EMPIRICAL ANALYSIS OF DESCENDANT INSURANCE AS A DRIVER OF DEMOGRAPHIC TRANSITION

By:

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B.A., Eastern Illinois University, 2011

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Submitted in Partial Fulfillment of the Requirements for the

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ABSTRACT

This research explores the concept of descendant insurance and its efficiency as a calculated estimate of a country's fertility rates based on the infant or child mortality rates of the same country. A database of 191 countries was used to evaluate the concept by nation. The results suggest that descendant insurance plays a significant roll in decreasing total fertility rates. Prediction strength for many countries can be increased greatly by incorporating time lags into the model. Adding a lag component produced strong results for predicting fertility rates in countries where many previous studies have failed to find significant fertility trends. The results of the analysis provide further evidence for the argument that preventing infant and child deaths is a driving factor for decreasing fertility rates.

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CHAPTER 1
INTRODUCTION

"Child survival is probabilistic, but the unpredictability in family formation and completed family size has been neglected in the fertility literature" Leslie and Winterhalder (2002). This analysis takes the next step in closing that gap by quantifying the relationship between child survival and fertility. Tremendous advances in agriculture and health care technology have enabled human population to grow, but continued growth may not be sustainable. This research identifies a relationship between child mortality rates and fertility rates and suggests that continued declines in child mortality rates could lead to population peaking and beginning to decline in the coming decades.

1.1 Problem Statement

The purpose of this research is to analyze the empirical data on national Total Fertility Rates (TFR), Infant Mortality Rates (IMR), Child Mortality Rates (CMR), and their relationship to population growth. An extensive literature review and an analysis of world population data are conducted to identify the relationship between child mortality and fertility in the context of the demographic transition.

1.2 Research Questions

In an attempt to increase the understanding of the drivers of population growth, there are three questions that this investigation seeks to answer:

1. How does descendant insurance integrate with demographic theory and how is it quantified?

2. Does descendant insurance help explain 20th Century fertility decline?
3. Is there a specific mortality age, time lag, or level of descendent insurance that optimizes the predictive efficiency of total fertility rates?

1.3 Justification

Descendant insurance is the hypothesis that expects high child mortality to be reciprocated by high fertility rates in order to obtain a high probability of a surviving child. This principle is applied to help answer and essential demographic question: what are the main causes of fertility decline? (Mason 1997).

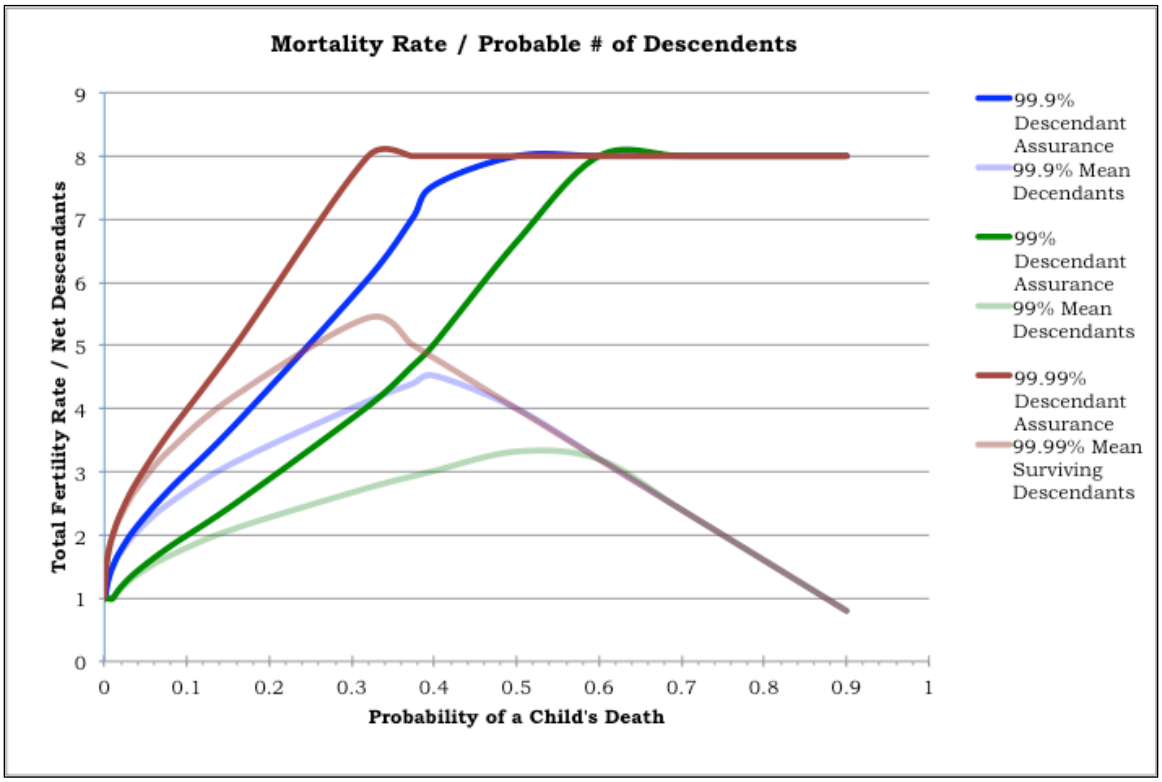

Figure 1.1 Fertility rate and Probable number of descendants.
The lighter color of each insurance rate is the number of net mean descendants expected.

As captured in Figure 1, descendant insurance is a demographic theory that hypothesizes that human fertility behavior is guided by the desire to maintain one's genetic

line by having at least one surviving child. What appears to be overlooked in the demographic literature is that this principle has enormous implications for understanding changing human demographics over time and space.

The basic mathematics is quite simple. The number of children one must have to assure a survivor depends upon the child mortality rate and the level of insurance to be achieved. In the simplest example, if the probability of a child's death is 0%, only one child is required to achieve a 100% probability of a surviving child. Such behavior would lead to population reductions of 50% in each generation. If the probability of each child's death is 50%, however, 8 children are needed to reach a 99.6% probability of a surviving child. Yet with half these children surviving, the net mean descendants expected is 4, leading to rapid population growth with population doubling every generation. Yet if 75% of children perish with a maximum TFR of 8, mean net descendants is 2 and population is stable. As stark as this sounds, it may characterize the demographics of many pre-modern societies, given that world population barely increased from ancient times until well into the second millennium C.E.

Figure 1 quantifies these relationships where the predicted total fertility rate is the lesser of 8 or:

$$\text{Log (1 - Descendant insurance \%) / Log (child mortality rate)}$$

If descendant insurance fertility behavior holds, and the maximum achievable total fertility rate (TFR) for a country is 8, then as child mortality rates fall from 60%, a rate common in pre-modern times, the mean net descendants at first climb. For insurance levels of 99%,

99.9% and 99.99% mean net descendants peak at about 3.3, 4.5 and 5.4 when child mortality falls to about 50%, 37% and 32%, respectively. Thus rapid population growth in a country should be associated with the period of time in which child mortality rates are declining through this range. As child mortality continues to fall, the associated descendant insurance fertility declines more than compensate and the number of mean net descendants decreases. At a child survival rate of around 98% (CMR of 2%), varying slightly with the insurance rate assumed, descendant insurance fertility reaches the equilibrium level of 2. Yet as CMR falls further, as it has in the late 20th to early 21st century in most affluent countries, the expected level of fertility continues to drop below 2 toward the asymptote at 1. Thus the descendant insurance hypothesis also helps to explain the empirical phenomenon of TFR's continuing to fall in Eurasian countries that have achieved very low levels of child mortality in recent decades.

Yet we would expect there to be a time lag of years to decades between the achievement of lower mortality and a fertility response. This lag could be due simply to the time it takes infants to grow to an age where mortality rates are at their lowest, or due to the time it takes for perceptions and social expectations about child mortality to shift, or for complex social adjustments to smaller families to work through a culture.

For this thesis, extensive demographic data on fertility and mortality were acquired for 182 counties from 1960-2012, thus spanning a half-century of demographic transition, a range in total fertility rates from 1.2 to 9.2, and a range in infant mortality rates from 1.7 to 269.2 per thousand live births. Through this dataset, the quantitative relationship between infant/child mortality and fertility will be explored through the lens of population insurance.

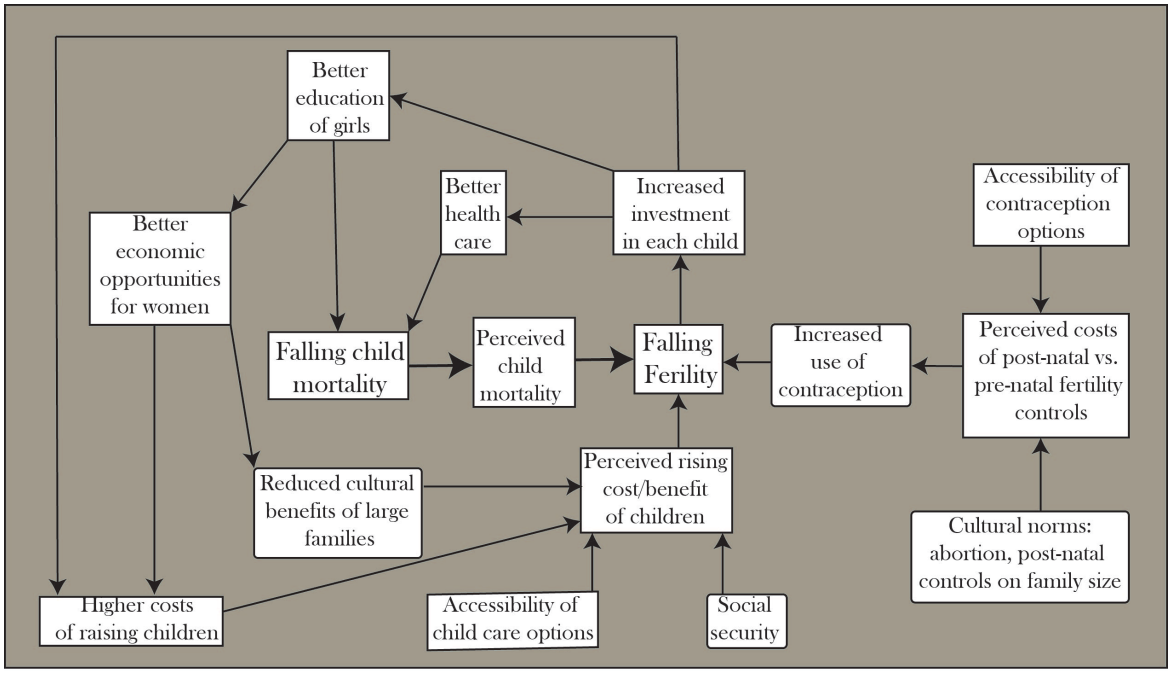

Figure 1.2. Falling fertility as a positive feedback system.

As the concept of descendant insurance is explored using the two key variables of child mortality and fertility rates, it is important to recognize that there are exogeneous variables that influence the two main variables. Several examples of variables that influence infant mortality and total fertility include: education, economic opportunities of women, and improved healthcare. Figure 1.2 shows a simplified version of how this very complex system functions. Within this positive feedback loop many variables are difficult to quantify. Infant mortality rates and total fertility rates provide the most readily accessible data and are both essential variables in a demographic transition.

CHAPTER 2

LITERATURE REVIEW

The review of previously published findings and discussion of demographic changes and their determinants, as well as conditions of fertility and child mortality are important to this preliminary study for two reasons. The first is to find to what extent this study has been explored previously. The second is to gain an understanding of the influential problems or variables that should be taken into account.

It should be noted that the proposed analysis of descendant insurance does not aim to discredit previous findings that concern the detailed intricacies of the relationship that infant and child mortality have on fertility. The aggregate of these studies shows that the relationship is very complex and that multiple drivers are often present. This applies to both child mortality and total fertility as both variables have a list of reasonably strong influences (Kirk 1996). Due to the complexity of influences on the total fertility rate, this thesis uses the infant mortality rate as a proxy indicator. This literature review is partial and is intended to give a general background. Additionally, there are variations between countries, cultures, and levels of development that increase the difficulty of extricating the results of the analysis (Mason 1997). Ultimately, the only cause and effect relation that is evaluated by this study is between infant and child mortality and total fertility, which is expected to produce an unbiased estimator of population trends.

