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THE ASSOCIATION BETWEEN ALCOHOL SALES AND COUNTY LEVEL ECONOMIC GROWTH IN KENTUCKY

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ABSTRACT OF THESIS

THE ASSOCIATION BETWEEN ALCOHOL SALES AND COUNTY LEVEL ECONOMIC GROWTH IN KENTUCKY

This thesis evaluates the effectiveness of using alcohol sales as an indicator of development or lag associated with development in Kentucky counties using summary statistics, shift-share analysis and an econometric model. The summary statistics are used to evaluate possible lines of causality and the Shift-share analysis and econometric model deal the specific characteristics of the county that are assumed to be influenced by the sale of alcohol. Limitations to the county level data were limiting to the time period evaluated in this thesis. As a result, much of the findings were inconclusive as to the relationship between county level economic development in Kentucky and the sale of alcohol.

Keywords: economic development, creative class, alcohol sales, wet and dry counties and Kentucky

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THESIS

Julia Hinkle Rollins

The Graduate School

University of Kentucky

2009

THE ASSOCIATION BETWEEN ALCOHOL SALES AND COUNTY LEVEL ECONOMIC GROWTH IN KENTUCKY

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
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Lexington, Kentucky

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2009

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Last, but not least, I would like to credit my family for their assistance in this thesis. If not for the constant, sometimes nagging, reminders from my father, the subtle words of encouragement from my mother and the loving support from my husband, I could question whether this project would have come to fruition.

I have learned many life lessons along the way and for this, a sincere *thank you* to all of those involved in this thesis!

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Chapter One

Introduction

Despite being known as the home of Bourbon whisky, Kentucky is a state where the overwhelming majority of counties do not allow the sale of alcohol. This thesis evaluates the potential for the use of alcohol sales as an indicator of the speed of economic development of rural Kentucky counties. The hypothesis is that, *ceteris paribus*, a county that allows the sale of alcohol will develop at a faster rate than its peers. Data from County Business Patterns, along with other sources will be used to test this hypothesis over time. Chapter 1 provides a background for the development of this thesis and introduces a set of hypotheses that will be tested in the thesis.

1.1 Background

The work of Richard Florida and his use of the social characteristics or demographic trends as indicators of economic development provides a basis for the general concept of evaluating alcohol sales and their relationship with economic development. Florida suggests that economic growth can be identified when a community has certain characteristics associated with social diversity and tolerance. Building on the ideas of Florida, it is hypothesized that the sale of alcohol could be used to better understand county level development suggesting the potential for a more open attitude toward different values analogous to the "Gay Index" (Florida 2000).

The interval considered will be 1988 to 2004 for basic summary statistics to determine if there are trends in per capita personal income, wages, and employment. The primary focus for evaluating these trends will lie with the group of counties that switched from "dry," where

alcohol sales are prohibited, to allowing the sale of alcohol in some form – in a particular city district, by the drink at restaurants, or county-wide.

To further evaluate the hypotheses tested, an econometric model will be used. The simultaneous model evaluates indicators of economic development in the year 2000 across Kentucky counties. While the majority of change in the counties allowing the sale of alcohol has occurred since 2000, data limitations constrain the model to evaluate counties with a change in the status of alcohol sales prior to 2000. The correlation between the indicators of economic development and the sale of alcohol is evaluated using three generally recognized variables. The three indicators of development, or dependent variables, are county employment, per capita income within the county and educational attainment in the county (Freshwater, Goetz, and Wojan). The independent variables are made up of various economic and social factors that influence development. In addition, there are three dummy variables used to capture the sale of alcohol.

1.2 Wet Dry Hypotheses

I first set out a number of possible hypotheses regarding the link between the sale of alcohol and patterns of economic growth. The first group of hypotheses suggests possible lines of causality, while the latter hypotheses are concerned with specific characteristics of the local economy that may be influenced by the legalization of alcohol sales.

Hypothesis 1: Alcohol sales are a leading indicator – willingness to allow alcohol sales is an indicator that people are prepared to abandon tradition and move to a new economic structure.

Hypothesis Two: Alcohol sales are a lagging indicator – alcohol sales are allowed once a county reaches a higher stage of development, before this point there is a social reluctance to allow alcohol but as the economy expands and the population grows this aversion loses out to more modern perspectives.

Hypothesis Three: Alcohol sales are unrelated to economic progress – social liberalization is not necessarily associated with economic growth. Economic growth is driven more by non-social factors such as location, resources, skills, etc.

Hypothesis Four: Alcohol sales may or may not stimulate economic growth in an aggregate sense, but they should alter the sectoral composition of the local economy. Higher restaurant sales and more entertainment and lodging may be found in wet counties. But does alcohol induce this pattern, or does alcohol support a pre-existing capacity to focus on entertainment and tourism (already inherent but alcohol makes it more productive)?

Hypothesis Five: Alcohol sales may be associated with higher recreation and tourism opportunities, and therefore should be associated with either the US Department of Agriculture, Economic Research Service amenity scale or the percent of a county that is covered by water, since water related activities are prominent in Kentucky tourism.

Through testing each of the hypotheses above, a better understanding of the role of alcohol sales as a predictor of county level development is achieved. Hypotheses one, two, and three look at alcohol and county development as a whole. Hypotheses four and five tend to look at specific industries within the service sector that are assumed to be impacted by the sale of alcohol. A better understanding of the capacity in which the sale of alcohol impacts county level development could provide insight to policy decisions at the county level.

Chapter Two

Literature Review

Chapter 2 provides a history of alcohol sales in America and Kentucky and brings the situation of alcohol sales forward to current conditions. It is hypothesized that alcohol sales, or the lack thereof can be used to establish a link between alcohol sales and development, or lack thereof. In particular, tourism and economic development are expected to be impacted by the sale of alcohol. Chapter 2 concludes with a look at the previous work on methods used to evaluate economic development using social factors.

2.1 History of Alcohol in America and Kentucky

Alcohol has always been an important part of American history. After all, the Puritans loaded more beer than water onto the Mayflower before their excursion to the new world (Royce). While bringing a strong foundation in education with the development of institutions for higher learning such as the founding of Harvard University in 1767, the Pilgrims also introduced alcohol production to America. A brewery was one of Harvard College's first construction projects so that a steady supply of beer could be served in the student dining halls (Furnas). This tradition of alcohol continued to impact some of the most memorialized events in American history, while heavily impacting the economy of Kentucky.

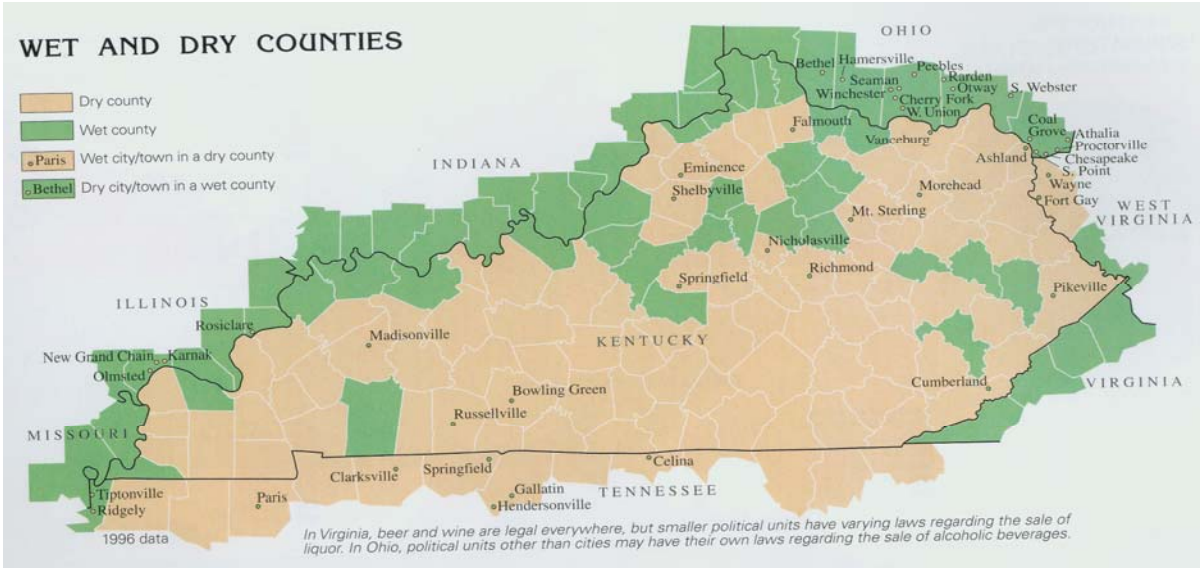
From the time of early settlement, alcohol, particularly bourbon and wine, have played an important role in the Kentucky economy and they continue to do so today. While bourbon is more often associated with alcohol production in Kentucky, wine at one time, was important to the Kentucky economy as well. Before prohibition, Kentucky was the third largest producer of wine and grapes in the United States (McLean). The history of bourbon lends itself to a more interesting tale. The first Kentucky whiskey was made in 1789 by a Baptist minister (Lender). In

the early years, whiskey or bourbon was as important to the Kentucky economy as tobacco had been in the 17th century to Virginia (Tachau). Today, Kentucky is most commonly noted for its ability to produce bourbon, with 10 distilleries that produce bourbon for domestic and international sales.

The Kentucky Constitution provides local governments with the right to determine whether each jurisdiction will allow the sale of alcohol. However, the General Assembly determines the level of local jurisdiction that will be allowed to vote on the decision. Prior to 1990 the decision to allow alcohol sales was made on a county-wide basis. In the last fifteen years the decision has been moved to smaller political divisions. Initially cities within a county could allow alcohol sales. Subsequently provisions were further relaxed to allow "liquor by the drink" sales in restaurants, but not the retail sale of alcohol by the bottle. Current provisions allow individual precincts to vote on sales at golf courses and wineries. However, retail sales still are a decision that is made on a city-wide basis.

Prior to these changes alcohol sales were geographically clustered as seen in Figure 2.1. The three major urban concentrations – Northern Kentucky-Cincinnati, Louisville and Lexington all allowed alcohol sales within most of the counties comprising the respective metropolitan areas. In addition most counties bordering the Ohio River also allowed alcohol sales. Other wet counties were scattered throughout the state, with counties close to the state border more likely to be wet. The clear exception to this was the southern border with Tennessee, which also has a high proportion of dry counties and the same local option laws as Kentucky.

Figure 2.1, Wet and Dry Counties in 1996



2.2 Current Conditions

While alcohol continues to be an important part of the Kentucky economy, the sale of alcohol can be quite complex. Some counties in Kentucky, primarily the larger urban agglomerations have allowed alcohol sales for decades. On the other hand, the rural counties exhibit an interesting mix of counties with a longstanding disapproval of alcohol sales and counties that have allowed alcohol sales since prohibition. While the counties that prohibit alcohol sales in Kentucky are in the majority, there is evidence of an increasing number of local referenda concerning alcohol sales. Typically each county that has removed its prohibition has gone through multiple votes to do so. There are also counties that continue to host unsuccessful efforts to allow alcohol sales. Since the passage of laws that allow the local option, the numbers of cities and towns that allow alcohol sales across Kentucky is on the rise. This trend has been much more dramatic in the last five years.

To evaluate the effectiveness of using alcohol sales as an indicator of development or lag associated with development, the parameters for the sale of alcohol must be defined: Current legislation in Kentucky allows five options that permit alcohol sales in Kentucky: The first option is counties defined as "wet." Counties considered wet, sell alcohol and/or liquor by the drink and by the bottle in accordance with local laws. Fayette County, for example is defined as wet, but local laws impose stipulations as to when alcohol can be sold in the county. The second option is "moist." Areas considered moist are the wet cities located in a dry county. These wet cities are again subject to stipulations associated with local laws as mentioned above. The third option for alcohol sales is "limited." Limited sale of alcohol occurs when one or more precincts within a county has voted to allow the sale of alcohol by the drink only in restaurants with a seating capacity of at least 100 and at least 70% of revenue comes from food sales. The fourth option for permitting the sale of alcohol occurs at golf courses located in a dry territory. The fifth option for the sale of alcohol occurs at wineries in a dry territory. Each of these options must be voted on by the precincts located in the areas. To petition for a vote for the sale of alcohol, 20% of the last recorded voting population in a precinct must be involved in the process by signing the petition.

2.3 Linking Alcohol Sales and Development Status

Alcohol sales can potentially act as an indicator of economic development, or, alternatively, alcohol sales can have a lagged relationship with economic development, suggesting that when a county economy expands more modern perspectives are adopted. Education, employment, wages, and income are critical signs of a county's economic vitality and will be used as measures of economic growth (Freshwater, Wojan, and Goetz). Change in employment, change in wages, and change in income, will be used to extract potential trends in

county level development. Comparing these variables in the counties that allow the sale alcohol with counties of similar size that do not allow the sale of alcohol will help to identify if there are significant differences in the counties. In addition, the findings will demonstrate if the sale of alcohol has the potential to encourage growth, decline, or no change in the economy.

The descriptive data will support, refute, or be inconclusive in determining if correlation between development and the sale of alcohol exists in Kentucky counties. If the group of counties that adopt the sale of alcohol between 1996 and 2004 experience a positive change in education, employment, and wages at a higher rate than their counterparts, credibility is lent to the hypothesis that alcohol sales are an indicator of development. If the group of counties that were wet between 1988 and 1996 experience a positive growth in education, employment and wages at a higher rate than their counterparts, credibility is lent to the hypothesis that alcohol is lag associated with development. If neither of these trends proves to be evident, the result will be considered inconclusive or negative.

