and Real (2000) in Million dollars



12 Machinery

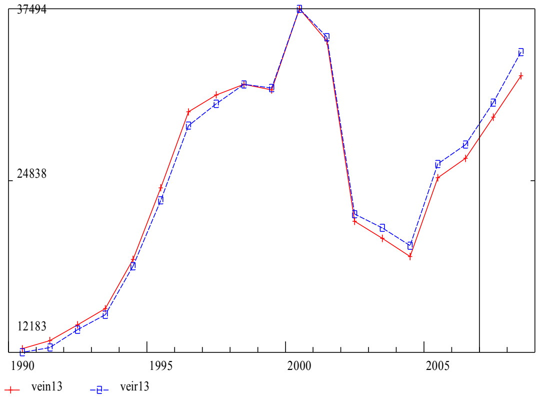
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

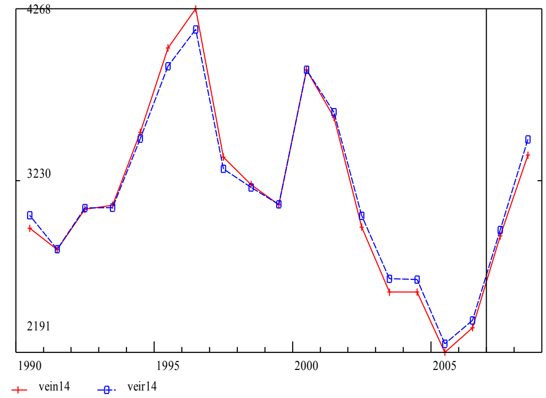
13 Computer and electronic products

Nominal and Real (2000) in Million dollars



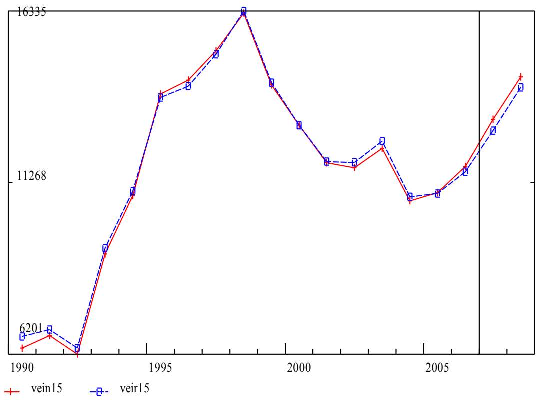
14 Electrical equipment, appliances, and components

Nominal and Real (2000) in Million dollars



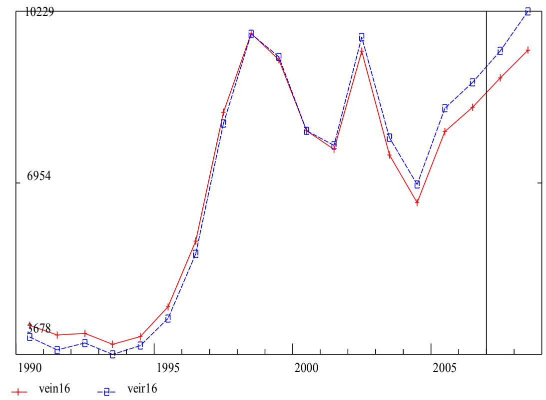
15 Motor vehicles, bodies and trailers, and parts

Nominal and Real (2000) in Million dollars



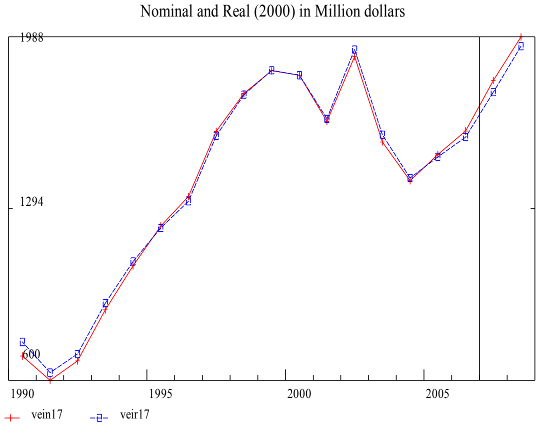
16 Other transportation equipment

Nominal and Real (2000) in Million dollars



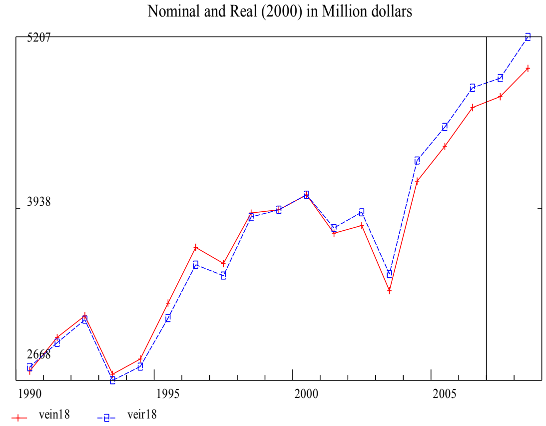
17 Furniture and related products

Nominal and Real (2000) in Million dollars



18 Miscellaneous manufacturing

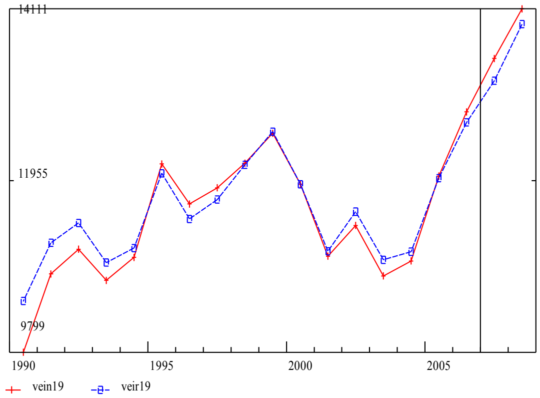
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

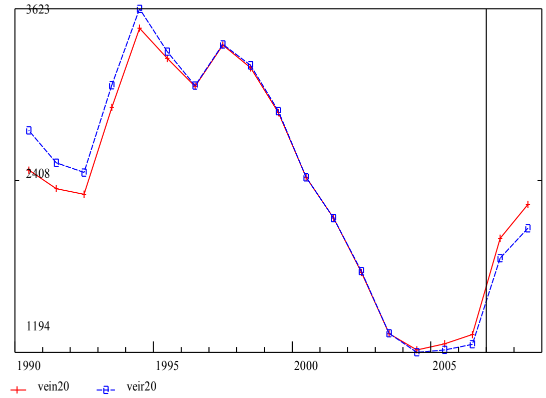
19 Food, beverage, and tobacco products

Nominal and Real (2000) in Million dollars



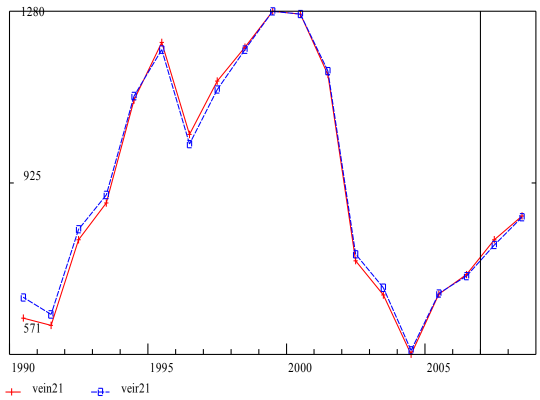
20 Textile mills and textile product mills

Nominal and Real (2000) in Million dollars



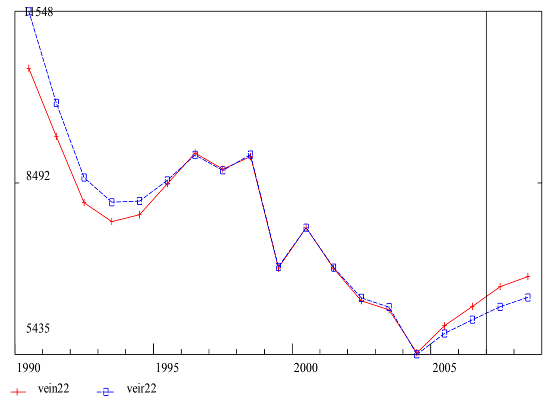
21 Apparel and leather and allied products

Nominal and Real (2000) in Million dollars



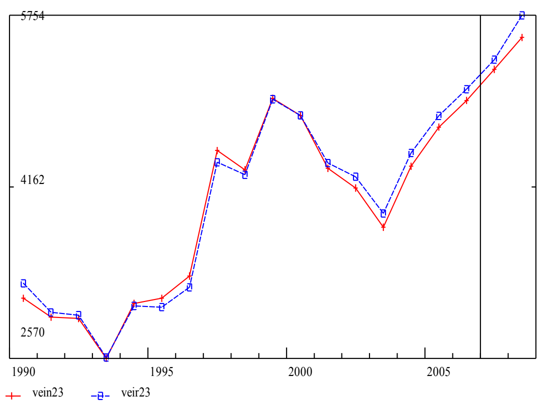
22 Paper products

Nominal and Real (2000) in Million dollars



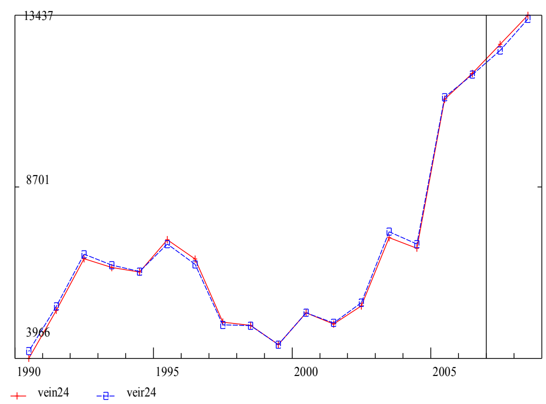
23 Printing and related support activities

Nominal and Real (2000) in Million dollars



24 Petroleum and coal products

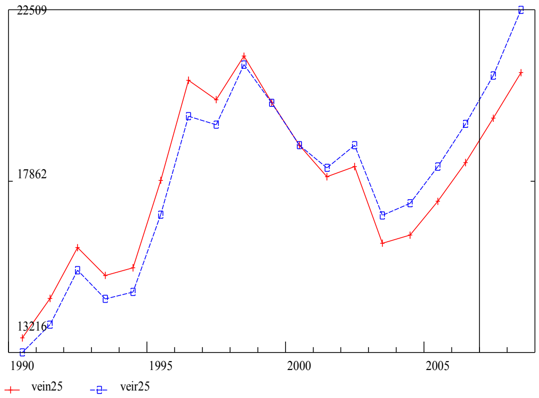
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

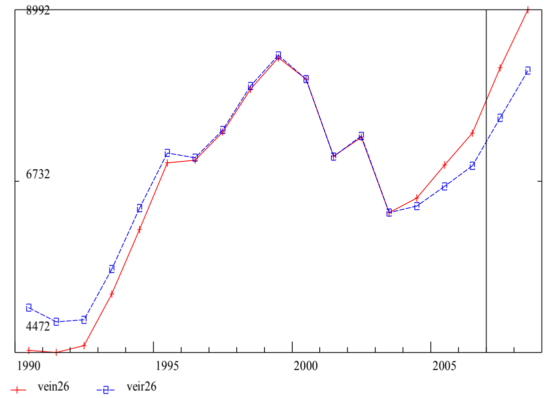
25 Chemical products

Nominal and Real (2000) in Million dollars



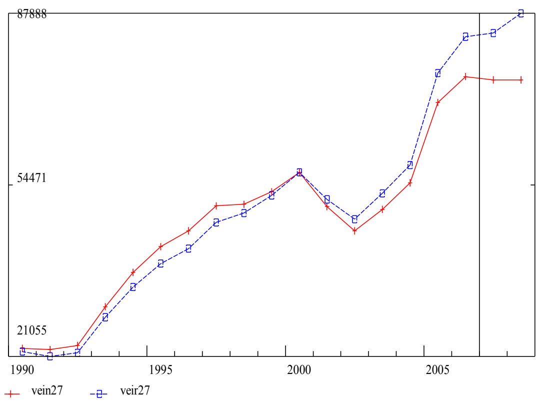
26 Plastics and rubber products

Nominal and Real (2000) in Million dollars



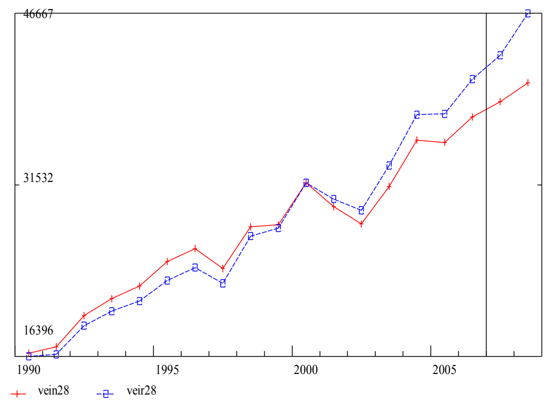
27 Wholesale trade

Nominal and Real (2000) in Million dollars



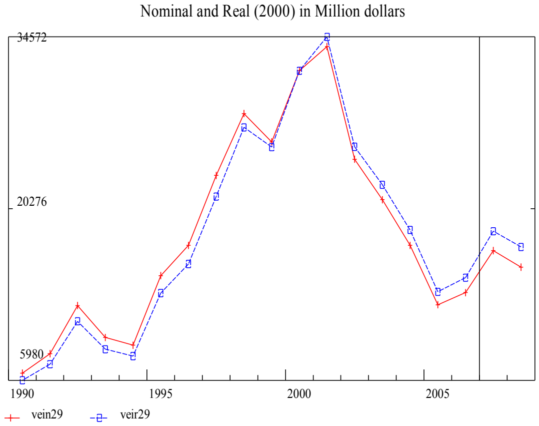
28 Retail trade

Nominal and Real (2000) in Million dollars



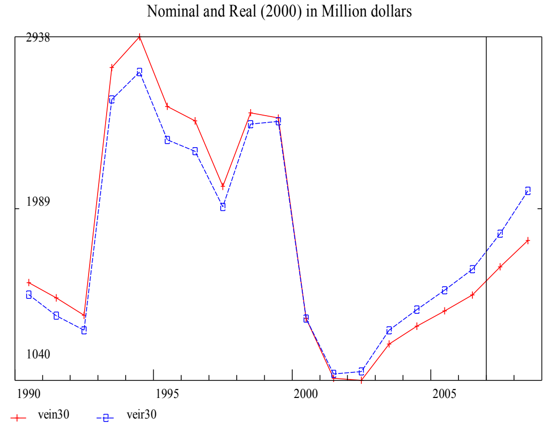
29 Air transportation

Nominal and Real (2000) in Million dollars



30 Railroad transportation

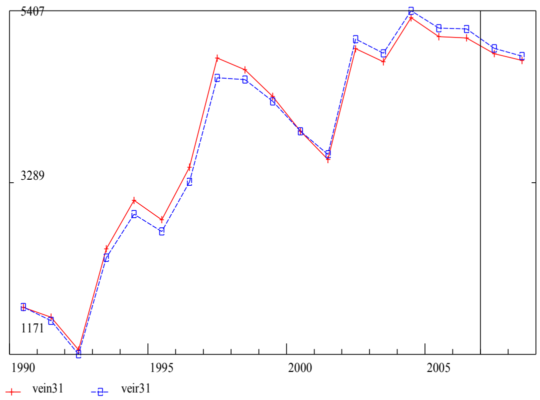
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

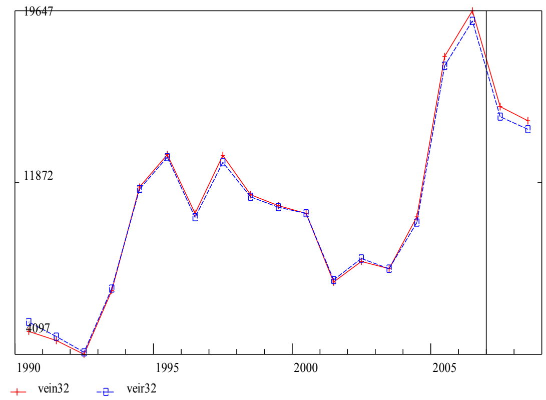
31 Water transportation

Nominal and Real (2000) in Million dollars



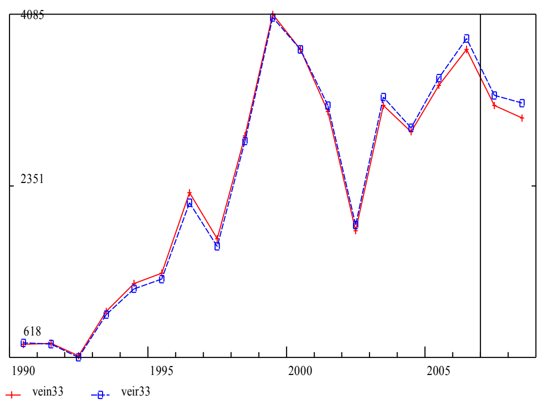
32 Truck transportation

Nominal and Real (2000) in Million dollars



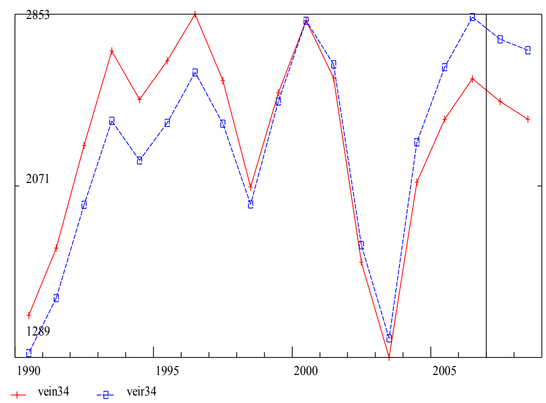
33 Transit and ground passenger transportation

Nominal and Real (2000) in Million dollars



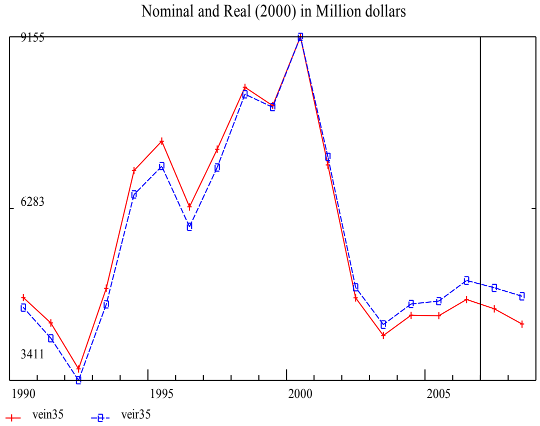
34 Pipeline transportation

Nominal and Real (2000) in Million dollars



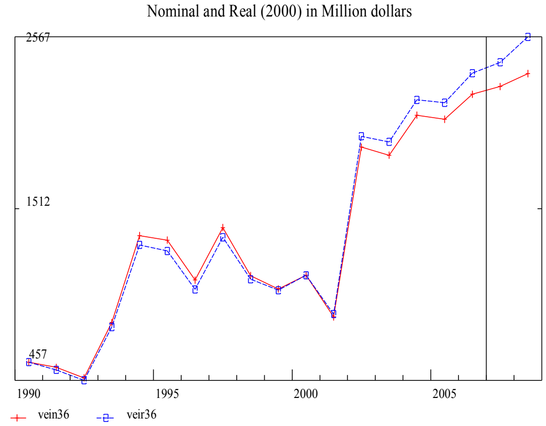
35 Other transportation and support activites

Nominal and Real (2000) in Million dollars



36 Warehousing and storage

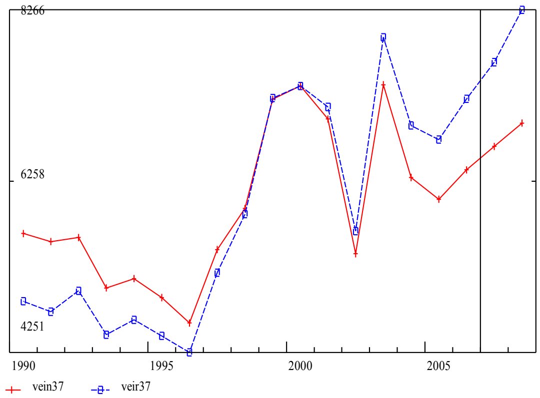
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

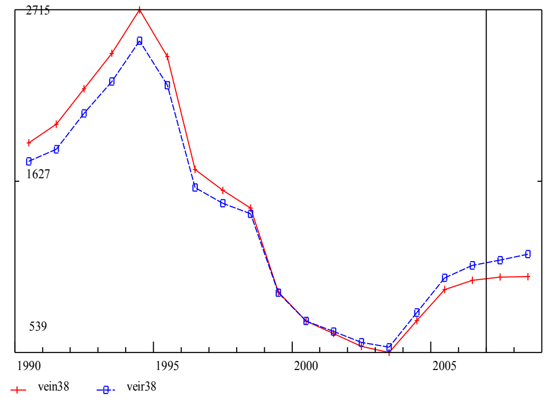
37 Publishing industries (including software)

Nominal and Real (2000) in Million dollars



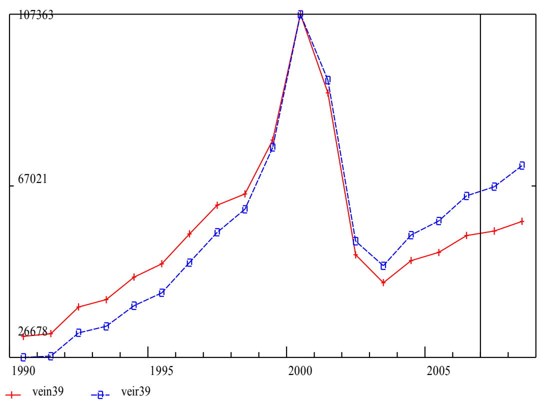
38 Motion picture and sound recording industries

Nominal and Real (2000) in Million dollars



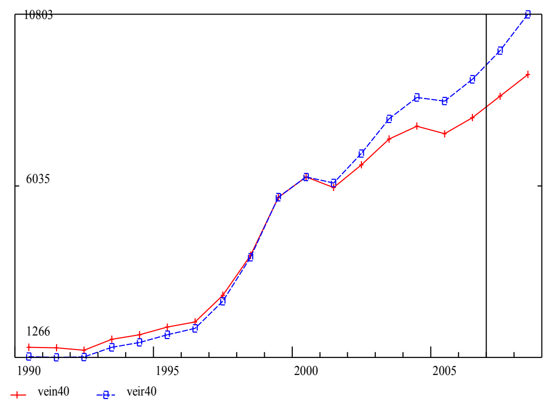
39 Broadcasting and telecommunications

Nominal and Real (2000) in Million dollars



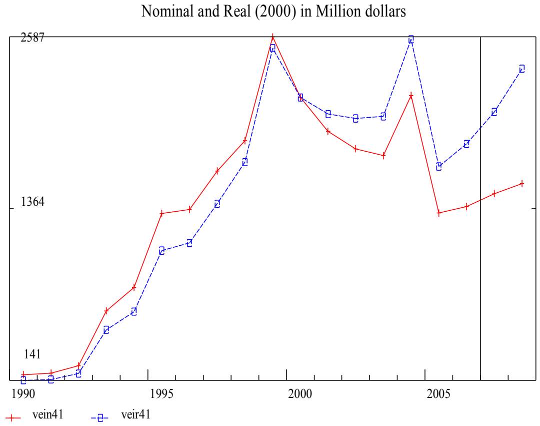
40 Information and data processing services

Nominal and Real (2000) in Million dollars



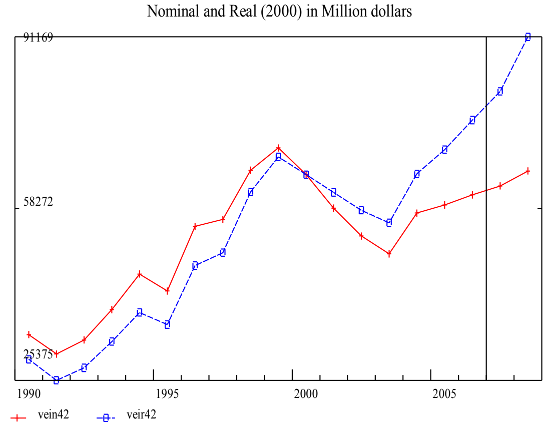
41 Federal Reserve banks

Nominal and Real (2000) in Million dollars



42 Credit intermediation and related activities

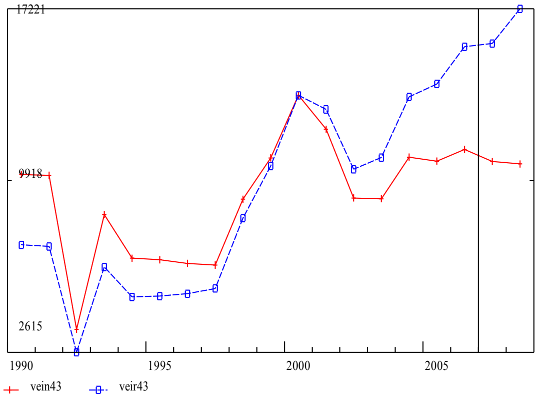
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

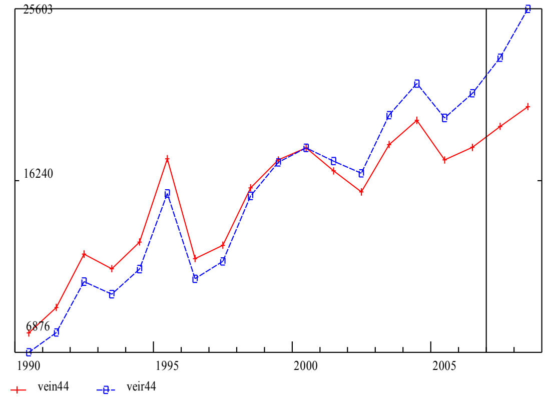
43 Securities, commodity contracts, and investments

Nominal and Real (2000) in Million dollars



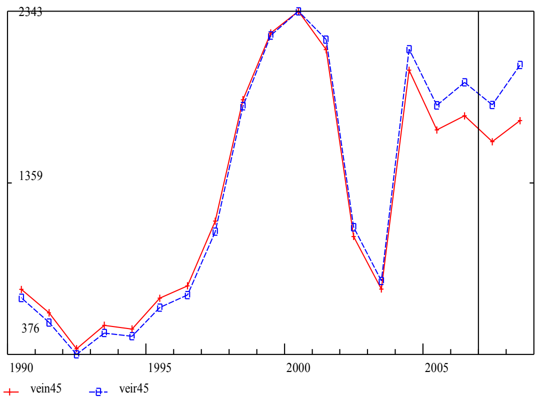
44 Insurance carriers and related activities

Nominal and Real (2000) in Million dollars



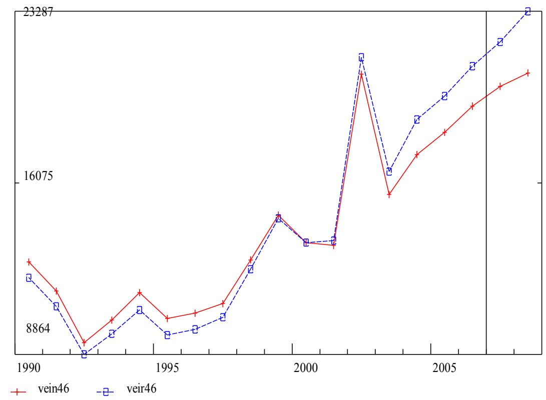
45 Funds, trusts, and other financial vehicles

Nominal and Real (2000) in Million dollars



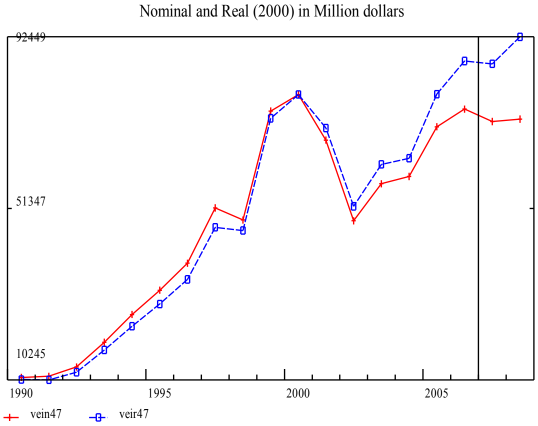
46 Real estate

Nominal and Real (2000) in Million dollars



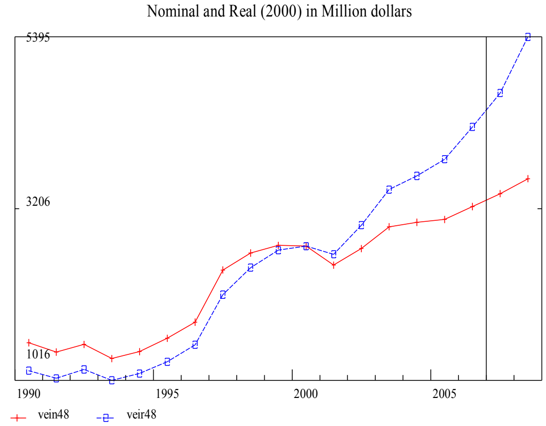
47 Rental and leasing services and lessors of intangible assets

Nominal and Real (2000) in Million dollars



48 Legal services

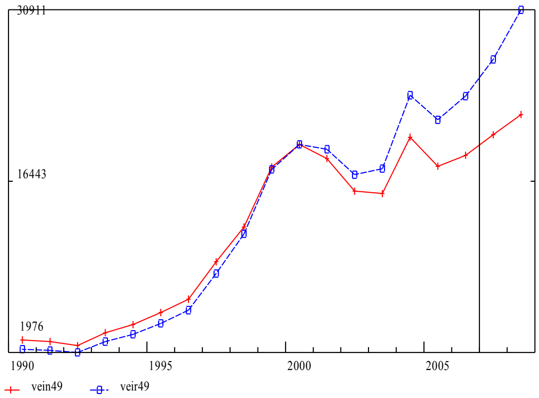
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

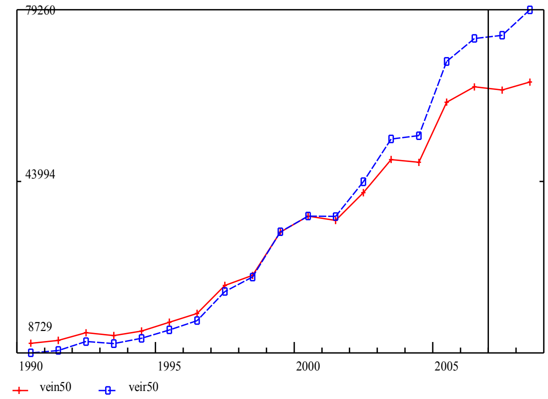
49 Computer systems design and related services

Nominal and Real (2000) in Million dollars



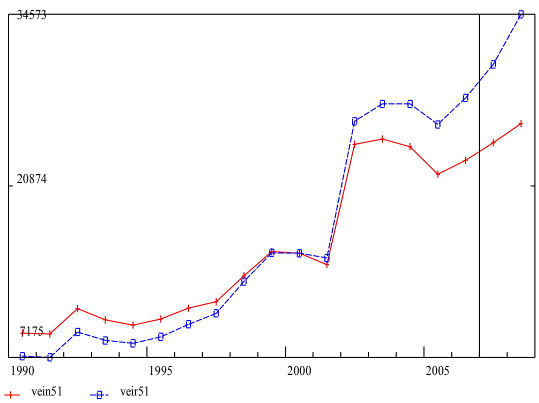
50 Miscellaneous professional, scientific, and technical service

Nominal and Real (2000) in Million dollars



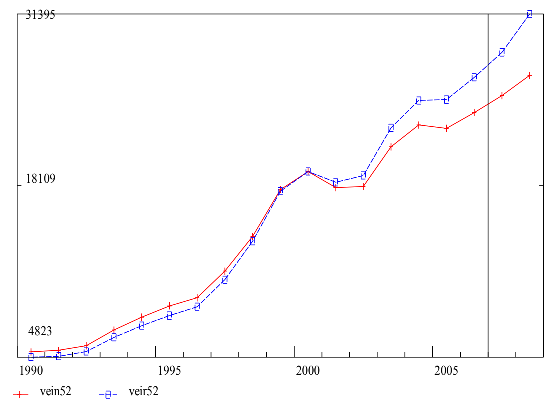
51 Management of companies and enterprises

Nominal and Real (2000) in Million dollars



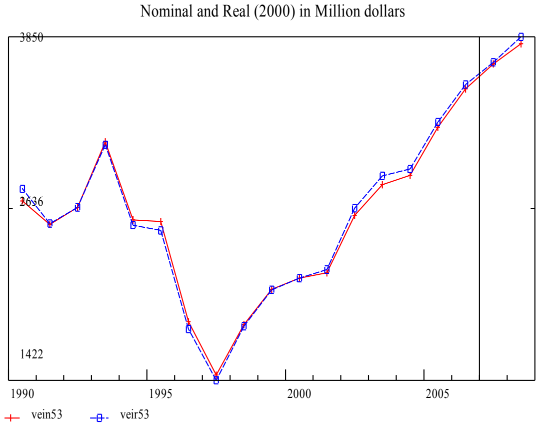
52 Administrative and support services

Nominal and Real (2000) in Million dollars



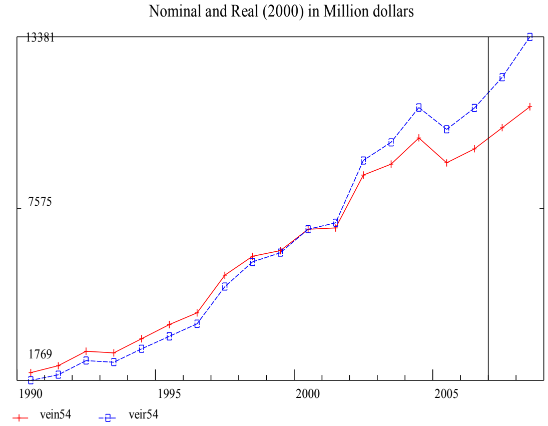
53 Waste management and remediation services

Nominal and Real (2000) in Million dollars



54 Educational services

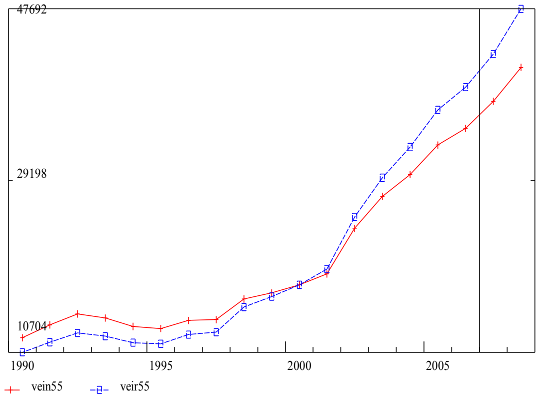
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

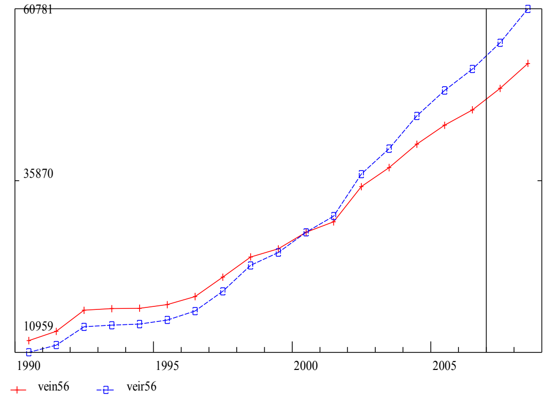
55 Ambulatory health care services

Nominal and Real (2000) in Million dollars



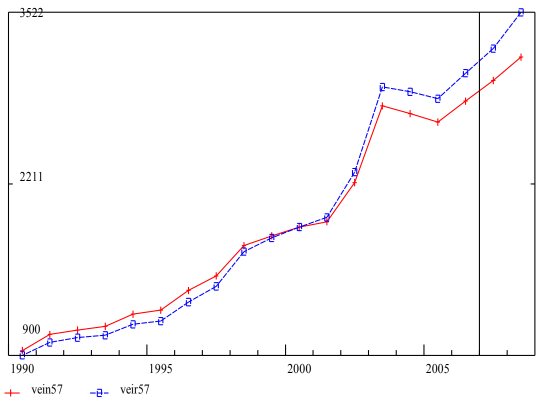
56 Hospitals

Nominal and Real (2000) in Million dollars



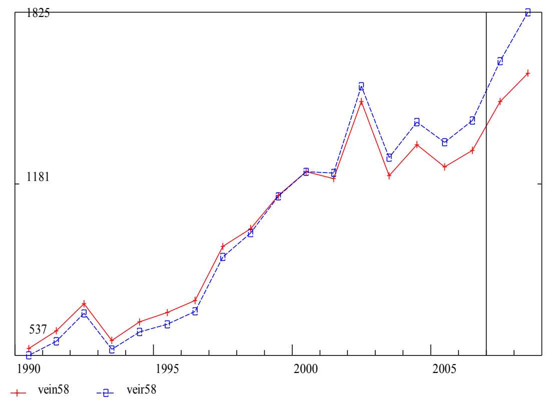
57 Nursing and residential care facilities

Nominal and Real (2000) in Million dollars



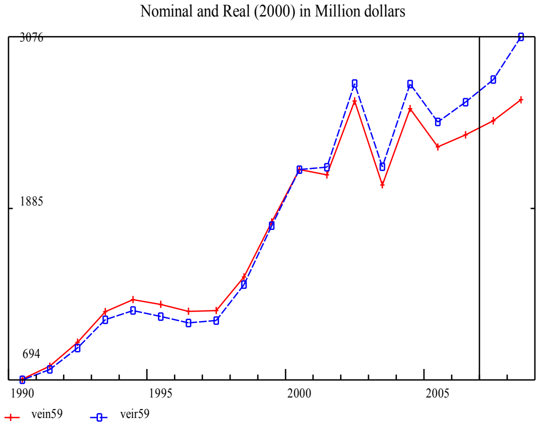
58 Social assistance

Nominal and Real (2000) in Million dollars



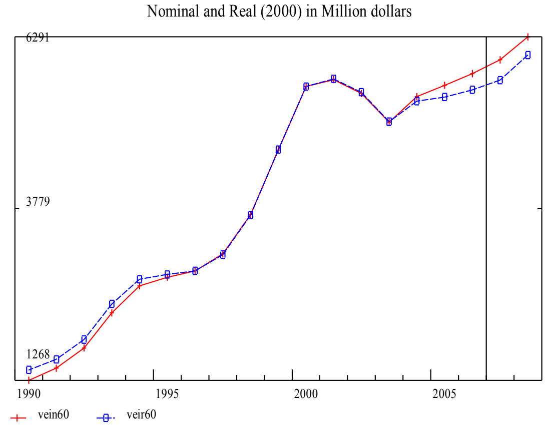
Performing arts, spectator sports, museums, and related activi

Nominal and Real (2000) in Million dollars



60 Amusements, gambling, and recreation industries

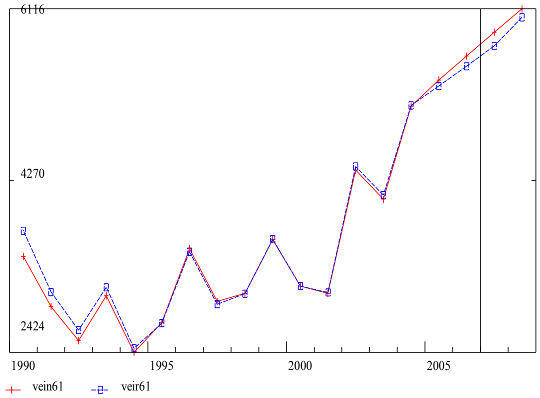
Nominal and Real (2000) in Million dollars



Appendix 4.5 (cont.)