2.1 Major Transition Theories

Mason (1997) provides the most comprehensive analysis of the history of demographic transition theories. The following descriptions of the six theories are a summarization of her comprehensive review:

1. Classic demographic transition theory was first pioneered by Thompson in 1930. Despite flaws, Mason gives it credit for being the theory that subsequent work builds upon. Classical transition theory is very simple and places socioeconomic conditions as the cause of demographic changes.
2. Economic modernization theory adds that, as societies modernize, individualism and secularization become increasingly important to the general society.
3. Wealth flows theory, outlined by Caldwell (1982), considers the cause for fertility decline as the increase of emotional ties within the family. This theory suggests that the societal change that produces lower fertility rates is when offspring begin to receive main focus of family wealth. Caldwell's wealth flows theory originates from his studies in Africa, where elders often enjoyed the majority of the benefits of high fertility.
4. Neoclassical microeconomic theory of fertility transition assumes that a family's fertility choice is determined by their income, the cost of children in comparison to other goods, and their relative value of children and other forms of consumption.
5. Easterlin's framework pioneered in 1975 adds a sociological variable to the microeconomic theory. The sociological variable points to three principles:

the relative supply of children or the number of children in absence of the ability to limit their number, the demand or the preferred family size, and the costs of contraception -- whether they are mental, social or monetary costs.

6. Ideational theory described by Cleland and Wilson in 1987, suggests that the fertility transition is dependent on the diffusion of new social perceptions of health and contraceptive possibilities. The rate of diffusion is determined by social networks, regional proximity to more developed nations or cultures, and other conditions that affect the acceptance of the new ideas.

Mason's (1997) analysis further describes each of the theories and their application on millennial, centennial, and decadal time scales. Beyond the historical analysis, Mason (1997) outlines four flaws in thinking of the six major transition theories described: assuming that there is one cause for all of the transitions, overlooking the role of mortality decline as a precondition of fertility transitions, assuming pre- and post- transitional fertility regulation is fundamentally different, and focusing on too small of a time scale (Mason 1997).

2.2 The Mortality and Fertility Relationship

Of the transition theories and effects on fertility, the most similar idea to the descendant insurance concept is the insurance effect, for which Mason (1997) sources Lloyd and Ivanov (1988). The insurance effect is one of the topics in this research that has used qualitative exploration. Randall and Le Grand (2003) explored Senegal to find a conscious relationship between child mortality and fertility. Of the included interviews the most interesting response was from a woman of a rural region (Randall and LeGrand

2003): “Ah... in my experience, all the couples who have ten or twelve children, either one of the parents dies or some children die. Perhaps even if I had ten or twelve children, the same would have happened to me [lost two of her eight children]. But all that depends on God, it's He who decides. One may have just one child and he could die... all depends on God." This example provides an interesting insight into the conscious decision that manifests high fertility.

Randall and LeGrand (2003) note that in conducting their qualitative analysis, social pressures to respond in respect of religious values might have played a role in the response that might not have manifested in other interview conditions. Social stigma often surrounds contraception use, but there have been cases where widespread presence has reduced the taboo-nature of the practice (Brauner-Otto, Axinn, and Ghimire 2007).

Studies of fertility transition have outlined a very crucial factor as the onset of fertility decline (Cleland and Wilson 1987). The onset is a certain point in the fertility transition, around a ten percent decline, where the fertility rate is not expected to rise again thereafter (Metscher 2008). It is also warned that this predictor should not be applied to developing areas that contain drastic social and economic disparities like Sub-Saharan Africa (Caldwell, Orubuloye, and Caldwell 1992; Metscher 2008). The Ideational Theory agrees with the special case of Sub-Saharan Africa and admits that diffusion of information in that region is recognizably different (Cleland and Wilson 1987). As Sub-Saharan Africa is a very important region to the future of global population growth, further consideration and review of literature on the region will need to be conducted.

New ideas have explored transitions in greater detail since the original but have barely added to the ability to predict time of initiation and cause (Kirk 1996). This is most

likely due to the understanding that over time and at a national level, some variance between the rates of total fertility and child mortality have been recognized, but changes in family planning exercises explain some of these residuals (Lloyd and Ivanov 1988). If a country's government or religion has a strict population policy the results will produce an outlier in the data. There are other variables that affect the relationship, but overall, studies show that the child mortality rate and fertility rate relation can be expected (Metscher 2008).

Health models developed to evaluate health signals that surround the infant and child mortality relationship, explore the details of causes for infant and child mortality, availability of health services, and the effects of contraceptive availability. Availability of health services is sometimes harder to measure depending on the geographic characteristics of the region. Brauner-Otto, Axinn, and Ghimire (2007) studied Nepal, particularly its mountainous region, and the availability of health services. Conducting the analysis required alternative GIS measures to test spatial distribution.

It should also be noted in this section that there is some evidence of a feedback effect, that fertility patterns have an effect on child survival. Comprehensive studies of this relationship have been examined in World Fertility Surveys and Demographic Health Surveys (Palloni and Rafalimanana 1999). Evidence found in the European Fertility Project gave two examples of European countries that witnessed a decline in fertility prior to a decline in infant mortality (van de Walle 1986 as cited in Mason 1997). Within the Latin American micro-level study of the reverse effect, Palloni and Rafalimanana (1999) admit that the relationship of child mortality on fertility is fundamental to the overall understanding of demographic transitions.

A possible cause for the feedback of the central relationship between mortality and fertility is the rate of geographic diffusion in which perceptions of increased health and probability of child survival spread between nations. This is the central idea of the ideational theory described by Cleland and Wilson (1987). Montgomery (2000: 795) responds to the ideational theory by saying that "In the case of mortality decline in developing countries, however, there is good reason to believe that perceptions are likely to be diffused, are quite possibly biased upward in relation to the empirical risks, and are probably rather slow to adjust to declines in those risks." Adjusting to risks at different rates is the reason a lag component has been implemented to the methodology of this study. Another observation that may be inferred from Montgomery's expertise is that the insurance effect is proportionally stronger in developing countries. This idea is supported by a relatively recent study in Bangladesh that found evidence of insurance or hoarding effect, but also suggests that rapid fertility decline is doubtful for the particular nation (Hossain et al. 2007).

2.4 Socioeconomics and Demography

Economists and demographers have often debated the extent of reducing fertility as a driver of increased income per capita and to this day there remains no conclusive agreement (Ashraf, Weil, and Wilde 2013). The opposite of this relationship has not been found to be statistically significant beyond small-scale application, but increase of per capita income often receives credit for being part of the equation that reduces infant mortality rates. Recent evaluation of Brazil's national family health program found decreasing infant mortality rates to be associated with higher income (Macinko, Guanais,

and de Souza 2006). Similarly, a global analysis found income equality as an independent predictor of infant mortality rates for middle-income countries (Schell et al 2007).

Concerning for transition theories, economic causes for the explanation of transition theories were very dominant in earlier stages of thinking. Cleland and Wilson (1987) explain that the presence of economic explanations are due to the realistic plausibility that social changes are driven in large part by economic conditions of the society, but ultimately overlook many key concepts found in sociological theories. Kirk (1996) agrees that economic effects are over-dominant in the literature and adds that part of the prevalence of economic studies on demographic transition are due to the ability of data used in heavily quantitative economic evaluations.

2.5 Variance Compensation Hypothesis

The variance compensation hypothesis is a mostly parallel idea in comparison to the descendant insurance hypothesis. Leslie and Winterhalder (2002) produced the hypothesis that encompasses the unpredictability of child survival and adds a further weight to the equation of risk fertility behavior by assigning the value of the child. Similar to descendant insurance, it refutes the replacement theory outlined in Lloyd and Ivanov (1988), and builds on the idea of insurance effect. Placing the relationship of their study to previous research, Leslie and Winterhalder (2002) note that previous studies have associated unpredictability of child survival with higher fertility; the variance compensation hypothesis is different as it allows for the unpredictability of child survival to produce a positive or negative effect on fertility compensation depending on the specific circumstances. One of these circumstances might be the absence of birth control methods,

which implies that even if high-fertility rates are present, this does not translate directly to an increased value of children by parents (Cleland and Wilson 1987).

The background of the variance compensation hypothesis comes from a behavior ecology perspective. Leslie and Winterhalder (2002) point to this as the "theoretical plausibility" of their hypothesis. This seems to be sound logic from an environmental philosophy perspective because it considers the relationship of humans to the natural environment to be more equal than often considered. There is a long discussion of this dichotomy between humans and nature and this separation between man and nature is suggested to be a main cause of the anthropogenic degradation of the environment (Penn 2003). The variation compensation hypothesis is very well thought out and predates the idea of descendant insurance, but there are some differences between the two ideas. In relation to the variation compensation hypothesis and other similar studies, the descendant insurance idea will attempt to outline the timeframe in which the transition in fertility rates occurs, once child mortality decreases. Variation compensation hypothesis is also very difficult to quantify, because placing value on a child is not an easily quantifiable method, where as descendant insurance in its simplicity can be readily quantified.

CHAPTER 3

METHODOLOGY

As this research employs a conceptual approach to predicting decreases in fertility rates of a population, the methods used to explore the relationship of fertility and mortality have been examined by a variety of perspectives. Previous studies have used infant mortality rates, while other studies have used child mortality rates as an indicator. Lloyd and Ivanov (1988) used age 20 mortality rates. This section outlines the major methods explored to produce the results of the analysis.

The data used by this analysis was downloaded from The World Bank online world development indicators database. The database was organized by country and year with variables Infant Mortality Rate, Child Mortality Rate, Total Fertility Rate, and Population. From these variables the new variables were calculated for the variations of descendant insurance estimates. After organizing the downloaded database in Excel and eliminating countries with limited data, the final database consisted of 191 countries. The time period of available data ranged from 1960 to 2012. After using Excel for some preliminary testing, the database was then transferred into SPSS. All regression models and correlations were generated in SPSS.

3.1 Definitions

One important resource to include is the definitions of each variable. The general variables that will be used in the analysis are defined by the World Bank World Development Indicators.

Infant mortality rate (IMR)	"The probability that a new born baby will die before reaching the age of one."

Child mortality rate (CMR)	"The probability that a newborn baby will die before reaching the age of five."
Total Fertility Rate (TFR)	The average number of children a woman will have during her lifetime, by country or region
Descendant Insurance (DI)	The estimation of TFR based on the rate of infant or child mortality and a percentage of insurance to be survived by a descendant.

3.2. Methods used by Research Questions

3.2.1. Research Question One:

How does descendant insurance integrate with demographic theory and how is it quantified? Question one is answered in the Results Chapter using the findings of the Literature Review and the equation used to produce the numerical value of Descendant Insurance.

The logarithmic equation used to produce the descendant insurance estimation of TFR uses the annual IMR and CMR data by country. Three levels of insurance were tested: 99%, 99.9%, and 99.99%. The standard equation:

$$\text{Log (IMR/DI\%)} = \text{estimated fertility}$$

To give an example, if the IMR was 0.005 and the descendant insurance level is set to 99.99% the equation would be:

$$\text{Log (0.005/0.0001)} = 1.74 \text{ estimated fertility}$$

3.2.2. Research Question Two:

Does descendant insurance help explain 20th and 21st Century Century fertility decline? Question Two is answered by the accumulative results of the analysis and

supported by previous literature on the subject. Calculations to evaluate the decrease in fertility rates are completed using filters and analysis tools in IBM SPSS software.

3.2.3. Research Question Three:

Is there a specific mortality age, time lag, or level of descendant insurance that optimizes the predictive efficiency of total fertility rates? Question three uses both the main World Bank population database as well as the age specific database retrieved from the UN Population Division database.

3.3. Models

For all of the regression functions used in the models listed below, the dependent variable is the empirical total fertility rate for a given year and is represented by (y_i). The independent variable (x) and the variations of the variable are all a function of the value produced by the equation used for descendant insurance based on infant mortality rate.

The two models are evaluated in four different ways: no detrending, detrended, with a five-year moving average, and a detrended five-year moving average. The detrending was completed by regressing each of the variables against time. Detrending was necessary as most of the countries exhibited a trend of decreasing total fertility and infant mortality rates over the course of the available data. The five-year moving average analysis was analyzed to account for the different rates of change in perception of infant mortality by a parental unit.