One should expect that alcohol sales should impact some industries more so than others. In particular, arts and entertainment, recreation, and food and tourism should be directly linked to the sale of alcohol. Recent trends suggest that natural amenities and recreational activities have drawn increasing numbers to visit and locate in areas conducive to such qualities (Johnson and Beale). The tourism and recreation activities and services available in the rural counties should be viewed as a potential means for growth opportunity. When individuals from other areas partake in the recreational activities or natural amenities, and consume goods and services provided in these rural counties of Kentucky, outside dollars come into the community. To analyze the mix of industries in rural counties, shift-share analysis will be used to better understand the development process (Curtis). The shift-share analysis of the industries at the county level will provide insight into the industry level growth or decline in employment. Shift-

share analysis is a methodology that allows a retrospective look at changes in an economy, typically employment.

One would expect that accommodations and food services industry should reflect growth if alcohol sales have impacted the county level economy. National and regional factors can be eliminated from the growth, finding the growth that is attributable to the sale of alcohol. If growth is detected in the counties that allow for the sale of alcohol when compared to their dry counterparts, the shift-share analysis will contribute to an understanding of the sectors in the economy that are impacted by the sale of alcohol. Shift-share analysis will be used to establish where growth occurred at the industry level and the potential impact of alcohol. The shift-share analysis allows the growth at the local level to be estimated excluding the impact of the national economy, regional economy, and the industry mix (Curtis). This provides an understanding of what factors can be attributed to the change in the economic measures discussed above.

The thought of alcohol sales as indicator of economic development resulted from the theory of Florida and Gates. While alcohol is not being considered a reason for economic development, the possibility for correlation strongly exits. In Kentucky, many communities tend to be fairly rural in nature. These rural counties continue to look for innovative ways to spur economic development. Many rural communities continue to deal with a decrease or loss in manufacturing jobs that were prevalent in such areas in the recent past. As the mix of industries continues to change, many of the rural counties in Kentucky have turned to their natural amenities and recreational attractions as alternatives. The parks and recreational areas have seen rapid growth in recent years (Johnson and Beale). The increase in recreational activities and tourism can in turn, potentially lead to positive ramifications on the local economy.

2.4 Tourism and Economic Development

As rural communities attempt to compete in a global economy, it is becoming more important to develop a differentiated product. Often, the differentiated product is the natural amenities within the community, and the development of tourism and recreational facilities enhance their use.

Many communities have seen the impact of amenity based economic development in the recent past. According to publications from the Cooperative State Research, Education, and Extension Service, tourism is becoming increasingly important to the US economy. Using 2000 data, the Federal Reserve Bank of Kansas estimates that basic travel and tourism industries accounted for 3.6 percent of U.S. employment. The Travel Industry Association of America found that 1 in 18 people are employed as a direct result of travel expenditures.

As manufacturing jobs continue to leave rural areas, alternative options are explored for replacing the loss of jobs. Recent literature suggests recreation and tourism can be a viable option for economic development. Rural communities that have stressed recreation and growth in the recent past have experienced significant growth compared to their counterparts (Reeder and Brown). Natural amenities involving mild climate conditions, topographic variation, and the presence of water areas are closely linked to population growth (McGranahan). In particular, MaGranahan notes that from 1970 through 1996, nonmetropolitan counties with a wealth of natural amenities – warm winters, winter sun, temperate summer, low summer humidity, topographic variation, and water areas – grew on average by 125 percent compared to an average growth of 1 percent for counties with relatively few of such natural amenities. It is this growth that has drawn attention to the idea of tourism and recreation development as a legitimate means of economic development within rural communities.

In assessing the value of tourism and recreation as a means of economic development, it is important to consider both the costs and benefits associated with tourism and the development of recreational activities and facilities.

The advantages associated with tourism and recreation result from the growth of the economy. Increases in tourism can lead to increases in profitability of businesses. Landowners also gain from increased land values associated with amenity based tourism. The development of recreation and tourism based industries can help local economies to diversify, which results in less dependency on one or two major industries. This economic diversification occurs on a regional basis. In particular, state and national parks can generate relatively large multipliers and jobs for not only their area, but also neighboring regions (Achana and O'Leary). Many of the jobs associated with tourism and recreation are part-time and/or seasonal. These types of jobs can supplement income for individuals who are underemployed and farmers. This allows such individuals to stay within the community and make a reasonable living (Reeder and Brown). The community or county can potentially gain increased revenue from taxes on land and goods associated with tourism. The increased government revenue can offset the increased government costs and thus lead to an improvement of the public services provided (Deller, Marcouiller, and Shaffer). Local residents may also gain from an increase in the services provided from the private sector as a result of the tourism.

The costs associated with tourism and recreation development within a community can at times be harder to define than the benefits. Many of the disadvantages are fairly consistent with rapid population growth. First and foremost, rapid growth can damage the natural amenities within the area, often damaging the means of growth. The growth can lead to increased pollution and related health problems and a variety of other public goods and services that are strained or exhausted. While the increased land values were identified as positives to the land owners, they

can also be seen as a burden. The increased taxes could be problematic for farmers and others reliant on renting land. Sporadic increases in population can lead to an increased cost of housing in the short-run, and crowded schools as well. Also, with large in-migration conflicts over land use can result. When individuals with different value systems and diverse backgrounds become a part of the community, social conflict can result. In turn, this could actually hinder social institutions, thus negatively impacting community development.

Along with issues related to rapid growth, there are also specific problems associated with the development of tourism and recreation industries. Increased poverty rates, a shift to low-wage and unskilled labor, higher crime rates, lower education levels, increased health problems, and increased costs associated with public services can be specifically linked to tourism and recreation (Reeder and Brown). The increased poverty can result from the increase in the low-wage and unskilled labor that is vital to tourism and recreation with respect to hotels, restaurants, and other necessary services. While the jobs can be the only means of employment for some individuals, they often do not provide enough to support a family. Also, such jobs tend to fluctuate with seasonality and can be compared to the traditional extractive industries due to the cyclical patterns of the economies of both (Keith, Fawson, and Chang). The higher poverty rates can then lead to increased crime, lower education, and other related social problems.

2.5 Previous Work

The work of Richard Florida is well noted for the use of the social characteristics or demographic trends as an indicator of economic development. His research suggests that certain properties associated with a community would indicate growth (Florida 2000). The properties of a community that suggest economic growth were centered on social diversity and tolerance. The research of Richard Florida and Gary Gates suggests that communities that exhibit social

diversity and tolerance will experience economic growth (Florida and Gates). Building on the ideas of Florida, it is hypothesized that the sale of alcohol could be used to better understand the level of county development.

Florida suggests that there exists a connection between the "creative class" and high technology industries. In attracting the creative class to a specific place, there are particular aspects or characteristics within a community or city that are essential. These characteristics stretch from work to leisure. It is the variety of alternatives that attracts creative individuals. Florida states, "Technological and economic creativity are nurtured by, and interact with, artistic and cultural creativity" (Florida 2000, pg.5). The variety of imperative components for the creative class implies diversity and tolerance are a necessary component as well. The tolerance for people and ideas allows the creativity to exist and thrive. Communities with high tech industries exhibit a plethora of such.

To evaluate the creative class, Florida's most widely known measure is the "Gay Index." The "Gay Index" acts as a proxy for creativity, suggesting that a high percentage of the population within a city that is homosexual is linked to the size of the creative class in the city. The higher the number of individuals involved with the creative class, the higher the number of individuals that will participate in the high-tech industry. The more individuals participating in the high-tech industry in turn leads to higher growth.

The "Gay Index" was useful as an indicator of where to look for economic development and the high tech industries. Openness to the gay community could be seen as a sign of tolerance and low barriers to entry of human capital. It is the human capital that is vital to the development of new ideas and thus economic development (Freshwater). Instead of the number of creative

individuals, the sale of alcohol is being evaluated at as a possible indicator of tolerance within a county in Kentucky and thus an indicator of or lag associated with development.

In determining what factors influence the influx of human capital and tolerance, the “Gay Index” is only one way of measuring tolerance and a variety of recreational activities. In Kentucky, the overwhelming majority of counties have historically been dry. Recent changes in legislation have resulted in more areas allowing the sale of alcohol in some form. Similar to the “Gay Index” discussed by Florida, the potential exists that alcohol could be used as an indictor of economic development in Kentucky.

Chapter Three

Methodology

If alcohol sales are associated in some way with economic progress, either as a leading indicator or lagging indicator then I should be able to detect differences in the levels or rates of growth of standard socio-economic indicators, such as, per capita income, unemployment rates, poverty rates, new business formation rates or educational attainment rates. All of these data are readily available over time and are objective indicators with standardized measurement procedures.

Obviously these measures have to be adjusted for fundamental differences among counties, including such factors as: population size, urbanization levels, metro versus non-metro, adjacency effects and presence of higher education facilities. Two approaches are possible for the analysis. The first is a paired county comparison that would match wet and dry counties with similar general attributes such as: population size, distance from a metro area and general attributes. The second approach is to use an econometric model with specific variables introduced to control for underlying structural differences among counties. Because wet and dry counties are not randomly distributed across the state it is not easy to match counties, so an econometric approach will be employed.

The first step is to compare simple income and population statistics on a county basis to see if there are obvious differences among wet and dry counties. Growth rates in per capita income and growth in average wage levels are the initial choice for searching for differences. Counties are grouped by Beale code (metro adjacency) and then sorted into wet and dry as of 1996 as seen in Table 3.1. Since some counties that were dry in 1996 allow alcohol sales as of 2004, the group of dry counties in 1996 is further sorted into still dry and now wet. Growth rates of the two indicators are compared to see if a statistically significant difference can be detected. I

Table 3.1, Beale Code Descriptions

Beale Codes	
0	**Central counties of metropolitan areas of 1 million population or more**
1	**Fringe counties of metropolitan areas of 1 million population or more**
2	**Counties in metropolitan areas of 250,000 – 1,000,000 population**
3	**Counties in metropolitan areas of less than 250,000 population**
4	**Urban population of 20,000 or more, adjacent to a metropolitan area**
5	**Urban population of 20,000 or more, not adjacent to a metropolitan area**
6	**Urban population of 2,500 – 19,999 or more, adjacent to a metropolitan area**
7	**Urban population of 2,500 – 19,999, not adjacent to a metropolitan area**
8	**Completely rural (no places with a population of 2,500 or more) adjacent to a metropolitan area**
9	**Completely rural (no places with a population of 2,500 or more) not adjacent to a metropolitan area**

then add a further refinement to see if counties adjacent to a wet county have a different rate of growth than either wet or non-adjacent dry counties.

A second step is to use County Business Pattern data to develop shift-share measures based upon employment growth. Once again counties are grouped by Beale code and then standard shift share analysis is applied at the 2 digit Standard Industrial Classification (SIC) code level for each county over the period 1988 -1996 and 1996 -2003. The results from the shift share analysis can be interpreted as reflecting:

- first, a state effect, that reflects the background or trend growth over the period attributable to broad macro characteristics,
- second, an industry mix effect, that reflects the specific combination of industries present in the county relative to the state average industry mix, and
- third, a competitiveness effect, that shows how well specific industries in the county did compared to the average for that industry in the state.

The second and third components are most interesting for this analysis. Sectors like retail, arts and entertainment and accommodation and food services, which are most directly tied to the availability of alcohol, might be expected to play a stronger role in wet than dry counties so the industry mix effect should be positive in these sectors. Proponents of the switch from dry to wet argue that allowing the sale of alcohol leads to growth in these specific industries. From competitiveness perspective, if alcohol sales are an indicator of development then all sectors in the wet counties should be able to add employment at rates above the state average.

The final step is to construct a simultaneous econometric model that accounts for economic development, or a lack there of. In particular, the model will be used to determine if the sale of alcohol is statistically significant, thus indicating an impact on economic development. The three

dependent variables used to measure economic development will be the natural log of educational attainment, the natural log of per capita income, and the natural log of employment. The log-linear form is used to correct the skewed distribution of the endogenous variables. Each of these endogenous variables is county level observations for 2000.

The following model is used to help explain the simultaneous nature of economic development in Kentucky counties:

Simultaneous Model

Equation 1:

$$lnEdu = ß_0 + ß_1\, lnP\ CJob + ß_2\ lnPCPI + ß_3\ Wet + ß_4\, Moist + ß_5\, Limited + ß_6\, metroadj + ß_7\ nonmetro + ß_8\, fouryr + ß_9\, Coll + ß_{10}\, Pov + ß_{11}\, FHH + ß_{12}\, HouseValue + e$$

Equation 2:

$$lnPCPI = ß_0 + ß_1\ lnCJob + ß_2\ lnEdu + ß_3\ Wet + ß_4\, Moist + ß_5\, Limited + ß_6\, metroadj + ß_7\ nonmetro + ß_8\, fouryr + ß_9\, coll + ß_{10}\, BSdegree + ß_{11}\, PCFarmEmp + e$$

Equation 3:

$$lnPCJob = ß_0 + ß_1\ lnPCPI + ß_2\, lnEdu + ß_3\ Wet + ß_4\, Moist + ß_5\, Limited + ß_6\, metroadj + ß_7\ nonmetro + ß_8\, fouryr + ß_9\, Coll + ß_{10}\, Wat + ß_{11}\ ProxI + ß_{12}\, Age + ß_{13}\, Hispanic + e$$

The simultaneous model above has endogenous variables on the right-hand side of each of the three equations. The natural log of education, the natural log of per capita income, and the natural log of county-wide employment are interrelated, thus the estimates that result from the model will potentially exhibit endogeneity bias. The endogeneity bias occurs as a result of covariance in the error terms of the models. To test of endogeneity bias, the Hausman Test will be used (Greene). If the null hypothesis of no endogeneity is rejected, the model must be corrected for biased estimates. To deal with biased estimates that result from covariance of the error terms, three stage least squares (3SLS) procedure will be used. The 3SLS procedure will correct the over-identification problems in the model leading to a more accurate estimation of the structural parameters in each of the models (Greene).

3.1 Data

The Census Bureau and the Bureau of Economic Analysis are the primary sources of data used in this paper. County Business Patterns, in particular, are readily available and collected on a county basis annually. The data used to evaluate trends associated with alcohol sales and economic growth, shift share analysis, and competitiveness come from County Business Patterns from 1988 to 2004.