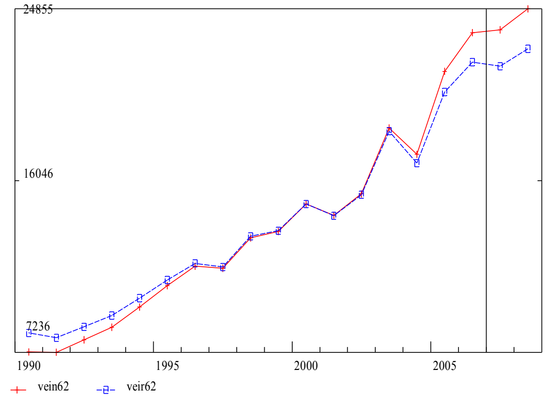
61 Accommodation

Nominal and Real (2000) in Million dollars



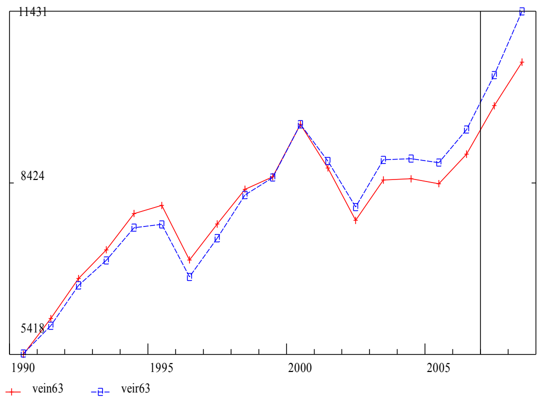
62 Food services and drinking places

Nominal and Real (2000) in Million dollars



63 Other services, except government

Nominal and Real (2000) in Million dollars



Appendix 5.1: Regressions' Results of Annual Fixed Investment in Nonresidential Structures

```
:                                Office (NIPA)
  SEE   =       0.07 RSQ   = 0.9999 RHO =  -0.36 Obser  =   10 from 1997.000
  SEE+1 =       0.07 RBSQ  = 0.9999 DW  =   2.72 DoFree =    9 to   2006.000
  MAPE  =       0.14
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn1               - - - - - - - - - - - - - - - - -      46.27 - - -
  1 vipoffice               1.14934 64571.2   1.00    1.00      40.26

:                                  Hospitals
  SEE   =       0.46 RSQ   = 0.9909 RHO =  -0.09 Obser  =   10 from 1997.000
  SEE+1 =       0.46 RBSQ  = 0.9882 DW  =   2.17 DoFree =    7 to   2006.000
  MAPE  =       2.85
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn4               - - - - - - - - - - - - - - - - -      15.45 - - -
  1 intercept              -4.98382   104.5  -0.32  109.36       1.00
  2 vipmc                   1.27634   180.8   1.88    1.46      22.70  1.329
  3 vipmc[1]               -0.40812    20.7  -0.55    1.00      20.93 -0.342

:                                Special Care
  SEE   =       0.47 RSQ   = 0.6281 RHO =   0.19 Obser  =    9 from 1998.000
  SEE+1 =       0.47 RBSQ  = 0.5042 DurH = 999.00 DoFree =    6 to   2006.000
  MAPE  =      12.17
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn5               - - - - - - - - - - - - - - - - -       3.77 - - -
  1 intercept               6.34659    15.8   1.68    2.69       1.00
  2 vstnn5[1]               0.04094     0.0   0.04    1.26       3.82  0.040
  3 vipmc                  -0.11749    12.2  -0.73    1.00      23.29 -0.756

:                              Medical Buildings
  SEE   =       0.54 RSQ   = 0.8829 RHO =  -0.03 Obser  =   10 from 1997.000
  SEE+1 =       0.54 RBSQ  = 0.8495 DW  =   2.06 DoFree =    7 to   2006.000
  MAPE  =       7.53
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn6               - - - - - - - - - - - - - - - - -       6.35 - - -
  1 intercept              -1.76966    13.5  -0.28    8.54       1.00
  2 vipmc                  -0.15372     3.5  -0.55    1.61      22.70 -0.486
  3 vipmc[1]                0.55478    26.8   1.83    1.00      20.93  1.413

:                          Multimerchandise shopping
  SEE   =       1.99 RSQ   = 0.8116 RHO =   0.58 Obser  =   10 from 1997.000
  SEE+1 =       1.72 RBSQ  = 0.7881 DW  =   0.85 DoFree =    8 to   2006.000
  MAPE  =       9.33
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn7               - - - - - - - - - - - - - - - - -      16.49 - - -
  1 intercept             -31.29721    68.4  -1.90    5.31       1.00
  2 vipcommerce             0.77776   130.4   2.90    1.00      61.44  0.901

:                      Food and beverage establishments
  SEE   =       0.26 RSQ   = 0.7059 RHO =  -0.33 Obser  =   10 from 1997.000
  SEE+1 =       0.23 RBSQ  = 0.6219 DW  =   2.66 DoFree =    7 to   2006.000
  MAPE  =       2.92
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn8               - - - - - - - - - - - - - - - - -       7.89 - - -
  1 intercept              11.37066   295.5   1.44    3.40       1.00
  2 vipoffice               0.04114    43.0   0.21    3.29      40.26  0.635
```

```
  3 vipcommerce             -0.08361    81.5  -0.65    1.00     61.44 -0.941

:                                Warehouses
  SEE   =       0.69 RSQ   = 0.6406 RHO =   0.25 Obser  =   10 from 1997.000
  SEE+1 =       0.71 RBSQ  = 0.5956 DW  =   1.51 DoFree =    8 to   2006.000
  MAPE  =       4.53
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn9                - - - - - - - - - - - - - - - - -     12.63 - - -
  1 vipcommerce              0.11288    85.8   0.55    2.67     61.44
  2 vipoffice                0.14031    63.3   0.45    1.00     40.26  0.887

:                             Other commercial
  SEE   =       1.05 RSQ   = 0.0704 RHO =  -0.13 Obser  =    8 from 1999.000
  SEE+1 =       1.02 RBSQ  = -0.6268 DurH = 999.00 DoFree =    4 to   2006.000
  MAPE  =       5.44
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn10               - - - - - - - - - - - - - - - - -     16.83 - - -
  1 intercept               24.63346    32.1   1.46    1.08      1.00
  2 vstnn10[1]              -0.16023     1.2  -0.16    1.05     16.89 -0.149
  3 vstnn10[2]              -0.14946     1.3  -0.15    1.03     16.75 -0.154
  4 vipcommerce             -0.04112     1.5  -0.15    1.00     63.20 -0.167

:                           Manufacturing (NIPA)
  SEE   =       2.62 RSQ   = 0.8905 RHO =   0.60 Obser  =   10 from 1997.000
  SEE+1 =       2.36 RBSQ  = 0.8768 DW  =   0.81 DoFree =    8 to   2006.000
  MAPE  =       7.52
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnnmanu             - - - - - - - - - - - - - - - - -     27.51 - - -
  1 intercept               -7.97617    18.0  -0.29    9.13      1.00
  2 vipmanu                  1.10648   202.2   1.29    1.00     32.07  0.944

:                                 Electric
  SEE   =       1.00 RSQ   = 0.9513 RHO =   0.17 Obser  =   10 from 1997.000
  SEE+1 =       1.01 RBSQ  = 0.9452 DW  =   1.66 DoFree =    8 to   2006.000
  MAPE  =       4.77
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn12               - - - - - - - - - - - - - - - - -     18.94 - - -
  1 intercept               -3.20768    18.1  -0.17   20.52      1.00
  2 vippower                 0.81715   353.0   1.17    1.00     27.10  0.975

:                                Other power
  SEE   =       0.70 RSQ   = 0.3736 RHO =   0.63 Obser  =    8 from 1999.000
  SEE+1 =       0.60 RBSQ  = -0.0962 DurH =  8.25 DoFree =    4 to   2006.000
  MAPE  =       8.15
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn13               - - - - - - - - - - - - - - - - -      7.15 - - -
  1 intercept               -1.62310     0.5  -0.23    1.60      1.00
  2 vstnn13[1]               0.54424    10.4   0.54    1.58      7.14  0.530
  3 vstnn13[2]              -0.08370     0.7  -0.08    1.50      6.88 -0.106
  4 vippower                 0.18702    22.3   0.76    1.00     29.22  0.747

:                               Communication
  SEE   =       1.42 RSQ   = 0.7663 RHO =   0.76 Obser  =   10 from 1997.000
  SEE+1 =       0.96 RBSQ  = 0.7371 DW  =   0.47 DoFree =    8 to   2006.000
  MAPE  =       8.49
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn14               - - - - - - - - - - - - - - - - -     15.88 - - -
  1 intercept                1.24004     1.1   0.08    4.28      1.00
  2 vipcomm                  0.86040   106.9   0.92    1.00     17.02  0.875

:                         Petroleum and natural gas
```

```
  SEE   =       0.25 RSQ   = 0.9999 RHO =  -0.56 Obser  =   10 from 1997.000
  SEE+1 =       0.20 RBSQ  = 0.9999 DW  =   3.12 DoFree =    8 to   2006.000
  MAPE  =       0.64
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn15              - - - - - - - - - - - - - - - - -     43.00 - - -
  1 intercept             -0.35667    22.4  -0.01 9761.48      1.00
  2 vstnnmin               0.96584  9780.0   1.01    1.00     44.89  1.000

:                                  Mining
  SEE   =       0.21 RSQ   = 0.9479 RHO =  -0.56 Obser  =    9 from 1998.000
  SEE+1 =       0.17 RBSQ  = 0.9305 DurH = 999.00 DoFree =    6 to   2006.000
  MAPE  =       9.32
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn16              - - - - - - - - - - - - - - - - -      1.96 - - -
  1 intercept              0.42963    14.8   0.22   19.18      1.00
  2 vstnn16[1]            -0.26083     2.7  -0.22    3.18      1.68 -0.180
  3 vstnnmin               0.04143    78.5   1.00    1.00     47.39  1.144

:                                 Religious
  SEE   =       0.02 RSQ   = 0.9991 RHO =  -0.16 Obser  =   10 from 1997.000
  SEE+1 =       0.02 RBSQ  = 0.9990 DW  =   2.32 DoFree =    8 to   2006.000
  MAPE  =       0.27
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn17              - - - - - - - - - - - - - - - - -      7.45 - - -
  1 intercept             -0.04507     1.9  -0.01 1092.95      1.00
  2 viprelig               0.97779  3206.0   1.01    1.00      7.67  1.000

:                        Educational and vocational
  SEE   =       0.16 RSQ   = 0.9922 RHO =   0.27 Obser  =   10 from 1997.000
  SEE+1 =       0.16 RBSQ  = 0.9912 DW  =   1.47 DoFree =    8 to   2006.000
  MAPE  =       0.85
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn18              - - - - - - - - - - - - - - - - -     13.11 - - -
  1 intercept              0.80318    23.6   0.06  127.52      1.00
  2 vipedu                 1.03639  1029.2   0.94    1.00     11.87  0.996

:                                  Lodging
  SEE   =       0.03 RSQ   = 0.9999 RHO =  -0.34 Obser  =   10 from 1997.000
  SEE+1 =       0.03 RBSQ  = 0.9999 DW  =   2.67 DoFree =    9 to   2006.000
  MAPE  =       0.14
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn19              - - - - - - - - - - - - - - - - -     17.00 - - -
  1 viplodge               1.23880 60149.0   1.00    1.00     13.72

:                         Amusement and recreation
  SEE   =       0.03 RSQ   = 0.9985 RHO =  -0.08 Obser  =   10 from 1997.000
  SEE+1 =       0.03 RBSQ  = 0.9983 DW  =   2.17 DoFree =    8 to   2006.000
  MAPE  =       0.26
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn20              - - - - - - - - - - - - - - - - -     10.02 - - -
  1 intercept             -0.10770     3.7  -0.01  662.95      1.00
  2 viprec                 1.21266  2474.8   1.01    1.00      8.35  0.999

:                            Air transportation
  SEE   =       0.31 RSQ   = 0.4030 RHO =   0.41 Obser  =    9 from 1998.000
  SEE+1 =       0.29 RBSQ  = 0.3177 DurH =  2.16 DoFree =    7 to   2006.000
  MAPE  =      19.40
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn22              - - - - - - - - - - - - - - - - -      1.31 - - -
  1 vstnn22[1]             0.67994    37.4   0.69    1.17      1.32
  2 viptr                  0.05868     8.2   0.31    1.00      7.02  0.059
```

```
:                             Land transportation
  SEE   =       0.47 RSQ   = 0.5815 RHO =   0.60 Obser  =    8 from 1999.000
  SEE+1 =       0.39 RBSQ  = 0.5117 DurH = 999.00 DoFree =    6 to   2006.000
  MAPE  =       7.09
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn23               - - - - - - - - - - - - - - - - -      5.40 - - -
  1 vstnn23[2]              -0.53781     9.1  -0.51    2.65      5.16
  2 viptr                    1.17405    62.8   1.52    1.00      6.97  0.672

:                                    Farm
  SEE   =       0.43 RSQ   = 0.5655 RHO =   0.06 Obser  =   10 from 1997.000
  SEE+1 =       0.43 RBSQ  = 0.4414 DW  =   1.88 DoFree =    7 to   2006.000
  MAPE  =       6.40
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn24               - - - - - - - - - - - - - - - - -      5.17 - - -
  1 intercept                1.23534     2.5   0.24    2.30      1.00
  2 vipoth                  -0.83102    10.8  -0.25    2.13      1.58 -0.315
  3 vipcommerce              0.08538    45.9   1.01    1.00     61.44  0.702

:                          Other (other) structures
  SEE   =       0.30 RSQ   = 0.7748 RHO =  -0.11 Obser  =   10 from 1997.000
  SEE+1 =       0.29 RBSQ  = 0.7104 DW  =   2.22 DoFree =    7 to   2006.000
  MAPE  =       6.26
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn25               - - - - - - - - - - - - - - - - -      3.42 - - -
  1 intercept               -0.67354     4.2  -0.20    4.44      1.00
  2 vipoth                   1.82297    70.7   0.84    1.34      1.58  0.716
  3 vipoth[1]                0.77788    15.7   0.36    1.00      1.56  0.301

:                            Brokers' commissions
  SEE   =       0.05 RSQ   = 0.9293 RHO =  -0.13 Obser  =   10 from 1997.000
  SEE+1 =       0.05 RBSQ  = 0.8939 DW  =   2.26 DoFree =    6 to   2006.000
  MAPE  =       1.97
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn26               - - - - - - - - - - - - - - - - -      2.27 - - -
  1 intercept                0.13316     1.7   0.06   14.14      1.00
  2 vipcommerce              0.02770   133.7   0.75    3.16     61.44  0.775
  3 vipoffice                0.00613    10.9   0.11    1.24     40.26  0.235
  4 vipmanu                  0.00586    11.2   0.08    1.00     32.07  0.209

:                               Used structures
  SEE   =       0.67 RSQ   = 0.5763 RHO =  -0.27 Obser  =   10 from 1997.000
  SEE+1 =       0.64 RBSQ  = 0.2373 DW  =   2.54 DoFree =    5 to   2006.000
  MAPE  =      55.55
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 vstnn27               - - - - - - - - - - - - - - - - -     -1.07 - - -
  1 intercept              -15.26220    31.0  14.26    2.36      1.00
  2 vipcommerce              0.53630    27.0 -30.80    2.34     61.44  2.768
  3 vipoffice               -0.25064    23.0   9.43    1.92     40.26 -1.774
  4 vipmanu                  0.09782    16.8  -2.93    1.71     32.07  0.643
  5 vipmc                   -0.52004    30.6  11.03    1.00     22.70 -2.524
```

Appendix 6.1: Gross Domestic Product by Industry Categories, BEA

BEA	Detailed Industry	
1		Gross domestic product
2		Private industries
3		Agriculture, forestry, fishing, and hunting
4	1	Farms
5	2	Forestry, fishing, and related activities
6		Mining
7	3	Oil and gas extraction
8	4	Mining, except oil and gas
9	5	Support activities for mining
10	6	Utilities
11	7	Construction
12		Manufacturing
13		Durable goods
14	8	Wood products
15	9	Nonmetallic mineral products
16	10	Primary metals
17	11	Fabricated metal products
18	12	Machinery
19	13	Computer and electronic products
20	14	Electrical equipment, appliances, and components
21	15	Motor vehicles, bodies and trailers, and parts
22	16	Other transportation equipment
23	17	Furniture and related products
24	18	Miscellaneous manufacturing
25		Nondurable goods
26	19	Food and beverage and tobacco products
27	20	Textile mills and textile product mills
28	21	Apparel and leather and allied products
29	22	Paper products
30	23	Printing and related support activities
31	24	Petroleum and coal products
32	25	Chemical products
33	26	Plastics and rubber products
34	27	Wholesale trade
35	28	Retail trade
36		Transportation and warehousing
37	29	Air transportation
38	30	Rail transportation
39	31	Water transportation

40	32	Truck transportation
41	33	Transit and ground passenger transportation
42	34	Pipeline transportation
43	35	Other transportation and support activities
44	36	Warehousing and storage
45		Information
46	37	Publishing industries (includes software)
47	38	Motion picture and sound recording industries
48	39	Broadcasting and telecommunications
49	40	Information and data processing services
50		Finance, insurance, real estate, rental, and leasing
51		Finance and insurance
52	41	Federal Reserve banks, credit intermediation, and related activities
53	42	Securities, commodity contracts, and investments
54	43	Insurance carriers and related activities
55	44	Funds, trusts, and other financial vehicles
56		Real estate and rental and leasing
57	45	Real estate /1/
58	46	Rental and leasing services and lessors of intangible assets
59		Professional and business services
60		Professional, scientific, and technical services
61	47	Legal services
62	48	Computer systems design and related services
63	49	Miscellaneous professional, scientific, and technical services
64	50	Management of companies and enterprises
65		Administrative and waste management services
66	51	Administrative and support services
67	52	Waste management and remediation services
68		Educational services, health care, and social assistance
69	53	Educational services
70		Health care and social assistance
71	54	Ambulatory health care services
72	55	Hospitals and nursing and residential care facilities
73	56	Social assistance
74		Arts, entertainment, recreation, accommodation, and food services
75		Arts, entertainment, and recreation
76	57	Performing arts, spectator sports, museums, and related activities
77	58	Amusements, gambling, and recreation industries

78		Accommodation and food services
79	59	Accommodation
80	60	Food services and drinking places
81	61	Other services, except government
82		Government
83		Federal
84	62	General government
85	63	Government enterprises
86		State and local
87	64	General government
88	65	Government enterprises
89		Private goods-producing industries
90		Private services-producing industries
91		Information-communications-technology-producing industries

Appendix 6.2: Results from Historical Simulations

Nominal in Billion dollars

Results from Historical simulations	2003 BEA	2003 actual exog	2003 predicted exog	2004 BEA	2004 actual exog	2004 predicted exog
Total Gross Output	19,757.5	19,544.2	19,630.9	21,306.9	20,923.8	20,590.4
Private industries	17,457.3	17,294.6	17,379.9	18,859.3	18,578.2	18,256.7
Total Services industries (40-61)	8,078.4	7,955.5	8,020.1	8,741.9	8,478.0	8,347.8
Agriculture, forestry, fishing, and hunting	279.6	270.1	256.0	319.5	319.0	277.7
Mining	259.9	254.5	280.2	307.1	303.9	400.4
Utilities	355.7	348.7	348.3	372.9	368.4	367.4
Construction	956.8	953.1	945.5	1,063.0	1,023.3	950.8
Manufacturing	3,957.6	3,942.8	3,956.6	4,207.1	4,195.2	4,120.0
Durable goods manufacturing	2,114.9	2,095.6	2,136.5	2,221.6	2,214.7	2,237.3
Nondurable goods manufacturing	1,842.7	1,847.2	1,820.1	1,985.5	1,980.5	1,882.6
Wholesale trade	902.3	886.4	896.1	995.1	1,046.7	1,004.4
Retail trade	1,138.9	1,122.5	1,121.4	1,223.3	1,205.5	1,172.3
Transportation and warehousing	598.5	629.7	636.4	648.4	655.5	663.7
Information	1,031.5	1,031.8	1,019.0	1,094.7	1,088.7	1,056.8
Finance, insurance, real estate, rental, and leasing	3,382.4	3,340.2	3,361.3	3,713.2	3,586.8	3,547.3
Professional and business services	2,004.5	1,952.4	2,000.9	2,164.3	2,064.1	2,054.5
Educational services, health care, and social assistance	1,387.6	1,374.3	1,376.0	1,474.5	1,462.6	1,429.4
Arts, entertainment, recreation, accommodation, and food services	721.3	715.5	708.0	770.9	767.7	733.5
Other services, except government	480.7	472.7	474.2	505.5	491.0	478.4
Government	2,300.2	2,249.5	2,251.0	2,447.6	2,345.5	2,333.7
Federal government	758.9	732.2	727.4	824.8	772.5	756.2
State and local government	1,541.3	1,517.3	1,523.6	1,622.8	1,573.1	1,577.5

Percentage Deviation from the BEA data as of December 2006

	2003 actual exog	2003 predicted exog	2004 actual exog	2004 predicted exog
Total Gross Output	-1.08%	-0.64%	-1.80%	-3.36%
Private industries	-0.93%	-0.44%	-1.49%	-3.20%
Total Services industries (40-61)	-1.52%	-0.72%	-3.02%	-4.51%
Agriculture, forestry, fishing, and hunting	-3.41%	-8.46%	-0.16%	-13.08%
Mining	-2.10%	7.79%	-1.05%	30.39%
Utilities	-1.96%	-2.09%	-1.21%	-1.48%
Construction	-0.39%	-1.17%	-3.73%	-10.55%
Manufacturing	-0.37%	-0.03%	-0.28%	-2.07%
Durable goods manufacturing	-0.91%	1.02%	-0.31%	0.71%
Nondurable goods manufacturing	0.24%	-1.22%	-0.25%	-5.18%
Wholesale trade	-1.77%	-0.69%	5.19%	0.94%
Retail trade	-1.44%	-1.54%	-1.46%	-4.17%
Transportation and warehousing	5.21%	6.33%	1.10%	2.37%
Information	0.03%	-1.22%	-0.54%	-3.46%
Finance, insurance, real estate, rental, and leasing	-1.25%	-0.62%	-3.41%	-4.47%
Professional and business services	-2.60%	-0.18%	-4.63%	-5.07%
Educational services, health care, and social assistance	-0.95%	-0.83%	-0.81%	-3.06%
Arts, entertainment, recreation, accommodation, and food services	-0.80%	-1.84%	-0.42%	-4.85%
Other services, except government	-1.67%	-1.37%	-2.88%	-5.36%
Government	-2.20%	-2.14%	-4.17%	-4.65%
Federal government	-3.51%	-4.15%	-6.34%	-8.32%
State and local government	-1.56%	-1.15%	-3.06%	-2.79%

Chained 2000 dollars in Billion dollars

Results from Historical simulations	2003 BEA	2003 actual exog	2003 predicted exog	2004 BEA	2004 actual exog	2004 predicted exog
Total Gross Output	18,782.6	18,686.1	18,672.6	19,496.2	19,344.6	18,965.7
Private industries	16,709.1	16,619.5	16,617.5	17,390.2	17,271.9	16,895.6
Total Services industries (40-61)	7,559.2	7,504.7	7,511.1	7,949.9	7,830.1	7,691.9
Agriculture, forestry, fishing, and hunting	262.0	261.0	261.9	269.8	269.5	265.9
Mining	211.4	208.0	213.0	216.4	213.7	221.3
Utilities	316.1	309.5	325.1	313.0	314.8	348.9
Construction	863.0	856.9	851.0	902.3	887.1	837.2
Manufacturing	3,943.8	3,936.1	3,915.8	4,000.6	3,999.1	3,884.9
Durable goods manufacturing	2,193.1	2,178.1	2,204.1	2,233.3	2,232.1	2,263.9
Nondurable goods manufacturing	1,751.2	1,757.9	1,714.0	1,768.7	1,768.8	1,632.4
Wholesale trade	911.8	896.3	901.9	950.1	986.7	938.4
Retail trade	1,125.8	1,115.1	1,111.0	1,181.6	1,195.0	1,151.6
Transportation and warehousing	575.7	590.6	592.1	607.8	596.0	584.3
Information	1,033.2	1,031.2	1,022.9	1,103.0	1,078.8	1,063.3
Finance, insurance, real estate, rental, and leasing	3,177.1	3,196.4	3,171.3	3,386.5	3,337.7	3,254.4
Professional and business services	1,909.7	1,861.8	1,904.5	2,013.2	1,954.4	1,991.2
Educational services, health care, and social assistance	1,265.0	1,253.2	1,251.7	1,301.5	1,298.7	1,262.2
Arts, entertainment, recreation, accommodation, and food services	669.9	664.1	657.7	692.5	696.6	666.2
Other services, except government	437.5	433.6	430.6	445.5	441.5	421.8
Government	2,071.5	2,064.4	2,053.4	2,106.9	2,073.5	2,069.1
Federal government	678.9	668.3	659.5	703.4	680.6	667.1
State and local government	1,392.3	1,395.9	1,393.7	1,403.0	1,392.6	1,401.8

Percentage Deviation from the BEA data as of December 2006

	2003 actual exog	2003 predicted exog	2004 actual exog	2004 predicted exog
Total Gross Output	-0.51%	-0.59%	-0.78%	-2.72%
Private industries	-0.54%	-0.55%	-0.68%	-2.84%
Total Services industries (40-61)	-0.72%	-0.64%	-1.51%	-3.25%
Agriculture, forestry, fishing, and hunting	-0.36%	-0.05%	-0.12%	-1.43%
Mining	-1.62%	0.72%	-1.27%	2.27%
Utilities	-2.09%	2.84%	0.55%	11.47%
Construction	-0.71%	-1.39%	-1.68%	-7.21%
Manufacturing	-0.19%	-0.71%	-0.04%	-2.89%
Durable goods manufacturing	-0.68%	0.50%	-0.05%	1.37%
Nondurable goods manufacturing	0.38%	-2.13%	0.01%	-7.70%
Wholesale trade	-1.70%	-1.09%	3.85%	-1.23%
Retail trade	-0.95%	-1.32%	1.13%	-2.55%
Transportation and warehousing	2.58%	2.85%	-1.94%	-3.86%
Information	-0.20%	-1.00%	-2.19%	-3.60%
Finance, insurance, real estate, rental, and leasing	0.61%	-0.18%	-1.44%	-3.90%
Professional and business services	-2.51%	-0.27%	-2.92%	-1.09%
Educational services, health care, and social assistance	-0.94%	-1.05%	-0.22%	-3.02%
Arts, entertainment, recreation, accommodation, and food services	-0.86%	-1.81%	0.59%	-3.80%
Other services, except government	-0.90%	-1.57%	-0.91%	-5.32%
Government	-0.34%	-0.88%	-1.58%	-1.79%
Federal government	-1.56%	-2.86%	-3.24%	-5.16%
State and local government	0.26%	0.10%	-0.74%	-0.08%

Chained Price Index (2000=100)

Results from Historical simulations	2003 BEA	2003 actual exog	2003 predicted exog	2004 BEA	2004 actual exog	2004 predicted exog
Total Gross Output	105.2	104.6	105.1	109.3	108.2	108.6
Private industries	104.5	104.1	104.6	108.4	107.6	108.1
Total Services industries (40-61)	106.9	106.0	106.8	110.0	108.3	108.5
Agriculture, forestry, fishing, and hunting	106.7	103.5	97.7	118.4	118.4	104.4
Mining	122.9	122.3	131.6	141.9	142.2	180.9
Utilities	112.5	112.7	107.1	119.1	117.0	105.3
Construction	110.9	111.2	111.1	117.8	115.4	113.6
Manufacturing	100.4	100.2	101.0	105.2	104.9	106.1
Durable goods manufacturing	96.4	96.2	96.9	99.5	99.2	98.8
Nondurable goods manufacturing	105.2	105.1	106.2	112.3	112.0	115.3
Wholesale trade	99.0	98.9	99.4	104.7	106.1	107.0
Retail trade	101.2	100.7	100.9	103.5	100.9	101.8
Transportation and warehousing	104.0	106.6	107.5	106.7	110.0	113.6
Information	99.8	100.1	99.6	99.2	100.9	99.4
Finance, insurance, real estate, rental, and leasing	106.5	104.5	106.0	109.6	107.5	109.0
Professional and business services	105.0	104.9	105.1	107.5	105.6	103.2
Educational services, health care, and social assistance	109.7	109.7	109.9	113.3	112.6	113.2
Arts, entertainment, recreation, accommodation, and food services	107.7	107.7	107.6	111.3	110.2	110.1
Other services, except government	109.9	109.0	110.1	113.5	111.2	113.4
Government	111.0	109.0	109.6	116.2	113.1	112.8
Federal government	111.8	109.6	110.3	117.3	113.5	113.4
State and local government	110.7	108.7	109.3	115.7	113.0	112.5

Percentage Deviation from the BEA data as of December 2006

	2003 actual exog	2003 predicted exog	2004 actual exog	2004 predicted exog
Total Gross Output	-0.57%	-0.06%	-1.03%	-0.66%
Private industries	-0.40%	0.11%	-0.82%	-0.36%
Total Services industries (40-61)	-0.81%	-0.09%	-1.53%	-1.31%
Agriculture, forestry, fishing, and hunting	-3.06%	-8.42%	-0.04%	-11.82%
Mining	-0.49%	7.01%	0.23%	27.49%
Utilities	0.13%	-4.80%	-1.75%	-11.62%
Construction	0.32%	0.22%	-2.08%	-3.60%
Manufacturing	-0.18%	0.69%	-0.25%	0.85%
Durable goods manufacturing	-0.23%	0.51%	-0.26%	-0.65%
Nondurable goods manufacturing	-0.14%	0.92%	-0.26%	2.73%
Wholesale trade	-0.07%	0.41%	1.29%	2.20%
Retail trade	-0.49%	-0.23%	-2.56%	-1.66%
Transportation and warehousing	2.57%	3.39%	3.10%	6.48%
Information	0.23%	-0.22%	1.69%	0.15%
Finance, insurance, real estate, rental, and leasing	-1.84%	-0.44%	-1.99%	-0.59%
Professional and business services	-0.09%	0.09%	-1.76%	-4.02%
Educational services, health care, and social assistance	-0.02%	0.22%	-0.59%	-0.04%
Arts, entertainment, recreation, accommodation, and food services	0.05%	-0.03%	-1.00%	-1.09%
Other services, except government	-0.78%	0.20%	-1.99%	-0.04%
Government	-1.87%	-1.27%	-2.63%	-2.91%
Federal government	-1.98%	-1.33%	-3.20%	-3.33%
State and local government	-1.81%	-1.25%	-2.35%	-2.71%