3.3.1 Model 1

Model 1 is the most basic regression equation to evaluate the efficiency of the basic descendant insurance concept. The equation is structured as:

$$y_i = b_0 + b_1 \cdot x_i + e_i$$

3.3.2 Model 2

$$y_i = b_0 + b_2 \cdot x_i^{(t-10)} + e_i$$

Model 2 evaluates the function of a 10-year lag. It presumes that it takes 10 years for human adjustment to changes in infant mortality rates to result in changes of fertility.

CHAPTER 4

RESULTS

4.1 Global Aggregate Results

Table 4.1 shows the parameters of the entire database constructed for the analysis. Due to main focus of the study being on selected countries, it is described as the global aggregate.

Table 4.1 Global Aggregate Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Life expectancy at birth, total (years)	9430	19.5049	85.1634	62.297722	11.5380522
Total fertility rate	9430	1.0760	9.2230	4.288230	2.0449777
IMR Descendant insurance at 99.9%	8562	1.0832	5.2639	2.320091	.7427212
Valid N (listwise)	8363				

Table 4.2 Aggregate Correlation Comparison of Descendant Insurance Rates

		Fertility rate, total (births per woman)	IMR Based Insurance Fertility at 99.99%	IMR Based Insurance Fertility at 99.9%	CMR Based Insurance Fertility at 99.99%	CMR Based Insurance Fertility at 99.9%
Total Fertility Rate	Pearson Correlation	1	.851**	.851**	.830**	.830**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	9430	8363	8363	8363	8363
**. Correlation is significant at the 0.01 level (2-tailed).						

Table 4.2 shows the correlation results of the relationship between Total Fertility Rates and the different levels of infant and child based descendant insurance.

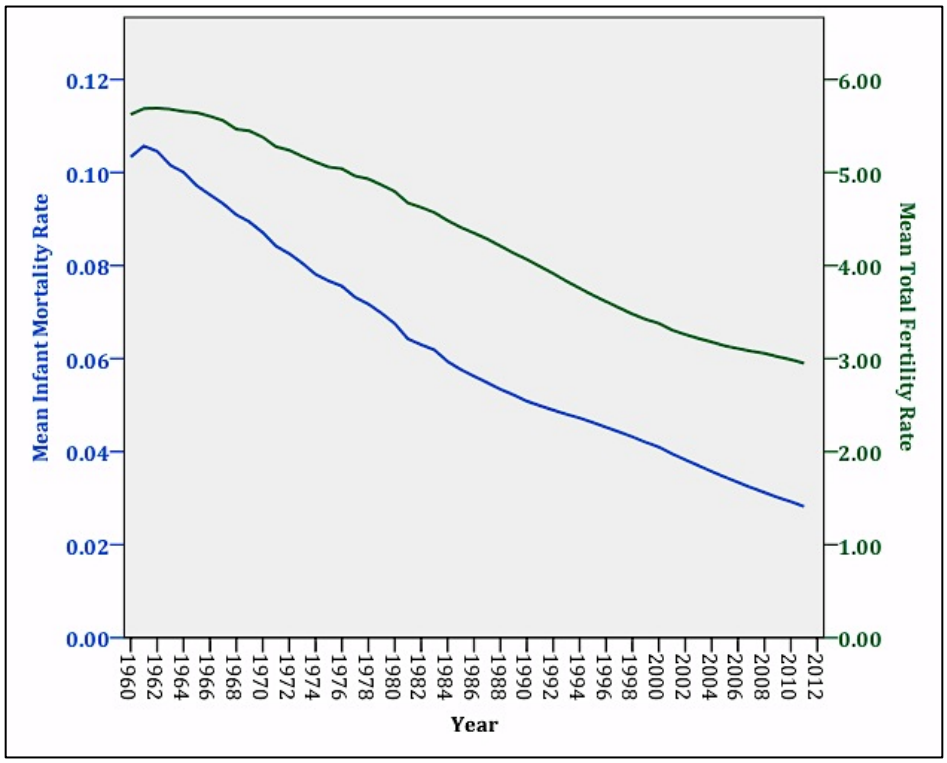

Figure 4.1 Timeline of the Global Mean of IMR and TFR

Figures 4.1 and shows the change in the major variables TFR and IMR; both show substantial decreases in the time period of available data.

Table 4.5. Correlation of Descendant Insurance and Empirical Total Fertility Rate. (Ordered by highest correlation)

Results with No Temporal Filters.

	Country Name	R	R^2	Std. Error
1	El Salvador	.999[a]	0.9974	0.0798
2	Ecuador	.998[a]	0.9958	0.0922
3	India	.998[a]	0.9968	0.0636
4	Albania	.997[a]	0.9934	0.0435
5	Panama	.994[a]	0.9876	0.1280
6	Grenada	.993[a]	0.9870	0.0862
7	Morocco	.992[a]	0.9839	0.2257
8	Belize	.991[a]	0.9824	0.1458
9	Macedonia,	.991[a]	0.9820	0.0525
10	Turkey	.991[a]	0.9822	0.1949
11	Colombia	.990[a]	0.9801	0.2131
12	Korea, Rep.	.990[a]	0.9794	0.2317

Results of Filter pre 1980 data.

	Country Name	R	R^2	Std. Error
1	Myanmar	.999a	0.9971	0.0204
2	Algeria	.998a	0.9969	0.0135
3	Mali	.998a	0.9967	0.0060
4	Sierra Leone	.998a	0.9962	0.0216
5	China	.997a	0.9949	0.0802
6	Congo, Dem. Rep.	.997a	0.9936	0.0108
7	Dominican	.997a	0.9936	0.0870
8	Kazakhstan	.997a	0.9942	0.0158
9	Liberia	.997a	0.9936	0.0161
10	Vanuatu	.997a	0.9949	0.0372
11	Cuba	.994a	0.9887	0.1089
12	Malaysia	.994a	0.9889	0.0887

Tabl

13	Qatar	.990[a]	0.9807	0.2244	13	Benin	.991a	0.9815	0.0331
14	Bolivia	.988[a]	0.9767	0.1720	14	El Salvador	.991a	0.9824	0.0730
15	Myanmar	.988[a]	0.9758	0.2243	15	Korea, Rep.	.990a	0.9794	0.1615
16	Bangladesh	.986[a]	0.9729	0.2923	16	Nicaragua	.990a	0.9792	0.0494
17	Ghana	.986[a]	0.9729	0.1733	17	Brazil	.989a	0.9788	0.1099
18	Egypt, Arab	.985[a]	0.9702	0.2215	18	Colombia	.989a	0.9782	0.1535
19	Samoa	.985[a]	0.9697	0.0752	19	Panama	.988a	0.9767	0.1029
20	Angola	.984[a]	0.9679	0.0584	20	Nigeria	.987a	0.9749	0.0293
21	Barbados	.984[a]	0.9679	0.1553	21	India	.986a	0.9713	0.0701
22	Bosnia	.984[a]	0.9681	0.0473	22	Barbados	.985a	0.9694	0.1505
23	Peru	.984[a]	0.9675	0.2804	23	Ecuador	.985a	0.9694	0.1171
24	Venezuela	.984[a]	0.9686	0.2411	24	New Zealand	.984a	0.9682	0.1316
25	Lebanon	.983[a]	0.9655	0.2562	25	Gambia	.983a	0.9663	0.0497
26	Mozambique	.983[a]	0.9665	0.0743	26	Singapore	.983a	0.9660	0.2489
27	Paraguay	.983[a]	0.9659	0.2043	27	Sri Lanka	.982a	0.9635	0.1347
28	Tonga	.983[a]	0.9654	0.1712	28	Turkey	.982a	0.9642	0.1175
29	Brazil	.982[a]	0.9638	0.2708	29	Venezuela, RB	.982a	0.9644	0.1715
30	Dominican	.981[a]	0.9620	0.3206	30	Burkina Faso	.981a	0.9618	0.0528
31	Chile	.979[a]	0.9577	0.2325	31	Guinea	.981a	0.9624	0.0279
32	Mexico	.979[a]	0.9589	0.3543	32	Chile	.978a	0.9573	0.2165
33	Portugal	.979[a]	0.9583	0.1379	33	Cameroon	.976a	0.9521	0.0653
34	Thailand	.977[a]	0.9551	0.3793	34	Netherlands	.976a	0.9519	0.1476
35	Vanuatu	.975[a]	0.9505	0.2385	35	St. Lucia	.975a	0.9511	0.1033
36	Malaysia	.974[a]	0.9487	0.2724	36	Tunisia	.975a	0.9497	0.1422
37	West Bank and	.974[a]	0.9493	0.1995	37	Morocco	.974a	0.9482	0.1171
38	Indonesia	.973[a]	0.9472	0.2963	38	Qatar	.971a	0.9432	0.0985
39	Brunei	.972[a]	0.9449	0.1662	39	Malawi	.970a	0.9402	0.0485
40	Jamaica	.972[a]	0.9442	0.2987	40	Lebanon	.969a	0.9383	0.1507
41	Nicaragua	.972[a]	0.9454	0.3886	41	Norway	.969a	0.9391	0.1185
42	South Sudan	.971[a]	0.9437	0.1384	42	Belgium	.966a	0.9330	0.1031
43	Trinidad and	.971[a]	0.9424	0.2517	43	Fiji	.964a	0.9290	0.2347
44	Uruguay	.970[a]	0.9410	0.0745	44	Togo	.964a	0.9297	0.0718
45	Vietnam	.970[a]	0.9407	0.4523	45	Luxembourg	.963a	0.9280	0.0997
46	Honduras	.964[a]	0.9290	0.4059	46	Ukraine	.962a	0.9251	0.0175
47	Lao PDR	.964[a]	0.9296	0.3300	47	Australia	.961a	0.9243	0.1533
48	Sri Lanka	.963[a]	0.9277	0.2895	48	Egypt, Arab Rep.	.961a	0.9232	0.1255
49	Algeria	.962[a]	0.9252	0.5869	49	Portugal	.961a	0.9241	0.0945
50	Tunisia	.959[a]	0.9206	0.5409	50	Denmark	.959a	0.9188	0.1123
51	Costa Rica	.957[a]	0.9158	0.3566	51	Tonga	.959a	0.9203	0.1887
52	Kiribati	.957[a]	0.9162	0.3415	52	Kyrgyz Republic	.955a	0.9123	0.0998
53	Montenegro	.957[a]	0.9152	0.0315	53	Kiribati	.952a	0.9057	0.3040
54	Sudan	.957[a]	0.9168	0.2222	54	Trinidad and	.952a	0.9055	0.2245
55	Comoros	.953[a]	0.9075	0.2662	55	France	.948a	0.8994	0.1273
56	Saudi Arabia	.953[a]	0.9080	0.5097	56	Peru	.947a	0.8962	0.2055
57	St. Vincent and	.953[a]	0.9091	0.3756	57	Iceland	.944a	0.8919	0.2086
58	Ireland	.951[a]	0.9046	0.2610	58	Thailand	.943a	0.8890	0.3301
59	Namibia	.951[a]	0.9053	0.3833	59	Switzerland	.942a	0.8868	0.1518
60	Turkmenistan	.947[a]	0.8965	0.3327	60	Canada	.937a	0.8784	0.2738
61	Philippines	.944[a]	0.8910	0.4156	61	Yemen, Rep.	.937a	0.8771	0.1946
62	Cuba	.942[a]	0.8869	0.3675	62	Austria	.936a	0.8766	0.1677
63	Fiji	.941[a]	0.8859	0.3400	63	Lesotho	.932a	0.8694	0.0249
64	Italy	.941[a]	0.8852	0.1820	64	Mozambique	.932a	0.8688	0.0138
65	Kuwait	.940[a]	0.8831	0.7090	65	United Arab	.932a	0.8691	0.1904
66	Uzbekistan	.937[a]	0.8776	0.3523	66	Cape Verde	.931a	0.8660	0.0733
67	Tajikistan	.935[a]	0.8751	0.3554	67	United States	.931a	0.8669	0.2516
68	St. Lucia	.934[a]	0.8732	0.4864	68	Paraguay	.929a	0.8623	0.2034