The data used for the econometric analysis encompass Kentucky counties from 2000. Along with the county business patterns, data to support some of the variables will come from other Census data. The simultaneous model was not taken farther than 2000 due to problems associated with converting SIC codes to NAICS codes. To convert from SIC classification to NAICS, three-digit codes must be used. At the county level in Kentucky, many categories are not disclosed at the three-digit level due to privacy concerns, therefore conversion is impossible.

Table 3.2 provides the variables found within the simultaneous model along with the expected sign for each variable found within the model. The three endogenous variables are the natural log of education, or the percent of the population in the county with a high school diploma; the natural log of per capita income; and the natural log of per capita employment or the percent of population in the county that are employed. Positive relationships are expected to be found for each of these variables between these endogenous variables. When education increases, per capita income and employment are expected to increase.

The focus of this paper is the relationship between alcohol sales and economic development. The three variables that represent the sale of alcohol at the county level within Kentucky are wet, dry, and moist. The variable defined as wet in Table 3.2 represents a dummy variable for county-wide sale of alcohol by the drink and by the bottle. If a county is wet the variable takes on the value of 1, otherwise, the variable is 0. The variable moistlim is a combination of two classifications for alcohol sales: moist and limited. A county is termed moist when the sale of alcohol is present within a city, while the remainder of the county is dry. A county is classified as limited when the sale of alcohol by the drink only within a precinct or city in establishments that seat over 100 and have 70% of sales receipts from food. If a county is defined as either moist or limited, the variable moistlim takes on the value of 1, otherwise, the variable is 0.

The Beale Codes are a metro-adjacency continuum that classifies counties of like size and proximity to metro areas. Beale Codes run from 1 to 9, with 1 being metro and 9 being small and remote non-metro. To eliminate having 8 dummy variables for population, the Beale codes have been grouped. For the purposes of this model, Beale Codes grouped in to three categories: first, Beale Codes 1, 2, and 3 are defined as metro, second, Beale codes 4 and 5 are defined metro-adjacent, and third, Beale codes 6, 7, 8, and 9 are defined as non-metro. The metro areas

Table 3.2, Definitions of Variables within the Simultaneous Model

Description	Variables	Expected Sign
Natural Log of Education	Edu	+
Natural Log of Per Capita Income	lnPCPI	+
Natural Log of Per Capita Employment	lnPCJob	+
Wet	Wet	+
Moist or Limited	Moist lim	+
Beale Codes 4 and 5	metroadj	-
Beale Codes 6, 7, 8, and 9	nonmetro	-
Public and/or Private University	Fouryr	+
Technical School	Coll	+
Poverty	Pov	-
Female Headed Households	FHH	-
Median House Value	HouseValue	+
% of Pop with BS or higher	BSdegree	+
% of Pop employed by farm	PCFarmEmp	-
Proximity to Interstate	ProxI	+
% of County covered by water	Wat	+
% of Pop between 18 and 65	Age	+
% of Hispanic pop	Hispanic	+
Error Term	e	

are used as a base and not included as a variable in the model as is evident by Table 3.1. The metro-adjacent and non-metro variables are expected to be negative in all three equations suggesting that there is a higher percentage of individuals with a high school diploma in urban areas, higher per capita income in more urban areas, and higher percent of county residents employed in more urban areas.

The variables "fouryr" and "coll" are related to the presence of educational institutions. "Fouryr" is characterized as a four year educational institution, public or private being present in a county. If a public or private university or college is present within a county, the variable takes a value of 1, otherwise, the variable takes a value of 0. The presence of a four year institution should have a positive influence on education, per capita income, and county employment, thus suggesting a positive sign. "Coll" is characterized as a Community and Technical College being present within the county. If a Community and Technical College is present, the variable takes on the value of 1, otherwise, the variable has a value of 0.

Poverty, Female Headed Households, and Median House Values are exogenous variables specific to the education equation or equation 1 in the simultaneous model. The poverty variable is the percent of the county below the poverty level in 2000. The variable described as female headed households is the percent of the families within the county with children under the age of 18 headed by a female. Literature suggests that poverty levels and female headed households are negatively correlated with education levels; therefore, Pov and FHH are expected to yield a negative sign. Median house value is self explanatory and expected to have a positive correlation with education. One should expect greater house values to result in more tax dollars going toward education, which in turn could increase the number of high school graduates within the county.

The percentage of the county with a Bachelor's degree and the percentage of the county considered to be employed are variables specific to per capita income or equation 2. Literature suggests that more education results in higher income, therefore a positive relationship is expected between the percentage of the population with at least a Bachelors degree and per capita income. Areas that tend to be reliant on farm employment tend to have lower incomes that their non-farm counterparts. It is expected that a higher percentage of individuals employed on the farm would have a negative correlation with per capita income.

The percentage of the county covered by water, the percentage of the county that is of working age (18-65), proximity to an interstate, and the percentage of the county that is Hispanic are all variables specific to county employment or equation 3. The percentage of the county covered by water is expected to have a positive sign. More water within a county could result in more tourism and therefore more employment opportunities as a result. The percent of the county of working age is also expected to have a positive sign. The more people that are of working age, the more people that are expected to be employed. The proximity of a county to an interstate is expected to have a positive relationship with both per capita income and employment. Counties that have an interstate passing through are given a value of 1 for the variable "ProxI" and 0 otherwise.

The percentage of the county population that is Hispanic is expected to have a positive relationship with per capita income as well. Hispanic migrants tend to locate in areas where jobs are available. High levels of Hispanics should suggest higher levels of employment.

Chapter Four

Analysis and Results

Chapter Four begins with the procedure of dividing Kentucky counties based on population and the proximity of the county to urban populations, as defined by Beale Codes. Through dividing the counties into groups of like size, relative comparisons of economic development can be made. In particular, this thesis looks at alcohol sales as either a leading indicator of economic development or alcohol sales as having a lagged relationship with economic development. Also, as discussed in Chapter 3, the sale of alcohol is expected to be more evident in specific areas of economic development, especially those associated with tourism and the service industry. Shift-share analysis is used to evaluate the impact of the sale of alcohol on specific industries. Finally, an econometric model is used to attempt in explaining development in Kentucky counties of similar population and metro-adjacency.

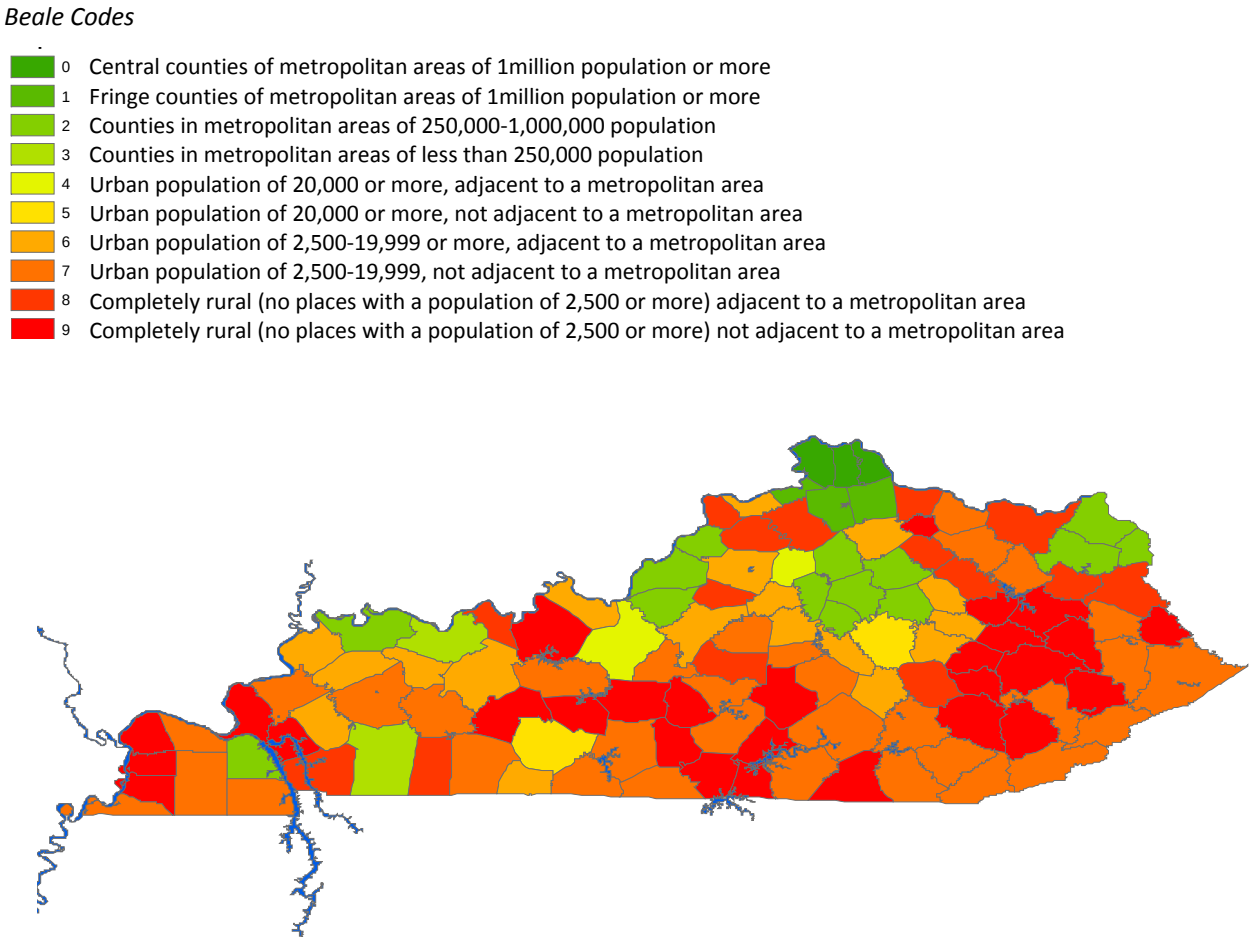
4.1 Beale Codes

The majority of Kentucky's counties have urban populations of less than 20,000, and these counties account for the majority of the dry counties, as seen in Figure 4.8. However between 1996 and 2005 there has been a striking increase in the number of non-adjacent counties with urban populations between 2,500 and 19,900 that have introduced alcohol sales. Of the 24 Kentucky counties in this category, 18 prohibited the sale of alcohol in 1996, but by 2005 eight had introduced alcohol sales in some portion of the county. The eight adjustments were to allow "liquor by the drink" or "limited" sale of alcohol to stimulate restaurant, entertainment and tourism sales in the county. While the number of wet counties in most other size/adjacency categories also increased over the interval there were typically only one or two counties making the switch from dry to wet. The only category not to experience any change over the interval was

category 9, non-adjacent counties with urban populations under 2,500. Only 3 of 21counties in this category allowed alcohol sales in 1996 and there were no changes in the number through 2005.

To examine the hypotheses about the link between alcohol and economic development I focus on the 24 category 7 counties. These category 7 counties are designated as a darker shade of orange color in Figure 4.1. The simplest way to test the hypotheses that decisions to allow alcohol sales are leading, coincident or lagging indicators of economic growth is to look at simple measures of economic growth before and after 1996 our base year for determining wet-dry status. Three measures are used, employment, average wage, and personal income. Employment growth rates are the most basic measure of economic development. Average wage is chosen to determine if per worker wage income increases before, or after, alcohol sales faster than in dry counties. The final measure is the change in total personal income which accounts for non-wage income effects such as self-employment or transfer payments.

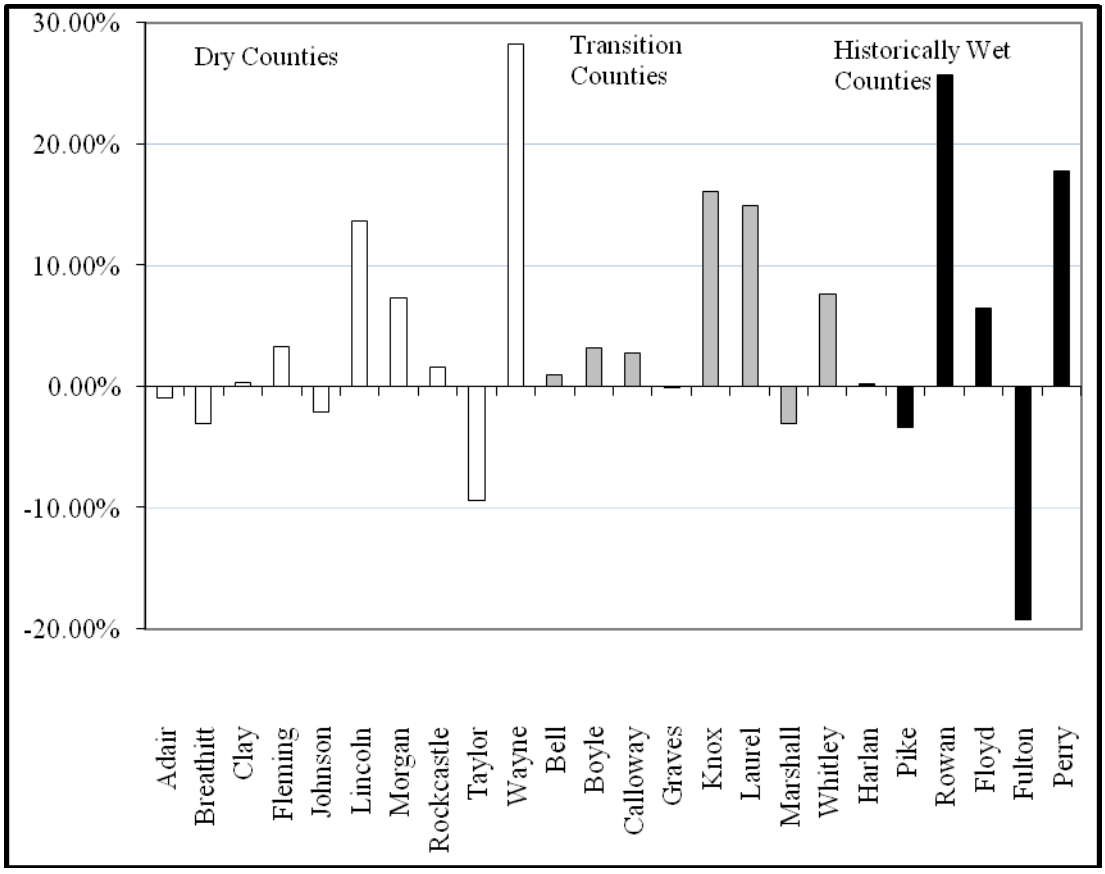
Figure 4.1, Kentucky Counties by Beale Code



4.2 The Sale of Alcohol as a Leading Indicator of Economic Development

For the period 1996-2004, four of the ten dry counties experienced a drop in employment, but the largest expansion in employment took place in Wayne County. Of the six wet counties in 1996 two had falling employment (Fulton and Pike Counties). Fulton had the largest decline for all counties in the category. However, Rowan was the county with the second highest employment growth. Six of the eight counties that introduced alcohol sales over the interval had positive employment growth, including two with well above average rates of growth.