Appendix 6.3: Real Gross Output and Price Index Regressions

```
# FARMS
:                            Nominal Gross Output: Farm
  SEE   =    9533.68 RSQ   = 0.7754 RHO =   0.27 Obser  =   13 from 1992.000
  SEE+1 =    9277.59 RBSQ  = 0.7305 DW  =   1.45 DoFree =   10 to   2004.000
  MAPE  =       3.73 Test period:  SEE  8679.47 MAPE     3.43 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago1                  - - - - - - - - - - - - - - - - - 208055.38 - - -
  1 foodpri[1]            1308.87204   155.2   0.79    1.93    125.56
  2 gdpa                    86.63329    32.1   3.67    1.68   8820.22  7.128
  3 gdpa[1]                -85.93539    29.8  -3.46    1.00   8382.53 -6.795

:                       Price Index of Gross Output: Farm
  SEE   =       3.65 RSQ   = 0.7020 RHO =   0.08 Obser  =   13 from 1992.000
  SEE+1 =       3.65 RBSQ  = 0.6027 DW  =   1.83 DoFree =    9 to   2004.000
  MAPE  =       2.93 Test period:  SEE     5.07 MAPE     4.31 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop1                 - - - - - - - - - - - - - - - - -    107.28 - - -
  1 intercept              159.57614   136.4   1.49    3.36      1.00
  2 farmlabexp               0.01145    43.6   2.01    3.28  18818.05  5.157
  3 wagnf                   -0.38250    20.0  -1.60    3.11    447.93 -3.033
  4 exri                    -0.90718    76.3  -0.90    1.00    106.37 -2.149

# FORESTRY, FISHING, AND RELATED ACTIVITIES
:          Real Gross Output: Forestry, fishing, and related services
  SEE   =    1487.62 RSQ   = 0.7120 RHO =   0.31 Obser  =   13 from 1992.000
  SEE+1 =    1456.24 RBSQ  = 0.6159 DW  =   1.39 DoFree =    9 to   2004.000
  MAPE  =       2.68 Test period:  SEE  2810.55 MAPE     4.91 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor2                 - - - - - - - - - - - - - - - - -  50893.13 - - -
  1 intercept            34820.75375     9.7   0.68    3.47      1.00
  2 ehe2                  -627.60330    72.5  -0.96    1.51     77.51 -1.154
  3 ips2_1                 484.66979    22.8   1.00    1.16    105.05  0.659
  4 ips2_2                 139.20092     7.8   0.27    1.00     99.18  0.262

:     Price Index of Gross Output: Forestry, fishing, and related services
  SEE   =       0.66 RSQ   = 0.9828 RHO =   0.00 Obser  =   13 from 1992.000
  SEE+1 =       0.66 RBSQ  = 0.9794 DW  =   2.00 DoFree =   10 to   2004.000
  MAPE  =       0.55 Test period:  SEE     2.03 MAPE     1.96 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop2                 - - - - - - - - - - - - - - - - -     99.21 - - -
  1 intercept               17.70190    83.6   0.18   58.20      1.00
  2 pri2                     0.42338   661.2   0.76    3.94    178.94  1.034
  3 cfur[1]                  0.10410    98.4   0.06    1.00     55.28  0.235

# OIL AND GAS EXTRACTION
:                    Real Gross Output: Oil and Gas Extraction
  SEE   =    1128.73 RSQ   = 0.9289 RHO =   0.04 Obser  =   13 from 1992.000
  SEE+1 =    1128.28 RBSQ  = 0.9147 DW  =   1.91 DoFree =   10 to   2004.000
  MAPE  =       0.67 Test period:  SEE  4153.74 MAPE     3.27 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor3                 - - - - - - - - - - - - - - - - - 139158.84 - - -
  1 intercept            61021.21383    32.3   0.44   14.07      1.00
  2 ips3                   576.69175    22.1   0.42    2.35    102.35  0.375
  3 ehe3                   134.71446    53.2   0.14    1.00    141.86  0.621

:               Price Index of Gross Output: Oil and Gas Extraction
  SEE   =       2.86 RSQ   = 0.9905 RHO =   0.49 Obser  =   13 from 1992.000
```

```
  SEE+1 =       2.66 RBSQ  = 0.9896 DW  =   1.01 DoFree =   11 to   2004.000
  MAPE  =       3.63 Test period:  SEE     3.47 MAPE     1.78 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop3                - - - - - - - - - - - - - - - - -     75.26 - - -
  1 intercept              -3.25044     7.6  -0.04  105.23      1.00
  2 pri3                    0.77110   925.8   1.04    1.00    101.82  0.995

# MINING, EXCEPT OIL AND GAS
:                 Real Gross Output: Mining, except Oil and Gas
  SEE   =     268.42 RSQ   = 0.9759 RHO =  -0.35 Obser  =   13 from 1992.000
  SEE+1 =     246.17 RBSQ  = 0.9711 DW  =   2.69 DoFree =   10 to   2004.000
  MAPE  =       0.50 Test period:  SEE   718.89 MAPE     1.48 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor4                - - - - - - - - - - - - - - - - -  46503.42 - - -
  1 intercept            3269.51085     7.1   0.07   41.53      1.00
  2 ips4                  398.58727   519.6   0.86    2.01    100.05  1.049
  3 ehe4                   14.21965    41.8   0.07    1.00    236.03  0.172

:            Price Index of Gross Output: Mining, except Oil and Gas
  SEE   =       1.96 RSQ   = 0.8649 RHO =   0.04 Obser  =   13 from 1992.000
  SEE+1 =       1.96 RBSQ  = 0.8379 DW  =   1.92 DoFree =   10 to   2004.000
  MAPE  =       1.52 Test period:  SEE     2.95 MAPE     2.23 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop4                - - - - - - - - - - - - - - - - -    108.25 - - -
  1 intercept              14.55680     5.7   0.13    7.40      1.00
  2 pri4                    1.16599   170.6   1.00    1.68     92.38  0.947
  3 wagnf                  -0.03130    29.6  -0.13    1.00    447.93 -0.311

# SUPPORT ACTIVITIES FOR MINING
:               Real Gross Output: Support activities for Mining
  SEE   =    2249.93 RSQ   = 0.7902 RHO =   0.08 Obser  =   13 from 1992.000
  SEE+1 =    2249.08 RBSQ  = 0.7483 DW  =   1.85 DoFree =   10 to   2004.000
  MAPE  =       6.89 Test period:  SEE  4863.64 MAPE    12.53 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor5                - - - - - - - - - - - - - - - - -  26792.74 - - -
  1 intercept            -27109.95120    32.0  -1.01    4.77      1.00
  2 ips5                   -6.48249     0.1  -0.03    4.53    118.24 -0.017
  3 ehe5                  320.54506   112.9   2.04    1.00    170.55  0.893

:        Price Index of for Gross Output: Support activities for Mining
  SEE   =      11.89 RSQ   = 0.8843 RHO =   0.30 Obser  =   13 from 1992.000
  SEE+1 =      11.54 RBSQ  = 0.8612 DW  =   1.40 DoFree =   10 to   2004.000
  MAPE  =       6.08 Test period:  SEE     3.13 MAPE     1.46 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop5                - - - - - - - - - - - - - - - - -    102.71 - - -
  1 intercept            -296.14561    32.9  -2.88    8.65      1.00
  2 pri5_2                  2.15780   157.5   2.51    1.15    119.42  0.876
  3 pri5_4                  1.23157     7.2   1.37    1.00    114.63  0.143

# UTILITIES
:                        Nominal Gross Output: Utilities
  SEE   =    5741.58 RSQ   = 0.9744 RHO =  -0.03 Obser  =   13 from 1992.000
  SEE+1 =    5734.57 RBSQ  = 0.9692 DW  =   2.05 DoFree =   10 to   2004.000
  MAPE  =       1.52 Test period:  SEE  3410.53 MAPE     0.83 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago6                 - - - - - - - - - - - - - - - - - 302719.77 - - -
  1 intercept            -82307.46187    47.8  -0.27   39.02      1.00
  2 ips6                 3459.21138   272.5   1.05    5.27     92.26  0.700
  3 oilp[1]              2994.81199   129.6   0.22    1.00     22.00  0.403

:                  Price Index of for Gross Output: Utilities
```

```
  SEE   =       0.81 RSQ   = 0.9918 RHO =   0.41 Obser  =   13 from 1992.000
  SEE+1 =       0.78 RBSQ  = 0.9878 DW  =   1.19 DoFree =    8 to   2004.000
  MAPE  =       0.57 Test period:  SEE     4.55 MAPE     3.42 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop6                 - - - - - - - - - - - - - - - - -     99.02 - - -
  1 intercept               3.30311     0.2   0.03  122.61      1.00
  2 wag6                    0.47508    15.7   0.10   21.80     21.35  0.138
  3 pri6_1                  0.31257     9.7   0.37    9.28    116.31  0.165
  4 pri6_2                  0.28283     9.5   0.32    4.21    113.00  0.169
  5 pri6_3                  0.13710   105.3   0.17    1.00    125.88  0.556

# CONSTRUCTION
:                        Real Gross output: Construction
  SEE   =    6962.39 RSQ   = 0.9947 RHO =   0.29 Obser  =   13 from 1992.000
  SEE+1 =    6909.06 RBSQ  = 0.9942 DW  =   1.42 DoFree =   11 to   2004.000
  MAPE  =       0.72 Test period:  SEE  5697.81 MAPE     0.61 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor7                 - - - - - - - - - - - - - - - - - 772214.43 - - -
  1 intercept             71600.83992    71.1   0.09  188.93      1.00
  2 ehe7                    117.01271  1274.5   0.91    1.00   5987.50  0.997

:                 Price Index of for Gross Output: Construction
  SEE   =       1.26 RSQ   = 0.9899 RHO =   0.35 Obser  =   13 from 1992.000
  SEE+1 =       1.26 RBSQ  = 0.9879 DW  =   1.29 DoFree =   10 to   2004.000
  MAPE  =       1.06 Test period:  SEE     5.43 MAPE     4.32 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop7                 - - - - - - - - - - - - - - - - -     94.14 - - -
  1 intercept              -10.88908    29.3  -0.12   99.48      1.00
  2 wag7                     6.10102   472.9   1.06    1.61     16.37  0.896
  3 oilp                     0.22008    26.8   0.06    1.00     23.53  0.124

# MANUFACTURING: WOOD PRODUCTS
:                       Real Gross Output: Wood Products
  SEE   =     747.75 RSQ   = 0.9885 RHO =   0.43 Obser  =   13 from 1992.000
  SEE+1 =     720.59 RBSQ  = 0.9862 DW  =   1.13 DoFree =   10 to   2004.000
  MAPE  =       0.75 Test period:  SEE  5920.60 MAPE     6.41 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor8                 - - - - - - - - - - - - - - - - -  85926.15 - - -
  1 intercept             -13876.12016    48.4  -0.16   86.87      1.00
  2 ips8                   862.41172   530.2   0.97    2.00     96.44  0.893
  3 ehe8                    29.23253    41.5   0.19    1.00    569.02  0.144

:                  Price Index of Gross Output: Wood Products
  SEE   =       1.21 RSQ   = 0.9648 RHO =   0.17 Obser  =   13 from 1992.000
  SEE+1 =       1.20 RBSQ  = 0.9578 DW  =   1.67 DoFree =   10 to   2004.000
  MAPE  =       0.92 Test period:  SEE     1.42 MAPE     1.25 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop8                 - - - - - - - - - - - - - - - - -     98.71 - - -
  1 intercept               -5.51910     3.5  -0.06   28.43      1.00
  2 wagnf                    0.09036   308.4   0.41   14.25    447.93  0.744
  3 pri8_1                   0.42354   277.4   0.65    1.00    150.53  0.684

# NONMETALLIC MINERAL PRODUCTS
:                Real Gross Output: Nonmetallic mineral products
  SEE   =     439.40 RSQ   = 0.9969 RHO =   0.52 Obser  =   13 from 1992.000
  SEE+1 =     387.62 RBSQ  = 0.9963 DW  =   0.97 DoFree =   10 to   2004.000
  MAPE  =       0.43 Test period:  SEE  1560.54 MAPE     1.58 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor9                 - - - - - - - - - - - - - - - - -  88241.95 - - -
  1 intercept             -2379.83058     2.1  -0.03  325.43      1.00
  2 ips9                   979.04120  1224.1   1.07    1.05     96.17  1.011
```

```
  3 ehe9                    -6.81513     2.6  -0.04    1.00    517.76 -0.018

:           Price Index of Gross Output: Nonmetallic mineral products
  SEE   =       0.19 RSQ   = 0.9991 RHO =   0.53 Obser  =   13 from 1992.000
  SEE+1 =       0.17 RBSQ  = 0.9990 DW  =   0.95 DoFree =   11 to   2004.000
  MAPE  =       0.17 Test period:  SEE     0.61 MAPE     0.54 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop9                 - - - - - - - - - - - - - - - - -     95.62 - - -
  1 intercept               -0.48434     1.4  -0.01 1135.42      1.00
  2 pri9                     0.74563  3269.6   1.01    1.00    128.89  1.000

# PRIMARY METALS
:                       Real Gross Output: Primary Metals
  SEE   =    1502.60 RSQ   = 0.9735 RHO =  -0.08 Obser  =   13 from 1992.000
  SEE+1 =    1490.41 RBSQ  = 0.9682 DW  =   2.17 DoFree =   10 to   2004.000
  MAPE  =       0.81 Test period:  SEE   607.84 MAPE     0.41 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor10                - - - - - - - - - - - - - - - - - 149129.53 - - -
  1 intercept             -933.87108     0.1  -0.01   37.72      1.00
  2 ips10                 1221.64143   441.2   0.86    3.19    105.04  0.894
  3 ehe10                   36.64322    78.7   0.15    1.00    593.22  0.249

:                  Price Index of Gross Output: Primary Metals
  SEE   =       0.48 RSQ   = 0.9952 RHO =   0.25 Obser  =   13 from 1992.000
  SEE+1 =       0.47 RBSQ  = 0.9948 DW  =   1.50 DoFree =   11 to   2004.000
  MAPE  =       0.34 Test period:  SEE     0.28 MAPE     0.21 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop10                - - - - - - - - - - - - - - - - -    100.43 - - -
  1 intercept               -4.00796    14.3  -0.04  210.10      1.00
  2 pri10                    0.86651  1349.5   1.04    1.00    120.53  0.998

# FABRICATED METAL PRODUCTS
:                Nominal Gross Output: Fabricated metal products
  SEE   =    3742.47 RSQ   = 0.9832 RHO =  -0.09 Obser  =   13 from 1992.000
  SEE+1 =    3659.06 RBSQ  = 0.9799 DW  =   2.18 DoFree =   10 to   2004.000
  MAPE  =       1.30 Test period:  SEE 11766.19 MAPE     4.34 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago11                 - - - - - - - - - - - - - - - - - 228872.62 - - -
  1 intercept             11529.19165     1.7   0.05   59.59      1.00
  2 ips11                 3922.51035   540.2   1.68    4.25     97.94  1.222
  3 ehe11                 -103.47916   106.1  -0.73    1.00   1612.32 -0.348

:             Price Index of Gross Output:Fabricated metal products
  SEE   =       0.15 RSQ   = 0.9991 RHO =   0.55 Obser  =   13 from 1992.000
  SEE+1 =       0.13 RBSQ  = 0.9990 DW  =   0.91 DoFree =   11 to   2004.000
  MAPE  =       0.13 Test period:  SEE     0.27 MAPE     0.24 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop11                - - - - - - - - - - - - - - - - -     97.66 - - -
  1 intercept               -4.54239    78.6  -0.05 1113.06      1.00
  2 pri11                    0.80065  3236.3   1.05    1.00    127.65  1.000

# MACHINERY
:                         Real Gross Output: Machinery
  SEE   =    1594.67 RSQ   = 0.9954 RHO =  -0.31 Obser  =   13 from 1992.000
  SEE+1 =    1510.81 RBSQ  = 0.9945 DW  =   2.63 DoFree =   10 to   2004.000
  MAPE  =       0.46 Test period:  SEE  1203.97 MAPE     0.45 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor12                - - - - - - - - - - - - - - - - - 246831.01 - - -
  1 intercept             6040.15572     4.5   0.02  218.73      1.00
  2 ips12                 2335.44648  1178.0   0.97    1.00    102.72  0.996
  3 ehe12                    0.65746     0.1   0.00    1.00   1364.78  0.003
```

```
:                    Price Index of Gross Output: Machinery
  SEE   =        0.93 RSQ   = 0.9553 RHO =   0.84 Obser  =   13 from 1992.000
  SEE+1 =        0.67 RBSQ  = 0.9512 DW  =   0.31 DoFree =   11 to   2004.000
  MAPE  =        0.83 Test period:  SEE     1.11 MAPE     1.02 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop12                - - - - - - - - - - - - - - - - -     97.48 - - -
  1 intercept               36.34052   191.7   0.37   22.36      1.00
  2 pri12                    0.40426   372.8   0.63    1.00    151.25  0.977

# COMPUTER AND ELECTRONIC PRODUCTS
:             Real Gross Output: Computer and electronics products
  SEE   =    12249.96 RSQ   = 0.9923 RHO =   0.52 Obser  =   13 from 1992.000
  SEE+1 =    11750.77 RBSQ  = 0.9907 DW  =   0.96 DoFree =   10 to   2004.000
  MAPE  =        4.74 Test period:  SEE 11539.94 MAPE     2.20 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor13                - - - - - - - - - - - - - - - - - 317952.52 - - -
  1 intercept             -316197.46716   125.5  -0.99  129.67      1.00
  2 ips13                 3862.44804  1000.5   0.77    8.32     63.34  1.098
  3 ehe13                  234.22982   188.4   1.23    1.00   1662.96  0.271

:        Price Index of Gross Output: Computer and electronics products
  SEE   =        5.21 RSQ   = 0.9922 RHO =   0.44 Obser  =   13 from 1992.000
  SEE+1 =        5.13 RBSQ  = 0.9914 DW  =   1.11 DoFree =   11 to   2004.000
  MAPE  =        2.96 Test period:  SEE     2.68 MAPE     3.69 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop13                - - - - - - - - - - - - - - - - -    144.54 - - -
  1 intercept               41.93604   311.5   0.29  127.44      1.00
  2 pri13                    0.30289  1028.9   0.71    1.00    338.76  0.996

#ELECTRICAL EQUIPMENT, APPLIANCES, AND COMPONENTS
:      Real Gross Output: Electrical equipment, appliances, and components
  SEE   =      668.61 RSQ   = 0.9948 RHO =   0.22 Obser  =   13 from 1992.000
  SEE+1 =      678.19 RBSQ  = 0.9938 DW  =   1.56 DoFree =   10 to   2004.000
  MAPE  =        0.44 Test period:  SEE    40.77 MAPE     0.04 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor14                - - - - - - - - - - - - - - - - - 104574.79 - - -
  1 intercept             4479.81442    12.1   0.04  194.08      1.00
  2 ips14                 1022.00022  1207.6   1.03    1.88    105.24  1.025
  3 ehe14                  -13.38465    37.1  -0.07    1.00    557.12 -0.074

: Price Index of Gross Output: Electrical equipment, appliances, and components
  SEE   =        0.61 RSQ   = 0.9316 RHO =   0.50 Obser  =   13 from 1992.000
  SEE+1 =        0.56 RBSQ  = 0.9179 DW  =   1.01 DoFree =   10 to   2004.000
  MAPE  =        0.52 Test period:  SEE     2.94 MAPE     2.73 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop14                - - - - - - - - - - - - - - - - -     98.49 - - -
  1 pri14                    0.85274   133.4   1.19    4.22    137.99
  2 hr14                    -0.11206     0.8  -0.05    1.53     41.51 -0.044
  3 wagnf                   -0.03243    23.6  -0.15    1.00    447.93 -0.739

# MOTOR VEHICLE, BODIES AND TRAILERS, AND PARTS
:       Real Gross Output: Motor vehicle, bodies and trailers, and parts
  SEE   =     6587.17 RSQ   = 0.9896 RHO =   0.11 Obser  =   13 from 1992.000
  SEE+1 =     6551.72 RBSQ  = 0.9875 DW  =   1.78 DoFree =   10 to   2004.000
  MAPE  =        1.08 Test period:  SEE  7045.25 MAPE     1.45 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor15                - - - - - - - - - - - - - - - - - 418208.43 - - -
  1 intercept             -15243.21608     1.3  -0.04   96.12      1.00
  2 ips15                 4656.20085   786.9   0.97    1.07     87.38  0.983
  3 ehe15                   22.24281     3.3   0.06    1.00   1194.64  0.029
```

```
:  Price Index of Gross Output: Motor vehicle, bodies and trailers, and parts
  SEE   =       0.26 RSQ   = 0.9736 RHO =   0.40 Obser  =   13 from 1992.000
  SEE+1 =       0.24 RBSQ  = 0.9683 DW  =   1.20 DoFree =   10 to   2004.000
  MAPE  =       0.21 Test period:  SEE     1.04 MAPE     1.05 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop15               - - - - - - - - - - - - - - - - -      98.98 - - -
  1 intercept              23.16113   109.5   0.23   37.91      1.00
  2 wagnf                   0.00520    43.9   0.02   34.64    447.93  0.170
  3 pri15                   0.54020   488.6   0.74    1.00    136.03  0.950

# OTHER TRANSPORTATION EQUIPMENT
:             Real Gross Output: Other transportation equipment
  SEE   =    1679.29 RSQ   = 0.9865 RHO =   0.36 Obser  =   13 from 1992.000
  SEE+1 =    1603.24 RBSQ  = 0.9838 DW  =   1.27 DoFree =   10 to   2004.000
  MAPE  =       0.86 Test period:  SEE   112.48 MAPE     0.07 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor16               - - - - - - - - - - - - - - - - - 158718.64 - - -
  1 intercept            16856.22084    12.6   0.11   73.97      1.00
  2 ips16                1756.78339   697.4   1.12    1.93    100.78  1.048
  3 ehe16                 -18.05430    38.8  -0.22    1.00   1948.58 -0.127

:          Price Index of Gross Output: Other transportation equipment
  SEE   =       0.49 RSQ   = 0.9941 RHO =   0.62 Obser  =   13 from 1992.000
  SEE+1 =       0.46 RBSQ  = 0.9936 DW  =   0.75 DoFree =   11 to   2004.000
  MAPE  =       0.40 Test period:  SEE     0.20 MAPE     0.18 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop16               - - - - - - - - - - - - - - - - -      97.62 - - -
  1 intercept              43.65025   951.7   0.45  170.88      1.00
  2 pri16                   0.35000  1207.2   0.55    1.00    154.21  0.997

# FURNITURE AND RELATED PRODUCTS
:             Real Gross Output: Furniture and related products
  SEE   =     262.31 RSQ   = 0.9988 RHO =  -0.08 Obser  =   13 from 1992.000
  SEE+1 =     258.28 RBSQ  = 0.9985 DW  =   2.16 DoFree =   10 to   2004.000
  MAPE  =       0.32 Test period:  SEE  1749.62 MAPE     2.23 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor17               - - - - - - - - - - - - - - - - -  65794.11 - - -
  1 intercept            -1254.35144     3.8  -0.02  825.13      1.00
  2 ips17                 771.48286  2356.8   1.07    1.33     90.92  1.012
  3 ehe17                  -5.06565    15.5  -0.05    1.00    611.03 -0.024

:          Price Index of Gross Output: Furniture and related products
  SEE   =       0.26 RSQ   = 0.9981 RHO =   0.09 Obser  =   13 from 1992.000
  SEE+1 =       0.26 RBSQ  = 0.9979 DW  =   1.83 DoFree =   11 to   2004.000
  MAPE  =       0.19 Test period:  SEE     1.16 MAPE     1.07 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop17               - - - - - - - - - - - - - - - - -      96.58 - - -
  1 intercept              -0.78951     1.7  -0.01  523.75      1.00
  2 pri17                   0.70308  2188.6   1.01    1.00    138.49  0.999

# MISCELLANEOUS MANUFACTURING
:              Real Gross Output: Miscellaneous manufacturing
  SEE   =     532.13 RSQ   = 0.9985 RHO =  -0.08 Obser  =   13 from 1992.000
  SEE+1 =     524.28 RBSQ  = 0.9982 DW  =   2.17 DoFree =   10 to   2004.000
  MAPE  =       0.35 Test period:  SEE  3943.20 MAPE     2.93 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor18               - - - - - - - - - - - - - - - - - 107540.05 - - -
  1 intercept            4643.52755     2.8   0.04  664.31      1.00
  2 ips18                1272.60670  2251.1   1.04    1.30     88.20  0.990
  3 ehe18                 -13.22931    14.0  -0.09    1.00    706.37 -0.023
```

```
:          Price Index of Gross Output: Miscellaneous manufacturing
  SEE   =       0.47 RSQ   = 0.9875 RHO =   0.63 Obser  =   13 from 1992.000
  SEE+1 =       0.41 RBSQ  = 0.9864 DW  =   0.73 DoFree =   11 to   2004.000
  MAPE  =       0.41 Test period:  SEE     0.59 MAPE     0.55 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop18               - - - - - - - - - - - - - - - - -     98.35 - - -
  1 intercept             51.57055   881.9   0.52   80.13      1.00
  2 pri18                  0.38306   795.1   0.48    1.00    122.11  0.994

# FOOD AND BEVERAGE AND TOBACCO PRODUCTS
:          Real Gross Output: Food and beverage and tobacco products
  SEE   =    3910.32 RSQ   = 0.9695 RHO =   0.09 Obser  =   13 from 1992.000
  SEE+1 =    3896.56 RBSQ  = 0.9635 DW  =   1.82 DoFree =   10 to   2004.000
  MAPE  =       0.65 Test period:  SEE 13889.44 MAPE     2.47 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor19               - - - - - - - - - - - - - - - - - 533591.75 - - -
  1 intercept            -186350.60597    22.0  -0.35   32.84      1.00
  2 ips19                6287.36558   457.4   1.16    1.24     98.35  1.010
  3 ehe19                 494.99965    11.2   0.19    1.00    205.26  0.090

:      Price Index of Gross Output: Food and beverage and tobacco products
  SEE   =       1.03 RSQ   = 0.9773 RHO =   0.70 Obser  =   13 from 1992.000
  SEE+1 =       0.81 RBSQ  = 0.9752 DW  =   0.60 DoFree =   11 to   2004.000
  MAPE  =       0.97 Test period:  SEE     1.45 MAPE     1.24 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop19               - - - - - - - - - - - - - - - - -     98.71 - - -
  1 intercept             -17.94846    42.0  -0.18   44.04      1.00
  2 pri19                  0.91361   563.6   1.18    1.00    127.69  0.989

# TEXTILE MILLS AND TEXTILE PRODUCT MILLS
:         Real Gross Output: Textile mills and textile product mills
  SEE   =    1191.64 RSQ   = 0.9611 RHO =   0.42 Obser  =   13 from 1992.000
  SEE+1 =    1094.44 RBSQ  = 0.9533 DW  =   1.15 DoFree =   10 to   2004.000
  MAPE  =       1.19 Test period:  SEE  3873.01 MAPE     5.65 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago20                - - - - - - - - - - - - - - - - -  81150.54 - - -
  1 intercept            -9951.41544    10.5  -0.12   25.69      1.00
  2 ips20                 874.55915   263.2   1.16    1.12    107.56  1.056
  3 ehe20_1                -7.54932     5.7  -0.04    1.00    392.72 -0.103

:     Price Index of Gross Output: Textile mills and textile product mills
  SEE   =       1.16 RSQ   = 0.4818 RHO =   0.79 Obser  =   13 from 1992.000
  SEE+1 =       0.91 RBSQ  = 0.3782 DW  =   0.41 DoFree =   10 to   2004.000
  MAPE  =       0.96 Test period:  SEE     0.58 MAPE     0.56 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop20               - - - - - - - - - - - - - - - - -     99.87 - - -
  1 intercept             66.00412   109.4   0.66    1.93      1.00
  2 pri20                  0.29608    38.6   0.32    1.19    107.53  0.821
  3 oilp                   0.08634     9.3   0.02    1.00     23.53  0.378

# APPAREL AND LEATHER AND ALLIED PRODUCTS
:         Real Gross Output: Apparel and leather and allied products
  SEE   =     972.72 RSQ   = 0.9960 RHO =  -0.18 Obser  =   13 from 1992.000
  SEE+1 =     946.74 RBSQ  = 0.9952 DW  =   2.36 DoFree =   10 to   2004.000
  MAPE  =       1.33 Test period:  SEE   534.81 MAPE     1.50 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor21               - - - - - - - - - - - - - - - - -  65639.27 - - -
  1 intercept            -487.33603     0.4  -0.01  248.46      1.00
  2 ips21                 454.95837   502.4   1.04    1.07    149.90  1.042
  3 ehe21_1                -3.37668     3.6  -0.03    1.00    613.64 -0.047
```

```
:     Price Index of Gross Output: Apparel and leather and allied products
  SEE   =       0.68 RSQ   = 0.8931 RHO =   0.75 Obser  =   13 from 1992.000
  SEE+1 =       0.49 RBSQ  = 0.8834 DW  =   0.50 DoFree =   11 to   2004.000
  MAPE  =       0.62 Test period:  SEE     0.78 MAPE     0.78 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop21               - - - - - - - - - - - - - - - - -     98.31 - - -
  1 intercept             45.34015   166.7   0.46    9.35      1.00
  2 pri21                  0.38844   205.8   0.54    1.00    136.38  0.945
```

PAPER PRODUCTS

```
:                     Real Gross Output: Paper products
  SEE   =     701.65 RSQ   = 0.9861 RHO =  -0.33 Obser  =   13 from 1992.000
  SEE+1 =     638.59 RBSQ  = 0.9833 DW  =   2.66 DoFree =   10 to   2004.000
  MAPE  =       0.36 Test period:  SEE  3619.94 MAPE     2.47 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor22               - - - - - - - - - - - - - - - - - 159469.06 - - -
  1 intercept           1813.43291     0.3   0.01   71.77      1.00
  2 ips22               1337.05973   382.1   0.86    3.79    102.66  0.780
  3 ehe22                 33.97987    94.8   0.13    1.00    600.15  0.276
```

```
:                  Price Index of Gross Output: Paper products
  SEE   =       3.39 RSQ   = 0.7959 RHO =   0.84 Obser  =   13 from 1992.000
  SEE+1 =       1.96 RBSQ  = 0.7773 DW  =   0.33 DoFree =   11 to   2004.000
  MAPE  =       3.29 Test period:  SEE     1.95 MAPE     1.84 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop22               - - - - - - - - - - - - - - - - -     93.10 - - -
  1 intercept              2.84726     0.2   0.03    4.90      1.00
  2 pri22                  0.62850   121.3   0.97    1.00    143.60  0.892
```

PRINTING AND RELATED SUPPORT ACTIVITIES

```
:          Real Gross Output: Printing and related support activities
  SEE   =     375.51 RSQ   = 0.9926 RHO =  -0.01 Obser  =   13 from 1992.000
  SEE+1 =     375.30 RBSQ  = 0.9911 DW  =   2.01 DoFree =   10 to   2004.000
  MAPE  =       0.32 Test period:  SEE  7101.57 MAPE     8.30 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor23               - - - - - - - - - - - - - - - - -  97610.61 - - -
  1 intercept           7691.93353    35.0   0.08  135.25      1.00
  2 ips23                942.03718   434.1   1.02    1.52    105.90  1.139
  3 ehe23                -12.67857    23.5  -0.10    1.00    776.04 -0.157
```

```
:     Price Index of Gross Output: Printing and related support activities
  SEE   =       0.69 RSQ   = 0.9878 RHO =   0.73 Obser  =   13 from 1992.000
  SEE+1 =       0.49 RBSQ  = 0.9867 DW  =   0.53 DoFree =   11 to   2004.000
  MAPE  =       0.56 Test period:  SEE     0.57 MAPE     0.54 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop23               - - - - - - - - - - - - - - - - -     95.71 - - -
  1 intercept             -5.05089     9.7  -0.05   82.18      1.00
  2 pri23                  0.67543   806.6   1.05    1.00    149.18  0.994
```

PETROLEUM AND COAL PRODUCTS

```
:                Nominal Gross Output: Petroleum and coal products
  SEE   =    4261.57 RSQ   = 0.9928 RHO =  -0.13 Obser  =   13 from 1992.000
  SEE+1 =    4212.68 RBSQ  = 0.9913 DW  =   2.26 DoFree =   10 to   2004.000
  MAPE  =       1.93 Test period:  SEE  7906.41 MAPE     1.99 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago24                - - - - - - - - - - - - - - - - - 186606.38 - - -
  1 intercept           188312.36126   128.9   1.01  138.16      1.00
  2 ehe24               -1013.13136   109.2  -0.71   34.19    131.27 -0.251
  3 oilp                5578.87223   484.8   0.70    1.00     23.53  0.788
```

```
:           Price Index of Gross Output: Petroleum and coal products
  SEE   =       0.42 RSQ   = 0.9995 RHO =  -0.11 Obser  =   13 from 1992.000
  SEE+1 =       0.42 RBSQ  = 0.9995 DW  =   2.21 DoFree =   11 to   2004.000
  MAPE  =       0.41 Test period:   SEE     0.93 MAPE     0.53 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop24                - - - - - - - - - - - - - - - - -     82.97 - - -
  1 intercept               1.66240    36.5   0.02 2188.71      1.00
  2 pri24                   0.87006  4578.4   0.98    1.00     93.45  1.000

# CHEMICAL PRODUCTS
:                    Nominal Gross Output: Chemical products
  SEE   =    9585.19 RSQ   = 0.9705 RHO =   0.18 Obser  =   13 from 1992.000
  SEE+1 =    9528.21 RBSQ  = 0.9646 DW  =   1.63 DoFree =   10 to   2004.000
  MAPE  =       2.02 Test period:   SEE 14800.69 MAPE     2.74 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago25                 - - - - - - - - - - - - - - - - - 403904.46 - - -
  1 intercept             118247.43730     0.9   0.29   33.89      1.00
  2 ehe25                 -233.55794     7.1  -0.56    4.34    973.29 -0.172
  3 ips25                 5646.89122   108.3   1.27    1.00     90.84  0.824

:                Price Index of Gross Output: Chemical products
  SEE   =       1.23 RSQ   = 0.9741 RHO =   0.66 Obser  =   13 from 1992.000
  SEE+1 =       0.98 RBSQ  = 0.9718 DW  =   0.69 DoFree =   11 to   2004.000
  MAPE  =       1.01 Test period:   SEE     5.54 MAPE     4.50 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop25                - - - - - - - - - - - - - - - - -     95.97 - - -
  1 intercept              14.44395    47.4   0.15   38.68      1.00
  2 pri25                   0.54987   521.9   0.85    1.00    148.27  0.987

# PLASTICS AND RUBBER PRODUCTS
:                Real Gross Output: Plastics and rubber products
  SEE   =     645.65 RSQ   = 0.9984 RHO =  -0.36 Obser  =   13 from 1992.000
  SEE+1 =     558.49 RBSQ  = 0.9981 DW  =   2.73 DoFree =   10 to   2004.000
  MAPE  =       0.31 Test period:   SEE  1641.39 MAPE     0.96 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor26                - - - - - - - - - - - - - - - - - 156981.26 - - -
  1 intercept              996.69926     0.4   0.01  617.95      1.00
  2 ips26                 1617.56635  2281.1   0.95    1.30     92.51  0.993
  3 ehe26                   7.14380    14.2   0.04    1.00    887.43  0.023

:           Price Index of Gross Output: Plastics and rubber products
  SEE   =       0.17 RSQ   = 0.9981 RHO =   0.14 Obser  =   13 from 1992.000
  SEE+1 =       0.16 RBSQ  = 0.9979 DW  =   1.72 DoFree =   11 to   2004.000
  MAPE  =       0.14 Test period:   SEE     0.09 MAPE     0.08 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop26                - - - - - - - - - - - - - - - - -     98.36 - - -
  1 intercept               1.01182     2.8   0.01  518.39      1.00
  2 pri26                   0.79269  2176.8   0.99    1.00    122.80  0.999

# WHOLESALE TRADE
:                     Real Gross Output: Wholesale trade
  SEE   =   19678.46 RSQ   = 0.9755 RHO =   0.31 Obser  =   13 from 1992.000
  SEE+1 =   19018.05 RBSQ  = 0.9706 DW  =   1.37 DoFree =   10 to   2004.000
  MAPE  =       2.23 Test period:   SEE 83629.12 MAPE     8.60 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor27                - - - - - - - - - - - - - - - - - 771270.77 - - -
  1 intercept             -311850.50078    16.8  -0.40   40.87      1.00
  2 whilst                    0.24246   263.6   0.78    1.58 2479824.85  0.842
  3 ehe27                  86.53847    25.5   0.62    1.00   5568.31  0.183

:                 Price Index of Gross Output: Wholesale trade
```

```
  SEE   =       1.33 RSQ   = 0.8082 RHO =   0.32 Obser  =   13 from 1992.000
  SEE+1 =       1.30 RBSQ  = 0.7443 DW  =   1.36 DoFree =    9 to   2004.000
  MAPE  =       0.98 Test period:   SEE     4.81 MAPE     4.36 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop27               - - - - - - - - - - - - - - - - -     99.76 - - -
  1 intercept              13.59763     0.2   0.14    5.21      1.00
  2 pri27                   0.10819   128.3   0.16    1.43    147.64  0.952
  3 hr27                    1.90054     5.5   0.73    1.04     38.46  0.209
  4 wag27                  -0.19366     1.8  -0.03    1.00     15.00 -0.118

# RETAIL TRADE
:                       Real Gross Output: Retail trade
  SEE   =    6449.49 RSQ   = 0.9986 RHO =   0.20 Obser  =   13 from 1992.000
  SEE+1 =    6489.33 RBSQ  = 0.9983 DW  =   1.60 DoFree =   10 to   2004.000
  MAPE  =       0.66 Test period:   SEE 39827.75 MAPE     3.25 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor28               - - - - - - - - - - - - - - - - - 901639.02 - - -
  1 intercept            197968.92002    33.4   0.22  700.72      1.00
  2 retl                    0.35838   980.4   1.05    1.63 2635187.54  1.072
  3 ehe28                 -16.74711    27.7  -0.27    1.00  14373.85 -0.079

:                  Price Index of Gross Output: Retail trade
  SEE   =       1.14 RSQ   = 0.5196 RHO =   0.61 Obser  =   13 from 1992.000
  SEE+1 =       0.95 RBSQ  = 0.3594 DW  =   0.79 DoFree =    9 to   2004.000
  MAPE  =       1.00 Test period:   SEE     2.13 MAPE     2.02 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop28               - - - - - - - - - - - - - - - - -     99.69 - - -
  1 intercept             -20.30247     0.1  -0.20    2.08      1.00
  2 hr28                    4.23553     4.3   1.31    2.08     30.78  0.227
  3 wag28                  -4.90742    16.9  -0.50    1.48     10.08 -3.997
  4 rtptot                  0.00002    21.5   0.39    1.00 1918479.15  4.548

# AIR TRANSPORTATION
:                     Real Gross Output: Air transportation
  SEE   =    1352.76 RSQ   = 0.9895 RHO =   0.16 Obser  =    9 from 1992.000
  SEE+1 =    1344.76 RBSQ  = 0.9860 DW  =   1.67 DoFree =    6 to   2000.000
  MAPE  =       1.22
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor29               - - - - - - - - - - - - - - - - - 101325.91 - - -
  1 intercept            -31651.38329    64.8  -0.31   94.92      1.00
  2 ehe29                 -92.45774    32.3  -0.50   19.69    543.24 -0.244
  3 wagnf                 436.68858   343.7   1.81    1.00    419.53  1.218

:                Price Index of Gross Output: Air transportation
  SEE   =       1.20 RSQ   = 0.6386 RHO =  -0.18 Obser  =    9 from 1992.000
  SEE+1 =       1.17 RBSQ  = 0.5869 DW  =   2.35 DoFree =    7 to   2000.000
  MAPE  =       0.88
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop29               - - - - - - - - - - - - - - - - -     95.76 - - -
  1 intercept              83.45588   799.7   0.87    2.77      1.00
  2 pri29                   0.08601    66.3   0.13    1.00    143.06  0.799

# RAIL TRANSPORTATION
:                  Nominal Gross Output: Rail transportation
  SEE   =    1536.81 RSQ   = 0.8273 RHO =   0.51 Obser  =   13 from 1992.000
  SEE+1 =    1435.03 RBSQ  = 0.7927 DW  =   0.98 DoFree =   10 to   2004.000
  MAPE  =       2.60 Test period:   SEE  9808.21 MAPE    17.03 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago30                - - - - - - - - - - - - - - - - -  42469.31 - - -
  1 intercept            34280.29024     9.5   0.81    5.79      1.00
  2 ehe30                 -70.82674     3.5  -0.38    2.58    229.00 -0.165
```

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:               Price Index of Gross Output: Rail transportation
  SEE   =       0.21 RSQ   = 0.9974 RHO =   0.64 Obser  =    8 from 1997.000
  SEE+1 =       0.19 RBSQ  = 0.9969 DW  =   0.73 DoFree =    6 to   2004.000
  MAPE  =       0.19 Test period:  SEE     2.12 MAPE     1.76 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop30                - - - - - - - - - - - - - - - - -    102.16 - - -
  1 intercept               -3.73173    21.3  -0.04  381.75      1.00
  2 pri30                    1.00912  1853.8   1.04    1.00    104.94  0.999

# WATER TRANSPORTATION
:                  Nominal Gross Output: Water transportation
  SEE   =     732.31 RSQ   = 0.9724 RHO =   0.40 Obser  =   13 from 1992.000
  SEE+1 =     689.97 RBSQ  = 0.9668 DW  =   1.20 DoFree =   10 to   2004.000
  MAPE  =       2.35 Test period:  SEE   845.27 MAPE     2.36 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago31                 - - - - - - - - - - - - - - - - -  25656.46 - - -
  1 intercept             -7768.02481    48.0  -0.30   36.17      1.00
  2 oilp                   134.96712    31.4   0.12   11.20     23.53  0.217
  3 wagnf                   67.52981   234.6   1.18    1.00    447.93  0.812

:               Price Index of Gross Output: Water transportation
  SEE   =       1.89 RSQ   = 0.9691 RHO =   0.73 Obser  =   13 from 1992.000
  SEE+1 =       1.49 RBSQ  = 0.9663 DW  =   0.54 DoFree =   11 to   2004.000
  MAPE  =       1.84 Test period:  SEE     2.14 MAPE     1.76 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop31                - - - - - - - - - - - - - - - - -     97.19 - - -
  1 intercept               58.99465   739.5   0.61   32.36      1.00
  2 pri31                    0.26167   468.8   0.39    1.00    145.98  0.984

# TRUCK TRANSPORTATION
:                  Nominal Gross Output: Truck transportation
  SEE   =    3152.70 RSQ   = 0.9912 RHO =   0.14 Obser  =   13 from 1992.000
  SEE+1 =    3149.67 RBSQ  = 0.9883 DW  =   1.72 DoFree =    9 to   2004.000
  MAPE  =       1.66 Test period:  SEE  6042.28 MAPE     2.41 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago32                 - - - - - - - - - - - - - - - - - 176999.85 - - -
  1 intercept             -199333.90468   307.6  -1.13  113.53      1.00
  2 wagnf                  319.76195   108.2   0.81    6.58    447.93  0.504
  3 ehe32                  168.81043   148.4   1.24    1.54   1297.01  0.451
  4 oilp                   601.53270    24.0   0.08    1.00     23.53  0.127

:               Price Index of Gross Output: Truck transportation
  SEE   =       1.34 RSQ   = 0.9746 RHO =   0.29 Obser  =   13 from 1992.000
  SEE+1 =       1.33 RBSQ  = 0.9723 DW  =   1.42 DoFree =   11 to   2004.000
  MAPE  =       1.22 Test period:  SEE     7.39 MAPE     6.32 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop32                - - - - - - - - - - - - - - - - -     95.51 - - -
  1 intercept              -72.91712   186.0  -0.76   39.38      1.00
  2 pri32                    1.59401   527.6   1.76    1.00    105.66  0.987