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69	Bahrain	.933[a]	0.8700	0.6317
70	Guinea-Bissau	.930[a]	0.8657	0.2047
71	Eritrea	.929[a]	0.8623	0.2050
72	Cape Verde	.928[a]	0.8619	0.5867
73	Slovak	.928[a]	0.8604	0.1596
74	Mauritania	.927[a]	0.8599	0.2545
75	Bahamas	.926[a]	0.8571	0.2168
76	Guatemala	.926[a]	0.8581	0.3082
77	Uganda	.926[a]	0.8566	0.1045
78	Bhutan	.924[a]	0.8531	0.6276
79	Papua New	.924[a]	0.8538	0.3128
80	Poland	.924[a]	0.8539	0.1885
81	Tanzania	.922[a]	0.8503	0.1956
82	Spain	.919[a]	0.8444	0.2856
83	Austria	.918[a]	0.8430	0.2014
84	Djibouti	.915[a]	0.8375	0.4440
85	Mongolia	.915[a]	0.8380	0.6408
86	Ethiopia	.913[a]	0.8340	0.3103
87	Nepal	.913[a]	0.8342	0.4516
88	Mauritius	.911[a]	0.8299	0.5824
89	Switzerland	.908[a]	0.8239	0.1684
90	Greece	.906[a]	0.8215	0.1994
91	Kyrgyz	.904[a]	0.8175	0.3293
92	Romania	.903[a]	0.8160	0.2795
93	Gabon	.902[a]	0.8140	0.2497
94	Singapore	.902[a]	0.8142	0.5476
95	China	.901[a]	0.8110	0.5151
96	Syrian Arab	.900[a]	0.8095	0.7523
97	Armenia	.898[a]	0.8064	0.1639
98	Cyprus	.898[a]	0.8060	0.1784
99	Suriname	.894[a]	0.7998	0.1640
100	Jordan	.886[a]	0.7857	0.8053
101	Croatia	.883[a]	0.7794	0.0909
102	United Arab	.880[a]	0.7752	0.8534
103	Canada	.878[a]	0.7713	0.3102
104	Iceland	.874[a]	0.7642	0.3156
105	Australia	.871[a]	0.7585	0.2722
106	Maldives	.867[a]	0.7518	0.9812
107	Madagascar	.865[a]	0.7476	0.4371
108	South Africa	.857[a]	0.7350	0.4947
109	Japan	.853[a]	0.7273	0.1573
110	Micronesia,	.852[a]	0.7262	0.4225
111	Haiti	.851[a]	0.7239	0.5082
112	Pakistan	.846[a]	0.7161	0.6207
113	Libya	.841[a]	0.7079	1.1963
114	Senegal	.835[a]	0.6973	0.4820
115	Argentina	.833[a]	0.6940	0.2245
116	Hungary	.832[a]	0.6925	0.1738
117	Malawi	.831[a]	0.6913	0.3778
118	Lithuania	.828[a]	0.6860	0.2103
119	Azerbaijan	.825[a]	0.6806	0.2639
120	Liberia	.821[a]	0.6745	0.3392
121	Iran, Islamic	.820[a]	0.6716	1.1397
122	Czech Republic	.818[a]	0.6688	0.1941
123	Malta	.817[a]	0.6672	0.2841
124	France	.814[a]	0.6630	0.2293

69	Tanzania	.929a	0.8622	0.0159
70	Guatemala	.926a	0.8569	0.0474
71	Honduras	.918a	0.8433	0.1548
72	United Kingdom	.917a	0.8415	0.1841
73	Finland	.911a	0.8291	0.1837
74	Bahrain	.909a	0.8268	0.3544
75	Romania	.909a	0.8259	0.1506
76	Indonesia	.908a	0.8239	0.1718
77	Papua New	.906a	0.8203	0.0787
78	Sweden	.906a	0.8204	0.1203
79	St. Vincent and	.900a	0.8107	0.3398
80	Costa Rica	.899a	0.8088	0.4574
81	Nepal	.894a	0.7987	0.0344
82	Libya	.886a	0.7851	0.0695
83	Poland	.881a	0.7765	0.1128
84	Bolivia	.876a	0.7674	0.1827
85	Namibia	.873a	0.7616	0.0589
86	Moldova	.872a	0.7609	0.0196
87	Oman	.866a	0.7496	0.1892
88	Botswana	.863a	0.7455	0.0748
89	Comoros	.862a	0.7427	0.0158
90	Mexico	.861a	0.7406	0.3623
91	Italy	.856a	0.7331	0.1559
92	Philippines	.856a	0.7329	0.3350
93	Russian	.854a	0.7286	0.0278
94	Jamaica	.853a	0.7268	0.3924
95	Germany	.849a	0.7213	0.1898
96	Solomon Islands	.839a	0.7042	0.1858
97	Sudan	.829a	0.6870	0.0432
98	Argentina	.819a	0.6710	0.0771
99	Kuwait	.813a	0.6603	0.3798
100	Uganda	.813a	0.6616	0.0195
101	Congo, Rep.	.806a	0.6492	0.0850
102	Maldives	.805a	0.6475	0.0692
103	Rwanda	.794a	0.6312	0.0620
104	Central African	.791a	0.6257	0.0202
105	Malta	.771a	0.5942	0.3447
106	Guyana	.769a	0.5911	0.3466
107	Mauritania	.768a	0.5898	0.0751
108	Ireland	.763a	0.5828	0.1967
109	Kenya	.755a	0.5696	0.1393
110	Ghana	.754a	0.5691	0.0816
111	Mauritius	.754a	0.5687	0.8411
112	Afghanistan	.742a	0.5511	0.0005
113	Haiti	.723a	0.5227	0.1809
114	Senegal	.719a	0.5168	0.1222
115	Vietnam	.707a	0.5000	0.3318
116	Jordan	.676a	0.4571	0.1927
117	Sao Tome and	.644a	0.4143	0.0484
118	Ethiopia	.640a	0.4090	0.1154
119	Iran, Islamic Rep.	.622a	0.3870	0.1252
120	Syrian Arab	.604a	0.3651	0.1102
121	Bhutan	.602a	0.3619	0.0336
122	Spain	.589a	0.3466	0.1623
123	Zambia	.588a	0.3452	0.1117
124	Cote d'Ivoire	.587a	0.3446	0.1488

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125	New Zealand	.810[a]	0.6560	0.4113
126	Moldova	.805[a]	0.6473	0.2838
127	Equatorial	.797[a]	0.6346	0.1558
128	Guyana	.797[a]	0.6345	0.7316
129	Israel	.794[a]	0.6303	0.1345
130	United	.785[a]	0.6155	0.2518
131	Belgium	.772[a]	0.5958	0.2363
132	Rwanda	.770[a]	0.5933	0.8304
133	Netherlands	.769[a]	0.5915	0.3666
134	Norway	.765[a]	0.5848	0.2769
135	Iraq	.758[a]	0.5751	0.6636
136	Kenya	.757[a]	0.5735	0.8894
137	Togo	.751[a]	0.5643	0.5833
138	Bulgaria	.742[a]	0.5511	0.2674
139	Cote d'Ivoire	.737[a]	0.5431	0.7776
140	Ukraine	.736[a]	0.5413	0.2500
141	Germany	.710[a]	0.5047	0.1699
142	Central African	.708[a]	0.5007	0.2869
143	Slovenia	.708[a]	0.5008	0.1616
144	Denmark	.700[a]	0.4903	0.2480
145	Botswana	.694[a]	0.4811	1.0823
146	United States	.690[a]	0.4762	0.3570
147	Cambodia	.688[a]	0.4730	0.8654
148	Congo, Rep.	.675[a]	0.4559	0.3690
149	Lesotho	.672[a]	0.4515	0.6765
150	Guinea	.663[a]	0.4399	0.3187
151	Finland	.653[a]	0.4263	0.2338
152	Oman	.649[a]	0.4218	1.5510
153	Russian	.647[a]	0.4180	0.2657
154	Zimbabwe	.646[a]	0.4176	1.1489
155	Estonia	.644[a]	0.4151	0.2729
156	Benin	.643[a]	0.4138	0.4513
157	Belarus	.640[a]	0.4097	0.2735
158	Kazakhstan	.620[a]	0.3847	0.4045
159	Congo, Dem.	.609[a]	0.3708	0.2928
160	Sweden	.607[a]	0.3683	0.2008
161	Solomon	.584[a]	0.3407	0.8158
162	Swaziland	.542[a]	0.2934	1.0539
163	Luxembourg	.530[a]	0.2804	0.2171
164	Zambia	.526[a]	0.2771	0.5111
165	Sierra Leone	.524[a]	0.2742	0.5300
166	Burundi	.514[a]	0.2644	0.3018
167	Afghanistan	.483[a]	0.2334	0.4999
168	Sao Tome and	.480[a]	0.2300	0.7457
169	Timor-Leste	.479[a]	0.2299	0.6201
170	Nigeria	.452[a]	0.2039	0.2436
171	Latvia	.427[a]	0.1819	0.3476
172	Chad	.348[a]	0.1211	0.2822
173	Yemen, Rep.	.346[a]	0.1199	1.3235
174	Georgia	.273[a]	0.0747	0.2045
175	Cameroon	.231[a]	0.0534	0.4952
176	Burkina Faso	.175[a]	0.0307	0.3680
177	Korea, Dem.	.139[a]	0.0194	0.1831
178	Antigua and	.131[a]	0.0172	0.0835
179	Mali	.117[a]	0.0137	0.1141
180	Gambia	.105[a]	0.0109	0.2134
181	Niger	.084[a]	0.0071	0.1290
182	Somalia	.016[a]	0.0003	0.2653

125	Eritrea	.570a	0.3246	0.0137
126	Niger	.454a	0.2064	0.1192
127	Burundi	.453a	0.2050	0.1457
128	Hungary	.397a	0.1579	0.1439
129	Bangladesh	.337a	0.1133	0.1552
130	Japan	.332a	0.1106	0.1597
131	Zimbabwe	.314a	0.0988	0.0953
132	Iraq	.313a	0.0978	0.3346
133	Pakistan	.307a	0.0940	0.0172
134	Uruguay	.299a	0.0896	0.0670
135	Lithuania	.252a	0.0637	0.1131
136	Swaziland	.198a	0.0393	0.0658
137	Bahamas	.090a	0.0081	0.2493
138	Madagascar	.059a	0.0034	0.2647
139	Bulgaria	.036a	0.0013	0.0907
140	Greece	.031a	0.0010	0.1041
	a. Predictors: (Constant), IMR Based Insurance Fertility at 99.9% * Countries with less than 10 years of data were eliminated			

Table 4.5 shows the how changing the scope of the data results in higher correlations for countries that have already completed a demographic transition. United States for example went from .690 in the unfiltered results to .932 limiting to 1980.