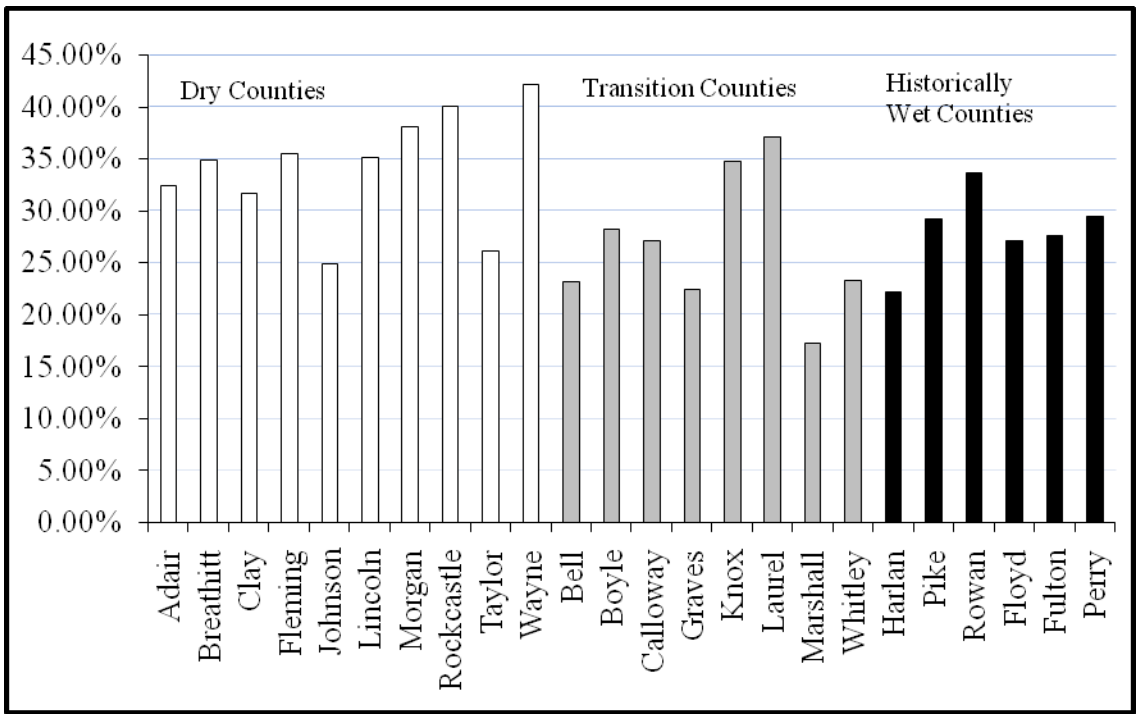
Figure 4.2, Employment Growth between 1996 and 2004 in Category 7 (Beale Code) Counties



Source: County Business Patterns U.S. Census Bureau

Average wages tended to grow faster in the counties that were dry and remained dry over the period between 1996 and 2004, as seen in Figure 4.3. This group included the three highest growth counties in average wages. Previously wet counties collectively had the second highest growth rate in average wage. The group of counties that switched to allow alcohol sales had both the county with the lowest growth in wages (Marshall County) and two counties with well above average wage growth (Knox and Laurel Counties).

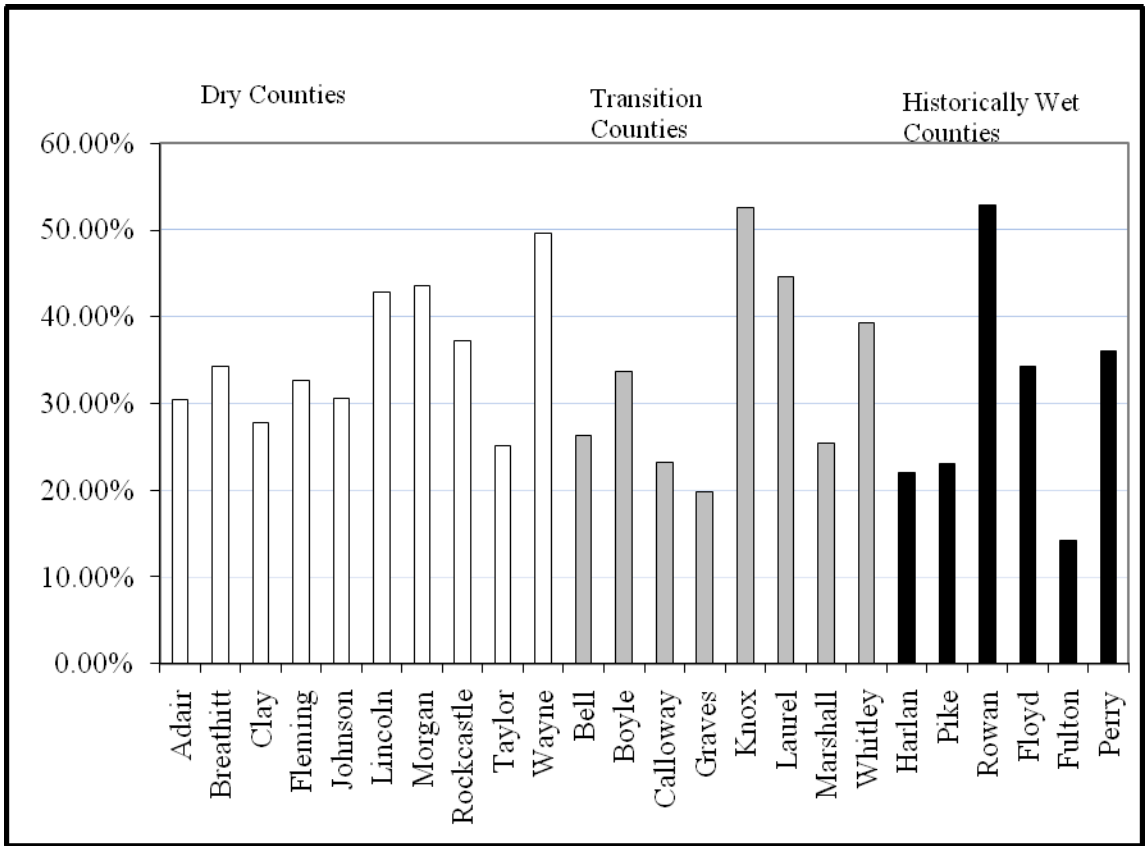
Figure 4.3, Average Wage Growth between 1996 and 2004 in Category 7 (Beale Code) Counties



Source: County Business Patterns U.S. Census Bureau

The third measure, change in personal income, is as equally inconclusive as both change in employment and change in average wage. On average, dry counties had slightly greater growth in total personal income between 1996 and 2004 than their counterparts that allow the sale of alcohol as seen in Figure 4.4.

Figure 4.4, Personal Income Growth between 1996 and 2004 in Category 7 (Beale Code) Counties



Source: County Business Patterns U.S. Census Bureau

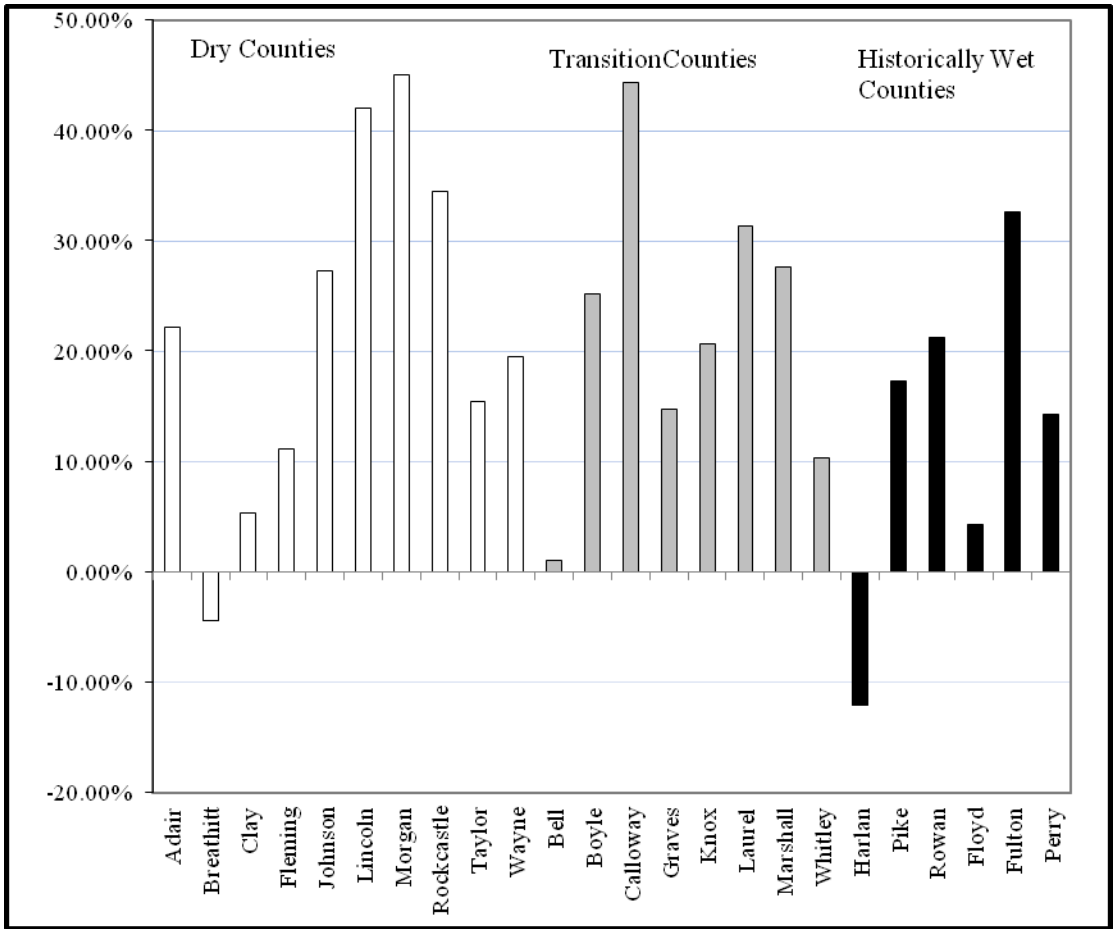
As noted previously, the three measures of economic growth tend to be inconclusive as seen from Figures 4.2 through 4.4. Historically, the wet counties had both the highest and lowest county income growth rates and the lowest average growth rate. The counties that switch from dry to allowing the sale of alcohol had a roughly equal mix of above and below average growth rates for all category 7 counties.

Over the interval 1996 to 2005, the results in aggregate suggest that there is no coincidental relationship between economic growth and the sale of alcohol. Since several of the counties termed Transition County or the counties that switched to wet did so early in the time period it may also be the case that there is no strong relationship between alcohol sales as a leading indicator of economic growth. I next examine the possibility that alcohol sales lag economic growth – that is more rapid growth leads in some way to the decision to introduce alcohol sales in later periods. To test this I look at the same indicators for the period 1988 to 1996.

4.3 The Sale of Alcohol as a Lagging Factor Associated with Economic Development

For the 1988 to 1996 period, employment growth was strong on average for the 18 dry counties. There does not appear to be a significant difference in employment growth rates between the ten counties that remain dry and the eight counties that chose to become wet in the later period as seen in Figure 4.5.