# TRANSIT AND GROUND PASSENGER TRANSPORTATION
:         Real Gross Output: Transit and ground passenger transportation
  SEE   =     476.75 RSQ   = 0.8181 RHO =   0.40 Obser  =   13 from 1992.000
  SEE+1 =     440.79 RBSQ  = 0.7817 DW  =   1.20 DoFree =   10 to   2004.000
  MAPE  =       1.62 Test period:  SEE   459.91 MAPE     1.88 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor33                - - - - - - - - - - - - - - - - -  25100.42 - - -
  1 intercept             12746.66328   124.0   0.51    5.50      1.00
  2 wagnf                  -54.83899   103.7  -0.98    5.15    447.93 -2.598
  3 ehe33                  105.48434   126.8   1.47    1.00    349.98  2.980
```

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:   Price Index of Gross Output: Transit and ground passenger transportation
  SEE   =       0.89 RSQ   = 0.9882 RHO =   0.08 Obser  =   13 from 1992.000
  SEE+1 =       0.89 RBSQ  = 0.9843 DW  =   1.84 DoFree =    9 to   2004.000
  MAPE  =       0.77 Test period:  SEE     0.63 MAPE     0.54 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop33              - - - - - - - - - - - - - - - - -     96.74 - - -
  1 intercept            -20.92750     4.8  -0.22   84.78      1.00
  2 hr33                   0.80804    15.3   0.32   38.15     38.05  0.101
  3 wag33                  5.68601   315.9   0.84    2.15     14.33  0.903
  4 oilp                   0.23101    46.6   0.06    1.00     23.53  0.200

# PIPELINE TRANSPORTATION
:                Nominal Gross Output: Pipeline transportation
  SEE   =     881.58 RSQ   = 0.9126 RHO =   0.07 Obser  =   13 from 1992.000
  SEE+1 =     879.64 RBSQ  = 0.8951 DW  =   1.87 DoFree =   10 to   2004.000
  MAPE  =       2.46 Test period:  SEE  7088.85 MAPE    18.15 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago34               - - - - - - - - - - - - - - - - -  27359.77 - - -
  1 intercept           64421.44870    28.1   2.35   11.44      1.00
  2 wagnf                -19.50436     2.0  -0.32    1.57    447.93 -0.346
  3 ehe34               -578.02697    25.3  -1.04    1.00     49.00 -1.295

:            Price Index of Gross Output: Pipeline transportation
  SEE   =       3.85 RSQ   = 0.7093 RHO =   0.47 Obser  =   13 from 1992.000
  SEE+1 =       3.73 RBSQ  = 0.6512 DW  =   1.07 DoFree =   10 to   2004.000
  MAPE  =       3.18 Test period:  SEE     4.60 MAPE     3.78 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop34              - - - - - - - - - - - - - - - - -     98.56 - - -
  1 intercept             66.60433    51.4   0.68    3.44      1.00
  2 pri34                  0.13718     2.2   0.14    2.18    103.80  0.145
  3 oilp                   0.75277    47.6   0.18    1.00     23.53  0.744

# OTHER TRANSPORTATION AND SUPPORT ACTIVITIES
:        Real Gross Output: Other transportation and support activities
  SEE   =     968.63 RSQ   = 0.9861 RHO =   0.05 Obser  =   13 from 1992.000
  SEE+1 =     968.46 RBSQ  = 0.9833 DW  =   1.90 DoFree =   10 to   2004.000
  MAPE  =       0.86 Test period:  SEE   702.55 MAPE     0.70 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor35              - - - - - - - - - - - - - - - - -  91210.09 - - -
  1 intercept           27717.52928   250.5   0.30   71.74      1.00
  2 wagnf                -29.95013    14.0  -0.15   12.01    447.93 -0.193
  3 ehe35                161.83338   246.5   0.84    1.00    475.23  1.173

:   Price Index of Gross Output: Other transportation and support activities
  SEE   =       1.18 RSQ   = 0.9815 RHO =   0.42 Obser  =   13 from 1992.000
  SEE+1 =       1.16 RBSQ  = 0.9779 DW  =   1.16 DoFree =   10 to   2004.000
  MAPE  =       1.00 Test period:  SEE     5.70 MAPE     4.71 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop35              - - - - - - - - - - - - - - - - -     95.42 - - -
  1 intercept             29.56344   180.9   0.31   54.18      1.00
  2 pri35                  0.53695   312.3   0.67    1.12    118.33  0.925
  3 oilp                   0.09831     5.9   0.02    1.00     23.53  0.080

# WAREHOUSING AND STORAGE
:                  Real Gross Output: Warehousing and storage
  SEE   =     966.99 RSQ   = 0.9713 RHO =   0.63 Obser  =   13 from 1992.000
  SEE+1 =     798.60 RBSQ  = 0.9655 DW  =   0.75 DoFree =   10 to   2004.000
  MAPE  =       2.91 Test period:  SEE   788.93 MAPE     1.93 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor36              - - - - - - - - - - - - - - - - -  29494.19 - - -
```

```
  1 intercept            -18988.10743    53.9  -0.64   34.83      1.00
  2 wagnf                  98.07608    26.6   1.49    1.00    447.93  0.910
  3 ehe36                   9.53155     0.2   0.15    1.00    477.52  0.076

:             Price Index of Gross Output: Warehousing and storage
  SEE   =       1.04 RSQ   = 0.9615 RHO =   0.44 Obser  =   11 from 1994.000
  SEE+1 =       0.97 RBSQ  = 0.9519 DW  =   1.11 DoFree =    8 to   2004.000
  MAPE  =       0.91 Test period:   SEE     0.75 MAPE     0.70 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop36               - - - - - - - - - - - - - - - - -     98.45 - - -
  1 intercept            -104.51001    80.5  -1.06   25.97      1.00
  2 pri36                   1.93645   189.5   2.07    1.01    105.06  1.005
  3 oilp                   -0.02029     0.3  -0.01    1.00     24.26 -0.028

#PUBLISHING INDUSTRIES (INCLUDING SOFTWARE)
:       Nominal Gross Output: Publishing industries (including software)
  SEE   =    5709.92 RSQ   = 0.9848 RHO =   0.47 Obser  =   12 from 1993.000
  SEE+1 =    5228.90 RBSQ  = 0.9815 DW  =   1.06 DoFree =    9 to   2004.000
  MAPE  =       2.38 Test period:   SEE 11175.06 MAPE     4.17 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago37                - - - - - - - - - - - - - - - - - 200453.67 - - -
  1 intercept            -39397.64188     8.1  -0.20   65.97      1.00
  2 ips37                1095.41097    38.9   0.54   28.00     98.04  0.162
  3 apce37               3715.60164   429.1   0.66    1.00     35.65  0.875

:    Price Index of Gross Output: Publishing industries (including software)
  SEE   =       1.06 RSQ   = 0.7567 RHO =   0.50 Obser  =   12 from 1993.000
  SEE+1 =       0.94 RBSQ  = 0.6655 DW  =   0.99 DoFree =    8 to   2004.000
  MAPE  =       0.86 Test period:   SEE     1.56 MAPE     1.56 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop37               - - - - - - - - - - - - - - - - -     98.44 - - -
  1 intercept              93.34451   129.1   0.95    4.11      1.00
  2 nipa37p                -0.00477     4.0  -0.01    1.10    260.90 -0.529
  3 oilp                    0.01766     0.1   0.00    1.02     23.78  0.060
  4 pri37                   0.03255     0.8   0.06    1.00    181.79  0.312

# MOTION PICTURE AND SOUND RECORDING INDUSTRIES
:       Real Gross Output: Motion picture and sound recording industries
  SEE   =    1423.02 RSQ   = 0.9549 RHO =   0.60 Obser  =   12 from 1993.000
  SEE+1 =    1157.08 RBSQ  = 0.9504 DW  =   0.79 DoFree =   10 to   2004.000
  MAPE  =       1.54 Test period:   SEE  1861.03 MAPE     2.38 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor38               - - - - - - - - - - - - - - - - -  71972.28 - - -
  1 intercept            17921.49742    81.5   0.25   22.19      1.00
  2 ehe38                 154.52064   371.1   0.75    1.00    349.80  0.977

:  Price Index of Gross Output: Motion picture and sound recording industries
  SEE   =       1.09 RSQ   = 0.9901 RHO =   0.24 Obser  =   12 from 1993.000
  SEE+1 =       1.07 RBSQ  = 0.9891 DW  =   1.52 DoFree =   10 to   2004.000
  MAPE  =       1.00 Test period:   SEE     2.41 MAPE     2.17 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop38               - - - - - - - - - - - - - - - - -     93.62 - - -
  1 intercept               2.42708     3.4   0.03  101.08      1.00
  2 wag38                   5.04690   905.4   0.97    1.00     18.07  0.995

# BROADCASTING AND TELECOMMUNICATIONS
:            Real Gross Output: Broadcasting and telecommunications
  SEE   =   29307.52 RSQ   = 0.9562 RHO =   0.33 Obser  =   12 from 1993.000
  SEE+1 =   27803.79 RBSQ  = 0.9464 DW  =   1.34 DoFree =    9 to   2004.000
  MAPE  =       4.82 Test period:   SEE 18534.81 MAPE     2.56 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
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  0 agor39              - - - - - - - - - - - - - - - - - - 455850.28 - - -
  1 intercept           1290150.84809    35.3   2.83   22.81      1.00
  2 ips39               6720.76413   139.0   1.16    1.69     78.81  1.513
  3 ehe39               -4289.67355    29.9  -2.99    1.00    317.97 -0.578

:       Price Index of Gross Output: Broadcasting and telecommunications
  SEE   =       1.03 RSQ   = 0.7932 RHO =   0.29 Obser  =   12 from 1993.000
  SEE+1 =       1.02 RBSQ  = 0.7472 DW  =   1.42 DoFree =    9 to   2004.000
  MAPE  =       0.84 Test period:   SEE     2.22 MAPE     2.34 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop39              - - - - - - - - - - - - - - - - -    100.81 - - -
  1 intercept            122.83895   945.0   1.22    4.83      1.00
  2 wag39                 -3.09879    53.3  -0.56    1.74     18.07 -2.966

# INFORMATION AND DATA PROCESSING SERVICES
:        Nominal Gross Output: Information and data processing services
  SEE   =    9172.66 RSQ   = 0.8918 RHO =   0.82 Obser  =   12 from 1993.000
  SEE+1 =    6383.22 RBSQ  = 0.8677 DW  =   0.36 DoFree =    9 to   2004.000
  MAPE  =      15.65 Test period:   SEE 13560.19 MAPE    11.48 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago40               - - - - - - - - - - - - - - - - -  67553.75 - - -
  1 intercept           -72381.26250    18.2  -1.07    9.24      1.00
  2 ips40                311.06129     7.4   0.36    1.46     78.81  0.352
  3 ehe40               2747.67946    20.8   1.71    1.00     42.01  0.608

:     Price Index of Gross Output: Information and data processing services
  SEE   =       2.90 RSQ   = 0.8466 RHO =   0.71 Obser  =   12 from 1993.000
  SEE+1 =       2.36 RBSQ  = 0.8313 DW  =   0.58 DoFree =   10 to   2004.000
  MAPE  =       2.51 Test period:   SEE     2.22 MAPE     2.19 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop40              - - - - - - - - - - - - - - - - -     95.89 - - -
  1 intercept            -74.65722    43.4  -0.78    6.52      1.00
  2 wag40                 15.91629   155.3   1.78    1.00     10.72  0.920

# FEDERAL RESERVE BANKS, CREDIT INTERMIDIATION, AND RELATED ACTIVITIES
:                            Real Gross Output: 41
  SEE   =   18774.13 RSQ   = 0.9107 RHO =   0.69 Obser  =   12 from 1993.000
  SEE+1 =   15504.54 RBSQ  = 0.8909 DW  =   0.63 DoFree =    9 to   2004.000
  MAPE  =       3.37 Test period:   SEE 24637.00 MAPE     4.15 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor41              - - - - - - - - - - - - - - - - - - 490324.79 - - -
  1 intercept           -484281.85192    82.7  -0.99   11.20      1.00
  2 ehe41_2              216.92518    15.0   1.12    1.17   2534.67  0.562
  3 ehe41_2[1]           170.38489     7.9   0.87    1.00   2493.02  0.403

:                       Price Index of Gross Output: 41
  SEE   =       0.63 RSQ   = 0.9972 RHO =   0.06 Obser  =   12 from 1993.000
  SEE+1 =       0.63 RBSQ  = 0.9961 DW  =   1.88 DoFree =    8 to   2004.000
  MAPE  =       0.55 Test period:   SEE     3.48 MAPE     3.02 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop41              - - - - - - - - - - - - - - - - -     93.96 - - -
  1 intercept           -184.48893    54.8  -1.96  353.19      1.00
  2 wag41                 -4.09420    13.3  -0.37   16.46      8.45 -0.170
  3 hr41                   5.64787    66.2   2.14   13.72     35.66  0.073
  4 atime                  3.91704   270.5   1.19    1.00     28.50  1.147

# SECURITIES, COMMODITY CONTRACRS, AND INVESTMENTS
:                            Real Gross Output: 42
  SEE   =   17329.18 RSQ   = 0.9697 RHO =   0.20 Obser  =   12 from 1993.000
  SEE+1 =   17291.19 RBSQ  = 0.9583 DW  =   1.61 DoFree =    8 to   2004.000
  MAPE  =      11.38 Test period:   SEE 63221.00 MAPE    17.36 end  2005.000
```

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   Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 agor42               - - - - - - - - - - - - - - - - - 198847.58 - - -
 1 intercept           -432759.86129   275.2  -2.18   32.99      1.00
 2 ehe42               1267.38103   100.1   4.37    1.76    685.57  1.357
 3 ehe42[1]            -910.38413    26.7  -3.03    1.76    661.35 -1.079
 4 ehe42[2]             573.45515    32.6   1.83    1.00    636.17  0.730

:                    Price Index of Gross Output: 42
 SEE   =       8.11 RSQ   = 0.9233 RHO =   0.58 Obser  =   12 from 1993.000
 SEE+1 =       6.71 RBSQ  = 0.9062 DW  =   0.85 DoFree =    9 to   2004.000
 MAPE  =       6.39 Test period:  SEE     6.39 MAPE     7.25 end  2005.000
   Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 agop42               - - - - - - - - - - - - - - - - -    122.77 - - -
 1 intercept           1011.48831    12.9   8.24   13.03      1.00
 2 wag42                -56.40244   247.7  -3.88    1.04      8.45 -0.946
 3 hr42                 -11.56314     2.2  -3.36    1.00     35.66 -0.060

# INSURANCE CARRIERS AND RELATED ACTIVITIES
:                         Real Gross Output: 43
 SEE   =    9041.56 RSQ   = 0.9157 RHO =   0.27 Obser  =   12 from 1993.000
 SEE+1 =    8810.89 RBSQ  = 0.8675 DW  =   1.47 DoFree =    7 to   2004.000
 MAPE  =       1.97 Test period:  SEE 21815.03 MAPE     4.41 end  2005.000
   Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 agor43               - - - - - - - - - - - - - - - - - 414833.71 - - -
 1 intercept           -619614.57658    20.8  -1.49   11.86      1.00
 2 ehe43                414.60404    29.4   2.18    4.37   2184.81  0.857
 3 ehe43[1]             109.46693     1.8   0.57    3.45   2166.58  0.252
 4 oilp                1936.49033    25.6   0.11    1.47     23.78  0.454
 5 exri                -1420.63821    21.4  -0.37    1.00    108.83 -0.634

:                    Price Index of Gross Output: 43
 SEE   =       1.63 RSQ   = 0.9818 RHO =   0.66 Obser  =   12 from 1993.000
 SEE+1 =       1.28 RBSQ  = 0.9778 DW  =   0.67 DoFree =    9 to   2004.000
 MAPE  =       1.46 Test period:  SEE     0.47 MAPE     0.39 end  2005.000
   Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 agop43               - - - - - - - - - - - - - - - - -     95.77 - - -
 1 intercept             19.65477     2.4   0.21   54.94      1.00
 2 wag43                 -5.05675     3.2  -0.45    3.16      8.45 -0.206
 3 atime                  4.16947    77.8   1.24    1.00     28.50  1.193

# FUNDS, TRUSTS, AND OTHER FINANCIAL VEHICLES
:                         Real Gross Output: 44
 SEE   =    2463.92 RSQ   = 0.9744 RHO =  -0.47 Obser  =   12 from 1993.000
 SEE+1 =    2135.90 RBSQ  = 0.9598 DW  =   2.94 DoFree =    7 to   2004.000
 MAPE  =       3.06 Test period:  SEE  5775.77 MAPE     6.09 end  2005.000
   Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 agor44               - - - - - - - - - - - - - - - - -  64193.23 - - -
 1 intercept           -45850.56481   150.2  -0.71   39.07      1.00
 2 ehe44               2794.93844   104.7   3.30    3.37     75.85  1.790
 3 ehe44[1]            -1199.82880    44.5  -1.38    2.98     73.60 -0.816
 4 oilp                 554.69077    24.7   0.21    1.06     23.78  0.263
 5 exri                -246.45658     3.2  -0.42    1.00    108.83 -0.222

:                    Price Index of Gross Output: 44
 SEE   =       1.46 RSQ   = 0.6527 RHO =   0.08 Obser  =   12 from 1993.000
 SEE+1 =       1.47 RBSQ  = 0.5225 DW  =   1.84 DoFree =    8 to   2004.000
 MAPE  =       1.13 Test period:  SEE     2.15 MAPE     2.18 end  2005.000
   Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 agop44               - - - - - - - - - - - - - - - - -     98.62 - - -
 1 intercept           -146.56918     8.2  -1.49    2.88      1.00
 2 wag44                  0.61604     0.1   0.05    1.39      8.45  0.122
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  3 wag44[1]                 2.35556     1.4   0.20    1.37      8.31  0.461
  4 hr44[1]                  6.18192    17.0   2.23    1.00     35.65  0.387

# REAL ESTATE
:                             Real Gross Output: 45
  SEE   =   13328.14 RSQ   = 0.9908 RHO =   0.14 Obser  =   12 from 1993.000
  SEE+1 =   13320.01 RBSQ  = 0.9873 DW  =   1.72 DoFree =    8 to   2004.000
  MAPE  =       0.78 Test period:  SEE 29612.50 MAPE     1.66 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor45              - - - - - - - - - - - - - - - - - 1425797.50 - - -
  1 intercept           -361260.18547    63.5  -0.25  108.14      1.00
  2 ehe45               1209.75792    43.1   1.08    3.52   1277.62  0.728
  3 ehe45[1]             104.22360     0.4   0.09    3.47   1252.54  0.063
  4 oilp                4663.79045    86.3   0.08    1.00     23.78  0.246

:                        Price Index of Gross Output: 45
  SEE   =       0.85 RSQ   = 0.9921 RHO =   0.75 Obser  =   12 from 1993.000
  SEE+1 =       0.59 RBSQ  = 0.9913 DW  =   0.51 DoFree =   10 to   2004.000
  MAPE  =       0.71 Test period:  SEE     1.63 MAPE     1.42 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop45              - - - - - - - - - - - - - - - - -      96.46 - - -
  1 intercept              9.89474    61.6   0.10  125.90      1.00
  2 wagnf                  0.19043  1022.0   0.90    1.00    454.56  0.996

# RENTAL AND LEASING SERVICES AND LESSORS OF INTANGIBLE ASSETS
:                             Real Gross Output: 46
  SEE   =   10364.97 RSQ   = 0.9160 RHO =   0.67 Obser  =   12 from 1993.000
  SEE+1 =    8715.75 RBSQ  = 0.8973 DW  =   0.66 DoFree =    9 to   2004.000
  MAPE  =       4.02 Test period:  SEE 26935.17 MAPE    11.99 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor46              - - - - - - - - - - - - - - - - - 171672.97 - - -
  1 intercept           -32260.53727     0.4  -0.19   11.90      1.00
  2 ehe46_1                1.14732     0.0   0.00    1.38    612.10  0.002
  3 ehe46_2             8508.59033    17.7   1.18    1.00     23.89  0.955

:                        Price Index of Gross Output: 46
  SEE   =       0.69 RSQ   = 0.9710 RHO =   0.04 Obser  =   12 from 1993.000
  SEE+1 =       0.69 RBSQ  = 0.9646 DW  =   1.93 DoFree =    9 to   2004.000
  MAPE  =       0.59 Test period:  SEE     1.58 MAPE     1.44 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop46              - - - - - - - - - - - - - - - - -      97.79 - - -
  1 intercept             72.95007   845.3   0.75   34.53      1.00
  2 wagnf                  0.03772    94.6   0.18    5.43    454.56  0.461
  3 oilp                   0.32332   133.1   0.08    1.00     23.78  0.581

# LEGAL SERVICES
:                             Real Gross Output: 47
  SEE   =    1854.28 RSQ   = 0.9829 RHO =  -0.15 Obser  =   12 from 1993.000
  SEE+1 =    1830.43 RBSQ  = 0.9792 DW  =   2.31 DoFree =    9 to   2004.000
  MAPE  =       0.75 Test period:  SEE   681.89 MAPE     0.34 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor47              - - - - - - - - - - - - - - - - - 176610.35 - - -
  1 intercept           -20063.49699    17.9  -0.11   58.64      1.00
  2 ehe47                292.81367    85.8   1.73    1.27   1041.20  1.468
  3 ehe47[1]            -105.72175    12.5  -0.61    1.00   1023.47 -0.483

:                        Price Index of Gross Output: 47
  SEE   =       1.45 RSQ   = 0.9846 RHO =   0.60 Obser  =   12 from 1993.000
  SEE+1 =       1.29 RBSQ  = 0.9831 DW  =   0.81 DoFree =   10 to   2004.000
  MAPE  =       1.16 Test period:  SEE     5.89 MAPE     4.79 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
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  0 agop47              - - - - - - - - - - - - - - - - - -     96.37 - - -
  1 intercept              8.59686    26.6   0.09   64.91      1.00
  2 wag47                  5.99527   705.7   0.91    1.00     14.64  0.992

# COMPUTER SYSTEMS DESIGN AND RELATED SERVICES
:                           Real Gross Output: 48
  SEE   =    6165.88 RSQ   = 0.9809 RHO =   0.50 Obser  =   12 from 1993.000
  SEE+1 =    5604.58 RBSQ  = 0.9767 DW  =   0.99 DoFree =    9 to   2004.000
  MAPE  =       3.56 Test period:  SEE 18353.12 MAPE     9.83 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor48              - - - - - - - - - - - - - - - - - - 127329.91 - - -
  1 intercept           -16556.45737    23.6  -0.13   52.44      1.00
  2 ehe48                116.20137    72.9   0.85    1.27    936.01  0.727
  3 ehe48[1]              40.02856    12.9   0.28    1.00    877.39  0.270

:                      Price Index of Gross Output: 48
  SEE   =       1.50 RSQ   = 0.8913 RHO =   0.07 Obser  =   12 from 1993.000
  SEE+1 =       1.50 RBSQ  = 0.8672 DW  =   1.86 DoFree =    9 to   2004.000
  MAPE  =       1.33 Test period:  SEE     0.86 MAPE     0.89 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop48              - - - - - - - - - - - - - - - - - -     95.18 - - -
  1 intercept             61.41592   419.2   0.65    9.20      1.00
  2 wag48                  0.00635     0.0   0.00    2.78     14.64  0.003
  3 exri                   0.30936    66.7   0.35    1.00    108.83  0.942

# MISCELLANEOUS PROFESSIONAL, SCIENTIFIC, AND TECHNICAL SERVICES
:                           Real Gross Output: 49
  SEE   =   21149.97 RSQ   = 0.9793 RHO =   0.68 Obser  =   12 from 1993.000
  SEE+1 =   17732.51 RBSQ  = 0.9747 DW  =   0.63 DoFree =    9 to   2004.000
  MAPE  =       3.52 Test period:  SEE 10247.88 MAPE     1.17 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor49              - - - - - - - - - - - - - - - - - - 590592.18 - - -
  1 intercept           269175.72239    23.9   0.46   48.36      1.00
  2 ehe49               1441.17097   273.5   1.49    1.94    612.47  1.301
  3 ehe49_2             -719.27815    39.2  -0.95    1.00    780.31 -0.350

:                      Price Index of Gross Output: 49
  SEE   =       1.42 RSQ   = 0.9440 RHO =   0.48 Obser  =   12 from 1993.000
  SEE+1 =       1.35 RBSQ  = 0.9316 DW  =   1.05 DoFree =    9 to   2004.000
  MAPE  =       1.18 Test period:  SEE     1.40 MAPE     1.31 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop49              - - - - - - - - - - - - - - - - - -     97.63 - - -
  1 intercept             54.39001   410.7   0.56   17.87      1.00
  2 wag49                  8.79549    52.2   1.32    1.58     14.64  2.830
  3 wag49[1]              -6.03823    25.8  -0.88    1.00     14.16 -1.884

# MANAGEMENT OF COMPANIES AND ENTERPRISES
:                           Real Gross Output: 50
  SEE   =    5963.07 RSQ   = 0.9072 RHO =   0.48 Obser  =   12 from 1993.000
  SEE+1 =    5597.93 RBSQ  = 0.8724 DW  =   1.05 DoFree =    8 to   2004.000
  MAPE  =       2.00 Test period:  SEE 10109.47 MAPE     3.09 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor50              - - - - - - - - - - - - - - - - - - 282490.78 - - -
  1 intercept           -2001764.63590    38.8  -7.09   10.78      1.00
  2 hr50                65961.11440    44.1   7.61   10.48     32.58  0.471
  3 exri                 805.86160    88.0   0.31    3.15    108.83  0.572
  4 oilp                1995.82152    77.6   0.17    1.00     23.78  0.745

:                      Price Index of Gross Output: 50
  SEE   =       1.61 RSQ   = 0.9770 RHO =   0.21 Obser  =   12 from 1993.000
  SEE+1 =       1.59 RBSQ  = 0.9719 DW  =   1.59 DoFree =    9 to   2004.000
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  MAPE  =       1.46 Test period:   SEE     2.45 MAPE     2.18 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop50                - - - - - - - - - - - - - - - - -     91.34 - - -
  1 intercept               12.15857    40.7   0.13   43.50      1.00
  2 wag50                    7.79691    34.5   1.25    1.08     14.64  1.422
  3 wag50[1]                -2.46918     3.7  -0.38    1.00     14.16 -0.437

# ADMINISTRATIVE AND SUPPORT SERVICES
:                             Real Gross Output: 51
  SEE   =   12141.25 RSQ   = 0.9712 RHO =   0.65 Obser  =   12 from 1993.000
  SEE+1 =    9854.77 RBSQ  = 0.9649 DW  =   0.69 DoFree =    9 to   2004.000
  MAPE  =       2.56 Test period:   SEE 19524.22 MAPE     4.25 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor51                - - - - - - - - - - - - - - - - - 363328.94 - - -
  1 intercept           -113521.19830    45.4  -0.31   34.78      1.00
  2 ehe51                   40.38731    20.4   0.75    1.37   6744.55  0.520
  3 ehe51[1]                31.49987    17.0   0.56    1.00   6490.69  0.471

:                      Price Index of Of Gross Output: 51
  SEE   =       0.55 RSQ   = 0.9968 RHO =  -0.19 Obser  =   12 from 1993.000
  SEE+1 =       0.53 RBSQ  = 0.9956 DW  =   2.39 DoFree =    8 to   2004.000
  MAPE  =       0.48 Test period:   SEE     1.43 MAPE     1.25 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop51                - - - - - - - - - - - - - - - - -     94.69 - - -
  1 intercept               24.63383   379.5   0.26  312.94      1.00
  2 wag51                    6.06696   102.4   0.94    2.33     14.64  1.204
  3 wag51[1]                -1.61281     8.5  -0.24    2.24     14.16 -0.310
  4 oilp                     0.17119    49.5   0.04    1.00     23.78  0.128

# WASTE MANAGEMENT AND REMEDIATION SERVICES
:                             Real Gross Output: 52
  SEE   =     711.00 RSQ   = 0.9690 RHO =   0.26 Obser  =   12 from 1993.000
  SEE+1 =     691.16 RBSQ  = 0.9574 DW  =   1.49 DoFree =    8 to   2004.000
  MAPE  =       1.10 Test period:   SEE  1186.32 MAPE     2.19 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor52                - - - - - - - - - - - - - - - - -  46700.05 - - -
  1 intercept           -132257.50696    23.3  -2.83   32.25      1.00
  2 ehe52                  212.03223    18.6   1.35    1.58    297.05  1.305
  3 ehe52[1]               -40.68929     0.9  -0.25    1.49    289.40 -0.282
  4 hr52                  3920.95011    22.2   2.74    1.00     32.58  0.136

:                      Price Index of Of Gross Output: 52
  SEE   =       1.80 RSQ   = 0.9703 RHO =   0.67 Obser  =   14 from 1991.000
  SEE+1 =       1.49 RBSQ  = 0.9649 DW  =   0.65 DoFree =   11 to   2004.000
  MAPE  =       1.64 Test period:   SEE     1.62 MAPE     1.33 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop52                - - - - - - - - - - - - - - - - -     95.78 - - -
  1 intercept               25.23230   105.9   0.26   33.70      1.00
  2 wag52                    5.20010   253.3   0.68    1.36     12.51  0.866
  3 oilp                     0.23442    16.7   0.06    1.00     23.39  0.154

# EDUCATIONAL SERVICES
:                             Real Gross Output: 53
  SEE   =    1433.59 RSQ   = 0.9893 RHO =   0.41 Obser  =   12 from 1993.000
  SEE+1 =    1342.64 RBSQ  = 0.9852 DW  =   1.18 DoFree =    8 to   2004.000
  MAPE  =       0.84 Test period:   SEE  2871.33 MAPE     1.86 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor53                - - - - - - - - - - - - - - - - - 132741.07 - - -
  1 intercept             -1361.39192     0.0  -0.01   93.04      1.00
  2 ehe53                   17.49507     6.6   0.30    1.32   2287.38  0.394
  3 ehe53[1]                26.07349    14.7   0.43    1.00   2199.97  0.590
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  4 hr53                 1140.98410     0.2   0.28    1.00     32.19  0.014

:                     Price Index of Of Gross Output: 53
  SEE   =       0.40 RSQ   = 0.9990 RHO =   0.49 Obser  =   12 from 1993.000
  SEE+1 =       0.36 RBSQ  = 0.9987 DW  =   1.01 DoFree =    9 to   2004.000
  MAPE  =       0.32 Test period:  SEE     0.12 MAPE     0.10 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop53               - - - - - - - - - - - - - - - - -     96.36 - - -
  1 intercept              -4.72092    49.3  -0.05  972.89      1.00
  2 wag53                   7.31368  1554.8   1.02    2.47     13.44  0.942
  3 oilp                    0.11801    57.1   0.03    1.00     23.78  0.069

# AMBULATORY HEALTH CARE SERVICES
:                          Nominal Gross Output: 54
  SEE   =   13935.60 RSQ   = 0.9774 RHO =   0.46 Obser  =   12 from 1993.000
  SEE+1 =   13132.76 RBSQ  = 0.9689 DW  =   1.08 DoFree =    8 to   2004.000
  MAPE  =       2.89 Test period:  SEE  8797.19 MAPE     1.35 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago54                - - - - - - - - - - - - - - - - - 432045.50 - - -
  1 intercept            -383061.00194    96.9  -0.89   44.21      1.00
  2 ehe54                 309.77753    22.7   3.01    1.73   4192.18  1.525
  3 ehe54[1]             -130.01027     5.2  -1.22    1.23   4046.01 -0.659
  4 oilp                 1786.59714    10.8   0.10    1.00     23.78  0.141

:                     Price Index of Of Gross Output: 54
  SEE   =       0.52 RSQ   = 0.9957 RHO =   0.18 Obser  =   12 from 1993.000
  SEE+1 =       0.52 RBSQ  = 0.9947 DW  =   1.65 DoFree =    9 to   2004.000
  MAPE  =       0.44 Test period:  SEE     0.82 MAPE     0.73 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop54               - - - - - - - - - - - - - - - - -     96.75 - - -
  1 intercept              32.25526   647.4   0.33  232.26      1.00
  2 wag54                  -1.09630     6.7  -0.15    5.11     13.44 -0.224
  3 atime                   2.77984   126.1   0.82    1.00     28.50  1.220

# HOSPITALS AND NURSING AND RESIDENTIAL CARE FACILITIES
:                            Real Gross Output: 55
  SEE   =    2167.64 RSQ   = 0.9966 RHO =   0.00 Obser  =   12 from 1993.000
  SEE+1 =    2167.65 RBSQ  = 0.9958 DW  =   1.99 DoFree =    9 to   2004.000
  MAPE  =       0.40 Test period:  SEE  7314.44 MAPE     1.45 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor55               - - - - - - - - - - - - - - - - - 423695.65 - - -
  1 intercept            -269703.02135   292.7  -0.64  290.51      1.00
  2 ehe55_1               153.01489   324.1   1.42    2.15   3942.82  0.798
  3 ehe55_2                35.90619    46.6   0.21    1.00   2509.00  0.208

:                     Price Index of Of Gross Output: 55
  SEE   =       0.52 RSQ   = 0.9978 RHO =   0.19 Obser  =   12 from 1993.000
  SEE+1 =       0.52 RBSQ  = 0.9973 DW  =   1.62 DoFree =    9 to   2004.000
  MAPE  =       0.44 Test period:  SEE     1.95 MAPE     1.60 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop55               - - - - - - - - - - - - - - - - -     97.13 - - -
  1 intercept               2.96776    18.0   0.03  460.46      1.00
  2 wag55                   0.48918     0.3   0.07    1.92     13.44  0.071
  3 wag55[1]                6.73884    38.5   0.90    1.00     13.00  0.928

# SOCIAL ASSISTANCE
:                            Real Gross Output: 56
  SEE   =    1531.56 RSQ   = 0.9906 RHO =   0.70 Obser  =   12 from 1993.000
  SEE+1 =    1203.86 RBSQ  = 0.9885 DW  =   0.61 DoFree =    9 to   2004.000
  MAPE  =       1.59 Test period:  SEE  2046.00 MAPE     1.84 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 agor56               - - - - - - - - - - - - - - - - - -  82755.07 - - -
  1 intercept           -457768.80566    24.5  -5.53  106.38      1.00
  2 ehe56                 49.95541   321.9   1.04    1.51   1727.12  0.860
  3 hr56                14113.07057    22.9   5.49    1.00     32.19  0.150

:                     Price Index of Of Gross Output: 56
  SEE   =       1.39 RSQ   = 0.9761 RHO =   0.76 Obser  =   12 from 1993.000
  SEE+1 =       1.02 RBSQ  = 0.9737 DW  =   0.48 DoFree =   10 to   2004.000
  MAPE  =       1.17 Test period:  SEE     3.64 MAPE     3.34 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop56               - - - - - - - - - - - - - - - - - -     94.44 - - -
  1 intercept              20.06176    98.3   0.21   41.87      1.00
  2 wag56                   5.53546   547.1   0.79    1.00     13.44  0.988

# PERFORMING ARTS, SPECTATOR SPORTS, MUSEUMS, AND RELATED ACTIVITIES
:                          Nominal Gross Output: 57
  SEE   =    1937.87 RSQ   = 0.9785 RHO =   0.54 Obser  =   12 from 1993.000
  SEE+1 =    1708.88 RBSQ  = 0.9737 DW  =   0.92 DoFree =    9 to   2004.000
  MAPE  =       2.67 Test period:  SEE   882.19 MAPE     1.08 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago57                - - - - - - - - - - - - - - - - - -  60817.08 - - -
  1 intercept           -27947.14056   112.8  -0.46   46.53      1.00
  2 ehe57_2                98.03047     0.5   0.16    1.81     99.96  0.103
  3 ehe57_2[1]            819.58460    34.4   1.30    1.00     96.35  0.887

:                     Price Index of Of Gross Output: 57
  SEE   =       0.78 RSQ   = 0.9959 RHO =   0.30 Obser  =   12 from 1993.000
  SEE+1 =       0.77 RBSQ  = 0.9950 DW  =   1.40 DoFree =    9 to   2004.000
  MAPE  =       0.72 Test period:  SEE     1.29 MAPE     1.08 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop57               - - - - - - - - - - - - - - - - - -     94.40 - - -
  1 intercept              -8.03012    56.5  -0.09  246.32      1.00
  2 wag57                  15.46610   726.1   1.28    2.80      7.81  1.164
  3 exri                   -0.16828    67.3  -0.19    1.00    108.83 -0.190

# AMUSEMENTS, GAMBLING, AND RECREATION INDUSTRIES
:                            Real Gross Output: 58
  SEE   =    1042.74 RSQ   = 0.9871 RHO =   0.38 Obser  =   12 from 1993.000
  SEE+1 =     966.74 RBSQ  = 0.9823 DW  =   1.24 DoFree =    8 to   2004.000
  MAPE  =       0.97 Test period:  SEE  3698.47 MAPE     4.17 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor58               - - - - - - - - - - - - - - - - - -  75374.03 - - -
  1 intercept           -703.73793     0.1  -0.01   77.78      1.00
  2 ehe58                  53.27452    29.2   0.84    1.83   1193.11  0.784
  3 ehe58[1]               31.25417    11.2   0.48    1.82   1152.14  0.513
  4 exri                -215.88569    34.9  -0.31    1.00    108.83 -0.326

:                     Price Index of Of Gross Output: 58
  SEE   =       0.60 RSQ   = 0.9956 RHO =   0.30 Obser  =   12 from 1993.000
  SEE+1 =       0.59 RBSQ  = 0.9940 DW  =   1.41 DoFree =    8 to   2004.000
  MAPE  =       0.56 Test period:  SEE     1.01 MAPE     0.89 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop58               - - - - - - - - - - - - - - - - - -     96.27 - - -
  1 intercept              18.71496   241.3   0.19  229.61      1.00
  2 wag58                   9.53560    31.8   0.77    2.00      7.81  0.973
  3 wag58[1]               -7.81491     6.1  -0.61    1.43      7.57 -0.782
  4 wag58[2]                8.48680    19.6   0.65    1.00      7.34  0.812

# ACCOMMODATION
:                            Real Gross Output: 59
  SEE   =    2901.85 RSQ   = 0.9304 RHO =   0.31 Obser  =   12 from 1993.000
```

```
  SEE+1 =    2847.72 RBSQ  = 0.8906 DW  =   1.39 DoFree =    7 to   2004.000
  MAPE  =       1.81 Test period:   SEE  9152.78 MAPE     6.12 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor59               - - - - - - - - - - - - - - - - - - 125238.67 - - -
  1 intercept           -37793.77577     0.1  -0.30   14.36      1.00
  2 ehe59                 79.57757    14.5   1.11    4.39   1747.02  0.654
  3 ehe59[1]             -12.63804     0.6  -0.17    4.27   1727.97 -0.118
  4 hr59                 963.33240     0.0   0.20    2.26     25.90  0.015
  5 oilp                 878.86775    50.2   0.17    1.00     23.78  0.584

:                    Price Index of Of Gross Output: 59
  SEE   =       1.12 RSQ   = 0.9864 RHO =   0.33 Obser  =   12 from 1993.000
  SEE+1 =       1.07 RBSQ  = 0.9834 DW  =   1.34 DoFree =    9 to   2004.000
  MAPE  =       1.04 Test period:   SEE     3.46 MAPE     3.03 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop59               - - - - - - - - - - - - - - - - -      94.08 - - -
  1 intercept             13.99267    75.9   0.15   73.49      1.00
  2 wag59                  7.87806    18.8   0.65    1.04      7.81  0.759
  3 atime                  0.65211     1.9   0.20    1.00     28.50  0.235

# FOOD SERVICES AND DRINKING PLACES
:                           Real Gross Output: 60
  SEE   =    3750.19 RSQ   = 0.9881 RHO =   0.60 Obser  =   12 from 1993.000
  SEE+1 =    3058.61 RBSQ  = 0.9855 DW  =   0.80 DoFree =    9 to   2004.000
  MAPE  =       0.95 Test period:   SEE  7173.12 MAPE     1.79 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agor60               - - - - - - - - - - - - - - - - - - 333534.53 - - -
  1 intercept           72392.00722     9.7   0.22   84.07      1.00
  2 ehe60                 13.95118     7.7   0.33    2.64   7901.43  0.238
  3 rtfood                 0.53101    62.4   0.45    1.00 284189.75  0.759

:                    Price Index of Of Gross Output: 60
  SEE   =       0.64 RSQ   = 0.9923 RHO =  -0.03 Obser  =   12 from 1993.000
  SEE+1 =       0.64 RBSQ  = 0.9894 DW  =   2.06 DoFree =    8 to   2004.000
  MAPE  =       0.47 Test period:   SEE     2.19 MAPE     1.91 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop60               - - - - - - - - - - - - - - - - -      98.21 - - -
  1 intercept             39.21065   609.0   0.40  130.11      1.00
  2 wag60                -11.55420    51.2  -0.92    4.82      7.81 -1.451
  3 wag60[1]               8.85818    46.6   0.68    3.28      7.57  1.092
  4 atime                  2.88086    81.0   0.84    1.00     28.50  1.352

# OTHER SERVICES, EXCEPT GOVERNMENT
:                         Nominal Gross Output: 61
  SEE   =    7005.37 RSQ   = 0.9901 RHO =   0.07 Obser  =   12 from 1993.000
  SEE+1 =    6999.65 RBSQ  = 0.9879 DW  =   1.85 DoFree =    9 to   2004.000
  MAPE  =       1.57 Test period:   SEE  8297.38 MAPE     1.59 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago61                - - - - - - - - - - - - - - - - - - 390858.58 - - -
  1 intercept           -441392.09928   295.1  -1.13  100.85      1.00
  2 ehe61                157.24330   479.8   2.00    3.52   4961.44  0.819
  3 oilp                2190.80386    87.6   0.13    1.00     23.78  0.227

:                    Price Index of Of Gross Output: 61
  SEE   =       1.12 RSQ   = 0.9877 RHO =   0.73 Obser  =   12 from 1993.000
  SEE+1 =       0.83 RBSQ  = 0.9865 DW  =   0.53 DoFree =   10 to   2004.000
  MAPE  =       0.95 Test period:   SEE     2.91 MAPE     2.48 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop61               - - - - - - - - - - - - - - - - -      96.38 - - -
  1 intercept              4.26249     8.2   0.04   81.28      1.00
  2 wagnf                  0.20265   801.6   0.96    1.00    454.56  0.994
```