Table 4.6 Comparing Model Regression Analysis Results

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Afghanistan	1	.421[a]	.177	.156	.0634033
	2	.511[b]	.261	.223	.0608297
Albania	1	.998[a]	.996	.996	.0197930
	2	1.000[b]	.999	.999	.0107503
Algeria	1	.947[a]	.896	.894	.6154487
	2	.949[b]	.900	.895	.6120011
Angola	1	.904[a]	.817	.808	.0644755
	2	.991[b]	.982	.980	.0206112
Antigua and Barbuda	1	.924[a]	.853	.840	.0392302
	2	.991[b]	.981	.978	.0146440
Argentina	1	.747[a]	.558	.545	.1961160
	2	.755[b]	.570	.542	.1966714
Armenia	1	.833[a]	.694	.681	.1852909
	2	.901[b]	.813	.797	.1479033
Australia	1	.898[a]	.807	.802	.2572175
	2	.952[b]	.906	.902	.1815494
Austria	1	.931[a]	.867	.864	.1929108
	2	.974[b]	.949	.946	.1209675
Azerbaijan	1	.916[a]	.839	.831	.1813344
	2	.967[b]	.934	.927	.1191334
Bahamas	1	.907[a]	.822	.817	.1980586
	2	.952[b]	.906	.900	.1464923
Bahrain	1	.925[a]	.855	.851	.6029974
	2	.954[b]	.910	.905	.4813315
Bangladesh	1	.977[a]	.955	.954	.3065647
	2	.977[b]	.955	.953	.3100634
Barbados	1	.983[a]	.965	.965	.1707288
	2	.994[b]	.987	.987	.1041177
Belarus	1	.714[a]	.509	.486	.2547859
	2	.984[b]	.969	.966	.0656097
Belgium	1	.889[a]	.790	.785	.1867237
	2	.904[b]	.818	.809	.1762916
Belize	1	.995[a]	.991	.990	.0867948
	2	.996[b]	.992	.991	.0816773
Benin	1	.235[a]	.055	.032	.3358929
	2	.839[b]	.704	.689	.1903079
Bhutan	1	.883[a]	.780	.773	.5414615
	2	.911[b]	.829	.819	.4842317

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Bolivia	1	.980[a]	.960	.959	.1824267
	2	.982[b]	.965	.963	.1743438
Bosnia and Herzegovina	1	.989[a]	.978	.977	.0327679
	2	.992[b]	.984	.983	.0285931
Botswana	1	.689[a]	.475	.462	.8873689
	2	.716[b]	.512	.488	.8657163
Brazil	1	.988[a]	.976	.975	.2053299
	2	.995[b]	.989	.989	.1393626
Brunei Darussalam	1	.953[a]	.908	.903	.1797568
	2	.964[b]	.930	.922	.1615925
Bulgaria	1	.696[a]	.485	.471	.2840404
	2	.822[b]	.676	.658	.2283896
Burkina Faso	1	.588[a]	.345	.329	.2228077
	2	.644[b]	.415	.386	.2132117
Burundi	1	.117[a]	.014	-.010	.1846852
	2	.297[b]	.088	.043	.1797735
Cambodia	1	.301[a]	.091	.056	.8369399
	2	.990[b]	.980	.979	.1259927
Cameroon	1	.352[a]	.124	.102	.3457394
	2	.666[b]	.444	.416	.2788322
Canada	1	.882[a]	.779	.773	.3245443
	2	.984[b]	.968	.966	.1255265
Cape Verde	1	.909[a]	.826	.820	.4788132
	2	.982[b]	.964	.961	.2222855
Central African Republic	1	.538[a]	.290	.272	.1584559
	2	.905[b]	.820	.811	.0808170
Chad	1	.964[a]	.929	.927	.0801104
	2	.995[b]	.990	.989	.0311081
Chile	1	.974[a]	.948	.946	.2535672
	2	.987[b]	.975	.974	.1773733
China	1	.977[a]	.954	.952	.2588453
	2	.977[b]	.955	.952	.2597781
Colombia	1	.991[a]	.981	.981	.2011648
	2	.997[b]	.994	.994	.1134218
Comoros	1	.931[a]	.867	.863	.3018933
	2	.986[b]	.972	.970	.1408496
Congo, Dem. Rep.	1	.954[a]	.910	.907	.1134267
	2	.966[b]	.932	.928	.0999136
Congo, Rep.	1	.625[a]	.391	.376	.3645099
	2	.710[b]	.504	.479	.3330842
Costa Rica	1	.954[a]	.910	.908	.3381994
	2	.986[b]	.973	.971	.1881153
Cote d'Ivoire	1	.642[a]	.412	.397	.7159847
	2	.674[b]	.454	.426	.6985324
Croatia	1	.912[a]	.833	.824	.0808137
	2	.914[b]	.835	.818	.0823429

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Cuba	1	.954[a]	.910	.907	.3402272
	2	.954[b]	.911	.906	.3432115
Cyprus	1	.766[a]	.587	.568	.1895793
	2	.890[b]	.792	.772	.1377715
Czech Republic	1	.973[a]	.946	.943	.0870601
	2	.975[b]	.950	.944	.0862095
Denmark	1	.814[a]	.662	.654	.2223687
	2	.844[b]	.713	.698	.2075609
Djibouti	1	.838[a]	.702	.690	.4264388
	2	.996[b]	.992	.991	.0723895
Dominican Republic	1	.986[a]	.973	.972	.2607537
	2	.997[b]	.994	.994	.1228251
Ecuador	1	.997[a]	.995	.995	.0935244
	2	.998[b]	.995	.995	.0920602
Egypt, Arab Rep.	1	.977[a]	.955	.954	.2328111
	2	.978[b]	.956	.953	.2352503
El Salvador	1	.998[a]	.997	.997	.0751378
	2	.999[b]	.998	.997	.0661285
Equatorial Guinea	1	.289[a]	.083	.035	.0630814
	2	.663[b]	.440	.377	.0506709
Eritrea	1	.943[a]	.890	.887	.0846882
	2	.987[b]	.975	.973	.0410529
Estonia	1	.861[a]	.741	.728	.2069849
	2	.885[b]	.783	.761	.1941491
Ethiopia	1	.671[a]	.451	.435	.2206640
	2	.949[b]	.900	.894	.0955702
Fiji	1	.922[a]	.850	.847	.3716432
	2	.962[b]	.926	.922	.2646380
Finland	1	.743[a]	.552	.541	.2275872
	2	.767[b]	.588	.567	.2209222
France	1	.906[a]	.821	.817	.1822889
	2	.912[b]	.833	.824	.1785741
Gabon	1	.792[a]	.627	.611	.2708567
	2	.977[b]	.955	.951	.0960228
Gambia	1	.256[a]	.065	.043	.2019853
	2	.915[b]	.837	.829	.0854154
Georgia	1	.022[a]	.000	-.076	.2494442
	2	.988[b]	.976	.973	.0398462
Germany	1	.735[a]	.540	.526	.1808183
	2	.932[b]	.868	.860	.0984673
Ghana	1	.976[a]	.952	.951	.1836711
	2	.987[b]	.975	.973	.1354270
Greece	1	.915[a]	.836	.832	.1927299
	2	.964[b]	.930	.926	.1279686
Grenada	1	.990[a]	.981	.979	.0926891
	2	.992[b]	.984	.982	.0865226

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Guatemala	1	.930[a]	.864	.861	.2053257
	2	.991[b]	.982	.981	.0752671
Guinea	1	.105[a]	.011	-.014	.2347887
	2	.790[b]	.624	.604	.1466815
Guinea-Bissau	1	.753[a]	.566	.549	.2134684
	2	.885[b]	.783	.765	.1540298
Guyana	1	.849[a]	.721	.714	.6658256
	2	.949[b]	.901	.896	.4010237
Haiti	1	.800[a]	.640	.632	.3834322
	2	.825[b]	.680	.664	.3660906
Honduras	1	.958[a]	.918	.916	.3561176
	2	.983[b]	.967	.965	.2280186
Hungary	1	.726[a]	.527	.516	.1832025
	2	.792[b]	.628	.609	.1646434
Iceland	1	.914[a]	.836	.832	.2766142
	2	.931[b]	.867	.860	.2520704
India	1	.997[a]	.995	.995	.0686355
	2	.998[b]	.996	.995	.0640753
Indonesia	1	.971[a]	.943	.942	.2917083
	2	.992[b]	.984	.984	.1542224
Iran, Islamic Rep.	1	.741[a]	.550	.536	1.1200195
	2	.995[b]	.990	.989	.1713558
Iraq	1	.689[a]	.475	.462	.5667051
	2	.710[b]	.505	.480	.5571445
Ireland	1	.956[a]	.914	.912	.2469566
	2	.961[b]	.923	.920	.2364847
Israel	1	.878[a]	.771	.762	.1172608
	2	.878[b]	.772	.754	.1192630
Italy	1	.964[a]	.929	.927	.1500638
	2	.976[b]	.953	.950	.1239362
Jamaica	1	.967[a]	.936	.934	.3090766
	2	.968[b]	.937	.933	.3114804
Japan	1	.806[a]	.650	.642	.1648130
	2	.863[b]	.744	.731	.1426887
Jordan	1	.849[a]	.721	.714	.7716680
	2	.932[b]	.868	.862	.5363836
Kazakhstan	1	.863[a]	.745	.737	.2804763
	2	.976[b]	.952	.949	.1237349
Kenya	1	.664[a]	.441	.428	.8966214
	2	.719[b]	.517	.493	.8437178
Kiribati	1	.934[a]	.872	.869	.3601198
	2	.938[b]	.880	.874	.3529108
Korea, Dem. Rep.	1	.766[a]	.586	.561	.1265454
	2	.950[b]	.902	.889	.0635743
Korea, Rep.	1	.990[a]	.980	.979	.2269061
	2	.990[b]	.980	.979	.2268793

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Kuwait	1	.926[a]	.857	.854	.7811321
	2	.961[b]	.924	.920	.5765133
Kyrgyz Republic	1	.929[a]	.863	.858	.2703500
	2	.970[b]	.942	.938	.1793958
Lao PDR	1	.908[a]	.825	.817	.3611777
	2	.976[b]	.952	.947	.1936354
Latvia	1	.138[a]	.019	-.026	.4055329
	2	.967[b]	.935	.929	.1068638
Lebanon	1	.984[a]	.969	.968	.2094914
	2	.992[b]	.985	.984	.1472735
Lesotho	1	.765[a]	.585	.575	.4029147
	2	.803[b]	.645	.628	.3772599
Liberia	1	.408[a]	.166	.146	.3284931
	2	.929[b]	.864	.857	.1345451
Libya	1	.775[a]	.600	.591	1.1982410
	2	.882[b]	.778	.767	.9037321
Lithuania	1	.841[a]	.707	.699	.1815933
	2	.918[b]	.843	.833	.1349942
Luxembourg	1	.575[a]	.331	.313	.2312014
	2	.849[b]	.720	.704	.1516372
Macedonia, FYR	1	.991[a]	.983	.982	.0404553
	2	.991[b]	.983	.981	.0414181
Madagascar	1	.650[a]	.422	.406	.4884448
	2	.916[b]	.839	.830	.2614181
Malawi	1	.607[a]	.369	.352	.3942697
	2	.929[b]	.862	.854	.1868456
Malaysia	1	.976[a]	.953	.952	.2213193
	2	.983[b]	.965	.964	.1916758
Maldives	1	.770[a]	.592	.581	.9225162
	2	.953[b]	.909	.904	.4426438
Mali	1	.533[a]	.284	.266	.0970415
	2	.797[b]	.636	.618	.0700632
Malta	1	.742[a]	.551	.540	.3005399
	2	.763[b]	.582	.561	.2935623
Mauritania	1	.918[a]	.843	.839	.2019096
	2	.921[b]	.848	.840	.2014702
Mauritius	1	.893[a]	.797	.792	.6357997
	2	.984[b]	.969	.967	.2524622
Mexico	1	.977[a]	.955	.954	.3487821
	2	.980[b]	.961	.959	.3275190
Micronesia, Fed. Sts.	1	.795[a]	.632	.614	.3737170
	2	.872[b]	.761	.736	.3088546
Moldova	1	.612[a]	.374	.353	.3110817
	2	.956[b]	.915	.909	.1167857
Mongolia	1	.988[a]	.977	.976	.2429663
	2	.999[b]	.997	.997	.0894762

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Montenegro	1	.985[a]	.971	.969	.0168527
	2	.996[b]	.993	.992	.0087215
Morocco	1	.991[a]	.982	.981	.2129388
	2	.996[b]	.993	.992	.1348874
Mozambique	1	.982[a]	.965	.964	.0552927
	2	.997[b]	.995	.994	.0217425
Myanmar	1	.991[a]	.982	.982	.1721432
	2	.998[b]	.997	.997	.0728760
Namibia	1	.951[a]	.904	.901	.3006737
	2	.973[b]	.946	.943	.2281628
Nepal	1	.915[a]	.837	.833	.2704800
	2	.968[b]	.938	.934	.1694059
Netherlands	1	.857[a]	.734	.727	.3227320
	2	.869[b]	.755	.743	.3131237
New Zealand	1	.854[a]	.729	.722	.3890341
	2	.906[b]	.820	.811	.3210194
Nicaragua	1	.964[a]	.930	.928	.3617352
	2	.970[b]	.942	.939	.3340343
Niger	1	.203[a]	.041	.013	.1393763
	2	.687[b]	.472	.440	.1049754
Nigeria	1	.033[a]	.001	-.025	.2290696
	2	.830[b]	.689	.673	.1294728
Norway	1	.841[a]	.707	.700	.2514553
	2	.856[b]	.732	.719	.2432494
Oman	1	.498[a]	.248	.229	1.2855052
	2	.901[b]	.811	.801	.6525768
Pakistan	1	.762[a]	.580	.570	.4805194
	2	.893[b]	.797	.787	.3381520
Panama	1	.996[a]	.992	.992	.1014604
	2	.999[b]	.997	.997	.0578605
Papua New Guinea	1	.911[a]	.831	.826	.2849617
	2	.914[b]	.835	.826	.2850058
Paraguay	1	.969[a]	.938	.937	.2232156
	2	.980[b]	.960	.958	.1819715
Peru	1	.986[a]	.973	.972	.2317859
	2	.998[b]	.996	.996	.0921799
Philippines	1	.918[a]	.842	.839	.4486732
	2	.976[b]	.952	.949	.2512036
Poland	1	.886[a]	.785	.780	.1922872
	2	.900[b]	.811	.801	.1826024
Portugal	1	.976[a]	.953	.952	.1431655
	2	.978[b]	.957	.954	.1400859
Qatar	1	.988[a]	.977	.976	.2076743
	2	.989[b]	.979	.977	.2019123
Romania	1	.911[a]	.830	.825	.2616292
	2	.959[b]	.919	.914	.1833928