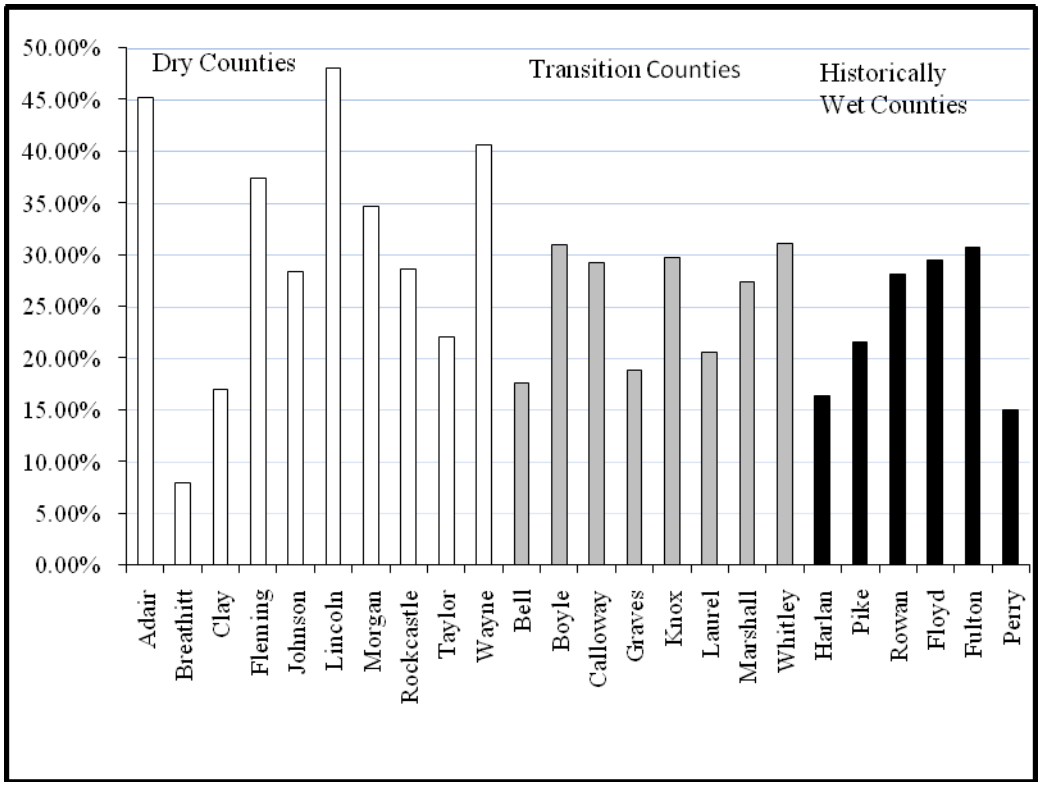
Figure 4.5, Employment Growth between 1988 and 1996 in Category 7 (Beale Code) Counties



Source: County Business Patterns U.S. Census Bureau

Similarly average wage growth was higher on average in the 18 dry counties, as seen in Figure 4.6. It is also important to note that in this case there appears to be a slightly higher average growth in wages in the group of counties that remain dry than in those that switch in the later period.

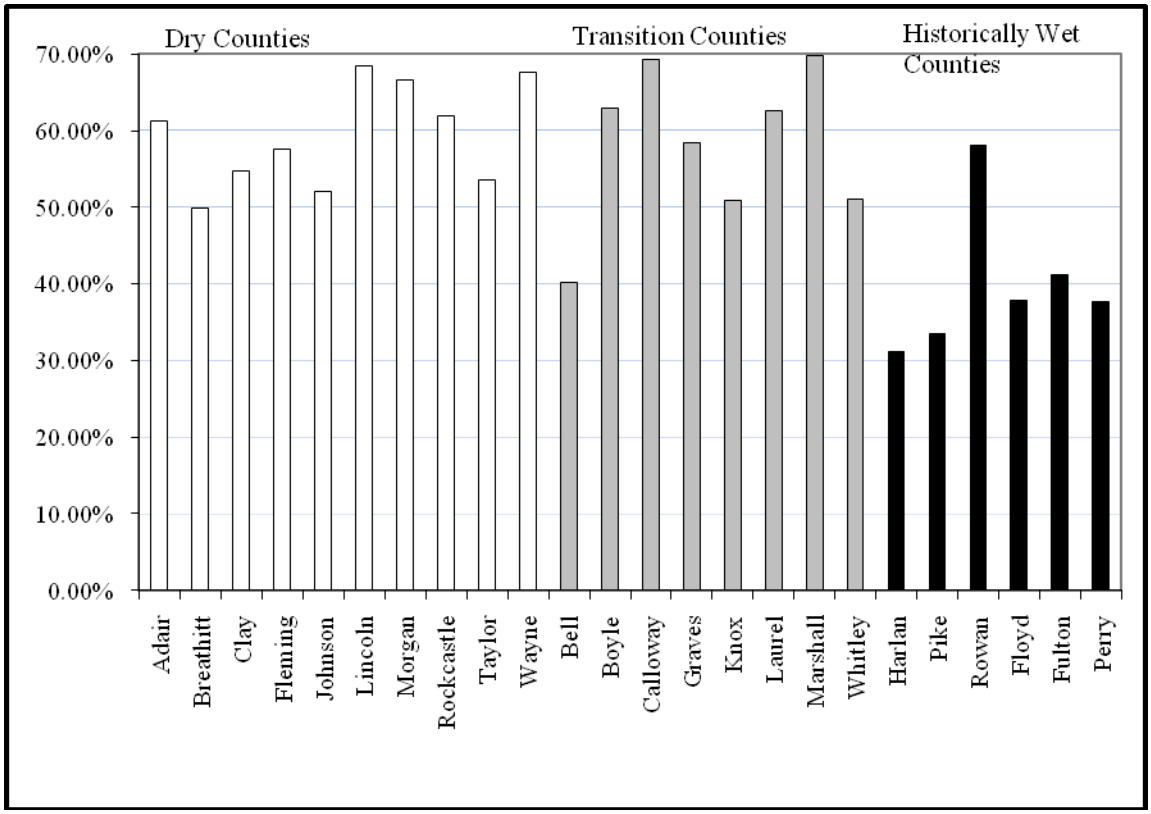
Figure 4.6, Average Wage Growth between 1988 and 1996 in Category 7 (Beale Code) Counties



Source: County Business Patterns U.S. Census Bureau

Once again personal income growth rates were higher on average in the 18 dry counties than in the six wet ones between 1988 and 2006 as seen in Figure 4.7. The data suggest that dry counties performed better in the earlier period than wet ones which seems to negate the hypothesis that alcohol sales stimulate economic growth.

Figure 4.7, Personal Income between 1988 and 1996 in Category 7 (Beale Code) Counties



Source: County Business Patterns U.S. Census Bureau

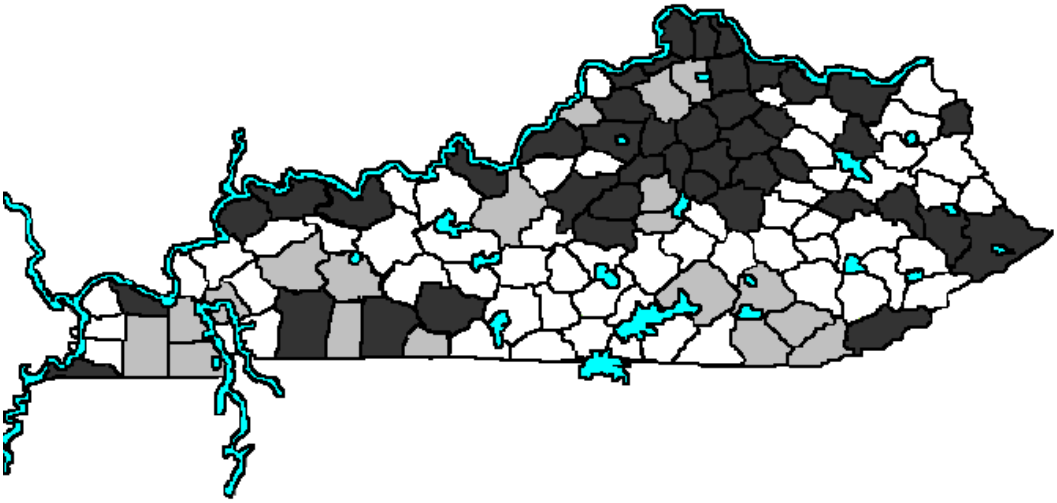
From these three indicators – change in employment, change in average wage, and change in personal income – it is not possible to conclude in the 1988 to 2004 interval that there is a strong correlation between alcohol sales and economic growth for category 7 counties (Counties with an urban population of 2,500 – 19,999, not adjacent to a metropolitan area). Yet 8 counties out of the 24 counties in this category chose to introduce alcohol sales in the last decade, while in other size categories there was little or no adjustment. For the larger more urbanized counties, size classes 1 through 5, only limited change is possible because the large majority was wet in 1996, and the few possible additions to wet counties were at the edges of the metropolitan fringe for category 1 and 2 counties. The small number of category 3 through 5 counties in Kentucky makes it difficult to discern any trends. However there are large numbers of category 6 through 9 counties, so the fact that only category 7 counties had significant change in the status of alcohol sales is interesting.

The eight counties that switched from dry to wet are grouped in two clusters: One group of three counties is in western Kentucky in the Purchase area, with close proximity to the Land Between the Lakes recreation area (Figure 4.8). The second cluster of four counties is in south-eastern Kentucky along the Tennessee border in close proximity to Lake Cumberland and Laurel Lake which are both major tourism and recreation attractions in the region (Figure 4.8). In addition Interstate 75 passes through these counties. The last county is at the fringe of the Lexington metropolitan area and has a significant private university, Centre College, and a major regional hospital complex. By contrast five of the category 7 counties that were wet in 1996 are in the eastern portion of the state in the core Appalachian region while the last is on the Mississippi River in the west.

Eastern and southern Kentucky counties make up the majority of the dry counties in the state, although there are an increasing number of wet counties interspersed through the predominantly dry region.

Figure 4.8, Historically Wet Counties, Transition Counties and Dry Counties in Kentucky.

	Historically Wet Counties
	Transition Counties
	Dry Counties



4.4 Shift-Share Analysis

Shift-Share analysis is usually used to decompose employment change within a region of interest into three parts; the amount resulting from:

- the background movement induced by a larger macro economy,
- the amount associated with the specific adjustments of industrial sectors of different types and,
- a residual amount that is associated with the specific firms in the region of interest.

The sum of these three effects gives the actual change in employment by industry. The standard shift-share component for the major NAICS categories for the period 1998-2003 is calculated. However another way to interpret these components is offered. The national effect is based upon aggregate economic growth in the state of Kentucky and has the usual interpretation of being the effect of some macro-economy. Similarly the industry specific effects are calculated for the 20, 2 digit NAICS industries using state level data. The sum of these two components would give the expected employment change in a county if its industries performed at the state average level since these two components capture background growth and the effect of specific types of industry. This suggests that an interpretation of the third component, usually referred to as competitiveness effect, is the comparative advantage of the local firms in each industry. But part of this comparative advantage may derive from the specific conditions in that county in terms of locational advantage, resource base, skill composition of the labor force etc. Specifically, if alcohol sales do induce growth then those sectors most closely associated with alcohol sales should have above average competitiveness effects.

Thus the magnitude and sign of the competitiveness effect gives a sense of how that specific sector is performing relative to other counties once the background or trend changes

measured by the first two components of shift-share have been removed. The interest in the third component is to see if there are differences in growing and declining NAICS sectors in the dry, newly wet and historically wet category 7 counties. If there is some strong association between alcohol and levels of economic development it may be at the industry level rather than the aggregate level of economic activity.

The hypothesis is that alcohol sales should be associated with faster growth of NAICS category 72, accommodation and food service, in the newly wet counties or transition counties. A major argument advanced by proponents of legalizing alcohol sales is that it stimulates the number and variety of restaurants. The effect might also be expected to be seen in the growth of NAICS category 71, arts and entertainment and recreation since rural counties with an advantage in this sector may view alcohol sales as a complementary activity. The demographic characteristics of the counties evaluated did not allow for available data in NAICS category 71. The rural nature of the counties evaluated prevented disclosure of the data.

The shift-share analysis is summarized in Tables 4.1, 4.2 and 4.3, and Figure 4.9. In Tables 4.1, 4.2 and 4.3 I report the hypothetical change in employment by industry for the competitiveness effect in the shift-share calculations. To simplify the analysis only the five largest values in absolute terms are reported for each county. The actual total change in employment over the 1998-2003 period is also reported. In each category of alcohol sales half the counties experienced employment growth and half experienced decline. Dry counties as a group had much smaller absolute change in employment while the newly wet category, or transition counties had the greatest variability. Newly wet counties experienced the three largest changes in employment, but two of the four smallest changes in employment were in this category. Historically wet counties had relatively moderate changes in employment magnitudes.

Table 4.1, Difference in Jobs in Dry County Industries Experiencing Major "Competitiveness" Employment By NAICS 1998 – 2003

	Dry Counties									
	Adair	Breathitt	Clay	Fleming	Johnson	Lincoln	Morgan	Rockcastle	Taylor	Wayne
11 Forestry & ag service		167								
21 Mining					-76					
23 Construction	114				123	34	81			-35
31-33 Manufacturing		149	-240	48			-49	-178	-393	513
42 Wholesale trade				-38		13			-103	-55
44-45 Retail trade	134				-102	24	32	94	59	233
48-49 Transportation & warehousing		-50	36		-132			81		
51 Information			-115							
52 Finance & insurance						-13	8			
54 Professional, scientific & technical services				-55						
56 Admin, support, waste & management service									171	
61 Educational services	-47		-34						-206	
62 Health care & social assistance	-236	-243	82	-53	119	-80				
72 Accommodation & food services	-85	-118		73			119	68		
81 Other services (except Public Admin)								69		-100
Total Employment Change	275	-152	-299	86	-98	-9	62	-41	772	432