```
# FEDERAL GOVERNMENT: GENERAL
:                           Nominal Gross Output: 62
  SEE   =   19052.56 RSQ   = 0.9569 RHO =   0.50 Obser  =   12 from 1993.000
  SEE+1 =   16953.83 RBSQ  = 0.9408 DW  =   1.00 DoFree =    8 to   2004.000
  MAPE  =       2.77 Test period:  SEE 32736.94 MAPE     4.19 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago62                 - - - - - - - - - - - - - - - - - 524062.33 - - -
  1 intercept             -1656730.68889   141.9  -3.16   23.23      1.00
  2 ehe62                  203.30124    12.0   0.78   19.74   1998.73  0.267
  3 ehe62[1]               314.56938    26.4   1.22   16.16   2028.99  0.502

:                      Price Index of Of Gross Output: 62
  SEE   =       1.54 RSQ   = 0.9781 RHO =   0.52 Obser  =   12 from 1993.000
  SEE+1 =       1.34 RBSQ  = 0.9732 DW  =   0.96 DoFree =    9 to   2004.000
  MAPE  =       1.15 Test period:  SEE     0.32 MAPE     0.26 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop62                - - - - - - - - - - - - - - - - -     97.27 - - -
  1 intercept               15.86664    36.0   0.16   45.58      1.00
  2 wagnf                    0.15896   232.4   0.74    2.27    454.56  0.761
  3 oilp                     0.38467    50.8   0.09    1.00     23.78  0.271

# FEDERAL GOVERNMENT: ENTERPRISES
:                           Nominal Gross Output: 63
  SEE   =    1057.25 RSQ   = 0.9809 RHO =   0.18 Obser  =   12 from 1993.000
  SEE+1 =    1055.37 RBSQ  = 0.9766 DW  =   1.64 DoFree =    9 to   2004.000
  MAPE  =       1.12 Test period:  SEE     7.67 MAPE     0.01 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago63                 - - - - - - - - - - - - - - - - -  77426.67 - - -
  1 intercept             -1271.23549     0.1  -0.02   52.31      1.00
  2 ehe63                   19.00818    18.3   0.21   52.27    845.64  0.087
  3 atime                 2197.32942   623.0   0.81    1.00     28.50  0.992

:                      Price Index of Of Gross Output: 63
  SEE   =       2.27 RSQ   = 0.9027 RHO =   0.24 Obser  =   12 from 1993.000
  SEE+1 =       2.21 RBSQ  = 0.8810 DW  =   1.53 DoFree =    9 to   2004.000
  MAPE  =       1.75 Test period:  SEE     2.58 MAPE     2.25 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop63                - - - - - - - - - - - - - - - - -    100.75 - - -
  1 intercept               43.31577    97.6   0.43   10.27      1.00
  2 wagnf                    0.11677    86.8   0.53    1.13    454.56  0.798
  3 oilp                     0.18335     6.4   0.04    1.00     23.78  0.184

# STATE AND LOCAL GOVERNMENT: GENERAL
:                           Nominal Gross Output: 64
  SEE   =   23954.35 RSQ   = 0.9870 RHO =   0.85 Obser  =   12 from 1993.000
  SEE+1 =   17202.61 RBSQ  = 0.9841 DW  =   0.30 DoFree =    9 to   2004.000
  MAPE  =       2.08 Test period:  SEE 64377.00 MAPE     4.20 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago64                 - - - - - - - - - - - - - - - - - 1076137.83 - - -
  1 intercept             -985233.45583     8.6  -0.92   77.03      1.00
  2 ehe64                  137.56510     1.1   0.35   28.16   2723.05  0.027
  3 atime                 59185.08520   430.6   1.57    1.00     28.50  0.972

:                      Price Index of Of Gross Output: 64
  SEE   =       1.22 RSQ   = 0.9854 RHO =   0.39 Obser  =   12 from 1993.000
  SEE+1 =       1.13 RBSQ  = 0.9822 DW  =   1.21 DoFree =    9 to   2004.000
  MAPE  =       0.93 Test period:  SEE     0.28 MAPE     0.23 end  2005.000
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop64                - - - - - - - - - - - - - - - - -     96.73 - - -
  1 intercept               16.78179    58.6   0.17   68.72      1.00
```

```
  2 wagnf                   0.15703   308.2   0.74    2.78    454.56  0.774
  3 oilp                    0.36031    66.9   0.09    1.00     23.78  0.261

# STATE AND LOCAL GOVERNMENT: ENTERPRISES
:                          Nominal Gross Output: 65
  SEE   =    1575.70 RSQ   = 0.9963 RHO =  -0.17 Obser  =   12 from 1993.000
  SEE+1 =    1546.68 RBSQ  = 0.9955 DW  =   2.35 DoFree =    9 to   2004.000
  MAPE  =       0.71 Test period:  SEE  5259.25 MAPE     2.67 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ago65                - - - - - - - - - - - - - - - - - 143749.92 - - -
  1 intercept            -93058.35239   217.8  -0.65  269.01      1.00
  2 ehe65                  27.64945    32.2   0.39   22.63   2019.17  0.158
  3 atime                6350.14808   375.7   1.26    1.00     28.50  0.848

:                     Price Index of Of Gross Output: 65
  SEE   =       1.46 RSQ   = 0.9721 RHO =   0.40 Obser  =   12 from 1993.000
  SEE+1 =       1.42 RBSQ  = 0.9659 DW  =   1.19 DoFree =    9 to   2004.000
  MAPE  =       1.13 Test period:  SEE     9.03 MAPE     7.41 end  2005.000
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 agop65               - - - - - - - - - - - - - - - - -     97.36 - - -
  1 intercept              20.92424    75.5   0.21   35.86      1.00
  2 wagnf                  -0.06965     0.9  -0.33    1.21    454.56 -0.395
  3 wagnf[1]                0.24504    10.0   1.11    1.00    441.12  1.380
```

Appendix 6.4: Regression Results for Monthly Equations

```
# Farms
:                             PPI: u311
  SEE   =       0.94 RSQ   = 0.9829 RHO =   0.01 Obser  =  144 from 1993.001
  SEE+1 =       0.94 RBSQ  = 0.9824 DurH = 999.00 DoFree =  139 to   2004.012
  MAPE  =       0.45 Test period:   SEE     1.61 MAPE     0.90 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 foodprim              - - - - - - - - - - - - - - - - -    128.60 - - -
  1 intercept               6.95262     2.3   0.05   58.36      1.00
  2 foodprim[1]             1.09027    48.0   1.09    1.08    128.41  1.081
  3 foodprim[2]            -0.09934     0.2  -0.10    1.05    128.22 -0.098
  4 foodprim[3]            -0.07479     0.3  -0.07    1.05    128.04 -0.073
  5 mnipaqfood              0.00453     2.6   0.03    1.00    872.92  0.084

:                           USDA: Farm Labor Expense
  SEE   =      54.21 RSQ   = 0.9996 RHO =   0.46 Obser  =  144 from 1993.001
  SEE+1 =      49.24 RBSQ  = 0.9996 DurH =  5.73 DoFree =  140 to   2004.012
  MAPE  =       0.16 Test period:   SEE   193.68 MAPE     0.74 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mfarmlexp             - - - - - - - - - - - - - - - - -  19228.17 - - -
  1 intercept              50.54923     0.8   0.00 2608.42      1.00
  2 mfarmlexp[1]            1.21112   255.4   1.21    1.44  19162.00  1.213
  3 mfarmlexp[4]           -0.21526     7.7  -0.21    1.00  18959.15 -0.216
  4 mfarmlexp[8]            0.00275     0.0   0.00    1.00  18689.69  0.003

:                          BEA Farm employment
  SEE   =       2.17 RSQ   = 0.9979 RHO =  -0.09 Obser  =   72 from 1999.001
  SEE+1 =       2.16 RBSQ  = 0.9979 DurH = -0.94 DoFree =   68 to   2004.012
  MAPE  =       0.07 Test period:   SEE  1007.01 MAPE 7.12e+10 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 memppprod1            - - - - - - - - - - - - - - - - -   1586.50 - - -
  1 intercept              13.16412     1.6   0.01  487.67      1.00
  2 memppprod1[1]           1.85858   273.1   1.86    5.29   1586.69  1.850
  3 memppprod1[2]          -0.86357    91.2  -0.86    1.02   1586.83 -0.857
  4 mnipaqfood             -0.00539     1.2  -0.00    1.00    987.86 -0.009

# Forestry, fishing, and related
:                            BLS: CES et1133
  SEE   =       0.86 RSQ   = 0.9746 RHO =  -0.07 Obser  =  144 from 1993.001
  SEE+1 =       0.86 RBSQ  = 0.9742 DurH = -0.88 DoFree =  141 to   2004.012
  MAPE  =       0.89 Test period:   SEE     1.66 MAPE     2.18 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe2m                 - - - - - - - - - - - - - - - - -     77.42 - - -
  1 intercept               5.85130     2.1   0.08   39.38      1.00
  2 ehe2m[1]                0.94777   258.4   0.95    1.05     77.50  0.936
  3 mnipaqfur              -0.00678     2.6  -0.02    1.00    278.07 -0.062

:                            IPI: n1133
  SEE   =       2.53 RSQ   = 0.6208 RHO =   0.02 Obser  =  144 from 1993.001
  SEE+1 =       2.53 RBSQ  = 0.6126 DurH = 999.00 DoFree =  140 to   2004.012
  MAPE  =       1.88 Test period:   SEE     3.41 MAPE     2.75 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips2_1m               - - - - - - - - - - - - - - - - -    104.42 - - -
  1 intercept              40.92302     6.7   0.39    2.64      1.00
  2 ips2_1m[1]              0.51323    12.5   0.51    1.11    104.44  0.516
  3 ips2_1m[2]              0.14052     1.0   0.14    1.06    104.48  0.142
  4 mnipaqfur              -0.01723     2.8  -0.05    1.00    278.07 -0.208
```

```
:                                  IPI: n3211
  SEE   =        2.86 RSQ   = 0.7568 RHO =  -0.09 Obser  =  144 from 1993.001
  SEE+1 =        2.85 RBSQ  = 0.7516 DurH = -2.61 DoFree =  140 to   2004.012
  MAPE  =        2.33 Test period:  SEE     6.40 MAPE     4.87 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips2_2m               - - - - - - - - - - - - - - - - -     99.71 - - -
  1 intercept               16.34002     3.4   0.16    4.11      1.00
  2 ips2_2m[1]               0.43623    11.1   0.44    1.27     99.62  0.437
  3 ips2_2m[3]               0.35386     7.4   0.35    1.04     99.44  0.355
  4 mnipaqfur                0.01701     1.9   0.05    1.00    278.07  0.145

:                           Growth rate of PPI: u1133
  SEE   =        1.34 RSQ   = 0.1814 RHO =  -0.00 Obser  =  144 from 1993.001
  SEE+1 =        1.34 RBSQ  = 0.1579 DurH = 999.00 DoFree =  139 to   2004.012
  MAPE  =      150.92 Test period:  SEE     0.55 MAPE   101.04 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri2gr                - - - - - - - - - - - - - - - - -      0.08 - - -
  1 intercept                0.15494     0.3   1.88    1.22      1.00
  2 pri2gr[1]                0.35612     6.3   0.43    1.03      0.10  0.359
  3 pri2gr[2]                0.15540     1.1   0.18    1.01      0.10  0.157
  4 pri2gr[3]               -0.07155     0.3  -0.09    1.01      0.10 -0.072
  5 cfurgr                  -0.24412     0.3  -1.41    1.00      0.48 -0.073

# oil and Gas extraction
:                                  IPI: g211
  SEE   =        0.93 RSQ   = 0.8888 RHO =  -0.04 Obser  =  144 from 1993.001
  SEE+1 =        0.93 RBSQ  = 0.8873 DurH = -0.60 DoFree =  141 to   2004.012
  MAPE  =        0.65 Test period:  SEE     4.26 MAPE     3.07 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips3m                 - - - - - - - - - - - - - - - - -    102.01 - - -
  1 intercept               18.36396     3.3   0.18    9.00      1.00
  2 ips3m[1]                 0.83491    66.6   0.84    1.04    102.07  0.831
  3 mnipaqgas               -0.00955     2.1  -0.02    1.00    165.14 -0.130

:                                BLS:CES et211
  SEE   =        0.82 RSQ   = 0.9975 RHO =   0.01 Obser  =  144 from 1993.001
  SEE+1 =        0.82 RBSQ  = 0.9974 DurH = 999.00 DoFree =  140 to   2004.012
  MAPE  =        0.46 Test period:  SEE     3.96 MAPE     2.90 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe3m                 - - - - - - - - - - - - - - - - -    138.51 - - -
  1 intercept               -1.25774     0.3  -0.01  400.16      1.00
  2 ehe3m[1]                 1.06609    46.6   1.07    1.05    138.86  1.082
  3 ehe3m[2]                -0.06846     0.2  -0.07    1.04    139.22 -0.070
  4 mnipaqgas[3]             0.00776     1.9   0.01    1.00    162.21  0.016

:                                  PPI: u211
  SEE   =       11.91 RSQ   = 0.9216 RHO =   0.04 Obser  =  144 from 1993.001
  SEE+1 =       11.90 RBSQ  = 0.9199 DurH =  9.17 DoFree =  140 to   2004.012
  MAPE  =        6.93 Test period:  SEE    49.96 MAPE    15.18 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri3m                 - - - - - - - - - - - - - - - - -    103.93 - - -
  1 intercept              -30.57015     7.1  -0.29   12.75      1.00
  2 pri3m[1]                 0.68813    19.5   0.68    1.22    102.99  0.672
  3 pri3m[2]                -0.08946     0.4  -0.09    1.22    101.94 -0.084
  4 mnipaqgas[1]             0.44317    10.4   0.70    1.00    164.15  0.384

# Mining
:                                  IPI: g212
  SEE   =        1.76 RSQ   = 0.8519 RHO =  -0.12 Obser  =  144 from 1993.001
  SEE+1 =        1.74 RBSQ  = 0.8498 DurH = -1.59 DoFree =  141 to   2004.012
```

```
  MAPE  =       1.37 Test period:   SEE     2.46 MAPE     1.90 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips4m                 - - - - - - - - - - - - - - - - -    100.65 - - -
  1 intercept               9.62637     2.9   0.10    6.75      1.00
  2 ips4m[1]                0.89596   130.4   0.90    1.01    100.57  0.906
  3 mgdp                    0.00010     0.3   0.01    1.00   9027.08  0.035

:                               BLS: CES et212
  SEE   =       0.89 RSQ   = 0.7915 RHO =  -0.02 Obser  =  144 from 1993.001
  SEE+1 =       0.00 RBSQ  = 0.7870 DurH = 999.00 DoFree =  140 to   2004.012
  MAPE  =     506.90 Test period:   SEE     0.28 MAPE   101.57 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe4gr                - - - - - - - - - - - - - - - - -     -0.63 - - -
  1 intercept              -0.21495     0.1   1.27    4.95      3.71
  2 ehe4gr[1]               0.79458    27.5   0.87    4.83     -0.68  0.575
  3 mgdpgr                  0.43307     1.8  -1.09    3.80      1.58  0.105
  4 ehe4gr_mu[1]           -0.73580    82.2  -0.05    1.00     -0.04 -1.055

:                                 PPI: u2121
  SEE   =       1.54 RSQ   = 0.8934 RHO =  -0.32 Obser  =  144 from 1993.001
  SEE+1 =       1.45 RBSQ  = 0.8918 DurH = -4.15 DoFree =  141 to   2004.012
  MAPE  =       1.17 Test period:   SEE    15.03 MAPE    11.72 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri4m                 - - - - - - - - - - - - - - - - -     92.25 - - -
  1 intercept               2.20092     0.2   0.02    9.38      1.00
  2 pri4m[1]                0.96076   188.9   0.96    1.03     92.16  0.927
  3 mgdp                    0.00017     1.3   0.02    1.00   9027.08  0.055

# Mining supports
:                                  IPI: g213
  SEE   =       2.77 RSQ   = 0.9602 RHO =   0.42 Obser  =  144 from 1993.001
  SEE+1 =       2.52 RBSQ  = 0.9596 DurH =  5.10 DoFree =  141 to   2004.012
  MAPE  =       1.75 Test period:   SEE     2.29 MAPE     1.22 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips5m                 - - - - - - - - - - - - - - - - -    119.72 - - -
  1 intercept               0.97230     0.1   0.01   25.11      1.00
  2 ips5m[1]                0.98024   400.5   0.98    1.01    119.60  0.981
  3 mnipaqgas[2]            0.00925     0.7   0.01    1.00    163.17  0.024

:                               BLS: CES et213
  SEE   =       1.85 RSQ   = 0.9834 RHO =   0.52 Obser  =  144 from 1993.001
  SEE+1 =       1.59 RBSQ  = 0.9832 DurH =  6.31 DoFree =  141 to   2004.012
  MAPE  =       0.81 Test period:   SEE    14.47 MAPE     5.34 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe5m                 - - - - - - - - - - - - - - - - -    171.77 - - -
  1 intercept               4.18414     1.4   0.02   60.31      1.00
  2 ehe5m[1]                0.94823   432.1   0.95    1.18    171.44  0.937
  3 mnipaqgas[2]            0.03073     8.7   0.03    1.00    163.17  0.077

:                                PPI: u213112
  SEE   =       1.99 RSQ   = 0.9807 RHO =  -0.01 Obser  =  144 from 1993.001
  SEE+1 =       1.99 RBSQ  = 0.9803 DurH = -0.42 DoFree =  140 to   2004.012
  MAPE  =       0.85 Test period:   SEE     3.88 MAPE     1.85 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri5_2m               - - - - - - - - - - - - - - - - -    120.73 - - -
  1 intercept               4.22903     2.3   0.04   51.81      1.00
  2 pri5_2m[1]              0.96876    39.6   0.97    1.12    120.42  0.962
  3 pri5_2m[2]             -0.04929     0.1  -0.05    1.11    120.11 -0.049
  4 mnipaqgas[2]            0.03530     5.4   0.05    1.00    163.17  0.088

:                                PPI: u213114
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  SEE   =       1.43 RSQ   = 0.8765 RHO =   0.03 Obser  =  144 from 1993.001
  SEE+1 =       1.43 RBSQ  = 0.8747 DurH =  0.34 DoFree =  141 to   2004.012
  MAPE  =       0.50 Test period:   SEE    11.03 MAPE     7.97 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri5_4m               - - - - - - - - - - - - - - - - -    115.11 - - -
  1 intercept               7.58897     1.7   0.07    8.09      1.00
  2 pri5_4m[1]              0.92952   181.0   0.93    1.01    115.03  0.931
  3 mnipaqgas[2]            0.00366     0.4   0.01    1.00    163.17  0.032

# Utilities
:                                IPI: g2211a2
  SEE   =       1.53 RSQ   = 0.9490 RHO =   0.03 Obser  =  144 from 1993.001
  SEE+1 =       1.53 RBSQ  = 0.9483 DurH =  0.76 DoFree =  141 to   2004.012
  MAPE  =       1.27 Test period:   SEE     2.53 MAPE     1.83 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips6m                 - - - - - - - - - - - - - - - - -     93.30 - - -
  1 intercept              17.32578    11.8   0.19   19.61      1.00
  2 ips6m[1]                0.55161    19.9   0.55    1.27     93.15  0.550
  3 mtime                   0.84691    12.8   0.26    1.00     29.04  0.433

:                                BLS: CES wp22
  SEE   =       0.12 RSQ   = 0.9977 RHO =  -0.13 Obser  =  144 from 1993.001
  SEE+1 =       0.11 RBSQ  = 0.9977 DurH = -3.04 DoFree =  140 to   2004.012
  MAPE  =       0.41 Test period:   SEE     0.26 MAPE     0.80 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag6m                 - - - - - - - - - - - - - - - - -     21.70 - - -
  1 intercept               2.15393     6.8   0.10  435.52      1.00
  2 wag6m[1]                0.51212    16.7   0.51    1.33     21.64  0.512
  3 mgdp                    0.00034     3.7   0.14    1.10   9027.08  0.221
  4 mtime                   0.18530     4.7   0.25    1.00     29.04  0.267

:                               PPI: u22112242
  SEE   =       2.04 RSQ   = 0.8977 RHO =   0.57 Obser  =  144 from 1993.001
  SEE+1 =       1.68 RBSQ  = 0.8940 DurH =  8.80 DoFree =  138 to   2004.012
  MAPE  =       1.33 Test period:   SEE    10.11 MAPE     6.34 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri6_1m               - - - - - - - - - - - - - - - - -    116.93 - - -
  1 intercept              14.61397     1.3   0.12    9.78      1.00
  2 pri6_1m[1]              0.41816    20.6   0.42    2.40    116.79  0.421
  3 pri6_1m[4]             -0.10329     2.5  -0.10    2.16    116.45 -0.103
  4 pri6_1m[8]             -0.00826     0.0  -0.01    2.05    116.07 -0.008
  5 pri6_1m[12]             0.54021    33.8   0.53    1.03    115.58  0.538
  6 mgdp                    0.00045     1.5   0.03    1.00   9027.08  0.109

:                               PPI: u22112243
  SEE   =       1.90 RSQ   = 0.9131 RHO =   0.37 Obser  =  144 from 1993.001
  SEE+1 =       1.77 RBSQ  = 0.9100 DurH =  5.85 DoFree =  138 to   2004.012
  MAPE  =       1.21 Test period:   SEE    11.93 MAPE     6.95 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri6_2m               - - - - - - - - - - - - - - - - -    113.33 - - -
  1 intercept               3.14902     0.1   0.03   11.51      1.00
  2 pri6_2m[1]              0.67631    40.7   0.68    1.58    113.22  0.674
  3 pri6_2m[4]             -0.13001     3.5  -0.13    1.50    112.92 -0.125
  4 pri6_2m[8]              0.06790     1.1   0.07    1.32    112.51  0.061
  5 pri6_2m[12]             0.32885    12.3   0.33    1.04    112.10  0.291
  6 mgdp                    0.00042     2.1   0.03    1.00   9027.08  0.102

:                               PPI: u221210114
  SEE   =       9.11 RSQ   = 0.9480 RHO =   0.20 Obser  =  144 from 1993.001
  SEE+1 =       8.94 RBSQ  = 0.9465 DurH =  2.84 DoFree =  139 to   2004.012
  MAPE  =       3.55 Test period:   SEE    50.51 MAPE    17.46 end  2006.012
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```
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri6_3m               - - - - - - - - - - - - - - - - -    128.52 - - -
  1 intercept              49.05714     0.9   0.38   19.24      1.00
  2 pri6_3m[1]              0.96048   100.6   0.95    1.10    127.69  0.943
  3 pri6_3m[4]             -0.08729     1.3  -0.09    1.09    125.45 -0.082
  4 mgdp                    0.01757     1.7   1.23    1.03   9027.08  0.686
  5 mtime                  -6.57083     1.3  -1.48    1.00     29.04 -0.570

# Construction
:                                BLS: CES etct
  SEE   =       23.29 RSQ   = 0.9990 RHO =  -0.15 Obser  =  144 from 1993.001
  SEE+1 =       23.01 RBSQ  = 0.9990 DurH = -1.86 DoFree =  139 to   2004.012
  MAPE  =        0.29 Test period:   SEE   141.18 MAPE     1.64 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe7m                 - - - - - - - - - - - - - - - - -   6102.69 - - -
  1 intercept              50.26997     2.0   0.01 1022.04      1.00
  2 mgdp[1]                 0.11233     3.6   0.17   88.12   8988.88  0.234
  3 mgdp[6]                -0.05593     0.3  -0.08   86.34   8800.77 -0.115
  4 mgdp[12]               -0.06062     1.2  -0.09   85.75   8581.40 -0.122
  5 ehe7m[1]                0.99503   826.0   0.99    1.00   6085.32  1.002

:                                BLS: CES wpct
  SEE   =        0.05 RSQ   = 0.9992 RHO =  -0.03 Obser  =  144 from 1993.001
  SEE+1 =        0.05 RBSQ  = 0.9992 DurH = -1.17 DoFree =  140 to   2004.012
  MAPE  =        0.22 Test period:   SEE     0.14 MAPE     0.64 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag7m                 - - - - - - - - - - - - - - - - -     16.58 - - -
  1 intercept               0.10239     1.9   0.01 1268.06      1.00
  2 wag7m[1]                0.61649    19.8   0.62    1.19     16.54  0.616
  3 wag7m[2]                0.37332     7.8   0.37    1.05     16.50  0.373
  4 mnipaqvnrs              0.00046     2.5   0.01    1.00    257.85  0.012

# Wood products
:                                  IPI: g321
  SEE   =        1.30 RSQ   = 0.9619 RHO =   0.01 Obser  =  144 from 1993.001
  SEE+1 =        1.30 RBSQ  = 0.9605 DurH = 999.00 DoFree =  138 to   2004.012
  MAPE  =        1.05 Test period:   SEE     5.28 MAPE     4.10 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips8m                 - - - - - - - - - - - - - - - - -     97.54 - - -
  1 intercept               3.58622     0.9   0.04   26.23      1.00
  2 ips8m[1]                0.78975    27.5   0.79    1.04     97.39  0.796
  3 ips8m[2]                0.11880     0.4   0.12    1.02     97.24  0.121
  4 ips8m[3]                0.04828     0.1   0.05    1.01     97.09  0.049
  5 mnipaqfur               0.00772     0.7   0.02    1.01    278.07  0.058
  6 mnipaqvnrs[1]          -0.00525     0.3  -0.01    1.00    256.88 -0.037

:                               BLS: CES et321
  SEE   =        2.06 RSQ   = 0.9953 RHO =  -0.08 Obser  =  144 from 1993.001
  SEE+1 =        2.06 RBSQ  = 0.9951 DurH = -1.07 DoFree =  139 to   2004.012
  MAPE  =        0.27 Test period:   SEE     8.40 MAPE     1.11 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe8m                 - - - - - - - - - - - - - - - - -    574.62 - - -
  1 intercept              11.15367     3.3   0.02  211.39      1.00
  2 ehe8m[1]                1.06609   168.2   1.07    1.53    574.30  1.081
  3 ehe8m[6]               -0.08250     2.1  -0.08    1.04    572.61 -0.090
  4 mnipaqfur               0.06769     1.2   0.03    1.03    278.07  0.112
  5 mnipaqfur[12]          -0.07738     1.5  -0.04    1.00    263.31 -0.130

:                                PPI: u321113
  SEE   =        3.19 RSQ   = 0.8987 RHO =   0.00 Obser  =  144 from 1993.001
  SEE+1 =        3.19 RBSQ  = 0.8958 DurH =  0.12 DoFree =  139 to   2004.012
```

```
  MAPE  =       1.61 Test period:   SEE     9.11 MAPE     4.97 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri8_1m               - - - - - - - - - - - - - - - - -    152.42 - - -
  1 intercept               26.95731     7.6   0.18    9.87      1.00
  2 pri8_1m[1]               1.25610    72.0   1.25    1.30    152.28  1.266
  3 pri8_1m[2]              -0.42281    11.4  -0.42    1.07    152.10 -0.433
  4 mnipaqfur                0.11078     2.3   0.20    1.05    278.07  0.546
  5 mnipaqfur[12]           -0.12271     2.7  -0.21    1.00    263.31 -0.618

#Nonmetallic mineral products
:                                     IPI: g327
  SEE   =       0.98 RSQ   = 0.1094 RHO =   0.03 Obser  =  144 from 1993.001
  SEE+1 =       0.98 RBSQ  = 0.0903 DurH =  2.33 DoFree =  140 to   2004.012
  MAPE  =     166.05 Test period:   SEE     1.29 MAPE   161.14 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips9gr                - - - - - - - - - - - - - - - - -      0.19 - - -
  1 intercept                0.18003     1.4   0.93    1.12      1.00
  2 ips9gr[1]               -0.29148     4.6  -0.27    1.03      0.18 -0.289
  3 ips9gr[12]               0.05491     0.2   0.05    1.03      0.18  0.054
  4 mvnrsgr                  0.14037     1.3   0.30    1.00      0.41  0.156

:                                BLS: CES et327
  SEE   =       1.97 RSQ   = 0.9901 RHO =  -0.21 Obser  =  144 from 1993.001
  SEE+1 =       1.93 RBSQ  = 0.9899 DurH = -3.76 DoFree =  140 to   2004.012
  MAPE  =       0.28 Test period:   SEE     6.18 MAPE     1.03 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe9m                 - - - - - - - - - - - - - - - - -    520.27 - - -
  1 intercept                7.91146     1.2   0.02  101.20      1.00
  2 ehe9m[1]                 1.14661   135.3   1.15    1.22    520.13  1.155
  3 ehe9m[4]                -0.07731     0.2  -0.08    1.01    519.64 -0.080
  4 ehe9m[6]                -0.08445     0.7  -0.08    1.00    519.34 -0.088

:                                     PPI: u327
  SEE   =       0.27 RSQ   = 0.9988 RHO =   0.12 Obser  =  144 from 1993.001
  SEE+1 =       0.27 RBSQ  = 0.9987 DurH =  1.48 DoFree =  138 to   2004.012
  MAPE  =       0.17 Test period:   SEE     8.26 MAPE     4.53 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri9m                 - - - - - - - - - - - - - - - - -    130.23 - - -
  1 intercept                4.73636     4.5   0.04  806.88      1.00
  2 pri9m[1]                 1.01037   182.9   1.01    1.21    130.01  1.013
  3 pri9m[6]                -0.02198     0.1  -0.02    1.12    128.91 -0.022
  4 pri9m[12]               -0.04319     0.8  -0.04    1.12    127.74 -0.045
  5 mgdp                     0.00066     2.9   0.05    1.02   9027.08  0.132
  6 mgdp[12]                -0.00040     1.0  -0.03    1.00   8581.40 -0.077

#Primary metals
:                                     IPI: g331
  SEE   =       2.24 RSQ   = 0.8834 RHO =  -0.32 Obser  =  144 from 1993.001
  SEE+1 =       2.11 RBSQ  = 0.8809 DurH = -3.89 DoFree =  140 to   2004.012
  MAPE  =       1.69 Test period:   SEE     7.63 MAPE     5.87 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips10m                - - - - - - - - - - - - - - - - -    106.10 - - -
  1 ips10m[1]                1.00208   900.3   1.00    1.01    105.96
  2 mnipaqgas                0.00213     0.0   0.00    1.01    165.14  0.012
  3 mnipaqmv                -0.01123     0.3  -0.04    1.00    345.86 -0.123
  4 mnipaqmv[4]              0.01008     0.2   0.03    1.00    339.61  0.112

:                                BLS: CES et331
  SEE   =       2.29 RSQ   = 0.9988 RHO =  -0.13 Obser  =  144 from 1993.001
  SEE+1 =       2.27 RBSQ  = 0.9987 DurH = -1.67 DoFree =  140 to   2004.012
  MAPE  =       0.28 Test period:   SEE     9.05 MAPE     1.58 end  2006.012
```

```
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe10m              - - - - - - - - - - - - - - - - -    590.11 - - -
  1 intercept              0.94029     0.1   0.00  801.68      1.00
  2 ehe10m[1]              1.20589   232.0   1.21    1.59    591.18  1.192
  3 ehe10m[5]             -0.20588     3.9  -0.21    1.00    595.58 -0.193
  4 ehe10m[9]             -0.00185     0.0  -0.00    1.00    600.17 -0.002

:                               PPI: u331
  SEE   =       0.67 RSQ   = 0.9937 RHO =  -0.07 Obser  =  144 from 1993.001
  SEE+1 =       0.67 RBSQ  = 0.9936 DurH = -1.30 DoFree =  140 to   2004.012
  MAPE  =       0.34 Test period:   SEE     7.08 MAPE     3.72 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri10m              - - - - - - - - - - - - - - - - -    121.26 - - -
  1 intercept              0.46039     0.1   0.00  159.97      1.00
  2 pri10m[1]              1.75021   168.1   1.75    2.35    120.95  1.657
  3 pri10m[2]             -0.75815    44.3  -0.75    1.03    120.65 -0.677
  4 mnipaqgas              0.00352     1.4   0.00    1.00    165.14  0.016

# 11 Fabricated metal product
:                               IPI: g332
  SEE   =       0.63 RSQ   = 0.9933 RHO =  -0.01 Obser  =  144 from 1993.001
  SEE+1 =       0.63 RBSQ  = 0.9931 DurH = -0.13 DoFree =  139 to   2004.012
  MAPE  =       0.50 Test period:   SEE     4.95 MAPE     3.85 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips11m              - - - - - - - - - - - - - - - - -     99.49 - - -
  1 intercept              2.09444     3.2   0.02  149.10      1.00
  2 ips11m[1]              1.03716   435.1   1.04    1.13     99.35  1.059
  3 ips11m[12]            -0.06108     4.2  -0.06    1.01     97.85 -0.075
  4 mnipaqmv               0.00490     0.6   0.02    1.01    345.86  0.046
  5 mnipaqmv[6]           -0.00407     0.5  -0.01    1.00    336.53 -0.039

:                           BLS: CES et332
  SEE   =       4.52 RSQ   = 0.9978 RHO =   0.61 Obser  =  144 from 1993.001
  SEE+1 =       3.58 RBSQ  = 0.9978 DurH =  7.38 DoFree =  140 to   2004.012
  MAPE  =       0.21 Test period:   SEE    16.71 MAPE     1.02 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe11m              - - - - - - - - - - - - - - - - -   1621.91 - - -
  1 intercept             30.97760     7.2   0.02  463.30      1.00
  2 ehe11m[1]              1.05689   950.7   1.06    2.00   1621.80  1.058
  3 ehe11m[12]            -0.07433    21.8  -0.07    1.01   1621.96 -0.074
  4 mnipaqmv              -0.00744     0.4  -0.00    1.00    345.86 -0.006

:                               PPI: u332
  SEE   =       0.18 RSQ   = 0.9992 RHO =  -0.13 Obser  =  156 from 1992.001
  SEE+1 =       0.18 RBSQ  = 0.9992 DurH = -2.26 DoFree =  152 to   2004.012
  MAPE  =       0.11 Test period:   SEE     1.20 MAPE     0.71 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri11m              - - - - - - - - - - - - - - - - -    127.65 - - -
  1 intercept              0.75134     0.7   0.01 1228.51      1.00
  2 pri11m[1]              1.73983   176.8   1.74    2.56    127.46  1.711
  3 pri11m[2]             -0.74785    50.2  -0.75    1.04    127.28 -0.723
  4 mnipaqgas              0.00197     1.8   0.00    1.00    162.02  0.012