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Russian Federation	1	.679[a]	.461	.443	.2598480
	2	.946[b]	.895	.888	.1165970
Rwanda	1	.399[a]	.159	.139	.8758263
	2	.864[b]	.747	.734	.4863561
Samoa	1	.994[a]	.988	.988	.0455553
	2	1.000[b]	.999	.999	.0116164
Sao Tome and Principe	1	.313[a]	.098	.073	.6805230
	2	.962[b]	.926	.922	.1977083
Saudi Arabia	1	.933[a]	.870	.866	.4530499
	2	.937[b]	.879	.870	.4456027
Senegal	1	.707[a]	.499	.487	.4581672
	2	.712[b]	.507	.482	.4604879
Sierra Leone	1	.068[a]	.005	-.020	.3909398
	2	.885[b]	.782	.772	.1850545
Singapore	1	.898[a]	.806	.801	.5704277
	2	.908[b]	.824	.815	.5498273
Slovak Republic	1	.957[a]	.916	.912	.1205942
	2	.957[b]	.917	.908	.1231159
Slovenia	1	.978[a]	.956	.954	.0534019
	2	.983[b]	.967	.963	.0476202
Solomon Islands	1	.502[a]	.252	.233	.6951531
	2	.729[b]	.532	.509	.5564979
Somalia	1	.973[a]	.946	.943	.0524920
	2	.976[b]	.952	.947	.0507013
South Africa	1	.863[a]	.745	.736	.4397208
	2	.903[b]	.816	.802	.3808257
South Sudan	1	.957[a]	.916	.912	.0844048
	2	.994[b]	.988	.987	.0321422
Spain	1	.915[a]	.837	.833	.2985986
	2	.933[b]	.870	.864	.2697005
Sri Lanka	1	.977[a]	.955	.954	.2304243
	2	.995[b]	.989	.989	.1143479
St. Lucia	1	.949[a]	.901	.898	.3894786
	2	.957[b]	.916	.911	.3648976
St. Vincent and the Grenadines	1	.962[a]	.925	.922	.3300237
	2	.986[b]	.972	.970	.2059090
Sudan	1	.889[a]	.791	.786	.2396558
	2	.990[b]	.979	.978	.0762425
Suriname	1	.837[a]	.701	.685	.1911949
	2	.885[b]	.783	.759	.1671187
Swaziland	1	.550[a]	.303	.286	.7987419
	2	.567[b]	.322	.288	.7978085
Sweden	1	.739[a]	.546	.535	.1857773
	2	.878[b]	.770	.759	.1338353
Switzerland	1	.919[a]	.845	.841	.1656072
	2	.920[b]	.846	.838	.1672142

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Syrian Arab Republic	1	.863[a]	.744	.738	.7046062
	2	.961[b]	.923	.920	.3902804
Tajikistan	1	.934[a]	.872	.867	.3074498
	2	.981[b]	.962	.959	.1711504
Tanzania	1	.881[a]	.776	.770	.1946313
	2	.985[b]	.969	.968	.0728577
Thailand	1	.982[a]	.963	.963	.3343179
	2	.982[b]	.965	.963	.3315871
Timor-Leste	1	.925[a]	.856	.848	.2997954
	2	.941[b]	.885	.872	.2758141
Togo	1	.607[a]	.368	.353	.5377662
	2	.705[b]	.497	.471	.4859088
Tonga	1	.976[a]	.953	.951	.1876591
	2	.981[b]	.962	.960	.1706483
Trinidad and Tobago	1	.973[a]	.946	.945	.2334264
	2	.976[b]	.952	.949	.2232971
Tunisia	1	.946[a]	.894	.891	.5754540
	2	.948[b]	.898	.893	.5709427
Turkey	1	.994[a]	.988	.988	.1464923
	2	.995[b]	.989	.989	.1428581
Turkmenistan	1	.901[a]	.811	.803	.3770297
	2	.994[b]	.987	.986	.1002730
Uganda	1	.679[a]	.461	.448	.0615646
	2	.844[b]	.713	.698	.0455037
Ukraine	1	.699[a]	.488	.471	.2581670
	2	.973[b]	.947	.944	.0843690
United Arab Emirates	1	.887[a]	.787	.782	.6781549
	2	.943[b]	.889	.883	.4964468
United Kingdom	1	.854[a]	.729	.722	.2292279
	2	.951[b]	.904	.899	.1379497
United States	1	.731[a]	.534	.523	.3679048
	2	.923[b]	.852	.845	.2096316
Uruguay	1	.960[a]	.921	.919	.0701713
	2	.970[b]	.940	.937	.0617950
Uzbekistan	1	.916[a]	.840	.833	.3580447
	2	.990[b]	.980	.978	.1289264
Vanuatu	1	.995[a]	.990	.989	.0888751
	2	.995[b]	.990	.990	.0877384
Venezuela, RB	1	.984[a]	.968	.968	.2284804
	2	.998[b]	.996	.996	.0841652
Vietnam	1	.957[a]	.917	.915	.4803358
	2	.983[b]	.966	.964	.3104342
West Bank and Gaza	1	.939[a]	.881	.870	.1904536
	2	.991[b]	.982	.979	.0770628
Yemen, Rep.	1	.124[a]	.015	-.009	.8991276
	2	.136[b]	.019	-.032	.9091455

Table 4.6 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Zambia	1	.071[a]	.005	-.019	.5148045
	2	.728[b]	.531	.507	.3580152
Zimbabwe	1	.642[a]	.412	.398	1.0161028
	2	.656[b]	.431	.402	1.0121249

a. Predictors: IMR DI 99.99%
b. Predictors: Lag(10year)DI 99.99

Table 4.7 Comparing Model Regression Analysis Results - Detrended

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Afghanistan	1	.820[a]	.673	.665	.17036024
	2	.878[b]	.771	.759	.14437211
Albania	1	.421[a]	.178	.129	.16615031
	2	.718[b]	.516	.456	.13135296
Algeria	1	.464[a]	.215	.196	.57038074
	2	.866[b]	.750	.738	.32582692
Angola	1	.272[a]	.074	.030	.05302460
	2	.873[b]	.762	.738	.02756673
Antigua and Barbuda	1	.203[a]	.041	-.046	.26829804
	2	.675[b]	.455	.346	.21212236
Argentina	1	.382[a]	.146	.119	.14950299
	2	.863[b]	.744	.727	.08315227
Armenia	1	.368[a]	.135	.101	.21316869
	2	.497[b]	.247	.184	.20302571
Australia	1	.427[a]	.182	.162	.26846319
	2	.810[b]	.656	.639	.17626353
Austria	1	.639[a]	.409	.394	.18682636
	2	.786[b]	.618	.599	.15196733
Azerbaijan	1	.561[a]	.315	.278	.12749393
	2	.591[b]	.349	.277	.12764553
Bahamas	1	.582[a]	.339	.319	.08188614
	2	.850[b]	.722	.705	.05392116
Bahrain	1	.291[a]	.085	.063	.21274127
	2	.640[b]	.409	.380	.17305637
Bangladesh	1	.819[a]	.671	.663	.28994594
	2	.942[b]	.887	.881	.17189607
Barbados	1	.934[a]	.872	.869	.16699394
	2	.961[b]	.924	.920	.13044872
Belarus	1	.940[a]	.883	.877	.06832389
	2	.985[b]	.970	.967	.03531939
Belgium	1	.892[a]	.796	.791	.11437599
	2	.937[b]	.877	.871	.08975850
Belize	1	.924[a]	.854	.848	.08942603
	2	.924[b]	.854	.842	.09125059

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Benin	1	.757[a]	.574	.563	.25537214
	2	.873[b]	.762	.750	.19306194
Bhutan	1	.580[a]	.336	.316	.37427399
	2	.975[b]	.950	.947	.10410200
Bolivia	1	.544[a]	.296	.279	.13361282
	2	.684[b]	.468	.441	.11759652
Bosnia and Herzegovina	1	.719[a]	.517	.488	.06572500
	2	.977[b]	.955	.950	.02060135
Botswana	1	.758[a]	.575	.565	.26468049
	2	.957[b]	.916	.912	.11918492
Brazil	1	.482[a]	.232	.214	.19985551
	2	.602[b]	.363	.331	.18432525
Brunei Darussalam	1	.719[a]	.518	.492	.07063386
	2	.789[b]	.623	.581	.06419046
Bulgaria	1	.762[a]	.581	.570	.13189864
	2	.880[b]	.774	.762	.09808014
Burkina Faso	1	.634[a]	.401	.387	.24723636
	2	.671[b]	.450	.423	.23992100
Burundi	1	.094[a]	.009	-.015	.25533927
	2	.579[b]	.335	.302	.21175801
Cambodia	1	.903[a]	.816	.809	.22720911
	2	.963[b]	.927	.921	.14634267
Cameroon	1	.862[a]	.743	.736	.21366794
	2	.875[b]	.766	.754	.20647504
Canada	1	.722[a]	.521	.510	.29509396
	2	.820[b]	.673	.657	.24688671
Cape Verde	1	.566[a]	.321	.300	.20112149
	2	.958[b]	.919	.913	.07072660
Central African Republic	1	.717[a]	.514	.502	.12494430
	2	.939[b]	.881	.876	.06249522
Chad	1	.325[a]	.106	.078	.14338522
	2	.661[b]	.437	.400	.11561852
Chile	1	.836[a]	.698	.691	.25521989
	2	.895[b]	.801	.791	.20984473
China	1	.731[a]	.535	.520	.31292065
	2	.749[b]	.561	.533	.30870359
Colombia	1	.899[a]	.809	.804	.18446009
	2	.950[b]	.903	.898	.13317143
Comoros	1	.595[a]	.354	.333	.32129584
	2	.857[b]	.735	.717	.20918065
Congo, Dem. Rep.	1	.753[a]	.567	.553	.14999129
	2	.971[b]	.942	.938	.05571662
Congo, Rep.	1	.298[a]	.089	.067	.24562051
	2	.939[b]	.883	.877	.08925914

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Costa Rica	1	.488[a]	.238	.217	.36345259
	2	.822[b]	.676	.657	.24053524
Cote d'Ivoire	1	.927[a]	.860	.857	.16332433
	2	.982[b]	.964	.962	.08446330
Croatia	1	.565[a]	.319	.285	.08230355
	2	.572[b]	.327	.256	.08395437
Cuba	1	.908[a]	.824	.819	.23267272
	2	.964[b]	.928	.925	.15032947
Cyprus	1	.647[a]	.418	.392	.11602556
	2	.794[b]	.630	.595	.09473465
Czech Republic	1	.715[a]	.512	.487	.16883197
	2	.847[b]	.717	.687	.13185883
Denmark	1	.803[a]	.645	.636	.17296807
	2	.804[b]	.647	.629	.17464413
Djibouti	1	.511[a]	.261	.232	.27503193
	2	.719[b]	.517	.477	.22704179
Dominican Republic	1	.916[a]	.840	.836	.16414609
	2	.973[b]	.947	.944	.09554926
Ecuador	1	.908[a]	.824	.820	.08654787
	2	.921[b]	.848	.840	.08156112
Egypt, Arab Rep.	1	.189[a]	.036	.012	.17090927
	2	.732[b]	.536	.513	.12004054
El Salvador	1	.849[a]	.721	.714	.06223435
	2	.849[b]	.721	.707	.06299712
Equatorial Guinea	1	.504[a]	.254	.214	.05448385
	2	.767[b]	.588	.542	.04158582
Eritrea	1	.862[a]	.743	.735	.08173152
	2	.957[b]	.916	.910	.04756683
Estonia	1	.529[a]	.280	.245	.27239027
	2	.886[b]	.784	.763	.15278461
Ethiopia	1	.968[a]	.936	.935	.09082628
	2	.968[b]	.937	.933	.09172194
Fiji	1	.192[a]	.037	.013	.36428049
	2	.621[b]	.385	.355	.29457008
Finland	1	.803[a]	.645	.636	.16500248
	2	.874[b]	.764	.752	.13624949
France	1	.743[a]	.552	.541	.16393119
	2	.769[b]	.591	.570	.15864731
Gabon	1	.434[a]	.188	.153	.32390223
	2	.652[b]	.425	.373	.27876138
Gambia	1	.578[a]	.334	.318	.17716055
	2	.805[b]	.647	.630	.13049074
Georgia	1	.663[a]	.440	.397	.09477393
	2	.923[b]	.852	.827	.05071023