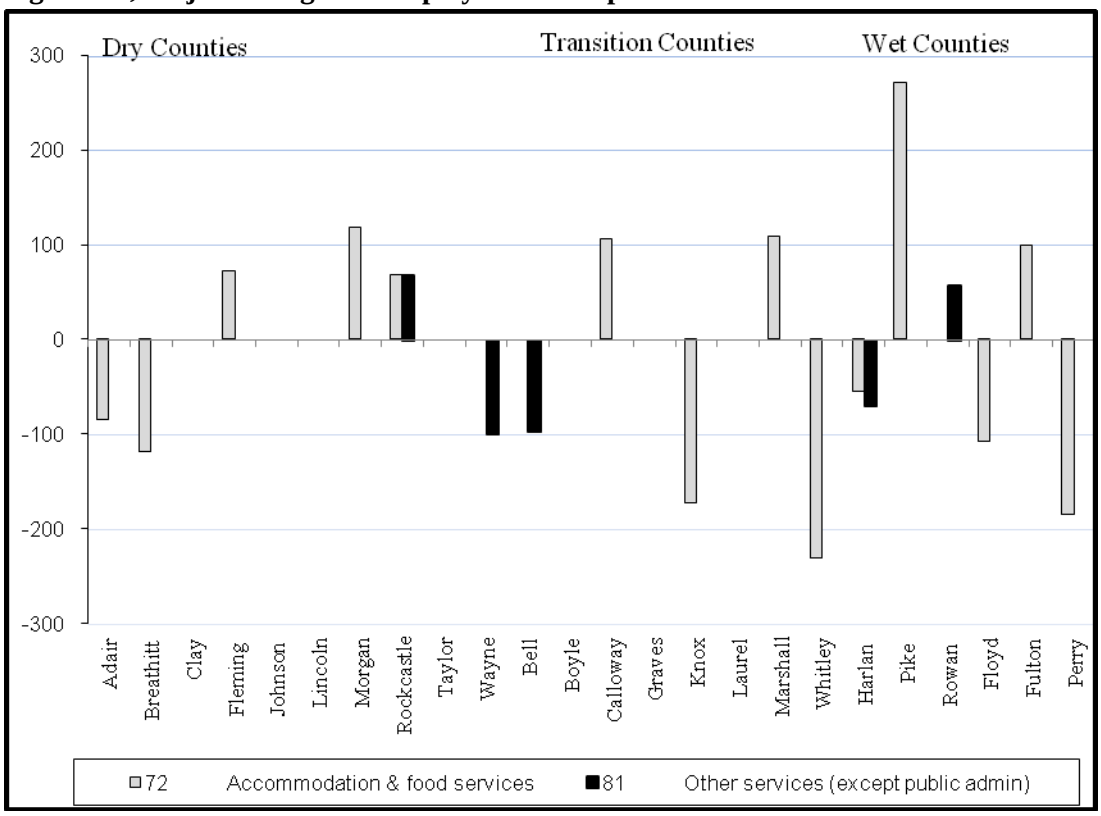
Table 4.2, Difference in Jobs in Transition County Industries Experiencing Major "Competitiveness" Employment Change By NAICS 1998 – 2003

	Transition Counties							
	Bell	Boyle	Calloway	Graves	Knox	Laurel	Marshall	Whitley
11 Forestry & ag service								
21 Mining	-104							
23 Construction	-72			-67			-145	
31-33 Manufacturing			-310		-451	634	126	-187
42 Wholesale trade		-128						
44-45 Retail trade	-402	257			-745		155	1221
48-49 Transportation & warehousing	-114		-310			999	-126	-128
51 Information		-359		-60		385		-515
52 Finance & insurance				-79		551		
54 Professional, scientific, & technical		-139	487	-107	-106			
56 Admin, support, waste & management					-213			
61 Educational services		599						
62 Health care & social assistance			-557	-392		830		
72 Accommodation & food services			106		-173		109	-231
81 Other services (except Public Admin)	-97							
Total Employment Change	-1069	28	-556	-788	-1868	3762	70	288

Table 4.3, Difference in Jobs in Historically Wet County Industries Experiencing Major "Competitiveness" Employment Change By NAICS 1998 – 2003

	Historically Wet Counties					
	Harlan	Pike	Rowan	Floyd	Fulton	Perry
11 Forestry & ag service						
21 Mining		225				
23 Construction						
31-33 Manufacturing	-73		228		-43	107
42 Wholesale trade				-307	185	
44-45 Retail trade	-111					-141
48-49 Transportation & warehousing		-422		-453		-105
51 Information			-61			
52 Finance & insurance					-32	
54 Professional, scientific, & technical services		316				520
56 Admin, support, waste & management services		193	83	257		
61 Educational services						
62 Health care & social assistance	337		152	-177	341	
72 Accommodation & food services	-55	272		-107	100	-185
81 Other services (except Public Admin)	-70		57			
Total Employment Change	-122	566	1032	-519	-183	174

Figure 4.9, Major Changes in Employment Competitiveness 1988 – 2004



There is no obvious pattern in terms of which categories expanded or contracted by alcohol availability. In particular accommodations and food service, the one category with the strongest direct link to alcohol sales, shows no evidence that alcohol sales are associated with positive growth. Further category 71, arts entertainment and recreation was one of the five categories that was not associated with employment volatility in any of the twenty-four counties.

An argument can be made that alcohol sales are likely to be associated with modernization. That would suggest that counties experiencing faster growth in professional services might be more likely to introduce alcohol, or already allow alcohol. NAICS categories 51 through 62 most closely correspond to advanced producer and consumer services. So if this hypothesis is correct we should expect wet counties to show faster rates of growth in these NAICS categories. In most counties the major source of employment volatility was traditional

sectors, such as, manufacturing, natural resources and trade. However the advanced services were more common among the top five sectors in both newly wet and historically wet counties than in dry counties. But in many cases these sectors experienced large declines in employment suggesting that the county was not particularly competitive in these activities over 1998 – 2003. One possibility in those counties where the competitiveness component is negative is that prior expansion in the advanced services sector may have influenced the decision to become wet.

4.5 Econometric Analysis

In the simultaneous model evaluated, the dependent variables are the natural log of education, the natural log of per capita personal income, and the natural log of per capita employment for equations 1, 2, and 3, respectively. The explanatory value of the model is relatively high, with an adjusted R-square of 0.804. The explanatory value associated with the adjusted R-square could be high due to the relatively large number of variables combined with a relatively low number of observations.

The simultaneous nature of the dependent variables within the model does tend to be supported. The per capita personal income is statistically significant in equation one, attempting to explain the percentage of county residents with a high school diploma or education. In the second equation, per capita personal income is the dependent variable. In equation 2, both employment and education are significant and positive as would be expected, suggesting that as education and employment increase, per capita income increases. In the third equation, related to county-wide employment, both education and per capita personal income are significant. Per capita personal income is positive, but the parameter estimate for education is negative as seen in Table 4.9. This suggests that counties with higher percentages of individuals without a high school diploma will have a larger percentage of the population that is employed.

Equation 1 - Education

In Table 4.4, the expected sign of the variables found in equation 1 are compared with the actual sign of the variables after 3 Stage Least Squares (3SLS) has been used to correct for endogeneity bias. Of the five variables that are found to be significant in equation 1, median house value does not exhibit the expected sign. While it was expected that increased housing values would increase tax dollars and thus benefit schools within the county, resulting in an increased number of individuals with a high school diploma, the opposite was found to be true. As the median house value increases, the number of individuals with a high school diploma decreases.

Table 4.4, Equation 1: Natural Log of Education Expected Sign

Description	Variables	Expected Sign	Actual Sign
Intercept	Intercept		+
Natural Log of Per Capita Income	lnPCPI	+	+
***Natural Log of Per Capita Employment	lnPCJob	+	+
Wet	Wet	+	-
Moist or Limited	Moistlim	+	+
Beale Codes 4 and 5	metroadj	-	+
**Beale Codes 6, 7, 8, and 9	nonmetro	-	-
Public and/or Private University	Fouryr	+	+
Technical School	Coll	+	-
***Poverty	Pov	-	-
***Female Headed Households	FHH	-	-
***Median House Value	HouseValue	+	-
Error Term	e		.

** 10% level of significance, ** 5% level of significance, *** 1% level of significance*

In attempting to explain education or the percentage of individuals within a county that have a high school diploma in 2000, five variables were found to be statistically significant as seen in Table 4.5, below. Per capita income was statistically significant at the 95% confidence level. Based on the parameter estimate, it can be estimated that a 1 unit increase in per capita income will result in approximately a .148. increase in the number of the population with a high school diploma. The variable nonmetro or Beale codes 6, 7, 8, and 9 was significant at the 95% confidence level as well. The parameter estimate for nonmetro was approximately -0.043, suggesting that nonmetro counties had 0.043 fewer individuals with a high school diploma than their metro counterparts. The variable used to capture poverty was significant at the 99% confidence level with a parameter estimate of -.007, suggesting that a 1 unit increase in the poverty rate will decrease the number of individuals within the county that have a high school diploma by 0.007. The variable used to capture the percent of families with children under 18 that have a female headed household was significant on a 99% confidence interval. The parameter estimate for FHH was approximately -0.011. The negative sign suggests that a 1 unit increase in the number of the population with a female headed household would result in a 0.01 decrease in the percent of the population with a high school diploma. The median house value also negatively affects the percent of the population within a county that has a high school diploma. For every 1 unit increase in the median house value, the number of high school graduates decreases by 0.0000032. It is important to note that the two variables of major interest: wet and moistlim, were not found to be significant.

Table 4.5, Equation 1: Natural Log of Education Parameter Estimates

Description	Variables	Parameter Estimate
Intercept	Intercept	0.598
Natural Log of Per Capita Income	lnPCPI	0.148
Natural Log of Per Capita Employment	lnPCJob	0.372***
Wet	Wet	- 0.012
Moist or Limited	Moistlim	0.003
Beale Codes 4 and 5	metroadj	0.014
Beale Codes 6, 7, 8, and 9	nonmetro	- 0.043**
Public and/or Private University	Fouryr	0.012
Technical School	Coll	- 0.023
Poverty	Pov	- 0.007***
Female Headed Households	FHH	- 0.011***
Median House Value	HouseValue	- 0.0000032***
Error Term	e	.

** 10% level of significance, ** 5% level of significance, *** 1% level of significance*

Equation 2 – Per Capita Personal Income

In Table 4.6, the expected signs for the variables in equation 2 or the equation attempting to explain per capita income are compared with the actual signs of the variables after the model was corrected for endogeneity bias. Of the variables that are significant, there are three with different signs than expected. The presence of a four year educational institution, public or private, and a county being termed either moist or limited was expected to positively impact income. The actual signs were negative, suggesting that per capita income is less in areas where such an institution is present. The presence of a community and technical college negatively impact per capita income as well, while the expected relationship was positive as seen in Table 4.6 below. The variable moistlim also has a negative impact on per capita income. In counties where alcohol is sold by the glass and in otherwise dry counties with a wet city, per capita income is less than similar counties that are dry.

Table 4.6, Equation 2: Natural Log of Per Capita Personal Income Expected Sign

Description	Variables	Expected Sign	Actual Sign
***Intercept	Intercept		+
***Natural Log of Per Capita Employment	lnPCJob	+	+
***Natural Log of Education	Edu	+	+
Wet	Wet	+	-
*Moist and/or Limited	Moistlim	+	-
***Beale Codes 4 and 5	metroadj	-	-
Beale Codes 6, 7, 8, and 9	nonmetro	-	-
**Public and/or Private University	Fouryr	+	-
**Technical School	Coll	+	-
% of Pop with BS or higher	BSdegree	+	+
% of Pop employed by farm	PCFarmEmp	-	-
Error Term	e		.

** 10% level of significance, ** 5% level of significance, *** 1% level of significance*

The second equation attempts to explain per capita personal income. There were seven variables that were statistically significant in this equation as seen in Table 4.7. The intercept was statistically significant at the 99% confidence level. The intercept was estimated at approximately 4.50. County-wide employment and education were both significant at the 99% confidence level as well. As employment increases by 1 unit, per capita income increases by 0.38. The parameter estimate for education was approximately 0.99, suggesting that a 1 unit increase in education will result in a .99 increase in per capita income. The moistlim variable evaluated at the 90% confidence level with a parameter estimate of -0.07, suggesting that counties that are moist or allow the limited sale of alcohol have 0.7 less per capita income than their dry counterparts. The presence of a four year institution and the presence of community and technical college are statistically significant using a 90% and 99% confidence level respectively. When a four year public or private, college or university is present, per capita personal income is 0.07 less than counties where no such institution is present. When a community and technical college is present in a county the per capita personal income is 0.11 less than counties where no community and technical college is present.

Table 4.7, Equation 2: Natural Log of Per Capita Personal Income Parameter Estimates

Description	Variables	Parameter Estimate
Intercept	Intercept	4.503***
Natural Log of Per Capita Employment	lnPCJob	0.376***
Natural Log of Education	Edu	0.995***
Wet	Wet	- 0.011
Moist and/or Limited	Moistlim	- 0.075*
Beale Codes 4 and 5	metroadj	- 0.189***
Beale Codes 6, 7, 8, and 9	nonmetro	- 0.009
Public and/or Private University	Fouryr	- 0.066**
Technical School	Coll	- 0.105**
% of Pop with BS or higher	BSdegree	0.0009
% of Pop employed by farm	PCFarmEmp	- 0.0005
Error Term	e	.

** 10% level of significance, ** 5% level of significance, *** 1% level of significance*

Equation 3 – Per Capita Employment

In Table 4.8, the actual signs of the variables attempting to explain county-wide employment or equation 3 are compared with the expected signs for the variables. Of the variables found in equation 3 that are significant, 2 have an actual sign different than the expected sign. Education was expected to increase employment, suggesting that more individuals with a high school diploma located in a county would result in a higher percentage of the county being employed. The opposite is found to be true, the more individuals with a high school diploma results in a lower percentage of the population being employed. Metro-adjacent counties were also expected to yield a negative sign. The positive sign suggests that a higher percentage of individuals are employed in metro-adjacent counties than metro counties.

Table 4.8 Equation 3: Natural Log of Per Capita Employment Expected Sign

Description	Variables	Expected Sign	Actual Sign
***Intercept	Intercept		-
***Natural Log of Per Capita Income	lnPCPI	+	+
***Natural Log of Education	Edu	+	-
Wet	Wet	+	+
*Moist or limited	Moistlim	+	+
**Beale Codes 4 and 5	metroadj	-	+
Beale Codes 6, 7, 8, and 9	nonmetro	-	+
***Public and/or Private University	Fouryr	+	+
***Technical School	Coll	+	+
% of County covered by water	Wat	+	-
Proximity to Interstate	ProxI	+	-
% of Pop between 18 and 65	Age	+	+
% of Hispanic pop	Hispanic	+	-
Error Term	e		.