# Machinery
:                               IPI: g333
  SEE   =       1.28 RSQ   = 0.9780 RHO =  -0.19 Obser  =  144 from 1993.001
  SEE+1 =       1.26 RBSQ  = 0.9773 DurH = -2.57 DoFree =  139 to   2004.012
  MAPE  =       0.94 Test period:   SEE     7.12 MAPE     5.27 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips12m              - - - - - - - - - - - - - - - - -    104.51 - - -
  1 intercept              3.83455     2.8   0.04   45.39      1.00
```

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  2 ips12m[1]              0.99307   133.7   0.99    1.11    104.36  1.015
  3 ips12m[6]             -0.03080     0.2  -0.03    1.05    103.55 -0.035
  4 mnipaqvnre             0.01650     2.3   0.12    1.05    737.62  0.253
  5 mnipaqvnre[4]         -0.01646     2.4  -0.11    1.00    725.53 -0.262

:                               BLS: CES et333
  SEE   =       3.48 RSQ   = 0.9992 RHO =   0.23 Obser  =  144 from 1993.001
  SEE+1 =       3.39 RBSQ  = 0.9992 DurH =  2.83 DoFree =  140 to   2004.012
  MAPE  =       0.19 Test period:  SEE    51.35 MAPE     3.60 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe12m                - - - - - - - - - - - - - - - - -   1369.38 - - -
  1 intercept             10.82490     2.9   0.01 1330.20      1.00
  2 ehe12m[1]              1.16863   710.2   1.17    3.15   1370.54  1.157
  3 ehe12m[6]             -0.17358    51.5  -0.17    1.04   1376.12 -0.163
  4 mnipaqvnre[2]         -0.00579     1.8  -0.00    1.00    731.52 -0.006

:                                 PPI: u333131
  SEE   =       0.43 RSQ   = 0.9982 RHO =   0.06 Obser  =  144 from 1993.001
  SEE+1 =       0.43 RBSQ  = 0.9981 DurH =  0.75 DoFree =  141 to   2004.012
  MAPE  =       0.20 Test period:  SEE     3.56 MAPE     1.74 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri12m                - - - - - - - - - - - - - - - - -    152.60 - - -
  1 intercept              0.49648     0.1   0.00  542.48      1.00
  2 pri12m[1]              0.99445   899.6   0.99    1.02    152.33  0.987
  3 mnipaqgas[1]           0.00378     1.0   0.00    1.00    164.15  0.014

# Computer and electronic products
:                                  IPI: g334
  SEE   =       0.90 RSQ   = 0.9995 RHO =   0.63 Obser  =  144 from 1993.001
  SEE+1 =       0.70 RBSQ  = 0.9995 DurH =  7.65 DoFree =  141 to   2004.012
  MAPE  =       1.09 Test period:  SEE     9.11 MAPE     4.24 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips13m                - - - - - - - - - - - - - - - - -     67.44 - - -
  1 intercept             -7.63222     9.4  -0.11 1853.28      1.00
  2 ips13m[1]              0.94903   746.6   0.94    1.23     66.64  0.946
  3 mnipaqfur              0.04252    11.1   0.18    1.00    278.07  0.054

:                               BLS: CES et334
  SEE   =       4.16 RSQ   = 0.9994 RHO =  -0.19 Obser  =  144 from 1993.001
  SEE+1 =       4.09 RBSQ  = 0.9994 DurH = -2.57 DoFree =  140 to   2004.012
  MAPE  =       0.18 Test period:  SEE    43.97 MAPE     2.75 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe13m                - - - - - - - - - - - - - - - - -   1659.26 - - -
  1 intercept              8.72423     1.0   0.01 1684.09      1.00
  2 ehe13m[1]              1.89106   323.8   1.89    5.13   1661.79  1.864
  3 ehe13m[2]             -0.89434   117.6  -0.90    1.02   1664.33 -0.869
  4 mnipaqfur             -0.01269     0.9  -0.00    1.00    278.07 -0.004

:                                 PPI: u334111
  SEE   =       3.26 RSQ   = 0.9996 RHO =   0.02 Obser  =  144 from 1993.001
  SEE+1 =       3.26 RBSQ  = 0.9996 DurH =  0.21 DoFree =  141 to   2004.012
  MAPE  =       0.80 Test period:  SEE     7.04 MAPE     7.19 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri13m                - - - - - - - - - - - - - - - - -    308.81 - - -
  1 intercept            -20.42022     1.0  -0.07 2738.91      1.00
  2 pri13m[1]              1.00142  1135.9   1.01    1.02    312.71  1.011
  3 mtime                  0.55365     0.9   0.05    1.00     29.04  0.011

# Electrical equipment, appliances, and components
:                                  IPI: g335
  SEE   =       1.10 RSQ   = 0.9839 RHO =  -0.22 Obser  =  144 from 1993.001
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```
  SEE+1 =       1.07 RBSQ  = 0.9836 DurH = -2.66 DoFree =  140 to   2004.012
  MAPE  =       0.81 Test period:   SEE     2.31 MAPE     1.94 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips14m               - - - - - - - - - - - - - - - - -    106.60 - - -
  1 intercept              2.59078     1.7   0.02   62.12      1.00
  2 ips14m[1]              1.03749   386.4   1.04    1.12    106.54  1.046
  3 ips14m[12]            -0.06050     3.8  -0.06    1.00    105.74 -0.068
  4 mnipaqfur             -0.00048     0.0  -0.00    1.00    278.07 -0.003

:                               BLS: CES et335
  SEE   =       1.86 RSQ   = 0.9988 RHO =  -0.08 Obser  =  144 from 1993.001
  SEE+1 =       1.85 RBSQ  = 0.9988 DurH = -1.04 DoFree =  140 to   2004.012
  MAPE  =       0.26 Test period:   SEE    10.78 MAPE     1.87 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe14m               - - - - - - - - - - - - - - - - -    555.26 - - -
  1 intercept              7.00572     1.6   0.01  827.97      1.00
  2 ehe14m[1]              1.15497   449.2   1.16    1.70    556.16  1.137
  3 ehe14m[6]             -0.16289    24.4  -0.16    1.03    560.70 -0.147
  4 mnipaqfur             -0.00995     1.7  -0.00    1.00    278.07 -0.009

:                               PPI: u335121p
  SEE   =       0.45 RSQ   = 0.9852 RHO =  -0.02 Obser  =  144 from 1993.001
  SEE+1 =       0.45 RBSQ  = 0.9848 DurH = -0.28 DoFree =  140 to   2004.012
  MAPE  =       0.22 Test period:   SEE     1.30 MAPE     0.71 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri14m               - - - - - - - - - - - - - - - - -    138.74 - - -
  1 intercept              5.42791     2.1   0.04   67.37      1.00
  2 pri14m[1]              0.95641   369.9   0.96    1.07    138.62  0.953
  3 mnipaqgas              0.01715     1.3   0.02    1.01    165.14  0.176
  4 mnipaqgas[1]          -0.01279     0.7  -0.02    1.00    164.15 -0.128

:                               BLS: CES hp335
  SEE   =       0.35 RSQ   = 0.8815 RHO =  -0.11 Obser  =  144 from 1993.001
  SEE+1 =       0.34 RBSQ  = 0.8781 DurH = -1.62 DoFree =  139 to   2004.012
  MAPE  =       0.60 Test period:   SEE     0.65 MAPE     1.43 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr14m                - - - - - - - - - - - - - - - - -     41.48 - - -
  1 intercept             17.75018    11.4   0.43    8.44      1.00
  2 hr14m[1]               0.61319    28.2   0.61    1.24     41.49  0.610
  3 hr14m[12]             -0.00910     0.0  -0.01    1.23     41.57 -0.009
  4 mnipaqfur              0.01880     4.8   0.13    1.14    278.07  0.924
  5 mnipaqfur[12]         -0.02492     7.0  -0.16    1.00    263.31 -1.250

# Motor Vehicles, bodies and trailers, and parts
:                               IPI: g3361t3
  SEE   =       3.03 RSQ   = 0.9377 RHO =  -0.14 Obser  =  144 from 1993.001
  SEE+1 =       3.00 RBSQ  = 0.9364 DurH = -2.12 DoFree =  140 to   2004.012
  MAPE  =       2.21 Test period:   SEE     2.54 MAPE     1.97 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips15m               - - - - - - - - - - - - - - - - -     89.63 - - -
  1 intercept              8.04873     4.5   0.09   16.06      1.00
  2 ips15m[1]              0.78771    68.8   0.79    1.11     89.35  0.795
  3 mnipaqmv               0.03978     2.4   0.15    1.00    345.86  0.235
  4 mnipaqmv[12]          -0.00782     0.1  -0.03    1.00    327.21 -0.048

:                              BLS: CES et336001
  SEE   =      17.58 RSQ   = 0.9487 RHO =  -0.26 Obser  =  144 from 1993.001
  SEE+1 =      16.96 RBSQ  = 0.9476 DurH = -4.24 DoFree =  140 to   2004.012
  MAPE  =       0.72 Test period:   SEE    16.13 MAPE     1.09 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe15m               - - - - - - - - - - - - - - - - -   1206.88 - - -
```

```
  1 intercept              59.13825     2.1   0.05   19.49      1.00
  2 ehe15m[1]               0.85156    60.4   0.85    1.06   1206.54  0.857
  3 ehe15m[6]               0.11814     1.6   0.12    1.05   1204.37  0.124
  4 mnipaqmv               -0.06352     2.6  -0.02    1.00    345.86 -0.059

:                                 PPI: u336110p
  SEE   =       1.71 RSQ   = 0.7003 RHO =   0.41 Obser  =  144 from 1993.001
  SEE+1 =       1.56 RBSQ  = 0.6895 DurH =  6.43 DoFree =  138 to   2004.012
  MAPE  =       0.98 Test period:   SEE     3.97 MAPE     2.38 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri15m                - - - - - - - - - - - - - - - - -    136.64 - - -
  1 intercept              40.66377     9.3   0.30    3.34      1.00
  2 pri15m[1]               0.29422     9.0   0.29    1.91    136.59  0.297
  3 pri15m[6]              -0.06913     0.7  -0.07    1.90    136.36 -0.076
  4 pri15m[9]              -0.06541     0.6  -0.07    1.84    136.22 -0.076
  5 pri15m[12]              0.57156    34.5   0.57    1.17    136.06  0.691
  6 mnipaqmv               -0.01053     8.2  -0.03    1.00    345.86 -0.243

#Other Transportation equipment
:                                 IPI: g3364t9
  SEE   =       1.08 RSQ   = 0.9857 RHO =   0.17 Obser  =  144 from 1993.001
  SEE+1 =       1.06 RBSQ  = 0.9852 DurH =  2.01 DoFree =  138 to   2004.012
  MAPE  =       0.78 Test period:   SEE     4.01 MAPE     2.40 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips16m                - - - - - - - - - - - - - - - - -    100.02 - - -
  1 intercept               2.49373     1.0   0.02   69.91      1.00
  2 ips16m[1]               1.02117   521.3   1.02    1.45    100.10  1.024
  3 ips16m[12]             -0.06428     8.4  -0.07    1.11    101.30 -0.066
  4 mnipaqmv               -0.01690     4.1  -0.06    1.10    345.86 -0.135
  5 mnipaqtr                0.02677     4.1   0.07    1.01    254.75  0.131
  6 mnipaqgas[4]            0.00526     0.3   0.01    1.00    161.33  0.020

:                                 BLS:CES et336
  SEE   =      17.57 RSQ   = 0.9735 RHO =  -0.22 Obser  =  144 from 1993.001
  SEE+1 =      17.12 RBSQ  = 0.9728 DurH = -3.03 DoFree =  139 to   2004.012
  MAPE  =       0.46 Test period:   SEE    25.12 MAPE     1.17 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe16m                - - - - - - - - - - - - - - - - -   1946.15 - - -
  1 intercept              73.93615     1.5   0.04   37.78      1.00
  2 ehe16m[1]               0.79173    47.0   0.79    1.13   1947.37  0.785
  3 ehe16m[4]               0.28556     4.9   0.29    1.10   1951.06  0.275
  4 ehe16m[12]             -0.10841     2.9  -0.11    1.02   1963.82 -0.094
  5 mnipaqmv[6]            -0.04108     1.1  -0.01    1.00    336.53 -0.028

:                                 PPI: u3364113
  SEE   =       0.71 RSQ   = 0.9983 RHO =   0.16 Obser  =  144 from 1993.001
  SEE+1 =       0.70 RBSQ  = 0.9983 DurH =  2.03 DoFree =  141 to   2004.012
  MAPE  =       0.30 Test period:   SEE     4.90 MAPE     2.08 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri16m                - - - - - - - - - - - - - - - - -    156.34 - - -
  1 intercept              -0.80811     0.6  -0.01  590.54      1.00
  2 pri16m[1]               1.03878   333.9   1.04    1.01    155.86  1.027
  3 pri16m[12]             -0.03148     0.7  -0.03    1.00    151.20 -0.028

# furniture and related products

:                                   IPI: g337
  SEE   =       0.95 RSQ   = 0.9893 RHO =   0.08 Obser  =  144 from 1993.001
  SEE+1 =       0.94 RBSQ  = 0.9891 DurH =  1.00 DoFree =  141 to   2004.012
  MAPE  =       0.80 Test period:   SEE     3.30 MAPE     2.57 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 ips17m              - - - - - - - - - - - - - - - - -      92.30 - - -
  1 intercept              2.06968     1.4   0.02   93.19      1.00
  2 ips17m[1]              0.96416   298.4   0.96    1.01     92.10  0.969
  3 mnipaqfur              0.00515     0.6   0.02    1.00    278.07  0.028

:                                BLS:CES et337
  SEE   =       2.00 RSQ   = 0.9967 RHO =  -0.14 Obser  =  144 from 1993.001
  SEE+1 =       1.98 RBSQ  = 0.9966 DurH = -1.88 DoFree =  140 to   2004.012
  MAPE  =       0.23 Test period:  SEE     6.09 MAPE     0.85 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe17m              - - - - - - - - - - - - - - - - -     615.06 - - -
  1 intercept              4.71585     0.9   0.01  301.95      1.00
  2 ehe17m[1]              1.36169   225.1   1.36    1.91    615.02  1.364
  3 ehe17m[3]             -0.36736    29.8  -0.37    1.01    614.91 -0.369
  4 mnipaqfur             -0.00442     0.5  -0.00    1.00    278.07 -0.006

:                                  PPI: u337
  SEE   =       0.28 RSQ   = 0.9986 RHO =  -0.04 Obser  =  144 from 1993.001
  SEE+1 =       0.28 RBSQ  = 0.9985 DurH = -0.50 DoFree =  141 to   2004.012
  MAPE  =       0.14 Test period:  SEE     1.09 MAPE     0.59 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri17m              - - - - - - - - - - - - - - - - -     139.78 - - -
  1 intercept              0.01100     0.0   0.00  691.30      1.00
  2 pri17m[1]              1.06376   325.8   1.06    1.07    139.56  1.065
  3 pri17m[12]            -0.06326     3.3  -0.06    1.00    137.40 -0.067

#Miscellaneous manufacturing

:                                  IPI: g339
  SEE   =       0.67 RSQ   = 0.9954 RHO =  -0.21 Obser  =  144 from 1993.001
  SEE+1 =       0.65 RBSQ  = 0.9953 DurH = -3.36 DoFree =  140 to   2004.012
  MAPE  =       0.55 Test period:  SEE     4.20 MAPE     3.31 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips18m              - - - - - - - - - - - - - - - - -      89.63 - - -
  1 intercept              4.89056     4.3   0.05  219.56      1.00
  2 ips18m[1]              0.99292    78.6   0.99    1.10     89.40  0.992
  3 ips18m[4]             -0.11485     1.6  -0.11    1.09     88.75 -0.115
  4 mnipaqdoth             0.04241     4.3   0.07    1.00    145.33  0.122

:                                BLS:CES et339
  SEE   =       1.54 RSQ   = 0.9962 RHO =  -0.12 Obser  =  144 from 1993.001
  SEE+1 =       1.53 RBSQ  = 0.9961 DurH = -1.50 DoFree =  140 to   2004.012
  MAPE  =       0.17 Test period:  SEE     2.61 MAPE     0.34 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe18m              - - - - - - - - - - - - - - - - -     707.53 - - -
  1 intercept              1.69031     0.0   0.00  262.27      1.00
  2 ehe18m[1]              1.15485   289.7   1.16    1.36    707.85  1.137
  3 ehe18m[6]             -0.16729     5.2  -0.17    1.00    709.23 -0.152
  4 ehe18m[12]             0.00989     0.1   0.01    1.00    710.61  0.008

:                                PPI: u339111
  SEE   =       0.47 RSQ   = 0.9978 RHO =   0.02 Obser  =  144 from 1993.001
  SEE+1 =       0.47 RBSQ  = 0.9978 DurH =  0.33 DoFree =  140 to   2004.012
  MAPE  =       0.27 Test period:  SEE     1.97 MAPE     1.23 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri18m              - - - - - - - - - - - - - - - - -     123.62 - - -
  1 intercept              3.67510     1.5   0.03  457.56      1.00
  2 pri18m[1]              0.83304    57.6   0.83    1.08    123.36  0.830
  3 pri18m[4]              0.10463     1.2   0.10    1.03    122.60  0.104
  4 mnipaqfood             0.00499     1.7   0.04    1.00    872.92  0.066
```

```
# Food,beverage, tobacco
:                            IPI: g331a2
  SEE   =       0.87 RSQ   = 0.9317 RHO =  -0.13 Obser  =  144 from 1993.001
  SEE+1 =       0.87 RBSQ  = 0.9297 DurH = -1.91 DoFree =  139 to   2004.012
  MAPE  =       0.71 Test period:  SEE     4.85 MAPE     4.01 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips19m                - - - - - - - - - - - - - - - - -     98.89 - - -
  1 intercept               29.98874     7.2   0.30   14.64      1.00
  2 ips19m[1]                0.75600    60.1   0.76    1.14     98.81  0.766
  3 ips19m[12]              -0.08122     1.0  -0.08    1.12     97.99 -0.089
  4 mnipaqfood[4]           -0.02546     4.1  -0.22    1.10    860.21 -0.977
  5 mgdp                     0.00267     4.9   0.24    1.00   9027.08  1.244

:                           BLS:CES et312
  SEE   =       1.00 RSQ   = 0.9465 RHO =  -0.07 Obser  =  144 from 1993.001
  SEE+1 =       1.00 RBSQ  = 0.9449 DurH = -0.98 DoFree =  139 to   2004.012
  MAPE  =       0.37 Test period:  SEE     3.23 MAPE     1.56 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe19m                - - - - - - - - - - - - - - - - -    204.98 - - -
  1 intercept               11.12297     1.2   0.05   18.68      1.00
  2 ehe19m[1]                0.91128    72.9   0.91    1.05    205.08  0.893
  3 ehe19m[4]                0.12151     1.2   0.12    1.05    205.33  0.112
  4 ehe19m[12]              -0.08297     1.4  -0.08    1.01    206.14 -0.060
  5 mnipaqfood[4]           -0.00101     0.7  -0.00    1.00    860.21 -0.030

:                              PPI: u311
  SEE   =       0.94 RSQ   = 0.9826 RHO =   0.14 Obser  =  144 from 1993.001
  SEE+1 =       0.94 RBSQ  = 0.9821 DurH =  1.98 DoFree =  139 to   2004.012
  MAPE  =       0.46 Test period:  SEE     1.64 MAPE     0.91 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri19m                - - - - - - - - - - - - - - - - -    128.60 - - -
  1 intercept                9.29319     2.4   0.07   57.31      1.00
  2 pri19m[1]                0.95715   102.1   0.96    1.06    128.41  0.949
  3 pri19m[4]               -0.00891     0.0  -0.01    1.06    127.85 -0.009
  4 pri19m[12]              -0.05731     0.7  -0.06    1.06    126.31 -0.048
  5 mnipaqfood[1]            0.00549     2.8   0.04    1.00    869.71  0.101

# Textile, mills
:                            IPI: g313a4
  SEE   =       1.45 RSQ   = 0.9654 RHO =  -0.20 Obser  =  144 from 1993.001
  SEE+1 =       1.42 RBSQ  = 0.9644 DurH = -3.40 DoFree =  139 to   2004.012
  MAPE  =       1.12 Test period:  SEE     3.97 MAPE     3.87 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips20m                - - - - - - - - - - - - - - - - -    107.88 - - -
  1 intercept                9.51544     2.7   0.09   28.88      1.00
  2 ips20m[1]                0.99094    70.1   0.99    1.07    107.96  0.980
  3 ips20m[4]               -0.04150     0.2  -0.04    1.06    108.17 -0.040
  4 mnipaqcloth[6]          -0.00302     0.0  -0.01    1.00    271.60 -0.012
  5 mnipaqcloth[12]         -0.01236     0.1  -0.03    1.00    267.24 -0.048

:                           BLS:CES et313
  SEE   =       1.69 RSQ   = 0.9995 RHO =  -0.03 Obser  =  120 from 1995.001
  SEE+1 =       1.69 RBSQ  = 0.9995 DurH = -0.32 DoFree =  116 to   2004.012
  MAPE  =       0.32 Test period:  SEE     8.15 MAPE     3.45 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe20_1m              - - - - - - - - - - - - - - - - -    367.00 - - -
  1 ehe20_1m[1]              1.07093    49.5   1.08    1.54    369.09
  2 ehe20_1m[2]              0.26411     1.8   0.27    1.32    371.16  0.262
  3 ehe20_1m[4]             -0.34504    10.0  -0.35    1.00    375.25 -0.338
  4 ehe20_1m[12]             0.00822     0.1   0.01    1.00    391.09  0.007
```

```
:                                  PPI: u31311
  SEE   =       0.45 RSQ   = 0.9908 RHO =   0.07 Obser  =  144 from 1993.001
  SEE+1 =       0.45 RBSQ  = 0.9906 DurH =  0.81 DoFree =  140 to   2004.012
  MAPE  =       0.30 Test period:  SEE     3.26 MAPE     2.72 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri20m                - - - - - - - - - - - - - - - - -    107.33 - - -
  1 intercept                1.73931     1.2   0.02  108.63      1.00
  2 pri20m[1]                1.14535   100.6   1.15    1.20    107.35  1.146
  3 pri20m[3]               -0.11675     1.2  -0.12    1.04    107.38 -0.117
  4 pri20m[12]              -0.04480     2.1  -0.04    1.00    107.69 -0.045

# Apparel and leather products
:                                  IPI: g315a6
  SEE   =       1.55 RSQ   = 0.9982 RHO =  -0.08 Obser  =  144 from 1993.001
  SEE+1 =       1.54 RBSQ  = 0.9981 DurH = -1.00 DoFree =  139 to   2004.012
  MAPE  =       0.87 Test period:  SEE    11.71 MAPE    12.03 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips21m                - - - - - - - - - - - - - - - - -    147.71 - - -
  1 intercept               14.29945     4.3   0.10  541.85      1.00
  2 ips21m[1]                0.98544   353.6   0.99    1.24    148.39  0.976
  3 ips21m[12]              -0.01198     0.2  -0.01    1.18    155.57 -0.010
  4 mnipaqcloth              0.08687     3.9   0.16    1.15    275.84  0.074
  5 mnipaqcloth[12]         -0.13067     7.0  -0.24    1.00    267.24 -0.110

:                                BLS:CES et315
  SEE   =       2.77 RSQ   = 0.9998 RHO =  -0.10 Obser  =  144 from 1993.001
  SEE+1 =       2.75 RBSQ  = 0.9998 DurH = -1.22 DoFree =  142 to   2004.012
  MAPE  =       0.38 Test period:  SEE     2.41 MAPE     0.84 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe21_1m              - - - - - - - - - - - - - - - - -    589.38 - - -
  1 ehe21_1m[1]              1.24473   311.2   1.25    1.65    593.72
  2 ehe21_1m[4]             -0.24655    28.4  -0.25    1.00    606.60 -0.245

:                                  PPI: u316
  SEE   =       0.37 RSQ   = 0.9929 RHO =  -0.11 Obser  =  144 from 1993.001
  SEE+1 =       0.37 RBSQ  = 0.9927 DurH = -1.43 DoFree =  139 to   2004.012
  MAPE  =       0.20 Test period:  SEE     0.40 MAPE     0.23 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri21m                - - - - - - - - - - - - - - - - -    137.16 - - -
  1 intercept                4.46386     1.6   0.03  141.16      1.00
  2 pri21m[1]                1.06339   120.4   1.06    1.08    137.04  1.071
  3 pri21m[4]               -0.13325     2.6  -0.13    1.05    136.70 -0.138
  4 pri21m[12]               0.02792     0.4   0.03    1.02    135.77  0.030
  5 mnipaqcloth              0.00502     0.8   0.01    1.00    275.84  0.035

# paper products
:                                  IPI: g322
  SEE   =       1.08 RSQ   = 0.9203 RHO =  -0.33 Obser  =  144 from 1993.001
  SEE+1 =       1.02 RBSQ  = 0.9180 DurH = -4.25 DoFree =  139 to   2004.012
  MAPE  =       0.81 Test period:  SEE     1.53 MAPE     1.28 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips22m                - - - - - - - - - - - - - - - - -    102.91 - - -
  1 intercept               18.22070     6.4   0.18   12.55      1.00
  2 ips22m[1]                0.89943   138.8   0.90    1.11    102.90  0.900
  3 ips22m[12]              -0.06113     1.3  -0.06    1.10    103.04 -0.059
  4 mnipaqnoth[4]            0.04372     2.3   0.20    1.05    471.65  1.223
  5 mnipaqnoth[12]          -0.04901     2.6  -0.22    1.00    452.87 -1.327

:                                BLS:CES et322
  SEE   =       1.22 RSQ   = 0.9994 RHO =  -0.10 Obser  =  144 from 1993.001
  SEE+1 =       1.21 RBSQ  = 0.9994 DurH = -1.32 DoFree =  142 to   2004.012
```

```
  MAPE  =       0.16 Test period:   SEE     3.22 MAPE     0.54 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe22m                - - - - - - - - - - - - - - - - -    596.85 - - -
  1 ehe22m[1]               1.33404   201.2   1.34    1.51    597.90
  2 ehe22m[3]              -0.33461    22.9  -0.34    1.00    599.98 -0.321

:                                PPI: u32212
  SEE   =       0.90 RSQ   = 0.9932 RHO =   0.10 Obser  =  144 from 1993.001
  SEE+1 =       0.89 RBSQ  = 0.9930 DurH =  1.50 DoFree =  139 to   2004.012
  MAPE  =       0.48 Test period:   SEE     5.04 MAPE     2.69 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri22m                - - - - - - - - - - - - - - - - -    145.01 - - -
  1 intercept               4.76259     5.9   0.03  146.29      1.00
  2 pri22m[1]               1.29204   244.7   1.29    3.25    144.80  1.301
  3 pri22m[4]              -0.38164     9.4  -0.38    1.03    144.21 -0.391
  4 pri22m[6]               0.05322     0.5   0.05    1.02    143.86  0.055
  5 mnipaqgas               0.00327     0.8   0.00    1.00    165.14  0.011

# Printing
:                                 IPI: g323
  SEE   =       0.67 RSQ   = 0.9920 RHO =  -0.18 Obser  =  144 from 1993.001
  SEE+1 =       0.00 RBSQ  = 0.9916 DurH = -2.30 DoFree =  137 to   2004.012
  MAPE  =       0.51 Test period:   SEE     1.26 MAPE     0.92 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips23m                - - - - - - - - - - - - - - - - -    134.60 - - -
  1 intercept               6.44430     5.1   0.06  118.47      1.27
  2 ips23m[1]               0.98287   229.9   0.98    1.21    134.66  0.979
  3 ips23m[12]             -0.03809     0.9  -0.04    1.14    135.37 -0.035
  4 mnipaqnoth              0.03161     5.1   0.14    1.13    610.43  0.583
  5 mnipaqnoth[12]         -0.03641     5.0  -0.16    1.07    574.35 -0.641
  6 mnipaqgas               0.00399     0.4   0.01    1.05    209.35  0.025
  7 ips23m_mu[1]           -0.21360     2.1   0.00    1.00     -0.01 -0.021

:                               BLS:CES et323
  SEE   =       1.72 RSQ   = 0.9991 RHO =  -0.06 Obser  =  144 from 1993.001
  SEE+1 =       1.71 RBSQ  = 0.9991 DurH = -0.69 DoFree =  142 to   2004.012
  MAPE  =       0.17 Test period:   SEE     3.91 MAPE     0.57 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe23m                - - - - - - - - - - - - - - - - -    775.70 - - -
  1 ehe23m[1]               1.27549   396.5   1.28    2.11    776.57
  2 ehe23m[4]              -0.27571    45.3  -0.28    1.00    779.12 -0.258

:                               PPI: u323110
  SEE   =       0.44 RSQ   = 0.9969 RHO =   0.03 Obser  =  144 from 1993.001
  SEE+1 =       0.44 RBSQ  = 0.9967 DurH =  0.56 DoFree =  138 to   2004.012
  MAPE  =       0.19 Test period:   SEE     0.39 MAPE     0.19 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri23m                - - - - - - - - - - - - - - - - -    150.71 - - -
  1 intercept               1.43382     0.2   0.01  318.72      1.00
  2 pri23m[1]               1.11139   135.1   1.11    1.09    150.52  1.127
  3 pri23m[4]              -0.11048     0.7  -0.11    1.01    149.92 -0.117
  4 pri23m[6]              -0.01547     0.0  -0.02    1.01    149.53 -0.017
  5 mnipaqnoth             -0.00257     0.1  -0.01    1.00    481.30 -0.036
  6 mnipaqfood              0.00241     0.2   0.01    1.00    872.92  0.041

# Petroleum and Coal
:                               BLS:CES et324
  SEE   =       0.74 RSQ   = 0.9958 RHO =  -0.01 Obser  =  144 from 1993.001
  SEE+1 =       0.74 RBSQ  = 0.9957 DurH = 999.00 DoFree =  139 to   2004.012
  MAPE  =       0.41 Test period:   SEE     3.16 MAPE     2.33 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
```

```
  0 ehe24m               - - - - - - - - - - - - - - - - -    129.52 - - -
  1 intercept              -3.82499     0.9  -0.03  238.24      1.00
  2 ehe24m[1]               0.79955    29.3   0.80    1.06    129.78  0.800
  3 ehe24m[2]               0.21844     2.4   0.22    1.02    130.03  0.219
  4 mnipaqgas               0.00283     0.1   0.00    1.00    165.14  0.009
  5 mnipaqgas[4]            0.00442     0.2   0.01    1.00    161.33  0.013

:                                  PPI: u324
  SEE   =       5.44 RSQ   = 0.9520 RHO =   0.29 Obser  =  144 from 1993.001
  SEE+1 =       5.26 RBSQ  = 0.9510 DurH =  4.24 DoFree =  140 to   2004.012
  MAPE  =       4.46 Test period:  SEE    28.04 MAPE    10.01 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri24m               - - - - - - - - - - - - - - - - -     94.54 - - -
  1 intercept              -5.64312     2.4  -0.06   20.83      1.00
  2 pri24m[1]               0.56444    24.8   0.56    1.40     94.04  0.555
  3 pri24m[4]               0.00280     0.0   0.00    1.38     92.27  0.002
  4 mnipaqgas               0.28368    17.4   0.50    1.00    165.14  0.431

# Chemical products
:                                  IPI: g325
  SEE   =       0.77 RSQ   = 0.9903 RHO =  -0.03 Obser  =  144 from 1993.001
  SEE+1 =       0.77 RBSQ  = 0.9901 DurH = -0.39 DoFree =  140 to   2004.012
  MAPE  =       0.66 Test period:  SEE     8.69 MAPE     6.82 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips25m               - - - - - - - - - - - - - - - - -     91.82 - - -
  1 intercept               0.79258     0.2   0.01  103.09      1.00
  2 ips25m[1]               0.98040   352.5   0.98    1.03     91.61  0.971
  3 mnipaqgas               0.00003     0.0   0.00    1.02    165.14  0.000
  4 mnipaqgas[12]           0.00778     1.2   0.01    1.00    154.72  0.029

:                                BLS:CES et325
  SEE   =       1.62 RSQ   = 0.9983 RHO =  -0.15 Obser  =  144 from 1993.001
  SEE+1 =       1.60 RBSQ  = 0.9983 DurH = -2.02 DoFree =  142 to   2004.012
  MAPE  =       0.13 Test period:  SEE     6.67 MAPE     0.50 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe25m               - - - - - - - - - - - - - - - - -    968.64 - - -
  1 ehe25m[1]               1.19327   202.1   1.19    1.22    969.66
  2 ehe25m[4]              -0.19372    10.2  -0.19    1.00    972.67 -0.186

:                                  PPI: u325
  SEE   =       0.68 RSQ   = 0.9971 RHO =   0.22 Obser  =  144 from 1993.001
  SEE+1 =       0.67 RBSQ  = 0.9971 DurH =  2.83 DoFree =  140 to   2004.012
  MAPE  =       0.33 Test period:  SEE     8.41 MAPE     3.25 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri25m               - - - - - - - - - - - - - - - - -    150.14 - - -
  1 intercept               2.89256     2.7   0.02  348.39      1.00
  2 pri25m[1]               1.14572   195.1   1.14    1.40    149.76  1.136
  3 pri25m[4]              -0.17733    10.3  -0.18    1.09    148.71 -0.173
  4 mnipaqgas               0.01229     4.4   0.01    1.00    165.14  0.036

# Plastic and rubbers
:                                  IPI: g326
  SEE   =       0.71 RSQ   = 0.9927 RHO =  -0.22 Obser  =  144 from 1993.001
  SEE+1 =       0.69 RBSQ  = 0.9924 DurH = -2.83 DoFree =  137 to   2004.012
  MAPE  =       0.60 Test period:  SEE     1.25 MAPE     1.02 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips26m               - - - - - - - - - - - - - - - - -     94.22 - - -
  1 intercept              -1.57653     0.1  -0.02  136.70      1.00
  2 ips26m[1]               1.04981    91.0   1.05    1.09     94.03  1.068
  3 ips26m[4]              -0.08102     0.6  -0.08    1.05     93.45 -0.087
  4 ips26m[12]             -0.02191     0.2  -0.02    1.05     91.78 -0.026
```

```
  5 mnipaqnoth              0.02107     0.8   0.11    1.05    481.30  0.274
  6 mnipaqnoth[4]          -0.03102     1.7  -0.16    1.02    471.65 -0.397
  7 mtime                   0.38398     1.1   0.12    1.00     29.04  0.160

:                                BLS:CES et326
  SEE   =       2.44 RSQ   = 0.9977 RHO =  -0.08 Obser  =  144 from 1993.001
  SEE+1 =       2.43 RBSQ  = 0.9977 DurH = -0.98 DoFree =  142 to   2004.012
  MAPE  =       0.21 Test period:  SEE     7.53 MAPE     0.85 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe26m                - - - - - - - - - - - - - - - - -    893.12 - - -
  1 ehe26m[1]               1.27175   363.1   1.27    1.94    893.31
  2 ehe26m[4]              -0.27184    39.1  -0.27    1.00    893.74 -0.267

:                                  PPI: u326
  SEE   =       0.30 RSQ   = 0.9951 RHO =   0.11 Obser  =  144 from 1993.001
  SEE+1 =       0.30 RBSQ  = 0.9949 DurH =  1.39 DoFree =  139 to   2004.012
  MAPE  =       0.19 Test period:  SEE     3.09 MAPE     1.80 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri26m                - - - - - - - - - - - - - - - - -    123.52 - - -
  1 intercept               3.53429     2.5   0.03  202.42      1.00
  2 pri26m[1]               1.13061   200.9   1.13    1.54    123.37  1.113
  3 pri26m[4]              -0.16461     9.2  -0.16    1.18    122.96 -0.157
  4 mnipaqgas               0.00965     7.7   0.01    1.04    165.14  0.084
  5 mnipaqgas[6]           -0.00534     1.8  -0.01    1.00    159.62 -0.040

# Wholesale Trade
:                                BLS:CES et42
  SEE   =       6.08 RSQ   = 0.9994 RHO =  -0.01 Obser  =  144 from 1993.001
  SEE+1 =       6.08 RBSQ  = 0.9993 DurH = -0.10 DoFree =  137 to   2004.012
  MAPE  =       0.09 Test period:  SEE   108.26 MAPE     1.43 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe27m                - - - - - - - - - - - - - - - - -   5606.48 - - -
  1 intercept             138.93537     2.1   0.02 1586.07      1.00
  2 ehe27m[1]               1.18221   177.1   1.18    2.81   5602.05  1.201
  3 ehe27m[4]              -0.19095     6.2  -0.19    1.10   5589.29 -0.202
  4 ehe27m[12]             -0.01397     0.4  -0.01    1.10   5560.48 -0.016
  5 mgdp                    0.03953     4.5   0.06    1.09   9027.08  0.254
  6 mgdp[6]                -0.02175     1.4  -0.03    1.02   8800.77 -0.137
  7 mnipaqfood[1]          -0.20200     1.0  -0.03    1.00    869.71 -0.109

:                                PPI: u429930
  SEE   =       5.82 RSQ   = 0.9591 RHO =   0.48 Obser  =  144 from 1993.001
  SEE+1 =       5.15 RBSQ  = 0.9582 DurH =  5.96 DoFree =  140 to   2004.012
  MAPE  =       2.69 Test period:  SEE    45.38 MAPE    17.47 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri27m                - - - - - - - - - - - - - - - - -    149.90 - - -
  1 intercept               1.70158     0.0   0.01   24.43      1.00
  2 pri27m[1]               0.97468   259.8   0.97    1.03    149.10  0.948
  3 mnipaqgas               0.06502     1.0   0.07    1.01    165.14  0.085
  4 mgdp[4]                -0.00089     0.4  -0.05    1.00   8875.59 -0.047

:                                BLS:CES hp42
  SEE   =       0.11 RSQ   = 0.9066 RHO =  -0.28 Obser  =  144 from 1993.001
  SEE+1 =       0.11 RBSQ  = 0.9032 DurH = -4.92 DoFree =  138 to   2004.012
  MAPE  =       0.23 Test period:  SEE     0.48 MAPE     1.01 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr27m                 - - - - - - - - - - - - - - - - -     38.45 - - -
  1 intercept              10.60211     4.5   0.28   10.71      1.00
  2 hr27m[1]                0.64970    33.3   0.65    1.24     38.46  0.640
  3 hr27m[12]               0.09670     0.9   0.10    1.21     38.51  0.083
  4 mgdp                    0.00074     4.5   0.17    1.15   9027.08  3.181
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  5 mgdp[4]                 -0.00051     1.9  -0.12    1.07   8875.59 -2.164
  6 mnipaqfood[1]           -0.00346     3.3  -0.08    1.00    869.71 -1.247

:                                BLS:CES wp42
  SEE   =       0.04 RSQ   = 0.9995 RHO =  -0.05 Obser  =  144 from 1993.001
  SEE+1 =       0.04 RBSQ  = 0.9995 DurH = -3.58 DoFree =  140 to   2004.012
  MAPE  =       0.19 Test period:   SEE     0.35 MAPE     1.56 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag27m                - - - - - - - - - - - - - - - - -     15.23 - - -
  1 intercept                0.08155     0.4   0.01 2178.63      1.00
  2 wag27m[1]                0.73851    25.9   0.74    1.07     15.19  0.740
  3 wag27m[2]                0.25932     3.5   0.26    1.00     15.16  0.260
  4 mgdp[1]                 -0.00000     0.0  -0.00    1.00   8988.88 -0.000

:                           CENSUS: wholesale trade
  SEE   =    1976.95 RSQ   = 0.9967 RHO =  -0.00 Obser  =  144 from 1993.001
  SEE+1 =    1976.94 RBSQ  = 0.9966 DurH = 999.00 DoFree =  139 to   2004.012
  MAPE  =       0.72 Test period:   SEE 12274.08 MAPE     3.08 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mwh42                 - - - - - - - - - - - - - - - - - 210734.99 - - -
  1 intercept               31.06328     0.0   0.00  301.49      1.00
  2 mwh42[1]                 0.92106    36.7   0.92    1.03 209773.40  0.915
  3 mwh42[2]                 0.11798     0.4   0.12    1.02 208838.80  0.117
  4 mwh42[3]                 0.10790     0.3   0.11    1.02 207931.52  0.106
  5 mwh42[4]                -0.14290     1.0  -0.14    1.00 207045.91 -0.140

# Retail Trade
:                                BLS:CES etrt
  SEE   =      22.13 RSQ   = 0.9990 RHO =  -0.06 Obser  =  144 from 1993.001
  SEE+1 =      22.08 RBSQ  = 0.9990 DurH = -0.78 DoFree =  137 to   2004.012
  MAPE  =       0.11 Test period:   SEE   123.60 MAPE     0.73 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe28m                - - - - - - - - - - - - - - - - -  14502.62 - - -
  1 intercept              220.84009     2.5   0.02 1016.44      1.00
  2 ehe28m[1]                1.01381   100.2   1.01    1.34  14486.73  1.030
  3 ehe28m[4]                0.02575     0.1   0.03    1.15  14439.17  0.027
  4 ehe28m[12]              -0.05703     2.2  -0.06    1.12  14316.79 -0.066
  5 mgdp                     0.12136     4.3   0.08    1.10   9027.08  0.268
  6 mgdp[6]                 -0.11538     3.4  -0.07    1.02   8800.77 -0.249
  7 mnipaqgas               -0.24549     0.9  -0.00    1.00    165.14 -0.013

:                                BLS:CES hprt
  SEE   =       0.09 RSQ   = 0.4328 RHO =  -0.02 Obser  =  144 from 1993.001
  SEE+1 =       0.09 RBSQ  = 0.4123 DurH = -0.40 DoFree =  138 to   2004.012
  MAPE  =       0.23 Test period:   SEE     0.23 MAPE     0.68 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr28m                 - - - - - - - - - - - - - - - - -     30.78 - - -
  1 intercept                8.76052     3.8   0.28    1.76      1.00
  2 hr28m[1]                 0.50873    15.4   0.51    1.10     30.78  0.510
  3 hr28m[3]                 0.27548     4.2   0.28    1.02     30.78  0.274
  4 hr28m[6]                -0.06828     0.3  -0.07    1.01     30.79 -0.072
  5 mnipaqgas               -0.00069     0.5  -0.00    1.01    165.14 -0.210
  6 mnipaqgas[6]             0.00061     0.3   0.00    1.00    159.62  0.160

:                                BLS:CES wprt
  SEE   =       0.03 RSQ   = 0.9996 RHO =  -0.08 Obser  =  144 from 1993.001
  SEE+1 =       0.03 RBSQ  = 0.9996 DurH = -1.32 DoFree =  139 to   2004.012
  MAPE  =       0.19 Test period:   SEE     0.11 MAPE     0.75 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag28m                - - - - - - - - - - - - - - - - -     10.24 - - -
  1 intercept                0.02598     0.5   0.00 2427.90      1.00
```

```
  2 wag28m[1]               0.70688    25.0   0.70    1.13     10.22  0.707
  3 wag28m[2]               0.37005     5.9   0.37    1.02     10.19  0.370
  4 wag28m[6]              -0.07612     0.7  -0.07    1.00     10.08 -0.076
  5 mnipaqgas              -0.00004     0.0  -0.00    1.00    165.14 -0.001

:                        CENSUS: Retail sales, total
  SEE   =    5017.39 RSQ   = 0.9999 RHO =   0.82 Obser  =  144 from 1993.001
  SEE+1 =    2912.26 RBSQ  = 0.9999 DurH =  9.93 DoFree =  141 to   2004.012
  MAPE  =       0.14 Test period:   SEE 16275.45 MAPE     0.40 end  2005.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 retlm                 - - - - - - - - - - - - - - - - - 2703476.57 - - -
  1 intercept             6011.66046     2.0   0.00 8888.50      1.00
  2 retlm[1]                0.94457   504.7   0.94    1.13 2691628.10  0.943
  3 mgdp                   17.17409     6.2   0.06    1.00   9027.08  0.057

:                     CENSUS: Retail  Purchases, total
  SEE   =    4167.33 RSQ   = 0.9999 RHO =   0.81 Obser  =  144 from 1993.001
  SEE+1 =    2468.73 RBSQ  = 0.9998 DurH =  9.79 DoFree =  141 to   2004.012
  MAPE  =       0.15 Test period:   SEE 13815.62 MAPE     0.46 end  2005.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 rtptotm               - - - - - - - - - - - - - - - - - 1968248.18 - - -
  1 intercept             6867.58752     3.9   0.00 6667.20      1.00
  2 rtptotm[1]              0.95136   585.5   0.95    1.12 1959774.94  0.951
  3 mgdp                   10.73723     6.0   0.05    1.00   9027.08  0.049

# Air transportation
:                              BLS:CES et481
  SEE   =       4.05 RSQ   = 0.9889 RHO =   0.66 Obser  =  144 from 1993.001
  SEE+1 =       3.05 RBSQ  = 0.9887 DurH =  7.99 DoFree =  141 to   2004.012
  MAPE  =       0.43 Test period:   SEE     7.26 MAPE     1.15 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe29m                - - - - - - - - - - - - - - - - -    549.27 - - -
  1 intercept               1.48159     0.0   0.00   89.77      1.00
  2 ehe29m[1]               1.00285   687.4   1.00    1.01    549.30  1.002
  3 mnipaqtr               -0.01207     0.6  -0.01    1.00    254.75 -0.014

:                               PPI: u4811
  SEE   =       1.70 RSQ   = 0.9960 RHO =   0.00 Obser  =  144 from 1993.001
  SEE+1 =       1.70 RBSQ  = 0.9959 DurH =  0.01 DoFree =  140 to   2004.012
  MAPE  =       0.67 Test period:   SEE    12.16 MAPE     4.98 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri29m                - - - - - - - - - - - - - - - - -    163.06 - - -
  1 intercept               1.38845     0.4   0.01  251.07      1.00
  2 pri29m[1]               0.96777   407.2   0.96    1.03    162.51  0.972
  3 mnipaqtr                0.01595     0.0   0.02    1.00    254.75  0.026
  4 mnipaqtr[4]             0.00135     0.0   0.00    1.00    250.59  0.002

# Rail Transportation
:                              BLS:CES et482
  SEE   =       1.37 RSQ   = 0.9643 RHO =  -0.20 Obser  =  144 from 1993.001
  SEE+1 =       1.34 RBSQ  = 0.9633 DurH = -2.54 DoFree =  139 to   2004.012
  MAPE  =       0.45 Test period:   SEE     0.64 MAPE     0.21 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe30m                - - - - - - - - - - - - - - - - -    227.40 - - -
  1 intercept              18.40754     3.2   0.08   28.00      1.00
  2 ehe30m[1]               0.99616   233.8   1.00    1.06    227.53  1.020
  3 ehe30m[12]             -0.07027     2.9  -0.07    1.02    229.27 -0.089
  4 mnipaqtr[12]           -0.00821     0.9  -0.01    1.00    242.20 -0.055
  5 mnipaqgas               0.00262     0.1   0.00    1.00    165.14  0.014

:                               PPI: u482
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  SEE   =       0.27 RSQ   = 0.9958 RHO =  -0.07 Obser  =   95 from 1997.002
  SEE+1 =       0.27 RBSQ  = 0.9956 DurH = -0.73 DoFree =   90 to   2004.012
  MAPE  =       0.18 Test period:  SEE     3.03 MAPE     1.64 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri30m               - - - - - - - - - - - - - - - - -    104.99 - - -
  1 intercept             -0.55699     0.1  -0.01  238.17      1.00
  2 pri30m[1]              1.00940   580.0   1.01    1.10    104.81  0.968
  3 mnipaqgas              0.00426     2.3   0.01    1.05    181.31  0.037
  4 mnipaqgas[6]           0.00264     0.7   0.00    1.04    174.21  0.020
  5 mnipaqtr[4]           -0.00527     2.1  -0.01    1.00    279.67 -0.025

# Water transportation
:                                PPI: u483111
  SEE   =       4.12 RSQ   = 0.9903 RHO =  -0.07 Obser  =  144 from 1993.001
  SEE+1 =       4.11 RBSQ  = 0.9900 DurH = -1.06 DoFree =  139 to   2004.012
  MAPE  =       1.48 Test period:  SEE     8.18 MAPE     3.18 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri31m               - - - - - - - - - - - - - - - - -    148.45 - - -
  1 intercept             -3.11896     1.1  -0.02  103.05      1.00
  2 pri31m[1]              1.06306    85.3   1.06    1.08    147.64  1.051
  3 pri31m[3]             -0.17903     2.2  -0.18    1.07    146.05 -0.173
  4 pri31m[6]              0.09026     1.4   0.09    1.04    143.71  0.084
  5 mnipaqmv[1]            0.02262     2.0   0.05    1.00    344.29  0.039

# Truck transportation
:                                BLS:CES et484
  SEE   =       7.09 RSQ   = 0.9911 RHO =  -0.01 Obser  =  144 from 1993.001
  SEE+1 =       7.09 RBSQ  = 0.9906 DurH = -0.10 DoFree =  136 to   2004.012
  MAPE  =       0.32 Test period:  SEE     8.47 MAPE     0.57 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe32m               - - - - - - - - - - - - - - - - -   1312.83 - - -
  1 intercept             48.01253     2.4   0.04  112.23      1.00
  2 ehe32m[1]              0.51707    12.8   0.52    1.30   1311.14  0.527
  3 ehe32m[2]              0.32844     4.6   0.33    1.16   1309.45  0.342
  4 ehe32m[3]              0.11605     0.7   0.12    1.16   1307.73  0.123
  5 ehe32m[12]            -0.01458     0.0  -0.01    1.10   1292.47 -0.018
  6 mnipaqtr               0.48211     1.1   0.09    1.08    254.75  0.283
  7 mnipaqtr[4]            0.06470     0.0   0.01    1.05    250.59  0.039
  8 mnipaqtr[12]          -0.47541     2.2  -0.09    1.00    242.20 -0.306

:                                PPI: u484121p
  SEE   =       0.50 RSQ   = 0.9906 RHO =  -0.29 Obser  =  144 from 1993.001
  SEE+1 =       0.48 RBSQ  = 0.9904 DurH = -3.53 DoFree =  140 to   2004.012
  MAPE  =       0.32 Test period:  SEE     2.49 MAPE     1.63 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri32m               - - - - - - - - - - - - - - - - -    106.15 - - -
  1 intercept              6.85544     3.7   0.06  106.59      1.00
  2 pri32m[1]              0.91186   222.4   0.91    1.13    106.01  0.896
  3 pri32m[12]             0.00387     0.9   0.00    1.12    101.25  0.015
  4 mnipaqgas              0.01353     5.8   0.02    1.00    165.14  0.098

# Transit and ground passenger transportation
:                                BLS:CES et485
  SEE   =       4.88 RSQ   = 0.9689 RHO =   0.01 Obser  =  144 from 1993.001
  SEE+1 =       4.88 RBSQ  = 0.9685 DurH =  0.28 DoFree =  141 to   2004.012
  MAPE  =       0.80 Test period:  SEE    11.16 MAPE     2.52 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe33m               - - - - - - - - - - - - - - - - -    355.14 - - -
  1 intercept             84.33597    12.9   0.24   32.17      1.00
  2 ehe33m[1]              0.58324    23.4   0.58    1.24    354.48  0.590
  3 mnipaqtr               0.25148    11.4   0.18    1.00    254.75  0.400
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:                                 BLS:CES hptr
  SEE   =       0.22 RSQ   = 0.9604 RHO =  -0.14 Obser  =  144 from 1993.001
  SEE+1 =       0.21 RBSQ  = 0.9595 DurH = -1.79 DoFree =  140 to   2004.012
  MAPE  =       0.40 Test period:  SEE     0.24 MAPE     0.57 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr33m                 - - - - - - - - - - - - - - - - -      38.09 - - -
  1 intercept               5.23460     5.0   0.14   25.24       1.00
  2 hr33m[1]                0.87674   146.6   0.88    1.09      38.10  0.876
  3 mnipaqtr                0.01683     1.0   0.11    1.02     254.75  0.684
  4 mnipaqtr[3]            -0.01919     1.2  -0.13    1.00     251.63 -0.799

:                                 BLS:CES wptr
  SEE   =       0.05 RSQ   = 0.9986 RHO =  -0.11 Obser  =  144 from 1993.001
  SEE+1 =       0.05 RBSQ  = 0.9986 DurH = -2.31 DoFree =  140 to   2004.012
  MAPE  =       0.25 Test period:  SEE     0.12 MAPE     0.60 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag33m                - - - - - - - - - - - - - - - - -      14.46 - - -
  1 intercept               0.13149     1.2   0.01  739.29       1.00
  2 wag33m[1]               0.77178    37.7   0.77    1.10      14.44  0.769
  3 wag33m[3]               0.20875     3.4   0.21    1.05      14.38  0.206
  4 mnipaqtr                0.00073     2.7   0.01    1.00     254.75  0.025

# Pipeline transportation
:                                 BLS:CES et486
  SEE   =       0.25 RSQ   = 0.9983 RHO =  -0.00 Obser  =  144 from 1993.001
  SEE+1 =       0.25 RBSQ  = 0.9983 DurH = -0.00 DoFree =  140 to   2004.012
  MAPE  =       0.33 Test period:  SEE     1.08 MAPE     2.20 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe34m                - - - - - - - - - - - - - - - - -      48.08 - - -
  1 intercept              -0.45959     0.3  -0.01  592.76       1.00
  2 ehe34m[1]               1.01250   166.9   1.02    1.01      48.23  1.014
  3 ehe34m[6]              -0.00963     0.0  -0.01    1.01      48.98 -0.010
  4 mnipaqgas               0.00108     0.3   0.00    1.00     165.14  0.007

:                                 PPI: u486110
  SEE   =       1.51 RSQ   = 0.9609 RHO =  -0.00 Obser  =  144 from 1993.001
  SEE+1 =       1.51 RBSQ  = 0.9598 DurH = -0.03 DoFree =  139 to   2004.012
  MAPE  =       0.65 Test period:  SEE     5.06 MAPE     3.75 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri34m                - - - - - - - - - - - - - - - - -     104.55 - - -
  1 intercept               3.63295     1.2   0.03   25.58       1.00
  2 pri34m[1]               1.00160    74.2   1.00    1.03     104.40  0.998
  3 pri34m[3]              -0.04201     0.2  -0.04    1.02     104.10 -0.042
  4 mnipaqgas               0.01062     0.9   0.02    1.00     165.14  0.052
  5 mnipaqtr[1]            -0.00406     0.2  -0.01    1.00     253.71 -0.024

# Other transportation
:                                 BLS:CES et488
  SEE   =       2.13 RSQ   = 0.9984 RHO =  -0.09 Obser  =  144 from 1993.001
  SEE+1 =       2.12 RBSQ  = 0.9984 DurH = -1.10 DoFree =  140 to   2004.012
  MAPE  =       0.35 Test period:  SEE    11.35 MAPE     1.80 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe35m                - - - - - - - - - - - - - - - - -     484.01 - - -
  1 intercept               8.47458     1.5   0.02  632.78       1.00
  2 ehe35m[1]               0.94990   289.1   0.95    1.19     482.81  0.959
  3 mnipaqtr                0.18502     8.3   0.10    1.14     254.75  0.152
  4 mnipaqtr[12]           -0.12477     7.0  -0.06    1.00     242.20 -0.112

:                                 PPI: u488119p
  SEE   =       2.00 RSQ   = 0.9814 RHO =  -0.09 Obser  =  144 from 1993.001
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  SEE+1 =       1.99 RBSQ  = 0.9807 DurH = -2.13 DoFree =  138 to   2004.012
  MAPE  =       1.21 Test period:  SEE     4.07 MAPE     1.84 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri35m               - - - - - - - - - - - - - - - - -    119.88 - - -
  1 intercept              5.46898     1.8   0.05   53.63      1.00
  2 pri35m[1]              0.66072    26.2   0.66    1.19    119.56  0.659
  3 pri35m[4]              0.02136     0.0   0.02    1.12    118.63  0.021
  4 pri35m[6]              0.18002     2.3   0.18    1.06    118.03  0.176
  5 mnipaqtr               0.03406     2.8   0.07    1.02    254.75  0.102
  6 mnipaqgas              0.01789     0.9   0.02    1.00    165.14  0.046

# warehousing and storage
:                                    BLS:CES et493
  SEE   =       2.01 RSQ   = 0.9978 RHO =  -0.10 Obser  =  144 from 1993.001
  SEE+1 =       2.00 RBSQ  = 0.9977 DurH = -1.28 DoFree =  139 to   2004.012
  MAPE  =       0.26 Test period:  SEE    22.41 MAPE     3.12 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe36m               - - - - - - - - - - - - - - - - -    483.49 - - -
  1 intercept             25.75244     4.5   0.05  450.86      1.00
  2 ehe36m[1]              0.88969   169.4   0.89    1.23    482.36  0.886
  3 mgdp                   0.00408     0.1   0.08    1.17   9027.08  0.149
  4 mgdp[1]                0.00696     0.1   0.13    1.15   8988.88  0.253
  5 mgdp[12]              -0.00826     7.0  -0.15    1.00   8581.40 -0.290

:                                    PPI: u4931101
  SEE   =       0.32 RSQ   = 0.9868 RHO =  -0.03 Obser  =  132 from 1994.001
  SEE+1 =       0.32 RBSQ  = 0.9866 DurH = -0.36 DoFree =  129 to   2004.012
  MAPE  =       0.17 Test period:  SEE     0.75 MAPE     0.62 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri36m               - - - - - - - - - - - - - - - - -    105.06 - - -
  1 intercept              7.29283     2.2   0.07   75.60      1.00
  2 pri36m[1]              0.91641   154.3   0.92    1.05    105.00  0.911
  3 mgdp                   0.00017     2.4   0.01    1.00   9242.51  0.086

# publishing
:                                     IPI: g5111
  SEE   =       0.86 RSQ   = 0.9851 RHO =  -0.03 Obser  =  144 from 1993.001
  SEE+1 =       0.86 RBSQ  = 0.9847 DurH = -0.37 DoFree =  139 to   2004.012
  MAPE  =       0.66 Test period:  SEE     3.41 MAPE     2.81 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips37m               - - - - - - - - - - - - - - - - -     98.04 - - -
  1 intercept              3.88732     2.6   0.04   67.15      1.00
  2 ips37m[1]              1.00410   276.2   1.00    1.08     97.97  1.009
  3 ips37m[12]            -0.05086     2.0  -0.05    1.03     97.38 -0.054
  4 mnipaqnoth             0.02698     1.5   0.13    1.03    481.30  0.415
  5 mnipaqnoth[12]        -0.02706     1.5  -0.13    1.00    452.87 -0.397

:                                     PPI: u51113
  SEE   =       1.01 RSQ   = 0.9976 RHO =  -0.17 Obser  =  144 from 1993.001
  SEE+1 =       1.00 RBSQ  = 0.9975 DurH = -2.15 DoFree =  140 to   2004.012
  MAPE  =       0.43 Test period:  SEE     2.64 MAPE     1.02 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri37m               - - - - - - - - - - - - - - - - -    181.79 - - -
  1 intercept              4.82487     1.3   0.03  415.11      1.00
  2 pri37m[1]              0.95042   213.3   0.95    1.03    181.28  0.949
  3 mnipaqnoth             0.00945     0.2   0.03    1.00    481.30  0.049
  4 mnipaqnoth[12]         0.00027     0.0   0.00    1.00    452.87  0.001

:                 NIPA: Nominal PCE of Computer and software
  SEE   =       1.53 RSQ   = 0.9806 RHO =   0.99 Obser  =  144 from 1993.001
  SEE+1 =       0.28 RBSQ  = 0.9804 DW   =   0.02 DoFree =  141 to   2004.012
```

```
  MAPE  =       4.43 Test period:   SEE     1.57 MAPE     2.44 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mcomppce              - - - - - - - - - - - - - - - - -     35.65 - - -
  1 intercept              -25.20839   199.8  -0.71   51.63      1.00
  2 mnipaqfur                0.13030     0.5   1.02    1.00    278.07  0.588
  3 mnipaqfur[1]             0.08896     0.2   0.69    1.00    276.82  0.402

:               NIPA: Price index of PCE of Computer and software
  SEE   =      55.67 RSQ   = 0.9458 RHO =   0.95 Obser  =  144 from 1993.001
  SEE+1 =      18.66 RBSQ  = 0.9447 DW  =   0.11 DoFree =  140 to   2004.012
  MAPE  =      35.25 Test period:   SEE    85.66 MAPE   199.93 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mcomppceq             - - - - - - - - - - - - - - - - -    260.90 - - -
  1 intercept            1565.04570   385.6   6.00   18.46      1.00
  2 mnipaqfur                8.48463     1.6   9.04    2.13    278.07  1.756
  3 mnipaqfur[1]           -15.12943     5.0 -16.05    2.09    276.82 -3.135
  4 mnipaqgas                3.17660    44.6   2.01    1.00    165.14  0.501

#Motion pictures and sound recording
:                                 BLS:CES et512
  SEE   =       4.09 RSQ   = 0.9909 RHO =  -0.06 Obser  =  144 from 1993.001
  SEE+1 =       4.08 RBSQ  = 0.9907 DurH = -0.95 DoFree =  140 to   2004.012
  MAPE  =       0.87 Test period:   SEE    10.60 MAPE     2.51 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe38m                - - - - - - - - - - - - - - - - -    349.80 - - -
  1 intercept                6.51582     1.5   0.02  109.44      1.00
  2 ehe38m[1]                0.93222    97.0   0.93    1.02    349.00  0.945
  3 ehe38m[6]                0.06303     0.6   0.06    1.01    344.50  0.068
  4 mnipaqnoth              -0.00784     0.5  -0.01    1.00    481.30 -0.020

:                                 BLS:CES wpin
  SEE   =       0.07 RSQ   = 0.9988 RHO =  -0.20 Obser  =  144 from 1993.001
  SEE+1 =       0.07 RBSQ  = 0.9988 DurH = -2.37 DoFree =  141 to   2004.012
  MAPE  =       0.30 Test period:   SEE     0.23 MAPE     0.82 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag38m                - - - - - - - - - - - - - - - - -     18.07 - - -
  1 intercept                0.06170     0.3   0.00  852.96      1.00
  2 wag38m[1]                0.99751  1248.1   0.99    1.00     18.02  0.996
  3 mnipaqgas                0.00019     0.1   0.00    1.00    165.14  0.003

# Broadcasting and telecommunication
:                                  IPI: b52120
  SEE   =       0.90 RSQ   = 0.9992 RHO =   0.50 Obser  =  144 from 1993.001
  SEE+1 =       0.79 RBSQ  = 0.9992 DurH =  6.07 DoFree =  140 to   2004.012
  MAPE  =       0.92 Test period:   SEE     2.56 MAPE     1.52 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ips39m                - - - - - - - - - - - - - - - - -     78.81 - - -
  1 intercept               -9.46846    17.0  -0.12 1237.49      1.00
  2 ips39m[1]                0.89288   450.2   0.89    1.64     78.22  0.896
  3 mnipaqnoth               0.00591     2.7   0.04    1.61    481.30  0.020
  4 mnipaqvnre               0.02115    26.8   0.20    1.00    737.62  0.088

:                                 BLS:CES et515
  SEE   =       0.90 RSQ   = 0.9978 RHO =  -0.04 Obser  =  144 from 1993.001
  SEE+1 =       0.90 RBSQ  = 0.9977 DurH = -0.48 DoFree =  140 to   2004.012
  MAPE  =       0.22 Test period:   SEE     6.37 MAPE     1.75 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe39m                - - - - - - - - - - - - - - - - -    317.97 - - -
  1 intercept               15.45412    10.7   0.05  444.94      1.00
  2 ehe39m[1]                0.93238   536.9   0.93    1.40    317.65  0.943
  3 mnipaqvnre               0.01284    15.2   0.03    1.19    737.62  0.090
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```
  4 mnipaqnoth              -0.00650     9.0  -0.01    1.00    481.30 -0.037

:                                PPI: u515112
  SEE   =       2.19 RSQ   = 0.9909 RHO =   0.19 Obser  =  144 from 1993.001
  SEE+1 =       2.15 RBSQ  = 0.9907 DurH =  2.86 DoFree =  140 to   2004.012
  MAPE  =       1.05 Test period:  SEE     4.65 MAPE     2.04 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 pri39m                - - - - - - - - - - - - - - - - -    154.19 - - -
  1 intercept               2.22124     1.1   0.01  109.87      1.00
  2 pri39m[1]               0.81409    74.5   0.81    1.11    153.65  0.816
  3 pri39m[6]               0.05836     0.4   0.06    1.04    150.91  0.058
  4 pri39m[12]              0.12221     2.1   0.12    1.00    147.88  0.124

#Information and data processing
:                                BLS:CES et519
  SEE   =       0.34 RSQ   = 0.9971 RHO =   0.06 Obser  =  144 from 1993.001
  SEE+1 =       0.34 RBSQ  = 0.9970 DurH =  0.70 DoFree =  139 to   2004.012
  MAPE  =       0.61 Test period:  SEE     0.69 MAPE     1.04 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe40m                - - - - - - - - - - - - - - - - -     42.01 - - -
  1 intercept               0.47362     2.0   0.01  341.97      1.00
  2 ehe40m[1]               1.09164    94.1   1.09    1.08     41.86  1.098
  3 ehe40m[3]              -0.06489     0.3  -0.06    1.03     41.58 -0.066
  4 ehe40m[6]              -0.00441     0.0  -0.00    1.01     41.17 -0.004
  5 ehe40m[12]             -0.03177     0.5  -0.03    1.00     40.46 -0.031

:                                BLS:CES w$in
  SEE   =       0.05 RSQ   = 0.9872 RHO =   0.02 Obser  =  144 from 1993.001
  SEE+1 =       0.00 RBSQ  = 0.9868 DurH = 999.00 DoFree =  139 to   2004.012
  MAPE  =       0.33 Test period:  SEE     0.01 MAPE     0.72 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag40m                - - - - - - - - - - - - - - - - -     10.18 - - -
  1 intercept               0.08344     0.3   0.01   78.07      0.95
  2 wag40m[1]               0.77097    21.1   0.77    1.07     10.17  0.772
  3 wag40m[3]               0.25349     2.2   0.25    1.00     10.16  0.255
  4 wag40m[4]              -0.03124     0.0  -0.03    1.00     10.15 -0.031
  5 wag40m_mu[1]            0.05312     0.1  -0.00    1.00     -0.00  0.006

# Federal reserve banks, credit intermediation, etc.
:                                BLS:CES et522
  SEE   =       4.13 RSQ   = 0.9994 RHO =   0.22 Obser  =  144 from 1993.001
  SEE+1 =       4.04 RBSQ  = 0.9993 DurH =  3.28 DoFree =  139 to   2004.012
  MAPE  =       0.12 Test period:  SEE    10.80 MAPE     0.31 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe41_2m              - - - - - - - - - - - - - - - - -   2534.67 - - -
  1 intercept              42.57581     2.6   0.02 1579.81      1.00
  2 ehe41_2m[1]             1.29367   248.9   1.29    2.34   2531.15  1.285
  3 ehe41_2m[4]            -0.37847     9.2  -0.38    1.11   2520.75 -0.369
  4 ehe41_2m[6]             0.06141     0.6   0.06    1.06   2513.73  0.059
  5 mnipaqsoth              0.02075     3.0   0.01    1.00    832.56  0.024

:                                BLS:CES hpfi
  SEE   =       0.10 RSQ   = 0.6722 RHO =  -0.10 Obser  =  144 from 1993.001
  SEE+1 =       0.10 RBSQ  = 0.6652 DurH = -2.06 DoFree =  140 to   2004.012
  MAPE  =       0.21 Test period:  SEE     0.27 MAPE     0.63 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr41m                 - - - - - - - - - - - - - - - - -     35.66 - - -
  1 intercept               3.65307     1.2   0.10    3.05      1.00
  2 hr41m[1]                0.57348    24.4   0.57    1.18     35.66  0.574
  3 hr41m[6]                0.31212     6.2   0.31    1.00     35.65  0.313
  4 hr41m[12]               0.01199     0.0   0.01    1.00     35.65  0.012
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:                                BLS:CES w$fi
  SEE   =       0.03 RSQ   = 0.9963 RHO =   0.08 Obser  =  144 from 1993.001
  SEE+1 =       0.03 RBSQ  = 0.9962 DurH =  1.12 DoFree =  139 to   2004.012
  MAPE  =       0.26 Test period:  SEE     0.13 MAPE     1.11 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag41m               - - - - - - - - - - - - - - - - -      8.45 - - -
  1 intercept               0.34299     1.6   0.04  270.97      1.00
  2 wag41m[1]               0.99636   101.8   1.00    1.05      8.44  0.998
  3 wag41m[4]              -0.05067     0.4  -0.05    1.05      8.40 -0.051
  4 mnipaqmv                0.00033     1.2   0.01    1.00    345.86  0.048
  5 mnipaqsoth[6]           0.00001     0.0   0.00    1.00    806.70  0.005

# securities, commodity contracts and investment
:                                BLS:CES et523
  SEE   =       2.18 RSQ   = 0.9996 RHO =  -0.22 Obser  =  144 from 1993.001
  SEE+1 =       2.13 RBSQ  = 0.9996 DurH = -2.92 DoFree =  138 to   2004.012
  MAPE  =       0.20 Test period:  SEE    24.58 MAPE     2.74 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe42m               - - - - - - - - - - - - - - - - -    685.57 - - -
  1 intercept               5.09952     4.1   0.01 2415.39      1.00
  2 ehe42m[1]               1.17302   184.7   1.17    2.53    683.54  1.184
  3 ehe42m[4]              -0.19987    11.3  -0.20    1.12    677.46 -0.207
  4 mnipaqsoth              0.01546     0.4   0.02    1.10    832.56  0.027
  5 mnipaqsoth[12]         -0.01573     0.3  -0.02    1.05    781.60 -0.027
  6 mnipaqvnre              0.01829     2.7   0.02    1.00    737.62  0.023

# Insurance
:                                BLS:CES et524
  SEE   =       2.59 RSQ   = 0.9984 RHO =  -0.10 Obser  =  144 from 1993.001
  SEE+1 =       2.57 RBSQ  = 0.9984 DurH = -1.25 DoFree =  139 to   2004.012
  MAPE  =       0.09 Test period:  SEE    26.03 MAPE     0.93 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe43m               - - - - - - - - - - - - - - - - -   2184.81 - - -
  1 intercept              60.94188     3.3   0.03  633.83      1.00
  2 ehe43m[1]               1.23958   304.6   1.24    1.68   2183.38  1.252
  3 ehe43m[4]              -0.27131    29.0  -0.27    1.05   2178.92 -0.282
  4 mgdp                    0.00013     0.0   0.00    1.01   9027.08  0.003
  5 mnipaqmv[6]             0.02188     0.7   0.00    1.00    336.53  0.025

# Funds, Trusts, etc.
:                                BLS:CES et525
  SEE   =       0.35 RSQ   = 0.9988 RHO =  -0.06 Obser  =  144 from 1993.001
  SEE+1 =       0.34 RBSQ  = 0.9988 DurH = -0.68 DoFree =  140 to   2004.012
  MAPE  =       0.31 Test period:  SEE     4.58 MAPE     4.13 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe44m               - - - - - - - - - - - - - - - - -     75.85 - - -
  1 intercept               0.35863     0.9   0.00  827.09      1.00
  2 ehe44m[1]               1.18397   165.6   1.18    1.29     75.66  1.191
  3 ehe44m[4]              -0.17259     3.9  -0.17    1.01     75.12 -0.177
  4 ehe44m[12]             -0.01537     0.3  -0.01    1.00     73.60 -0.016

# Real estate
:                                BLS:CES et531
  SEE   =       3.27 RSQ   = 0.9985 RHO =  -0.00 Obser  =  144 from 1993.001
  SEE+1 =       3.27 RBSQ  = 0.9984 DurH = 999.00 DoFree =  140 to   2004.012
  MAPE  =       0.20 Test period:  SEE    11.87 MAPE     0.68 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe45m               - - - - - - - - - - - - - - - - -   1277.62 - - -
  1 intercept              62.33624     2.0   0.05  658.01      1.00
  2 ehe45m[1]               0.96571    39.0   0.96    1.04   1275.48  0.965
```