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Germany	1	.101[a]	.010	-.020	.19694897
	2	.718[b]	.515	.485	.13995065
Ghana	1	.876[a]	.768	.762	.14211771
	2	.892[b]	.796	.786	.13497459
Greece	1	.362[a]	.131	.110	.19846358
	2	.708[b]	.502	.477	.15220374
Grenada	1	.904[a]	.817	.806	.09426164
	2	.987[b]	.974	.971	.03663320
Guatemala	1	.882[a]	.777	.772	.10316700
	2	.966[b]	.933	.929	.05737043
Guinea	1	.942[a]	.887	.884	.09958612
	2	.949[b]	.900	.895	.09482018
Guinea-Bissau	1	.057[a]	.003	-.037	.29132797
	2	.893[b]	.798	.781	.13382482
Guyana	1	.773[a]	.598	.588	.33299360
	2	.832[b]	.692	.677	.29487068
Haiti	1	.776[a]	.602	.593	.25131986
	2	.784[b]	.614	.595	.25066199
Honduras	1	.759[a]	.576	.566	.13760737
	2	.880[b]	.774	.763	.10176497
Hungary	1	.062[a]	.004	-.020	.18611436
	2	.562[b]	.316	.282	.15613695
Iceland	1	.757[a]	.573	.562	.22710791
	2	.837[b]	.701	.686	.19241179
India	1	.509[a]	.259	.241	.06857770
	2	.709[b]	.503	.478	.05686257
Indonesia	1	.065[a]	.004	-.020	.27165785
	2	.543[b]	.295	.259	.23147434
Iran, Islamic Rep.	1	.620[a]	.385	.367	.58742708
	2	.845[b]	.714	.696	.40682875
Iraq	1	.878[a]	.770	.765	.19340495
	2	.905[b]	.819	.809	.17402447
Ireland	1	.411[a]	.169	.149	.25294688
	2	.748[b]	.559	.537	.18655736
Israel	1	.546[a]	.298	.272	.11543500
	2	.797[b]	.634	.606	.08490607
Italy	1	.756[a]	.571	.561	.15199830
	2	.831[b]	.691	.676	.13060510
Jamaica	1	.516[a]	.266	.248	.31271164
	2	.622[b]	.387	.356	.28939829
Japan	1	.350[a]	.122	.101	.11262617
	2	.520[b]	.270	.234	.10398682
Jordan	1	.846[a]	.715	.708	.24320897
	2	.966[b]	.932	.929	.12011665

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Kazakhstan	1	.730[a]	.533	.518	.15704659
	2	.895[b]	.801	.787	.10439616
Kenya	1	.835[a]	.696	.689	.20479152
	2	.985[b]	.971	.970	.06399129
Kiribati	1	.458[a]	.210	.189	.37321237
	2	.459[b]	.210	.168	.37812366
Korea, Dem. Rep.	1	.555[a]	.308	.265	.10078926
	2	.907[b]	.824	.800	.05257936
Korea, Rep.	1	.929[a]	.863	.859	.20582646
	2	.929[b]	.863	.856	.20836247
Kuwait	1	.375[a]	.141	.120	.70080639
	2	.577[b]	.333	.300	.62500651
Kyrgyz Republic	1	.448[a]	.201	.175	.21877677
	2	.649[b]	.422	.383	.18917948
Lao PDR	1	.058[a]	.003	-.040	.52695784
	2	.969[b]	.940	.934	.13239137
Latvia	1	.817[a]	.667	.652	.18336325
	2	.945[b]	.893	.883	.10652692
Lebanon	1	.772[a]	.595	.586	.04454011
	2	.805[b]	.649	.631	.04202555
Lesotho	1	.747[a]	.558	.547	.17572173
	2	.883[b]	.779	.768	.12577634
Liberia	1	.210[a]	.044	.021	.34974255
	2	.798[b]	.637	.619	.21817071
Libya	1	.801[a]	.642	.633	.51328463
	2	.925[b]	.855	.848	.33015309
Lithuania	1	.255[a]	.065	.038	.14327883
	2	.509[b]	.259	.214	.12950929
Luxembourg	1	.833[a]	.694	.685	.13580655
	2	.914[b]	.835	.825	.10119315
Macedonia, FYR	1	.510[a]	.260	.223	.04047508
	2	.856[b]	.733	.705	.02493890
Madagascar	1	.259[a]	.067	.041	.17337603
	2	.269[b]	.072	.019	.17536948
Malawi	1	.419[a]	.175	.153	.32282076
	2	.851[b]	.725	.709	.18908850
Malaysia	1	.478[a]	.229	.210	.25512552
	2	.753[b]	.566	.545	.19372432
Maldives	1	.867[a]	.751	.744	.39204038
	2	.867[b]	.751	.738	.39710292
Mali	1	.923[a]	.852	.848	.04432667
	2	.930[b]	.865	.858	.04285960
Malta	1	.287[a]	.083	.060	.30575942
	2	.465[b]	.216	.177	.28621020

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Mauritania	1	.910[a]	.829	.824	.05907068
	2	.935[b]	.874	.868	.05120282
Mauritius	1	.332[a]	.110	.088	.60914121
	2	.853[b]	.728	.714	.34097177
Mexico	1	.473[a]	.224	.205	.35019969
	2	.534[b]	.286	.250	.34020733
Micronesia, Fed. Sts.	1	.522[a]	.273	.236	.11379170
	2	.819[b]	.671	.637	.07847182
Moldova	1	.883[a]	.779	.772	.10363647
	2	.920[b]	.847	.836	.08777374
Mongolia	1	.695[a]	.483	.460	.42183240
	2	.798[b]	.637	.604	.36137848
Montenegro	1	.662[a]	.439	.406	.08419310
	2	.792[b]	.627	.580	.07078156
Morocco	1	.662[a]	.438	.424	.20447215
	2	.873[b]	.762	.750	.13477800
Mozambique	1	.735[a]	.541	.528	.06756553
	2	.977[b]	.955	.952	.02147534
Myanmar	1	.168[a]	.028	-.001	.26314002
	2	.699[b]	.489	.457	.19376375
Namibia	1	.302[a]	.091	.064	.34694801
	2	.688[b]	.474	.442	.26801934
Nepal	1	.696[a]	.484	.472	.25805722
	2	.899[b]	.808	.799	.15933676
Netherlands	1	.939[a]	.883	.880	.14007094
	2	.957[b]	.916	.912	.12009436
New Zealand	1	.086[a]	.007	-.017	.41349549
	2	.456[b]	.208	.168	.37399960
Nicaragua	1	.198[a]	.039	.016	.29096354
	2	.965[b]	.931	.927	.07917179
Niger	1	.711[a]	.506	.492	.06140719
	2	.964[b]	.929	.924	.02368436
Nigeria	1	.889[a]	.790	.785	.09894967
	2	.912[b]	.832	.823	.08966522
Norway	1	.523[a]	.273	.256	.25446087
	2	.546[b]	.298	.263	.25312340
Oman	1	.866[a]	.750	.743	.59318798
	2	.942[b]	.887	.882	.40281409
Pakistan	1	.546[a]	.298	.281	.39812490
	2	.711[b]	.505	.481	.33825779
Panama	1	.937[a]	.879	.876	.10126755
	2	.956[b]	.914	.909	.08653585
Papua New Guinea	1	.455[a]	.207	.188	.13074035
	2	.631[b]	.398	.368	.11537780

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Paraguay	1	.209[a]	.044	.020	.14779184
	2	.516[b]	.266	.229	.13109786
Peru	1	.689[a]	.474	.461	.13058864
	2	.788[b]	.621	.602	.11218240
Philippines	1	.748[a]	.560	.549	.10854829
	2	.779[b]	.607	.588	.10379956
Poland	1	.133[a]	.018	-.006	.18769645
	2	.287[b]	.082	.036	.18368433
Portugal	1	.710[a]	.504	.492	.14478075
	2	.735[b]	.540	.517	.14107480
Qatar	1	.666[a]	.443	.426	.20059155
	2	.715[b]	.511	.479	.19103456
Romania	1	.117[a]	.014	-.016	.33171877
	2	.224[b]	.050	-.009	.33055045
Russian Federation	1	.709[a]	.503	.486	.15843878
	2	.865[b]	.748	.731	.11468468
Rwanda	1	.124[a]	.015	-.009	.58718276
	2	.539[b]	.291	.255	.50462192
Samoa	1	.171[a]	.029	-.028	.08214467
	2	.991[b]	.983	.981	.01119497
Sao Tome and Principe	1	.284[a]	.081	.055	.26431541
	2	.904[b]	.817	.807	.11945588
Saudi Arabia	1	.017[a]	.000	-.034	.41663343
	2	.995[b]	.991	.990	.04049682
Senegal	1	.369[a]	.136	.115	.38983250
	2	.818[b]	.669	.652	.24433346
Sierra Leone	1	.932[a]	.869	.866	.15832191
	2	.989[b]	.979	.978	.06412942
Singapore	1	.738[a]	.545	.534	.47599582
	2	.826[b]	.682	.665	.40326946
Slovak Republic	1	.538[a]	.289	.253	.16033624
	2	.933[b]	.870	.856	.07037970
Slovenia	1	.921[a]	.848	.841	.03905164
	2	.959[b]	.919	.911	.02920614
Solomon Islands	1	.908[a]	.824	.820	.21262447
	2	.965[b]	.931	.927	.13526842
Somalia	1	.630[a]	.398	.366	.16049506
	2	.713[b]	.509	.454	.14885490
South Africa	1	.578[a]	.334	.310	.14109208
	2	.948[b]	.899	.892	.05593645
South Sudan	1	.445[a]	.198	.161	.11791504
	2	.747[b]	.558	.516	.08957311
Spain	1	.150[a]	.023	-.001	.28061048
	2	.459[b]	.211	.172	.25524161

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Sri Lanka	1	.549[a]	.302	.285	.25991903
	2	.778[b]	.606	.586	.19764401
St. Lucia	1	.822[a]	.676	.666	.09562987
	2	.847[b]	.718	.699	.09065990
St. Vincent and the Grenadines	1	.478[a]	.228	.204	.29531555
	2	.945[b]	.892	.885	.11207852
Sudan	1	.517[a]	.267	.249	.24079787
	2	.808[b]	.653	.636	.16766006
Suriname	1	.459[a]	.211	.169	.32647776
	2	.946[b]	.895	.883	.12247026
Swaziland	1	.849[a]	.722	.715	.24491170
	2	.975[b]	.950	.948	.10466455
Sweden	1	.811[a]	.657	.649	.12865875
	2	.825[b]	.680	.664	.12577396
Switzerland	1	.864[a]	.747	.740	.12270058
	2	.877[b]	.770	.758	.11835739
Syrian Arab Republic	1	.862[a]	.743	.736	.24989508
	2	.948[b]	.898	.893	.15941038
Tajikistan	1	.365[a]	.133	.103	.22255501
	2	.479[b]	.229	.174	.21358956
Tanzania	1	.103[a]	.011	-.013	.14574437
	2	.824[b]	.679	.663	.08399505
Thailand	1	.712[a]	.507	.495	.34237373
	2	.725[b]	.526	.502	.33985185
Timor-Leste	1	.659[a]	.435	.403	.55102973
	2	.915[b]	.838	.819	.30380480
Togo	1	.957[a]	.917	.915	.13871084
	2	.995[b]	.989	.989	.05067592
Tonga	1	.720[a]	.518	.505	.17723574
	2	.735[b]	.541	.516	.17524202
Trinidad and Tobago	1	.517[a]	.267	.250	.24603242
	2	.534[b]	.285	.250	.24599648
Tunisia	1	.117[a]	.014	-.011	.29754468
	2	.913[b]	.833	.824	.12404174
Turkey	1	.555[a]	.308	.291	.17058216
	2	.646[b]	.417	.388	.15847195
Turkmenistan	1	.707[a]	.499	.479	.12804085
	2	.794[b]	.631	.599	.11234020
Uganda	1	.778[a]	.606	.596	.08702195
	2	.791[b]	.626	.607	.08587414
Ukraine	1	.909[a]	.826	.820	.08934845
	2	.910[b]	.829	.817	.09018159
United Arab Emirates	1	.825[a]	.680	.672	.15863978
	2	.924[b]	.853	.846	.10883131