** 10% level of significance, ** 5% level of significance, *** 1% level of significance*

Equation 3 attempts to explain the percent of the county that is employed. Approximately seven variables are statistically significant in equation 3 as seen in Table 4.9. The intercept, per capita personal income and the presence of a community and technical college are each statistically significant using the 99% confidence level. The parameter estimate for per capita income suggests a 1 unit increase in per capita personal income results correlates with a 2.56 increase in county employment. The presence of a community and technical college results in a 0.27 increase in the percent of the county that is employed. In counties considered metro-adjacent or grouped in Beale codes 4 and 5 the percent of county employment numbers are 0.48 higher than the county employment numbers in metro county grouped in Beale codes 1, 2, and 3 when using the 95% confidence level. The presence of limited alcohol sales or a county defined as moist results in a 0.18 higher number of the population being employed when compared with dry counterparts using the 90% confidence level. The presence of a four year institution is also statistically significant on the 90% confidence level. The parameter estimate suggests that counties where a public or private university or college is present has 0.15 higher employment rates than counties where no institution is present.

Table 4.9, Equation 3: Natural Log of Per Capita Employment Parameter Estimates

Description	Variables	Parameter Estimate
Intercept	Intercept	- 12.24***
Natural Log of Per Capita Income	lnPCPI	2.560***
Natural Log of Education	Edu	- 2.441***
Wet	Wet	0.033
Moist or limited	Moistlim	0.183*
Beale Codes 4 and 5	metroadj	0.489**
Beale Codes 6, 7, 8, and 9	nonmetro	0.039
Public and/or Private University	Fouryr	0.152***
Technical School	Coll	0.274***
% of County covered by water	Wat	- 0.004
Proximity to Interstate	ProxI	- 0.011
% of Pop between 18 and 65	Age	0.007
% of Hispanic pop	Hispanic	- 0.011
Error Term	e	.

** 10% level of significance, ** 5% level of significance, *** 1% level of significance*

To specifically evaluate the impact of alcohol related to economic development, the two variables relating to the sale of alcohol are considered: wet and moistlim. The variable termed wet lacks significance throughout the model. The moistlim variable is significant in both equations 2 and 3, where per capita income and percent of the county that is employed are the dependent variables. In equation 2, the moistlim is negative, suggesting that a county termed moist or limited results in lower per capita personal income. In equation 3, moistlim is positive, suggesting that a county termed as either moist or limited is associated with a higher percentage of county employment.

Chapter Five

Conclusions and Recommendations for Further Study

Kentucky provides an interesting example of the effect of local decision-making on economic development. It is often argued that the restaurant and entertainment industry relies upon alcohol sales for a significant share of its profits and that places that prohibit alcohol have a difficult time establishing private sector recreation and tourism facilities. With the decline in textile and clothing production and other forms of low skill manufacturing in the smaller counties of south central and western Kentucky there is a growing interest in recreation based development.

At present, most of the recreation facilities and accommodations in the rural part of the state are either part of state government in the park system or are provided by local entrepreneurs. Franchise operations and direct investments by large hotel and restaurant chains are rare. Whether this is due to prohibitions on the sale of alcohol or other factors is not clear, but dry counties clearly face a barrier not present in wet counties in attracting this type of investment.

The switch from dry to moist by two blocks of counties in close proximity to two of the major recreation and tourism destinations in the state is certainly consistent with the recognition that to provide a full service experience for tourists it is necessary not just to provide alcohol sales, but a range of restaurants that includes national chains that serve alcohol. This has made the adoption of 'liquor by the drink' legislation the preferred way to introduce alcohol to previously dry counties. One reason that the adjustment has taken place in the category 7 counties as opposed to the category 9 counties is that in the smaller counties there are no urban places large enough to be a viable site for one of these national chain restaurants.

Referenda to allow the sale of alcohol create major controversies in rural Kentucky. They pit one element of the community that favors change to facilitate external investment and attract visitors against another group that worries about the disruptive effects of alcohol on youth and has a religious concern with alcohol sales.

The power of opposition to alcohol sales in rural Kentucky can be judged by the simple fact that no county has voted to become fully wet and in the last decade and there have been no cities which have voted to allow the retail sale of alcohol. Where alcohol referenda have been successful it has been to support expansion of restaurants or to allow the sale of alcohol at golf courses or wineries. These narrow opportunities may provide an entry point for broader authority in the future, but there is currently a strong aversion in the majority of rural Kentuckians to the wide-spread retail sale of alcohol.

Since there is little evidence that wet counties enjoy uniformly higher rates of growth than wet counties of similar size, the decision of whether to allow alcohol sales must depend upon the social values of the community and to a lesser extent on whether the specific development opportunities present in the county can be enhanced by introducing the retail sale of alcohol at hotels resorts and restaurants.

Beyond the geographic clustering and the tendency for more urbanized counties to allow alcohol sales, there is little that is obvious to differentiate counties in terms of allowing or prohibiting alcohol sales. Using ERS Urban Adjacency codes for 2003 it is clear that in both Beale Code 1 and 2 counties – major metropolitan counties – have allowed alcohol sales for an extended period of time. Conversely in the smallest and most remote counties- code 9 the sale of alcohol is almost completely restricted, even under the current more liberal voting schemes. Most code 3 counties in Kentucky also allow alcohol sales. There are too few code 4 and 5 counties to allow analysis. In terms of more remote counties, codes 6 through 9, there is significant

variability in the sale of alcohol. In 1996, in all these categories, the majority of counties prohibited the sale of alcohol. However between 1996 and 2005 almost half the category 7 counties – non-adjacent with urban populations over 2,500 but less than 20,000 – allowed some form of alcohol sales. Conversely the category 9 counties, as noted above, continued to prohibit alcohol sales.

Beyond the size effect described above, there is no obvious pattern among counties that prohibit or allow the sale of alcohol. Using the ERS county typology there is no obvious correlation among alcohol sales and economic specialization (manufacturing, services government, recreation, retirement or non-specialized) nor among the socio-economic categories (persistent poverty, low educational attainment, deficient housing stock or transfer dependency).

Most interesting, given the potential for alcohol sales to support recreation and tourism enterprises, there seems to be little correlation between alcohol sales and the amenity index. In part this reflects a relatively narrow range of amenity categories in the state (primarily values of 3 or 4), but within specific rural-urban continuum codes there is no obvious link between counties with higher amenity values being more likely to allow alcohol sales. To further examine the potential linkage on component of the amenity index, amount of county in water, was included. A major form of summer recreation in Kentucky is boating-related activities (fishing, houseboats, skiing and wakeboards). Further, other aspects of the index such as climatic data are relatively constant across the state, so they would not be expected to provide any differences in behavior. However the presence of larger amounts of water does not appear to be strongly associated with allowing alcohol sales.

Shift-share analysis offers only a tentative link between higher levels of advanced services and alcohol sales. But even here the evidence is tenuous since wet counties can experience significant declines in service employment. Most telling is the absence of strong

patterns of employment growth in the two sectors NAIC 71 and 72 that are most directly linked with retail sales of alcohol. This is especially surprising given the nature of the eight counties that switched from dry to wet. Seven of the eight are in close proximity to major recreation and tourism sites. While dry counties experienced significantly less employment volatility than wet counties it is not clear how volatility and alcohol sales are related.

Further research would be needed to address the question of so many category 7 communities choosing to introduce the sale of alcohol in the past decade, while so few other rural communities altered their position. While there was much change over the past decade, the change was not necessarily reflected in the data set used for this thesis. Future census data might provide a more depictive look as counties and communities continue to adopt the sale of alcohol.

The NAICS data were also limiting due to disclosure issues associated with the rural nature of the counties evaluated. The industries expected to be impacted by alcohol sales were among those that did not disclose their information. Future studies might warrant other sources of data.

Appendix A: Output

The MEANS Procedure

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
FIPS	FIPS	120	21120.00	69.5701085	21001.00	21239.00
RuralUrb93	RuralUrb93	120	6.4083333	2.4716743	1.0000000	9.0000000
B2	B2	120	0.1166667	0.3223687	0	1.0000000
B3	B3	120	0.0166667	0.1285559	0	1.0000000
B4	B4	120	0.0166667	0.1285559	0	1.0000000
B5	B5	120	0.0166667	0.1285559	0	1.0000000
B6	B6	120	0.1500000	0.3585686	0	1.0000000
B7	B7	120	0.2750000	0.4483865	0	1.0000000
B8	B8	120	0.1250000	0.3321056	0	1.0000000
B9	B9	120	0.2333333	0.4247260	0	1.0000000
Wet96	Wet96	121	0.4958678	2.7389900	0	30.0000000
Wet	Wet	121	0.4958678	2.7389900	0	30.0000000
Moist	Moist	121	0.2644628	1.4819390	0	16.0000000
Limited	Limited	121	0.2975207	1.6615486	0	18.0000000
IPI	IPI	120	648494.05	1718739.11	31772.00	17530563.00
PI	PI	120	912016.88	2468419.71	40121.00	25191656.00
CPI	CPI	120	31.4736826	8.7734122	13.0089292	61.5089762
Ijob	Ijob	120	14785.52	43699.06	362.0000000	441295.00
Job	Job	120	15710.62	44886.95	439.0000000	449218.00
Cjob	Cjob	120	5.1439584	11.9079217	-33.9509264	39.7206195
IAW	IAW	120	20486.33	4164.33	13028.00	37223.00
AW	AW	120	25914.25	4600.64	17269.00	41972.00
CAW	CAW	120	23.7747072	6.8056808	3.1027254	36.8509599
Iedu	Iedu	120	59.1340000	9.2867491	39.3200000	79.0400000
Edu	Edu	120	67.5611667	8.2429436	48.7400000	84.2000000
Cedu	Cedu	120	13.7970391	4.8823186	4.0677076	25.7021277
Pov	Pov	120	18.9643974	8.1844013	4.0616942	45.3800924
BC	BC	120	0.4000000	0.4919520	0	1.0000000
PubU	PubU	120	0.0666667	0.2504897	0	1.0000000
PrivU	PrivU	120	0.2333333	0.6576420	0	5.0000000
Coll	Coll	120	0.3083333	0.4637413	0	1.0000000
amenity_ind	amenity ind	120	3.3166667	0.5795294	2.0000000	4.0000000
Wat	Wat	120	4.0345083	1.8119659	0	7.3700000
AE	AE	120	158.6000000	536.5547917	0	5001.00
AcFs	AcFs	120	1134.75	3426.90	0	32919.00
ProxI	ProxI	120	0.3833333	0.4882370	0	1.0000000

The SYSLIN Procedure

Two-Stage Least Squares Estimation

Model	PERSONAL
Dependent Variable	CPI
Label	CPI

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	25	3456.997	138.2799	2.48	0.0009
Error	94	5235.227	55.69390		
Corrected Total	119	9159.759			

Root MSE	7.46283	R-Square	0.39771
Dependent Mean	31.47368	Adj R-Sq	0.23753
Coeff Var	23.71135		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Intercept	1	72.96845	26.54185	2.75	0.0072	Intercept
Cjob	1	0.077830	0.425839	0.18	0.8554	Cjob
Cedu	1	-0.28479	1.176502	-0.24	0.8093	Cedu
IPI	1	-5.6E-6	4.092E-6	-1.37	0.1745	IPI
CAW	1	0.369755	0.219694	1.68	0.0957	CAW
Wet	1	-1.76900	2.408578	-0.73	0.4645	Wet
Moist	1	-1.73853	2.658486	-0.65	0.5147	Moist
Limited	1	0.034005	3.881340	0.01	0.9930	Limited
B2	1	-4.54180	4.271380	-1.06	0.2904	B2
B3	1	-4.64764	7.476235	-0.62	0.5357	B3
B4	1	-3.32152	7.082464	-0.47	0.6402	B4
B5	1	-5.81437	6.799751	-0.86	0.3947	B5
B6	1	-4.97895	4.230687	-1.18	0.2422	B6
B7	1	-7.75329	4.370834	-1.77	0.0793	B7
B8	1	-5.84788	4.527538	-1.29	0.1997	B8
B9	1	-7.43230	4.599383	-1.62	0.1095	B9
Edu	1	-0.48639	0.255480	-1.90	0.0600	Edu
Pov	1	-0.40676	0.393100	-1.03	0.3034	Pov
BC	1	-2.15113	2.324734	-0.93	0.3572	BC
PubU	1	0.532140	4.351032	0.12	0.9029	PubU
PrivU	1	0.001653	2.157372	0.00	0.9994	PrivU
Coll	1	0.435499	1.887083	0.23	0.8180	Coll
Wat	1	0.380738	0.596643	0.64	0.5249	Wat
AE	1	0.007793	0.006060	1.29	0.2016	AE
AcFs	1	0.001847	0.002069	0.89	0.3744	AcFs

The SYSLIN Procedure

Two-Stage Least Squares Estimation

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
ProxI	1	0.116662	2.208729	0.05	0.9580	ProxI

Two-Stage Least Squares Estimation

Model	EDUCATIO
Dependent Variable	Cedu
Label	Cedu

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	25	2806.521	112.2608	106.38	<.0001
Error	94	99.19557	1.055272		
Corrected Total	119	2836.607			