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  3 ehe45m[2]              -0.04220     0.1  -0.04    1.04   1273.33 -0.042
  4 mgdp                    0.00413     1.9   0.03    1.00   9027.08  0.077

# Rental and leasing
:                                 BLS:CES et532
  SEE   =       2.26 RSQ   = 0.9981 RHO =   0.04 Obser  =  144 from 1993.001
  SEE+1 =       2.26 RBSQ  = 0.9980 DurH =  0.51 DoFree =  139 to   2004.012
  MAPE  =       0.26 Test period:  SEE     4.23 MAPE     0.56 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe46_1m              - - - - - - - - - - - - - - - - -    612.10 - - -
  1 intercept               5.89633     1.2   0.01  525.79      1.00
  2 ehe46_1m[1]             1.00053   165.9   1.00    1.12    611.12  1.014
  3 ehe46_1m[6]             0.08402     1.0   0.08    1.08    606.16  0.091
  4 ehe46_1m[12]           -0.09393     2.8  -0.09    1.00    600.03 -0.109
  5 mnipaqmv[6]             0.00057     0.0   0.00    1.00    336.53  0.001

:                                 BLS:CES et533
  SEE   =       0.27 RSQ   = 0.9956 RHO =  -0.01 Obser  =  144 from 1993.001
  SEE+1 =       0.27 RBSQ  = 0.9955 DurH = -0.18 DoFree =  140 to   2004.012
  MAPE  =       0.77 Test period:  SEE     2.02 MAPE     5.93 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe46_2m              - - - - - - - - - - - - - - - - -     23.89 - - -
  1 intercept               0.37125     2.4   0.02  227.57      1.00
  2 ehe46_2m[1]             1.11575    93.0   1.11    1.04     23.81  1.131
  3 ehe46_2m[3]            -0.13818     1.1  -0.14    1.00     23.68 -0.144
  4 ehe46_2m[6]             0.00915     0.0   0.01    1.00     23.46  0.010

# Legal services
:                                BLS:CES et5411
  SEE   =       1.96 RSQ   = 0.9992 RHO =   0.02 Obser  =  144 from 1993.001
  SEE+1 =       1.96 RBSQ  = 0.9992 DurH =  0.20 DoFree =  138 to   2004.012
  MAPE  =       0.14 Test period:  SEE     3.84 MAPE     0.28 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe47m                - - - - - - - - - - - - - - - - -   1041.20 - - -
  1 intercept              11.16727     1.1   0.01 1332.53      1.00
  2 ehe47m[1]               1.05718    81.2   1.06    1.11   1039.73  1.051
  3 ehe47m[3]              -0.02291     0.0  -0.02    1.07   1036.73 -0.022
  4 ehe47m[12]             -0.04978     1.7  -0.05    1.03   1023.47 -0.045
  5 mnipaqmv                0.00210     0.0   0.00    1.01    345.86  0.002
  6 mnipaqmv[3]             0.01414     0.5   0.00    1.00    341.15  0.014

:                                 BLS:CES wppb
  SEE   =       0.04 RSQ   = 0.9996 RHO =  -0.23 Obser  =  144 from 1993.001
  SEE+1 =       0.04 RBSQ  = 0.9996 DurH = -3.97 DoFree =  139 to   2004.012
  MAPE  =       0.18 Test period:  SEE     0.09 MAPE     0.41 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag47m                - - - - - - - - - - - - - - - - -     14.64 - - -
  1 intercept               0.27625     2.6   0.02 2714.01      1.00
  2 wag47m[1]               0.95153    86.7   0.95    1.18     14.60  0.950
  3 wag47m[4]               0.27045     3.4   0.27    1.17     14.48  0.268
  4 wag47m[6]              -0.26425     6.6  -0.26    1.05     14.40 -0.261
  5 mnipaqsoth              0.00043     2.4   0.02    1.00    832.56  0.043

# computer systems design
:                                BLS:CES et5415
  SEE   =       3.62 RSQ   = 0.9998 RHO =   0.18 Obser  =  144 from 1993.001
  SEE+1 =       3.57 RBSQ  = 0.9998 DurH =  2.23 DoFree =  140 to   2004.012
  MAPE  =       0.27 Test period:  SEE   105.27 MAPE     7.70 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe48m                - - - - - - - - - - - - - - - - -    936.01 - - -
  1 intercept             -20.85032     9.3  -0.02 6019.41      1.00
```

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  2 ehe48m[1]              1.15413   273.8   1.15    4.97    931.01  1.162
  3 ehe48m[4]             -0.19599    26.2  -0.19    1.27    916.13 -0.201
  4 mnipaqvnre             0.08393    12.6   0.07    1.00    737.62  0.040

# Other professional services
:                               BLS:CES et5416
  SEE   =       2.97 RSQ   = 0.9995 RHO =   0.05 Obser  =  144 from 1993.001
  SEE+1 =       2.96 RBSQ  = 0.9995 DurH =  0.64 DoFree =  139 to   2004.012
  MAPE  =       0.35 Test period:  SEE    24.23 MAPE     1.76 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe49m               - - - - - - - - - - - - - - - - -    612.47 - - -
  1 intercept              1.12445     0.2   0.00 2025.84      1.00
  2 ehe49m[1]              1.07647   198.6   1.07    1.26    609.37  1.080
  3 ehe49m[6]             -0.09496     4.6  -0.09    1.03    594.09 -0.097
  4 mnipaqgas              0.03412     1.7   0.01    1.01    165.14  0.010
  5 mnipaqvnrs             0.02389     0.5   0.01    1.00    257.85  0.008

:                               BLS:CES et5412
  SEE   =       7.06 RSQ   = 0.9905 RHO =   0.05 Obser  =  144 from 1993.001
  SEE+1 =       7.05 RBSQ  = 0.9902 DurH =  0.91 DoFree =  138 to   2004.012
  MAPE  =       0.55 Test period:  SEE    23.08 MAPE     2.16 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe49_2m             - - - - - - - - - - - - - - - - -    780.31 - - -
  1 intercept            132.72003     9.7   0.17  105.54      1.00
  2 ehe49_2m[1]            0.67272    36.5   0.67    1.27    779.20  0.679
  3 mnipaqvnrs[12]         0.26442     4.5   0.08    1.27    247.37  0.185
  4 mnipaqvnre             0.08261     1.9   0.08    1.13    737.62  0.151
  5 mnipaqmv              -0.12522     5.5  -0.06    1.01    345.86 -0.124
  6 mnipaqvnre[4]          0.05564     0.6   0.05    1.00    725.53  0.106

# management
:                                BLS:CES hpps
  SEE   =       0.07 RSQ   = 0.7976 RHO =   0.03 Obser  =  144 from 1993.001
  SEE+1 =       0.07 RBSQ  = 0.7903 DurH =  0.98 DoFree =  138 to   2004.012
  MAPE  =       0.16 Test period:  SEE     0.05 MAPE     0.10 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr50m                - - - - - - - - - - - - - - - - -     32.58 - - -
  1 intercept              1.36698     0.4   0.04    4.94      1.00
  2 hr50m[1]               0.42917     8.8   0.43    1.32     32.58  0.428
  3 hr50m[2]               0.11836     0.6   0.12    1.17     32.58  0.117
  4 hr50m[3]               0.35067     4.9   0.35    1.00     32.58  0.344
  5 hr50m[4]               0.00683     0.0   0.01    1.00     32.59  0.007
  6 hr50m[6]               0.05296     0.2   0.05    1.00     32.59  0.051

# Administrative
:                                BLS:CES et561
  SEE   =      30.18 RSQ   = 0.9989 RHO =   0.13 Obser  =  144 from 1993.001
  SEE+1 =      29.92 RBSQ  = 0.9989 DurH =  1.65 DoFree =  140 to   2004.012
  MAPE  =       0.34 Test period:  SEE   226.76 MAPE     2.45 end  2006.012
    Variable name          Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe51m               - - - - - - - - - - - - - - - - -   6744.55 - - -
  1 intercept             65.50723     1.1   0.01  948.97      1.00
  2 ehe51m[1]              1.00345   309.6   1.00    1.24   6724.09  1.017
  3 mnipaqvnre             1.18153     8.4   0.13    1.23    737.62  0.169
  4 mnipaqvnre[2]         -1.28464    11.0  -0.14    1.00    731.52 -0.187

# Waste management and remediation
:                                BLS:CES et562
  SEE   =       1.42 RSQ   = 0.9968 RHO =  -0.24 Obser  =  144 from 1993.001
  SEE+1 =       1.37 RBSQ  = 0.9967 DurH = -3.02 DoFree =  139 to   2004.012
  MAPE  =       0.33 Test period:  SEE     2.06 MAPE     0.47 end  2006.012
```

```
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 ehe52m               - - - - - - - - - - - - - - - - -    297.05 - - -
 1 intercept              8.40465     2.5   0.03  311.66      1.00
 2 ehe52m[1]              0.94982   308.5   0.95    1.03    296.40  0.959
 3 mnipaqho               0.02414     0.7   0.03    1.01    359.22  0.055
 4 mnipaqsoth             0.00697     0.3   0.02    1.01    832.56  0.053
 5 mnipaqsoth[12]        -0.00942     0.6  -0.02    1.00    781.60 -0.068

:                                BLS:CES wpps
 SEE   =        0.02 RSQ   = 0.9999 RHO =  -0.12 Obser  =  144 from 1993.001
 SEE+1 =        0.02 RBSQ  = 0.9998 DurH = -1.48 DoFree =  141 to   2004.012
 MAPE  =        0.11 Test period:  SEE     0.09 MAPE     0.42 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 wag52m               - - - - - - - - - - - - - - - - -     12.90 - - -
 1 intercept              0.11959     0.9   0.01 6758.85      1.00
 2 wag52m[1]              0.98430   584.5   0.98    1.01     12.86  0.983
 3 mnipaqsoth             0.00014     0.7   0.01    1.00    832.56  0.017

# Educational services
:                                BLS:CES et61
 SEE   =       10.00 RSQ   = 0.9990 RHO =  -0.04 Obser  =  144 from 1993.001
 SEE+1 =        9.99 RBSQ  = 0.9990 DurH = -0.52 DoFree =  141 to   2004.012
 MAPE  =        0.30 Test period:  SEE    12.19 MAPE     0.36 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 ehe53m               - - - - - - - - - - - - - - - - -   2287.38 - - -
 1 intercept             15.18050     2.1   0.01  976.51      1.00
 2 ehe53m[1]              0.99283  1587.7   0.99    1.01   2279.76  0.995
 3 mnipaqvnrs             0.03404     0.4   0.00    1.00    257.85  0.005

:                                BLS:CES hpeh
 SEE   =        0.07 RSQ   = 0.8565 RHO =   0.14 Obser  =  144 from 1993.001
 SEE+1 =        0.07 RBSQ  = 0.8524 DurH =  2.26 DoFree =  139 to   2004.012
 MAPE  =        0.16 Test period:  SEE     0.15 MAPE     0.44 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 hr53m                - - - - - - - - - - - - - - - - -     32.19 - - -
 1 intercept             15.95915    10.3   0.50    4.96      1.00
 2 hr53m[1]               0.37029     5.2   0.37    1.41     32.18  0.368
 3 hr53m[3]               0.38178     5.1   0.38    1.25     32.18  0.375
 4 hr53m[12]             -0.26061     4.4  -0.26    1.25     32.15 -0.245
 5 mnipaqmv               0.00117    11.6   0.01    1.00    345.86  0.464

:                                BLS:CES wpeh
 SEE   =        0.03 RSQ   = 0.9998 RHO =  -0.16 Obser  =  144 from 1993.001
 SEE+1 =        0.03 RBSQ  = 0.9997 DurH = -1.96 DoFree =  142 to   2004.012
 MAPE  =        0.11 Test period:  SEE     0.03 MAPE     0.14 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 wag53m               - - - - - - - - - - - - - - - - -     13.44 - - -
 1 intercept             -0.02005     0.4  -0.00 4014.14      1.00
 2 wag53m[1]              1.00426  6235.7   1.00    1.00     13.40  1.000

# Ambulatory health care services
:                                BLS:CES et621
 SEE   =        4.82 RSQ   = 0.9999 RHO =   0.04 Obser  =  144 from 1993.001
 SEE+1 =        4.81 RBSQ  = 0.9999 DurH =  0.71 DoFree =  139 to   2004.012
 MAPE  =        0.09 Test period:  SEE     7.98 MAPE     0.13 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
 0 ehe54m               - - - - - - - - - - - - - - - - -   4192.18 - - -
 1 intercept             33.95366     4.4   0.01 9051.14      1.00
 2 ehe54m[1]              1.09920    95.6   1.10    1.41   4180.03  1.101
 3 ehe54m[3]             -0.11149     1.5  -0.11    1.15   4155.63 -0.112
 4 mnipaqvnre            -0.03204     6.2  -0.01    1.07    737.62 -0.009
```

```
  5 mgdp                    0.00559     3.5   0.01    1.00   9027.08  0.019

#Hospitals, residential care
:                                BLS:CES et622
  SEE   =       3.43 RSQ   = 0.9997 RHO =  -0.06 Obser  =  144 from 1993.001
  SEE+1 =       3.43 RBSQ  = 0.9997 DurH = -0.79 DoFree =  139 to   2004.012
  MAPE  =       0.06 Test period:   SEE    21.39 MAPE     0.45 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe55_1m              - - - - - - - - - - - - - - - - -   3942.82 - - -
  1 intercept               7.45300     0.3   0.00 3181.90      1.00
  2 ehe55_1m[1]             1.17223   104.9   1.17    1.53   3938.90  1.163
  3 ehe55_1m[3]            -0.08581     0.4  -0.09    1.12   3931.05 -0.084
  4 ehe55_1m[6]            -0.08985     1.9  -0.09    1.06   3919.24 -0.085
  5 mnipaqvnrs[6]           0.02995     2.8   0.00    1.00    252.31  0.008

:                                BLS:CES et623
  SEE   =       2.70 RSQ   = 0.9998 RHO =   0.24 Obser  =  144 from 1993.001
  SEE+1 =       2.62 RBSQ  = 0.9998 DurH =  2.87 DoFree =  141 to   2004.012
  MAPE  =       0.08 Test period:   SEE     5.97 MAPE     0.14 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe55_2m              - - - - - - - - - - - - - - - - -   2509.00 - - -
  1 intercept              26.52857    18.1   0.01 6316.30      1.00
  2 ehe55_2m[1]             0.98891  3686.7   0.99    1.05   2503.69  0.995
  3 mnipaqvnrs[6]           0.02590     2.5   0.00    1.00    252.31  0.006

# Social assistance
:                                BLS:CES et624
  SEE   =       7.45 RSQ   = 0.9993 RHO =  -0.03 Obser  =  144 from 1993.001
  SEE+1 =       7.45 RBSQ  = 0.9992 DurH = -0.41 DoFree =  140 to   2004.012
  MAPE  =       0.30 Test period:   SEE    14.66 MAPE     0.49 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe56m                - - - - - - - - - - - - - - - - -   1727.12 - - -
  1 intercept              27.64292     2.1   0.02 1341.47      1.00
  2 ehe56m[1]               0.95663   305.5   0.95    1.04   1720.78  0.957
  3 mnipaqvnre              0.01125     0.5   0.00    1.02    737.62  0.005
  4 mnipaqsoth              0.05410     1.2   0.03    1.00    832.56  0.038

#Performing Arts, spectator sports, museums, etc.
:                                BLS:CES et712
  SEE   =       0.55 RSQ   = 0.9984 RHO =   0.01 Obser  =  144 from 1993.001
  SEE+1 =       0.55 RBSQ  = 0.9984 DurH =  0.12 DoFree =  139 to   2004.012
  MAPE  =       0.41 Test period:   SEE     1.62 MAPE     1.02 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe57_2m              - - - - - - - - - - - - - - - - -     99.96 - - -
  1 intercept               0.78629     0.4   0.01  641.08      1.00
  2 ehe57_2m[1]             0.99637    69.9   0.99    1.02     99.66  1.000
  3 ehe57_2m[3]             0.03268     0.1   0.03    1.01     99.06  0.033
  4 ehe57_2m[12]           -0.03795     0.6  -0.04    1.00     96.35 -0.039
  5 mnipaqrec[12]           0.00127     0.0   0.00    1.00    227.57  0.005

:                                BLS:CES wplh
  SEE   =       0.02 RSQ   = 0.9995 RHO =  -0.15 Obser  =  144 from 1993.001
  SEE+1 =       0.02 RBSQ  = 0.9995 DurH = -1.77 DoFree =  141 to   2004.012
  MAPE  =       0.19 Test period:   SEE     0.03 MAPE     0.24 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 wag57m                - - - - - - - - - - - - - - - - -      7.81 - - -
  1 intercept               0.03261     1.6   0.00 2215.85      1.00
  2 wag57m[1]               0.99108  2228.5   0.99    1.07      7.79  0.990
  3 mnipaqvnrs              0.00022     3.4   0.01    1.00    257.85  0.011

# Amusement, Gambling
```

```
:                                BLS:CES et713
  SEE   =       7.89 RSQ   = 0.9966 RHO =   0.01 Obser  =  144 from 1993.001
  SEE+1 =       7.89 RBSQ  = 0.9966 DurH =  0.11 DoFree =  141 to   2004.012
  MAPE  =       0.53 Test period:   SEE    11.38 MAPE     0.65 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe58m                - - - - - - - - - - - - - - - - -   1193.11 - - -
  1 intercept              24.84941     1.8   0.02  297.35      1.00
  2 ehe58m[1]               0.97584   398.5   0.97    1.00   1189.82  0.986
  3 mnipaqrec[12]           0.03161     0.2   0.01    1.00    227.57  0.013

# accommodation
:                                BLS:CES et721
  SEE   =       7.51 RSQ   = 0.9934 RHO =   0.26 Obser  =  144 from 1993.001
  SEE+1 =       7.25 RBSQ  = 0.9931 DurH =  4.21 DoFree =  138 to   2004.012
  MAPE  =       0.30 Test period:   SEE    25.57 MAPE     1.22 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe59m                - - - - - - - - - - - - - - - - -   1747.02 - - -
  1 intercept             101.20397     0.6   0.06  150.63      1.00
  2 ehe59m[1]               1.05935   117.2   1.06    1.08   1745.34  1.072
  3 ehe59m[4]              -0.13272     2.0  -0.13    1.01   1740.55 -0.139
  4 mnipaqrec[12]          -0.01251     0.1  -0.00    1.01    227.57 -0.007
  5 mnipaqvnrs[12]         -0.06008     0.6  -0.01    1.01    247.37 -0.033
  6 mnipaqvnre[7]           0.06364     0.5   0.03    1.00    716.85  0.098

:                                BLS:CES hplh
  SEE   =       0.14 RSQ   = 0.5661 RHO =   0.35 Obser  =  144 from 1993.001
  SEE+1 =       0.13 RBSQ  = 0.5537 DurH = 999.00 DoFree =  139 to   2004.012
  MAPE  =       0.41 Test period:   SEE     0.16 MAPE     0.53 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 hr59m                 - - - - - - - - - - - - - - - - -     25.90 - - -
  1 intercept               4.36864     2.5   0.17    2.30      1.00
  2 hr59m[2]                0.38330     6.4   0.38    1.16     25.90  0.383
  3 hr59m[3]                0.31949     3.7   0.32    1.01     25.90  0.319
  4 hr59m[4]                0.04687     0.1   0.05    1.01     25.90  0.047
  5 hr59m[6]                0.08162     0.3   0.08    1.00     25.90  0.081

# Food services
:                                BLS:CES et722
  SEE   =      18.74 RSQ   = 0.9990 RHO =  -0.22 Obser  =  144 from 1993.001
  SEE+1 =      18.29 RBSQ  = 0.9990 DurH = -2.64 DoFree =  141 to   2004.012
  MAPE  =       0.17 Test period:   SEE    25.64 MAPE     0.22 end  2006.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 ehe60m                - - - - - - - - - - - - - - - - -   7901.43 - - -
  1 intercept             172.05646     3.5   0.02  986.97      1.00
  2 ehe60m[1]               0.96242   524.6   0.96    1.05   7885.82  0.964
  3 mnipaqfood              0.16026     2.6   0.02    1.00    872.92  0.036

:           CENSUS: Retail sales of Food services and drinking places
  SEE   =    2568.78 RSQ   = 0.9974 RHO =   0.94 Obser  =  144 from 1993.001
  SEE+1 =     843.95 RBSQ  = 0.9974 DW  =   0.11 DoFree =  142 to   2004.012
  MAPE  =       0.72 Test period:   SEE  3710.18 MAPE     0.83 end  2005.012
    Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
  0 mrt722                - - - - - - - - - - - - - - - - - 284920.89 - - -
  1 intercept            -48958.73717   202.5  -0.17  388.69      1.00
  2 mnipaqfood            382.48385  1871.5   1.17    1.00    872.92  0.999

# other services
:                                BLS:CES etos
  SEE   =       6.36 RSQ   = 0.9997 RHO =   0.20 Obser  =  144 from 1993.001
  SEE+1 =       6.27 RBSQ  = 0.9997 DurH =  2.39 DoFree =  139 to   2004.012
  MAPE  =       0.10 Test period:   SEE   108.93 MAPE     1.55 end  2006.012
```

```
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 ehe61m                - - - - - - - - - - - - - - - - -   4961.44 - - -
1 intercept              -11.33681     0.0  -0.00 3338.07      1.00
2 ehe61m[1]                1.00453   536.8   1.00    1.17   4953.76  1.011
3 mnipaqsoth              -0.07319     1.3  -0.01    1.02    832.56 -0.038
4 mgdp[6]                  0.00840     0.6   0.01    1.02   8800.77  0.035
5 mnipaqgas               -0.09921     1.2  -0.00    1.00    165.14 -0.010

# Federal Government : General
:                                  BLS:CES et911
 SEE   =       37.06 RSQ   = 0.9172 RHO =  -0.09 Obser  =  144 from 1993.001
 SEE+1 =       36.90 RBSQ  = 0.9148 DurH = -1.34 DoFree =  139 to   2004.012
 MAPE  =        0.67 Test period:  SEE    16.04 MAPE     0.76 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 ehe62m                - - - - - - - - - - - - - - - - -   1998.73 - - -
1 intercept              133.25703     0.7   0.07   12.08      1.00
2 ehe62m[1]                0.85652    85.7   0.86    1.03   2001.21  0.873
3 ehe62m[6]                0.07895     1.1   0.08    1.00   2013.78  0.087
4 mgdp                     0.01305     0.1   0.06    1.00   9027.08  0.158
5 mgdp[12]                -0.01461     0.1  -0.06    1.00   8581.40 -0.170

# Federal enterprises
:                                  BLS:CES et91912
 SEE   =        4.27 RSQ   = 0.9860 RHO =  -0.07 Obser  =  144 from 1993.001
 SEE+1 =        4.26 RBSQ  = 0.9855 DurH = -1.22 DoFree =  138 to   2004.012
 MAPE  =        0.35 Test period:  SEE    19.54 MAPE     2.35 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 ehe63m                - - - - - - - - - - - - - - - - -    845.64 - - -
1 ehe63m[1]                0.81263    49.5   0.81    1.26    845.74
2 ehe63m[3]                0.20094     3.6   0.20    1.26    845.65  0.201
3 mnipaqtr[3]             -0.25072     0.4  -0.07    1.10    251.63 -0.313
4 mnipaqtr[6]              0.15521     0.2   0.05    1.09    248.50  0.198
5 mnipaqvnrs[1]           -0.40666     2.9  -0.12    1.07    256.88 -0.534
6 mnipaqvnrs               0.45530     3.7   0.14    1.00    257.85  0.595

# SL government
:                                  BLS:CES et922
 SEE   =        3.80 RSQ   = 0.9922 RHO =  -0.10 Obser  =  144 from 1993.001
 SEE+1 =        3.78 RBSQ  = 0.9920 DurH = -1.27 DoFree =  139 to   2004.012
 MAPE  =        0.10 Test period:  SEE     8.91 MAPE     0.27 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 ehe64m                - - - - - - - - - - - - - - - - -   2723.05 - - -
1 intercept               83.73656     3.1   0.03  128.01      1.00
2 ehe64m[1]                1.09206   269.3   1.09    1.26   2722.17  1.105
3 ehe64m[6]               -0.12500    10.4  -0.12    1.04   2717.76 -0.136
4 mnipaqvnrs               0.01679     0.1   0.00    1.00    257.85  0.018
5 mnipaqvnre               0.00261     0.0   0.00    1.00    737.62  0.008

# SL enterprises
:                                  BLS:CES et921611
 SEE   =        8.46 RSQ   = 0.9968 RHO =   0.21 Obser  =  144 from 1993.001
 SEE+1 =        8.26 RBSQ  = 0.9967 DurH =  2.57 DoFree =  141 to   2004.012
 MAPE  =        0.29 Test period:  SEE    10.40 MAPE     0.40 end  2006.012
  Variable name           Reg-Coef  Mexval  Elas   NorRes     Mean   Beta
0 ehe65m                - - - - - - - - - - - - - - - - -   2019.17 - - -
1 intercept               29.68681     2.1   0.01  309.47      1.00
2 ehe65m[1]                0.97667   920.1   0.98    1.09   2016.17  0.976
3 mnipaqvnrs[12]           0.08229     4.2   0.01    1.00    247.37  0.028
```

Appendix 6.5: Glossary of Variables used in Chapter 6

aempprod1	: Annual employment in production of all private industries, BEA industry accounts
agoxx	: Annual nominal gross output of industry xx, BEA
agorxx	: Annual real gross output of industry xx, BEA
agopxx	: Annual price index of gross output of industry xx, BEA
apce37	: Annual nominal personal consumption expenditure of Publishing industries (includes software), BEA
atime	: Annual time trend (1970=1)
cfur	: Annual nominal personal consumption expenditure of Furniture, including mattresses and bedsprings, BEA
ehexx or ehexx_y	: Annual all employee in industry xx option# y, BLS
ehexxm or ehexx_ym	: Monthly all employee in industry xx option# y, BLS
exri	: Annual U.S. trade weighted exchange index, FRED
exrim	: Monthly U.S. trade weighted exchange index, FRED
farmlabexp	: Annual Farm labor expenditure, USDA
foodpri	: Annual Price Index of PCE of food, BEA NIPA
foodprim	: Monthly Price Index of PCE of food, BEA NIPA
gdpa	: Annual Nominal Gross Domestic Product, BEA
hrxx	: Annual average weekly hours of production workers in industry xx ,BLS
hrxxm	: Monthly average weekly hours of production workers in industry xx ,BLS
ipsxx or ipsxx_y	: Annual Industrial production index of industry xx option# y, Federal Reserve
ipsxxm or ipsxx_ym	: Monthly Industrial production index of industry xx option# y, Federal Reserve
mcomppce	: Monthly nominal PCE of Computers, peripherals, and software, BEA
mcomppceq	: Monthly Price Index of PCE of Computers, peripherals, and software, BEA
mempprod1	: Monthly employment in production of all private industries, BEA industry accounts
mfarmlexp	: Monthly Farm labor expenditure, USDA
mgdp	: Monthly nominal Gross Domestic Product, BEA
mnipaqcloth	: Monthly nominal PCE of Clothing and shoes, BEA
mnipaqdoth	: Monthly nominal PCE of Other durables, BEA
mnipaqfood	: Monthly nominal PCE of Food, BEA
mnipaqfur	: Monthly nominal PCE of Furniture and household equipment, BEA
mnipaqgas	: Monthly nominal PCE of Gasoline, fuel oil, and other energy goods, BEA
mnipaqho	: Monthly nominal PCE of Household operation, BEA
mnipaqhous	: Monthly nominal PCE of Housing, BEA
mnipaqmc	: Monthly nominal PCE of Medical care, BEA
mnipaqmv	: Monthly nominal PCE of Motor vehicles and parts, BEA
mnipaqnoth	: Monthly nominal PCE of Other nondurables, BEA
mnipaqrec	: Monthly nominal PCE of Recreation, BEA
mnipaqsoth	: Monthly nominal PCE of Other services, BEA
mnipaqtr	: Monthly nominal PCE of Transportation, BEA
mnipaqvfr	: Monthly Private fixed investment in Residential, BEA
mnipaqvnre	: Monthly Private fixed investment in Nonresidential equipment, BEA
mnipaqvnrs	: Monthly Private fixed investment in Nonresidential Structures, BEA
mrt722	: Monthly retail sales of Food services and drinking places, Census

Appendix 6.5 (cont.)

mtime	:	Monthly time trend (December 1969 = 0)
mwh42	:	Monthly total wholesale sales, Census
nipa37p	:	Annual Price Index of PCE of Computers, peripherals, and software, BEA
oilp	:	Annual Crude Oil Price, FRED
oilpm	:	Monthly Crude oil price, FRED
prixx or prixx_y	:	Annual Producer price index of industry xx option# y, BLS
prixxm or prixx_ym	:	Annual Producer price index of industry xx option# y, BLS
retl	:	Annual Retail Sales, Total, Census
retlm	:	Monthly Retail Sales, Total, Census
rtfood	:	Annual retail sales of Food services and drinking places, Census
rtptot	:	Annual Retail purchase, Total, Census
rtptotm	:	Monthly Retail purchase, Total, Census
wagxx or wagxx_y	:	Annual average hourly earnings of production workers in industry xx option# y, BLS
wagxxm or wagxx_ym	:	Monthly average hourly earnings of production workers in industry xx option# y, BLS
wagnf	:	Annual average hourly earnings of production workers, Total Nonfarm, BLS
wagnfm	:	Monthly average hourly earnings of production workers, Total Nonfarm, BLS
whsl	:	Annual total wholesale sales, Census

Appendix 6.6: Gross Output by Detailed industries in 2006-2008

	Nominal Gross Output (Million of Dollars)	2005	2006	2007	2008	2005-2006	2006-2007	2007-2008
1	Farms	253,170	270,782	275,080	287,677	6.96%	1.59%	4.58%
2	Forestry, fishing, and related activities	59,202	57,028	81,832	77,267	-3.67%	43.49%	-5.58%
3	Oil and gas extraction	248,488	246,668	274,728	307,901	-0.73%	11.38%	12.08%
4	Mining, except oil and gas	64,368	69,190	66,923	71,471	7.49%	-3.28%	6.80%
5	Support activities for mining	83,422	141,628	173,566	214,441	69.77%	22.55%	23.55%
6	Utilities	409,979	455,648	474,331	529,597	11.14%	4.10%	11.65%
7	Construction	1,174,995	1,252,784	1,360,278	1,501,666	6.62%	8.58%	10.39%
8	Wood products	105,013	103,552	94,447	85,411	-1.39%	-8.79%	-9.57%
9	Nonmetallic mineral products	111,788	125,743	126,527	135,038	12.48%	0.62%	6.73%
10	Primary metals	193,520	231,278	248,754	270,089	19.51%	7.56%	8.58%
11	Fabricated metal products	270,896	284,251	290,519	293,506	4.93%	2.21%	1.03%
12	Machinery	287,403	315,283	328,831	338,393	9.70%	4.30%	2.91%
13	Computer and electronic products	381,270	436,813	460,787	470,704	14.57%	5.49%	2.15%
14	Electrical equipment, appliances, and components	109,254	117,213	123,692	128,411	7.28%	5.53%	3.82%
15	Motor vehicles, bodies and trailers, and parts	482,931	467,907	461,174	479,038	-3.11%	-1.44%	3.87%
16	Other transportation equipment	191,929	236,034	265,976	295,652	22.98%	12.69%	11.16%
17	Furniture and related products	85,380	87,714	87,140	90,102	2.73%	-0.65%	3.40%
18	Miscellaneous manufacturing	144,743	155,945	168,387	174,398	7.74%	7.98%	3.57%
19	Food and beverage and tobacco products	658,751	695,643	794,432	807,476	5.60%	14.20%	1.64%
20	Textile mills and textile product mills	68,572	67,537	63,265	60,670	-1.51%	-6.33%	-4.10%
21	Apparel and leather and allied products	35,814	36,086	34,790	23,453	0.76%	-3.59%	-32.59%
22	Paper products	155,198	162,761	160,989	161,220	4.87%	-1.09%	0.14%
23	Printing and related support activities	89,593	96,260	97,252	94,667	7.44%	1.03%	-2.66%
24	Petroleum and coal products	397,578	407,701	495,486	606,978	2.55%	21.53%	22.50%
25	Chemical products	539,280	545,947	546,982	562,569	1.24%	0.19%	2.85%
26	Plastics and rubber products	192,909	212,460	218,144	225,126	10.13%	2.68%	3.20%
27	Wholesale trade	1,073,587	1,237,017	1,427,440	1,588,718	15.22%	15.39%	11.30%
28	Retail trade	1,288,716	1,406,178	1,510,383	1,626,061	9.11%	7.41%	7.66%
29	Air transportation	135,068	176,208	183,593	195,844	30.46%	4.19%	6.67%
30	Rail transportation	57,588	57,742	58,646	59,424	0.27%	1.56%	1.33%
31	Water transportation	35,752	37,792	41,156	44,914	5.71%	8.90%	9.13%
32	Truck transportation	250,622	264,937	287,375	314,906	5.71%	8.47%	9.58%
33	Transit and ground passenger transportation	28,726	28,604	28,940	31,735	-0.42%	1.18%	9.66%
34	Pipeline transportation	39,053	35,698	34,282	33,685	-8.59%	-3.97%	-1.74%
35	Other transportation and support activities	121,355	127,066	132,533	145,849	4.71%	4.30%	10.05%
36	Warehousing and storage	43,978	49,238	54,527	57,452	11.96%	10.74%	5.36%
37	Publishing industries (includes software)	268,169	289,176	298,650	297,658	7.83%	3.28%	-0.33%
38	Motion picture and sound recording industries	86,978	91,666	96,688	100,297	5.39%	5.48%	3.73%
39	Broadcasting and telecommunications	687,822	743,219	776,378	787,875	8.05%	4.46%	1.48%
40	Information and data processing services	118,165	123,631	128,640	129,924	4.63%	4.05%	1.00%
41	Federal Reserve banks, credit intermediation, and	682,942	732,837	779,864	814,201	7.31%	6.42%	4.40%
42	Securities, commodity contracts, and investments	320,693	286,224	248,949	240,298	-10.75%	-13.02%	-3.48%
43	Insurance carriers and related activities	592,952	659,147	744,531	829,765	11.16%	12.95%	11.45%
44	Funds, trusts, and other financial vehicles	93,674	115,695	121,143	133,006	23.51%	4.71%	9.79%
45	Real estate /1/	2,053,073	2,221,504	2,423,726	2,662,353	8.20%	9.10%	9.85%
46	Rental and leasing services and lessors of intangi	247,528	267,118	316,242	348,951	7.91%	18.39%	10.34%
47	Legal services	245,323	256,929	270,594	281,863	4.73%	5.32%	4.16%
48	Computer systems design and related services	180,407	181,914	187,082	194,555	0.84%	2.84%	3.99%
49	Miscellaneous professional, scientific, and techni	933,598	1,063,424	1,175,119	1,282,543	13.91%	10.50%	9.14%
50	Management of companies and enterprises	367,956	382,855	432,400	488,646	4.05%	12.94%	13.01%
51	Administrative and support services	525,169	566,431	604,741	636,710	7.86%	6.76%	5.29%
52	Waste management and remediation services	66,025	69,794	75,436	83,204	5.71%	8.08%	10.30%
53	Educational services	192,063	205,738	221,608	241,148	7.12%	7.71%	8.82%
54	Ambulatory health care services	649,450	686,482	745,202	811,559	5.70%	8.55%	8.90%
55	Hospitals and nursing and residential care facilit	615,685	645,828	695,507	758,904	4.90%	7.69%	9.12%
56	Social assistance	120,808	129,473	139,417	150,197	7.17%	7.68%	7.73%
57	Performing arts, spectator sports, museums, and re	81,683	83,567	86,893	93,132	2.31%	3.98%	7.18%
58	Amusements, gambling, and recreation industries	101,086	107,125	114,954	121,578	5.97%	7.31%	5.76%
59	Accommodation	170,767	179,433	199,243	215,400	5.08%	11.04%	8.11%
60	Food services and drinking places	461,855	487,048	499,304	516,485	5.45%	2.52%	3.44%
61	Other services, except government	522,252	535,339	573,564	615,880	2.51%	7.14%	7.38%
62	General government	781,886	817,805	852,569	884,398	4.59%	4.25%	3.73%
63	Government enterprises	90,371	92,480	94,552	96,576	2.33%	2.24%	2.14%
64	General government	1,531,929	1,587,380	1,644,878	1,702,753	3.62%	3.62%	3.52%
65	Government enterprises	196,945	201,226	208,467	217,446	2.17%	3.60%	4.31%

Appendix 6.6 (cont.)

	Real 2000 Gross Output (Million of Dollars)	2005	2006	2007	2008	2005-2006	2006-2007	2007-2008
1	Farms	215,052	220,011	221,079	229,290	2.31%	0.49%	3.71%
2	Forestry, fishing, and related activities	57,272	55,985	57,721	53,567	-2.25%	3.10%	-7.20%
3	Oil and gas extraction	127,206	130,655	132,380	129,324	2.71%	1.32%	-2.31%
4	Mining, except oil and gas	48,610	48,782	46,090	47,424	0.35%	-5.52%	2.89%
5	Support activities for mining	38,803	50,879	56,842	62,990	31.12%	11.72%	10.81%
6	Utilities	308,632	326,804	325,695	336,083	5.89%	-0.34%	3.19%
7	Construction	935,694	974,130	973,468	981,431	4.11%	-0.07%	0.82%
8	Wood products	92,357	91,336	84,267	79,865	-1.11%	-7.74%	-5.22%
9	Nonmetallic mineral products	98,513	103,171	101,423	107,480	4.73%	-1.69%	5.97%
10	Primary metals	147,582	153,104	151,179	153,675	3.74%	-1.26%	1.65%
11	Fabricated metal products	235,857	237,165	231,001	223,859	0.55%	-2.60%	-3.09%
12	Machinery	264,962	280,041	281,194	278,562	5.69%	0.41%	-0.94%
13	Computer and electronic products	525,050	637,953	708,315	734,782	21.50%	11.03%	3.74%
14	Electrical equipment, appliances, and components	101,601	106,874	110,016	111,759	5.19%	2.94%	1.58%
15	Motor vehicles, bodies and trailers, and parts	485,024	481,758	477,700	497,025	-0.67%	-0.84%	4.05%
16	Other transportation equipment	168,100	200,456	221,457	240,605	19.25%	10.48%	8.65%
17	Furniture and related products	78,323	77,912	75,719	77,054	-0.52%	-2.82%	1.76%
18	Miscellaneous manufacturing	134,385	142,423	150,096	152,931	5.98%	5.39%	1.89%
19	Food and beverage and tobacco products	563,183	593,495	619,657	620,626	5.38%	4.41%	0.16%
20	Textile mills and textile product mills	66,151	64,574	59,177	55,555	-2.38%	-8.36%	-6.12%
21	Apparel and leather and allied products	35,572	35,522	33,871	22,755	-0.14%	-4.65%	-32.82%
22	Paper products	146,427	147,552	143,998	141,672	0.77%	-2.41%	-1.62%
23	Printing and related support activities	85,531	90,120	90,432	87,189	5.37%	0.35%	-3.59%
24	Petroleum and coal products	224,720	196,702	223,667	262,016	-12.47%	13.71%	17.15%
25	Chemical products	438,657	426,927	416,269	408,578	-2.67%	-2.50%	-1.85%
26	Plastics and rubber products	170,619	177,371	181,109	182,881	3.96%	2.11%	0.98%
27	Wholesale trade	972,399	1,085,999	1,182,849	1,284,355	11.68%	8.92%	8.58%
28	Retail trade	1,225,873	1,314,233	1,388,841	1,460,585	7.21%	5.68%	5.17%
29	Air transportation	147,957	169,019	179,681	189,415	14.23%	6.31%	5.42%
30	Rail transportation	47,794	44,188	43,952	42,771	-7.54%	-0.53%	-2.69%
31	Water transportation	29,347	31,028	34,222	36,965	5.73%	10.29%	8.01%
32	Truck transportation	214,465	214,541	225,916	234,689	0.04%	5.30%	3.88%
33	Transit and ground passenger transportation	24,424	23,603	22,656	23,480	-3.36%	-4.01%	3.64%
34	Pipeline transportation	32,080	28,429	25,117	22,322	-11.38%	-11.65%	-11.13%
35	Other transportation and support activities	100,113	102,879	104,476	107,498	2.76%	1.55%	2.89%
36	Warehousing and storage	40,833	43,681	46,002	48,221	6.97%	5.31%	4.82%
37	Publishing industries (includes software)	268,429	287,733	297,254	297,002	7.19%	3.31%	-0.08%
38	Motion picture and sound recording industries	78,072	77,536	78,774	78,536	-0.69%	1.60%	-0.30%
39	Broadcasting and telecommunications	723,188	806,274	866,162	900,777	11.49%	7.43%	4.00%
40	Information and data processing services	116,550	117,465	120,739	121,454	0.79%	2.79%	0.59%
41	Federal Reserve banks, credit intermediation, and	593,519	620,387	635,042	647,377	4.53%	2.36%	1.94%
42	Securities, commodity contracts, and investments	364,161	354,161	362,861	381,029	-2.75%	2.46%	5.01%
43	Insurance carriers and related activities	494,138	534,059	587,780	636,674	8.08%	10.06%	8.32%
44	Funds, trusts, and other financial vehicles	94,909	112,711	119,476	128,793	18.76%	6.00%	7.80%
45	Real estate /1/	1,782,986	1,862,015	1,964,428	2,090,476	4.43%	5.50%	6.42%
46	Rental and leasing services and lessors of intangi	224,722	238,085	268,937	281,179	5.95%	12.96%	4.55%
47	Legal services	199,537	200,341	201,929	202,778	0.40%	0.79%	0.42%
48	Computer systems design and related services	186,670	193,150	200,992	211,391	3.47%	4.06%	5.17%
49	Miscellaneous professional, scientific, and techni	876,800	947,711	1,018,006	1,096,161	8.09%	7.42%	7.68%
50	Management of companies and enterprises	327,183	325,385	351,451	383,579	-0.55%	8.01%	9.14%
51	Administrative and support services	459,005	471,529	477,045	477,790	2.73%	1.17%	0.16%
52	Waste management and remediation services	54,153	55,445	56,495	58,421	2.39%	1.89%	3.41%
53	Educational services	154,539	158,954	163,190	168,347	2.86%	2.67%	3.16%
54	Ambulatory health care services	579,629	603,263	643,008	687,723	4.08%	6.59%	6.95%
55	Hospitals and nursing and residential care facilit	504,922	515,545	535,316	565,149	2.10%	3.83%	5.57%
56	Social assistance	110,909	114,683	119,687	124,740	3.40%	4.36%	4.22%
57	Performing arts, spectator sports, museums, and re	68,246	66,039	63,086	62,356	-3.23%	-4.47%	-1.16%
58	Amusements, gambling, and recreation industries	88,618	91,817	94,135	96,540	3.61%	2.52%	2.56%
59	Accommodation	149,578	154,329	165,531	172,512	3.18%	7.26%	4.22%
60	Food services and drinking places	401,774	426,737	447,293	462,650	6.21%	4.82%	3.43%
61	Other services, except government	444,704	439,733	455,239	473,153	-1.12%	3.53%	3.94%
62	General government	631,773	637,044	618,422	594,289	0.83%	-2.92%	-3.90%
63	Government enterprises	78,843	78,205	76,937	75,554	-0.81%	-1.62%	-1.80%
64	General government	1,252,665	1,251,825	1,210,575	1,163,748	-0.07%	-3.30%	-3.87%
65	Government enterprises	161,670	164,568	166,466	169,144	1.79%	1.15%	1.61%

Appendix 6.6 (cont.)

	Price Index (2000=100)	2005	2006	2007	2008	2005-2006	2006-2007	2007-2008
1	Farms	117.72	123.08	124.43	125.46	4.55%	1.10%	0.83%
2	Forestry, fishing, and related activities	103.37	101.86	141.77	144.25	-1.46%	39.18%	1.75%
3	Oil and gas extraction	195.34	188.79	207.53	238.09	-3.35%	9.92%	14.72%
4	Mining, except oil and gas	132.42	141.83	145.20	150.71	7.11%	2.37%	3.79%
5	Support activities for mining	214.99	278.36	305.35	340.44	29.48%	9.69%	11.49%
6	Utilities	132.84	139.43	145.64	157.58	4.96%	4.45%	8.20%
7	Construction	125.57	128.61	139.74	153.01	2.41%	8.65%	9.50%
8	Wood products	113.70	113.37	112.08	106.94	-0.29%	-1.14%	-4.58%
9	Nonmetallic mineral products	113.47	121.88	124.75	125.64	7.41%	2.36%	0.71%
10	Primary metals	131.13	151.06	164.54	175.75	15.20%	8.93%	6.81%
11	Fabricated metal products	114.86	119.85	125.77	131.11	4.35%	4.93%	4.25%
12	Machinery	108.47	112.58	116.94	121.48	3.79%	3.87%	3.88%
13	Computer and electronic products	72.62	68.47	65.05	64.06	-5.71%	-4.99%	-1.53%
14	Electrical equipment, appliances, and components	107.53	109.67	112.43	114.90	1.99%	2.51%	2.20%
15	Motor vehicles, bodies and trailers, and parts	99.57	97.12	96.54	96.38	-2.45%	-0.60%	-0.17%
16	Other transportation equipment	114.18	117.75	120.10	122.88	3.13%	2.00%	2.31%
17	Furniture and related products	109.01	112.58	115.08	116.93	3.28%	2.22%	1.61%
18	Miscellaneous manufacturing	107.71	109.50	112.19	114.04	1.66%	2.46%	1.65%
19	Food and beverage and tobacco products	116.97	117.21	128.21	130.11	0.21%	9.38%	1.48%
20	Textile mills and textile product mills	103.66	104.59	106.91	109.21	0.90%	2.22%	2.15%
21	Apparel and leather and allied products	100.68	101.59	102.72	103.07	0.90%	1.11%	0.34%
22	Paper products	105.99	110.31	111.80	113.80	4.07%	1.35%	1.79%
23	Printing and related support activities	104.75	106.81	107.54	108.58	1.97%	0.68%	0.96%
24	Petroleum and coal products	176.92	207.27	221.53	231.66	17.15%	6.88%	4.57%
25	Chemical products	122.94	127.88	131.40	137.69	4.02%	2.76%	4.79%
26	Plastics and rubber products	113.06	119.78	120.45	123.10	5.94%	0.56%	2.20%
27	Wholesale trade	110.41	113.91	120.68	123.70	3.17%	5.95%	2.50%
28	Retail trade	105.13	107.00	108.75	111.33	1.78%	1.64%	2.37%
29	Air transportation	91.29	104.25	102.18	103.39	14.20%	-1.99%	1.19%
30	Rail transportation	120.49	130.67	133.43	138.94	8.45%	2.11%	4.13%
31	Water transportation	121.82	121.80	120.26	121.50	-0.02%	-1.26%	1.03%
32	Truck transportation	116.86	123.49	127.20	134.18	5.67%	3.01%	5.48%
33	Transit and ground passenger transportation	117.61	121.19	127.74	135.16	3.04%	5.40%	5.81%
34	Pipeline transportation	121.74	125.57	136.48	150.90	3.15%	8.70%	10.56%
35	Other transportation and support activities	121.22	123.51	126.86	135.68	1.89%	2.71%	6.95%
36	Warehousing and storage	107.70	112.72	118.53	119.14	4.66%	5.15%	0.52%
37	Publishing industries (includes software)	99.90	100.50	100.47	100.22	0.60%	-0.03%	-0.25%
38	Motion picture and sound recording industries	111.41	118.22	122.74	127.71	6.12%	3.82%	4.05%
39	Broadcasting and telecommunications	95.11	92.18	89.63	87.47	-3.08%	-2.76%	-2.42%
40	Information and data processing services	101.39	105.25	106.54	106.97	3.81%	1.23%	0.40%
41	Federal Reserve banks, credit intermediation, and	115.07	118.13	122.81	125.77	2.66%	3.96%	2.41%
42	Securities, commodity contracts, and investments	88.06	80.82	68.61	63.07	-8.23%	-15.11%	-8.08%
43	Insurance carriers and related activities	120.00	123.42	126.67	130.33	2.85%	2.63%	2.89%
44	Funds, trusts, and other financial vehicles	98.70	102.65	101.40	103.27	4.00%	-1.22%	1.85%
45	Real estate /1/	115.15	119.31	123.38	127.36	3.61%	3.41%	3.22%
46	Rental and leasing services and lessors of intangi	110.15	112.19	117.59	124.10	1.86%	4.81%	5.54%
47	Legal services	122.95	128.25	134.00	139.00	4.31%	4.49%	3.73%
48	Computer systems design and related services	96.64	94.18	93.08	92.04	-2.55%	-1.17%	-1.12%
49	Miscellaneous professional, scientific, and techni	106.48	112.21	115.43	117.00	5.38%	2.87%	1.36%
50	Management of companies and enterprises	112.46	117.66	123.03	127.39	4.62%	4.56%	3.54%
51	Administrative and support services	114.41	120.13	126.77	133.26	4.99%	5.53%	5.12%
52	Waste management and remediation services	121.92	125.88	133.53	142.42	3.25%	6.08%	6.66%
53	Educational services	124.28	129.43	135.80	143.24	4.14%	4.92%	5.48%
54	Ambulatory health care services	112.05	113.79	115.89	118.01	1.56%	1.84%	1.82%
55	Hospitals and nursing and residential care facilit	121.94	125.27	129.92	134.28	2.73%	3.71%	3.36%
56	Social assistance	108.93	112.90	116.48	120.41	3.65%	3.18%	3.37%
57	Performing arts, spectator sports, museums, and re	119.69	126.54	137.74	149.36	5.72%	8.85%	8.43%
58	Amusements, gambling, and recreation industries	114.07	116.67	122.12	125.94	2.28%	4.67%	3.13%
59	Accommodation	114.17	116.27	120.37	124.86	1.84%	3.53%	3.73%
60	Food services and drinking places	114.95	114.13	111.63	111.64	-0.71%	-2.19%	0.01%
61	Other services, except government	117.44	121.74	125.99	130.17	3.66%	3.49%	3.31%
62	General government	123.76	128.38	137.86	148.82	3.73%	7.39%	7.95%
63	Government enterprises	114.62	118.25	122.90	127.82	3.17%	3.93%	4.01%
64	General government	122.29	126.81	135.88	146.32	3.69%	7.15%	7.68%
65	Government enterprises	121.82	122.28	125.23	128.56	0.37%	2.42%	2.66%

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