Root MSE	1.02726	R-Square	0.96586
Dependent Mean	13.79704	Adj R-Sq	0.95678
Coeff Var	7.44554		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Intercept	1	13.81305	4.055395	3.41	0.0010	Intercept
CPI	1	-0.05673	0.103299	-0.55	0.5842	CPI
Cjob	1	0.077835	0.070396	1.11	0.2717	Cjob
CAW	1	-0.02222	0.040833	-0.54	0.5876	CAW
Iedu	1	-1.75054	0.055995	-31.26	<.0001	Iedu
Wet	1	0.314076	0.328181	0.96	0.3410	Wet
Moist	1	-0.18370	0.458737	-0.40	0.6897	Moist
Limited	1	0.173754	0.362812	0.48	0.6331	Limited
B2	1	0.192180	0.584804	0.33	0.7432	B2
B3	1	1.124694	1.009927	1.11	0.2683	B3
B4	1	1.158540	0.947751	1.22	0.2246	B4
B5	1	0.440678	0.946864	0.47	0.6427	B5
B6	1	-0.06315	0.574761	-0.11	0.9128	B6
B7	1	-0.18911	0.593674	-0.32	0.7508	B7
B8	1	0.170521	0.615657	0.28	0.7824	B8
B9	1	0.430036	0.635106	0.68	0.5000	B9
Edu	1	1.544555	0.060950	25.34	<.0001	Edu
Pov	1	0.041926	0.036443	1.15	0.2529	Pov
BC	1	-0.03941	0.305859	-0.13	0.8978	BC
PubU	1	-0.06394	0.572332	-0.11	0.9113	PubU
PrivU	1	0.007236	0.286752	0.03	0.9799	PrivU
Coll	1	-0.22018	0.273879	-0.80	0.4235	Coll
Wat	1	0.005213	0.078089	0.07	0.9469	Wat
AE	1	-0.00041	0.000674	-0.61	0.5436	AE
AcFs	1	0.000127	0.000103	1.23	0.2226	AcFs

The SYSLIN Procedure

Two-Stage Least Squares Estimation

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
ProxI	1	0.117130	0.250786	0.47	0.6415	ProxI

The SYSLIN Procedure

Two-Stage Least Squares Estimation

Model	EMPLOYME
Dependent Variable	Cjob
Label	Cjob

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	25	3512.219	140.4887	0.31	0.9993
Error	94	43076.88	458.2647		
Corrected Total	119	16874.03			

Root MSE	21.40712	R-Square	0.07539
Dependent Mean	5.14396	Adj R-Sq	-0.17052
Coeff Var	416.16040		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Intercept	1	52.37085	215.3964	0.24	0.8084	Intercept
CPI	1	-1.15358	5.611373	-0.21	0.8376	CPI
Cedu	1	-2.91438	6.804479	-0.43	0.6694	Cedu
Ijob	1	-0.00052	0.001521	-0.34	0.7339	Ijob
CAW	1	0.947948	2.728834	0.35	0.7291	CAW
Wet	1	-5.11280	14.82562	-0.34	0.7310	Wet
Moist	1	-2.36683	15.21257	-0.16	0.8767	Moist
Limited	1	-4.46069	16.00600	-0.28	0.7811	Limited
B2	1	-1.38499	12.25244	-0.11	0.9102	B2
B3	1	-7.96952	21.44556	-0.37	0.7110	B3
B4	1	-7.99364	20.31603	-0.39	0.6949	B4
B5	1	-9.61041	19.50506	-0.49	0.6234	B5
B6	1	-5.71901	12.13571	-0.47	0.6386	B6
B7	1	-6.02580	12.53772	-0.48	0.6319	B7
B8	1	-7.22409	12.98723	-0.56	0.5794	B8
B9	1	-7.24993	13.19332	-0.55	0.5840	B9
Edu	1	0.084355	0.732845	0.12	0.9086	Edu
Pov	1	0.705603	1.237287	0.57	0.5698	Pov
BC	1	-6.60821	19.42961	-0.34	0.7345	BC
PubU	1	-6.59972	25.09399	-0.26	0.7931	PubU
PrivU	1	-4.68024	9.287001	-0.50	0.6155	PrivU
Coll	1	0.914583	5.498455	0.17	0.8683	Coll
Wat	1	-0.36229	1.636391	-0.22	0.8253	Wat
AE	1	0.022756	0.062003	0.37	0.7144	AE
AcFs	1	0.003565	0.012615	0.28	0.7781	AcFs

The SYSLIN Procedure

Two-Stage Least Squares Estimation

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
ProxI	1	2.619652	6.474216	0.40	0.6867	ProxI

The SYSLIN Procedure

Three-Stage Least Squares Estimation

Cross Model Covariance

	PERSONAL	EDUCATIO	EMPLOYME
PERSONAL	55.694	0.69945	105.283
EDUCATIO	0.699	1.05527	-8.700
EMPLOYME	105.283	-8.70021	458.265

Cross Model Correlation

	PERSONAL	EDUCATIO	EMPLOYME
PERSONAL	1.00000	0.09124	0.65902
EDUCATIO	0.09124	1.00000	-0.39563
EMPLOYME	0.65902	-0.39563	1.00000

Cross Model Inverse Correlation

	PERSONAL	EDUCATIO	EMPLOYME
PERSONAL	2.38762	-0.99630	-1.96766
EDUCATIO	-0.99630	1.60131	1.29011
EMPLOYME	-1.96766	1.29011	2.80713

Cross Model Inverse Covariance

	PERSONAL	EDUCATIO	EMPLOYME
PERSONAL	0.042870	-0.12996	-.012317
EDUCATIO	-.129959	1.51743	0.058666
EMPLOYME	-.012317	0.05867	0.006126

System Weighted MSE	0.9946
Degrees of freedom	282
System Weighted R-Square	0.9415

Model	PERSONAL
Dependent Variable	CPI
Label	CPI

The SYSLIN Procedure

Three-Stage Least Squares Estimation

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Intercept	1	72.41316	26.50882	2.73	0.0075	Intercept
Cjob	1	0.085133	0.425483	0.20	0.8418	Cjob
Cedu	1	-0.24083	1.171825	-0.21	0.8376	Cedu
IPI	1	-5.61E-6	4.092E-6	-1.37	0.1733	IPI
CAW	1	0.367793	0.219644	1.67	0.0974	CAW
Wet	1	-1.72641	2.406437	-0.72	0.4749	Wet
Moist	1	-1.71893	2.658075	-0.65	0.5194	Moist
Limited	1	0.138600	3.873323	0.04	0.9715	Limited
B2	1	-4.51877	4.271027	-1.06	0.2928	B2
B3	1	-4.55013	7.472621	-0.61	0.5441	B3
B4	1	-3.23501	7.079462	-0.46	0.6488	B4
B5	1	-5.78936	6.799490	-0.85	0.3967	B5
B6	1	-4.94837	4.230060	-1.17	0.2450	B6
B7	1	-7.72331	4.370250	-1.77	0.0804	B7
B8	1	-5.82067	4.527074	-1.29	0.2017	B8
B9	1	-7.40429	4.598899	-1.61	0.1107	B9
Edu	1	-0.48547	0.255471	-1.90	0.0605	Edu
Pov	1	-0.41850	0.392103	-1.07	0.2886	Pov
BC	1	-2.09468	2.320836	-0.90	0.3691	BC
PubU	1	0.592741	4.348633	0.14	0.8919	PubU
PrivU	1	0.014856	2.157142	0.01	0.9945	PrivU
Coll	1	0.416016	1.886512	0.22	0.8259	Coll
Wat	1	0.393234	0.595899	0.66	0.5109	Wat
AE	1	0.007666	0.006052	1.27	0.2084	AE
AcFs	1	0.001878	0.002068	0.91	0.3660	AcFs
ProxI	1	0.065228	2.205323	0.03	0.9765	ProxI

Model	EDUCATIO
Dependent Variable	Cedu
Label	Cedu

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Intercept	1	13.84912	4.055189	3.42	0.0009	Intercept
CPI	1	-0.05811	0.103287	-0.56	0.5751	CPI
Cjob	1	0.083283	0.070125	1.19	0.2380	Cjob
CAW	1	-0.02386	0.040791	-0.58	0.5601	CAW
Iedu	1	-1.78068	0.044372	-40.13	<.0001	Iedu
Wet	1	0.336996	0.327151	1.03	0.3056	Wet
Moist	1	-0.17093	0.458508	-0.37	0.7101	Moist

The SYSLIN Procedure

Three-Stage Least Squares Estimation

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Limited	1	0.219849	0.359031	0.61	0.5418	Limited
B2	1	0.222744	0.583777	0.38	0.7037	B2
B3	1	1.281611	0.994148	1.29	0.2005	B3
B4	1	1.273316	0.938783	1.36	0.1782	B4
B5	1	0.531767	0.941221	0.56	0.5734	B5
B6	1	-0.03170	0.573655	-0.06	0.9561	B6
B7	1	-0.16387	0.592985	-0.28	0.7829	B7
B8	1	0.161298	0.615569	0.26	0.7939	B8
B9	1	0.490878	0.631353	0.78	0.4388	B9
Edu	1	1.571409	0.052808	29.76	<.0001	Edu
Pov	1	0.037605	0.036112	1.04	0.3004	Pov
BC	1	-0.02279	0.305279	-0.07	0.9407	BC
PubU	1	-0.05397	0.572221	-0.09	0.9251	PubU
PrivU	1	0.014097	0.286646	0.05	0.9609	PrivU
Coll	1	-0.24655	0.272244	-0.91	0.3675	Coll
Wat	1	0.011725	0.077739	0.15	0.8804	Wat
AE	1	-0.00047	0.000671	-0.71	0.4818	AE
AcFs	1	0.000140	0.000102	1.37	0.1737	AcFs
ProxI	1	0.083695	0.247907	0.34	0.7364	ProxI

Model	EMPLOYME
Dependent Variable	Cjob
Label	Cjob

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
Intercept	1	51.43689	215.3849	0.24	0.8118	Intercept
CPI	1	-0.97968	5.596041	-0.18	0.8614	CPI
Cedu	1	-3.07376	6.793865	-0.45	0.6520	Cedu
Ijob	1	-0.00044	0.001509	-0.29	0.7722	Ijob
CAW	1	0.852077	2.719247	0.31	0.7547	CAW
Wet	1	-5.05690	14.82502	-0.34	0.7338	Wet
Moist	1	-2.27594	15.21103	-0.15	0.8814	Moist
Limited	1	-5.10589	15.93194	-0.32	0.7493	Limited
B2	1	-1.67146	12.23339	-0.14	0.8916	B2
B3	1	-9.18234	21.24979	-0.43	0.6666	B3
B4	1	-9.06963	20.15347	-0.45	0.6537	B4
B5	1	-9.92150	19.49096	-0.51	0.6119	B5
B6	1	-6.09932	12.10180	-0.50	0.6154	B6
B7	1	-6.39868	12.50618	-0.51	0.6101	B7

The SYSLIN Procedure

Three-Stage Least Squares Estimation

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Variable Label
B8	1	-7.56249	12.96215	-0.58	0.5610	B8
B9	1	-7.59837	13.16715	-0.58	0.5653	B9
Edu	1	0.072885	0.732334	0.10	0.9209	Edu
Pov	1	0.775785	1.225925	0.63	0.5284	Pov
BC	1	-6.45717	19.42627	-0.33	0.7403	BC
PubU	1	-6.37407	25.08822	-0.25	0.8000	PubU
PrivU	1	-4.40083	9.263087	-0.48	0.6358	PrivU
Coll	1	1.095116	5.481588	0.20	0.8421	Coll
Wat	1	-0.46764	1.617005	-0.29	0.7731	Wat
AE	1	0.021224	0.061895	0.34	0.7324	AE
AcFs	1	0.002650	0.012425	0.21	0.8316	AcFs
ProxI	1	2.962012	6.422573	0.46	0.6457	ProxI

BIBLIOGRAPHY

Achana, Fancis T. and Joseph T. O'Leary. "The Transboundary Relationship Between National Parks and Adjacent Communities" Nation Parks and Rural Development: Practice and Policy in the Unites States. G. E. Machlis and D. R. Field, 67-87, Washington D. C. Island Press

Curtis, Wayne C. "Shift-Share Analysis as a Technique in Rural Development Research." *America Journal of Agricultural Economics*, Vol. 54 No. 2

Deller, Steve, Dave Marcouiller, and Ron Shaffer. *Community Economics Linking Theory and Practice.* Second Edition. Blackwell Publishing.2004

Florida, Richard. *The Rise of the Creative Class and how it's transforming work, leisure, community, and everyday life.* Basic Books, May 2000

Florida, Richard and Gary Gates. "Technology and Tolerance: The Importance of Diversity to High-Technology Growth." *The City as an Entertainment Machine Research in Urban Policy*, Vol. 9 pp 199-219 2003

Freshwater, David. Local Development and the Roles of Community. Her Majesty The Queen in Right of Canada. 2004

Freshwater, David, Timothy Wojan and Stephan Goetz. The Effectiveness of Rural Development Policies In The United States. in *European Agriculture Facing the 21-st Century* European Agricultural Economics Association, Warsaw, Poland 1999.

Furnas, J.C. *The Life and Times of the Late Demon Rum*. New York: G.P. Putnam's Sons, 1965, p.20

Greene, William H. *Econometric Analysis*. New Jersey: Prentice Hall, 2003

Johnson, Kenneth M. and Calvin L. Beale. "Nonmetro Recreation Counties, Their Identification and Rapid Growth." *Rural America* Vol. 14 Issue 4 Winter 2002

Keith, John, Christopher Fawson, and Tsangyao Chang. "Recreation as an Economic Development Strategy: Some Evidence From Utah." Journal of Leisure Research 1996. 28(2): 96-107

Lender, Mark E. and James K. Martin. Drinking in America. New York: Free Press, 1982, p.33.

McGranahan, David A. "Natural Amenities Drive Rural Population Change." Agricultural Ceonomic Report 781, October 1999, Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. Washington D.C.

McLean, Terri Dar. "Back to the Future: Once-Vibrant Grape, Wine Industries Making a Comeback. *The Ag Magazine*. Spring 2006 University of Kentucky

Reeder, Richard J. and Dennis M. Brown."Recreation, Tourism, and Rural Well-being" *Economic Research Service, U.S. Department of Agriculture, Summary Report*. August 2005

Royce, James E. *Alcohol Problems: A Comprehensive Survey*. New York: Free Press, 1981, p. 38.

Tachau, Mary K. Baonsteel. "The Whiskey Rebellion in Kentucky: A Forgotten Episode of Civil Disobedience" *Journal of the Early Republic*. 1982 Univeristy of Pennsylvania Press

Vita

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February 20, 2009