Table 4.7 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
United Kingdom	1	.394[a]	.156	.135	.24054126
	2	.655[b]	.429	.400	.20033366
United States	1	.668[a]	.446	.432	.31402837
	2	.856[b]	.733	.720	.22057940
Uruguay	1	.684[a]	.467	.454	.07349873
	2	.816[b]	.665	.649	.05899828
Uzbekistan	1	.281[a]	.079	.037	.18588522
	2	.606[b]	.368	.307	.15767832
Vanuatu	1	.243[a]	.059	.036	.08859267
	2	.857[b]	.735	.721	.04764706
Venezuela, RB	1	.651[a]	.424	.410	.22913696
	2	.819[b]	.671	.654	.17531263
Vietnam	1	.455[a]	.207	.188	.34653920
	2	.491[b]	.241	.203	.34330817
West Bank and Gaza	1	.274[a]	.075	-.009	.11990771
	2	.897[b]	.805	.766	.05774237
Yemen, Rep.	1	.991[a]	.983	.982	.13908074
	2	.991[b]	.983	.982	.14084720
Zambia	1	.548[a]	.300	.283	.20214303
	2	.672[b]	.452	.425	.18110329
Zimbabwe	1	.431[a]	.186	.166	.46539029
	2	.907[b]	.823	.814	.21975334

a. Predictors: (Constant), Unstandardized Residual of IMR DI 99.99%
b. Predictors: (Constant), Unstandardized Residual of IMR DI 99.99% with 10 year lag.
c. Dependent Variable: Unstandardized Residual of TFR
d. The unstandardized residual is calculated by regressing the variable against time.

Table 4.8 Five Year Moving Average Regression Results

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Afghanistan	1	.509[a]	.259	.239	.4795908
	2	.730[b]	.533	.506	.3863861
Albania	1	.995[a]	.990	.990	.0344307
	2	.998[b]	.997	.996	.0209072
Algeria	1	.947[a]	.898	.895	.6214441
	2	.993[b]	.987	.986	.2284811
Angola	1	.995[a]	.991	.990	.0255311
	2	.999[b]	.998	.998	.0106791
Antigua and Barbuda	1	1.000[a]	1.000	1.000	.0011606
	2	1.000[b]	1.000	.999	.0012385
Argentina	1	.977[a]	.955	.953	.0764525
	2	.980[b]	.960	.957	.0736372
Armenia	1	.899[a]	.809	.800	.1501196
	2	.986[b]	.972	.969	.0591829

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Australia	1	.749[a]	.561	.549	.1057688
	2	.910[b]	.829	.819	.0670180
Austria	1	.904[a]	.817	.812	.0683860
	2	.950[b]	.903	.898	.0504364
Azerbaijan	1	.632[a]	.400	.360	.1428867
	2	.632[b]	.400	.314	.1478941
Bahamas	1	.893[a]	.798	.791	.1916159
	2	.984[b]	.968	.966	.0771639
Bahrain	1	.986[a]	.973	.972	.1924533
	2	.987[b]	.974	.972	.1918218
Bangladesh	1	.994[a]	.988	.988	.1783829
	2	.999[b]	.998	.998	.0689033
Barbados	1	.971[a]	.942	.941	.0558831
	2	.971[b]	.942	.939	.0566171
Belarus	1	.190[a]	.036	-.021	.1481327
	2	.626[b]	.391	.315	.1213228
Belgium	1	.042[a]	.002	-.026	.1106489
	2	.335[b]	.112	.061	.1058365
Belize	1	.975[a]	.951	.949	.1390061
	2	1.000[b]	1.000	.999	.0139680
Benin	1	.934[a]	.873	.869	.2277215
	2	.951[b]	.905	.900	.1993785
Bhutan	1	.986[a]	.973	.972	.2508495
	2	.988[b]	.976	.974	.2405498
Bolivia	1	.994[a]	.988	.988	.0941034
	2	.996[b]	.991	.991	.0820171
Bosnia and Herzegovina	1	.932[a]	.868	.858	.0449921
	2	.932[b]	.869	.848	.0466289
Botswana	1	.483[a]	.233	.212	1.1922551
	2	.918[b]	.842	.833	.5483489
Brazil	1	.975[a]	.951	.950	.2019148
	2	.976[b]	.952	.949	.2039897
Brunei Darussalam	1	.988[a]	.975	.974	.0508285
	2	.990[b]	.980	.977	.0477575
Bulgaria	1	.712[a]	.508	.494	.2784119
	2	.921[b]	.848	.840	.1566803
Burkina Faso	1	.726[a]	.526	.513	.2624738
	2	.737[b]	.543	.517	.2615055
Burundi	1	.694[a]	.482	.467	.2683905
	2	.832[b]	.692	.675	.2097542
Cambodia	1	.792[a]	.627	.610	.6516925
	2	.963[b]	.927	.920	.2951131
Cameroon	1	.697[a]	.486	.472	.3989291
	2	.729[b]	.531	.504	.3864107
Canada	1	.801[a]	.641	.631	.0635124
	2	.801[b]	.642	.621	.0643433

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Cape Verde	1	.996[a]	.992	.992	.1144249
	2	.999[b]	.999	.999	.0427642
Central African Republic	1	.926[a]	.858	.854	.1529519
	2	.955[b]	.911	.906	.1224552
Chad	1	.362[a]	.131	.100	.2121350
	2	.890[b]	.791	.776	.1058531
Chile	1	.931[a]	.867	.863	.1559029
	2	.940[b]	.883	.876	.1482153
China	1	.743[a]	.551	.535	.3606851
	2	.852[b]	.727	.706	.2866648
Colombia	1	.999[a]	.997	.997	.0409289
	2	.999[b]	.998	.997	.0376819
Comoros	1	.950[a]	.903	.899	.1910503
	2	.989[b]	.979	.977	.0908126
Congo, Dem. Rep.	1	.084[a]	.007	-.028	.2916772
	2	.244[b]	.060	-.010	.2890611
Congo, Rep.	1	.656[a]	.431	.415	.3689900
	2	.976[b]	.952	.949	.1086716
Costa Rica	1	.950[a]	.903	.900	.2010732
	2	.953[b]	.908	.902	.1985740
Cote d'Ivoire	1	.891[a]	.793	.787	.5016645
	2	.939[b]	.882	.875	.3839202
Croatia	1	.416[a]	.173	.122	.0990325
	2	.727[b]	.529	.466	.0772386
Cuba	1	.870[a]	.756	.749	.2219468
	2	.957[b]	.916	.912	.1318013
Cyprus	1	.969[a]	.938	.935	.0812765
	2	.971[b]	.942	.935	.0808597
Czech Republic	1	.019[a]	.000	-.062	.1688035
	2	.945[b]	.892	.878	.0571919
Denmark	1	.387[a]	.150	.126	.1440015
	2	.519[b]	.269	.227	.1354231
Djibouti	1	.945[a]	.893	.888	.2996212
	2	.991[b]	.983	.981	.1239371
Dominican Republic	1	.981[a]	.963	.962	.1685794
	2	.993[b]	.986	.985	.1039906
Ecuador	1	.998[a]	.997	.997	.0521957
	2	.999[b]	.999	.999	.0302821
Egypt, Arab Rep.	1	.975[a]	.951	.950	.2252553
	2	.996[b]	.993	.992	.0890695
El Salvador	1	.998[a]	.996	.996	.0755656
	2	.999[b]	.997	.997	.0619958
Equatorial Guinea	1	.974[a]	.948	.945	.0583674
	2	.988[b]	.976	.972	.0414273
Eritrea	1	.947[a]	.897	.893	.1723917
	2	.998[b]	.995	.995	.0383467

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Estonia	1	.530[a]	.280	.238	.1235043
	2	.731[b]	.534	.476	.1024073
Ethiopia	1	.962[a]	.926	.923	.2209758
	2	.995[b]	.991	.990	.0799916
Fiji	1	.975[a]	.951	.950	.0996855
	2	.991[b]	.981	.980	.0626009
Finland	1	.736[a]	.542	.529	.0594185
	2	.773[b]	.597	.574	.0565089
France	1	.231[a]	.053	.027	.1228702
	2	.250[b]	.062	.009	.1240078
Gabon	1	.896[a]	.803	.793	.1760401
	2	.995[b]	.989	.988	.0419753
Gambia	1	.961[a]	.923	.921	.0543517
	2	.975[b]	.951	.949	.0437816
Georgia	1	.930[a]	.864	.849	.0349781
	2	.976[b]	.953	.941	.0218902
Germany	1	.348[a]	.121	.091	.0543771
	2	.485[b]	.236	.181	.0516150
Ghana	1	.996[a]	.993	.993	.0809463
	2	.998[b]	.995	.995	.0655254
Greece	1	.894[a]	.799	.793	.1840975
	2	.918[b]	.842	.833	.1655965
Grenada	1	.981[a]	.962	.959	.0473361
	2	.982[b]	.964	.958	.0479370
Guatemala	1	.958[a]	.918	.915	.2171076
	2	.998[b]	.995	.995	.0536654
Guinea	1	.862[a]	.743	.736	.2311788
	2	.899[b]	.807	.796	.2031611
Guinea-Bissau	1	.997[a]	.995	.995	.0388355
	2	1.000[b]	.999	.999	.0137916
Guyana	1	.613[a]	.376	.359	.6265855
	2	.647[b]	.419	.386	.6130612
Haiti	1	.887[a]	.787	.781	.4342863
	2	.908[b]	.825	.815	.3986206
Honduras	1	.994[a]	.987	.987	.1395227
	2	.998[b]	.996	.996	.0812306
Hungary	1	.947[a]	.898	.895	.1056708
	2	.951[b]	.905	.900	.1031667
Iceland	1	.734[a]	.539	.526	.1542103
	2	.786[b]	.618	.596	.1423840
India	1	.999[a]	.998	.998	.0354754
	2	1.000[b]	.999	.999	.0248342
Indonesia	1	.961[a]	.923	.921	.2673629
	2	.962[b]	.925	.921	.2672726
Iran, Islamic Rep.	1	.959[a]	.920	.917	.5356717
	2	.961[b]	.923	.918	.5336350

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Iraq	1	.959[a]	.920	.918	.2566517
	2	.960[b]	.922	.917	.2584064
Ireland	1	.929[a]	.863	.860	.2229899
	2	.931[b]	.867	.859	.2233282
Israel	1	.182[a]	.033	-.009	.0797025
	2	.680[b]	.462	.413	.0607797
Italy	1	.842[a]	.709	.701	.1784400
	2	.860[b]	.740	.725	.1709707
Jamaica	1	.972[a]	.944	.943	.1680655
	2	.991[b]	.982	.981	.0973474
Japan	1	.951[a]	.904	.902	.0731692
	2	.970[b]	.941	.938	.0580613
Jordan	1	.976[a]	.952	.951	.3356208
	2	.976[b]	.953	.950	.3396628
Kazakhstan	1	.314[a]	.098	.064	.4393113
	2	.941[b]	.886	.877	.1593224
Kenya	1	.608[a]	.369	.352	.9399776
	2	.920[b]	.847	.838	.4696251
Kiribati	1	.929[a]	.863	.859	.2578222
	2	.948[b]	.898	.892	.2253562
Korea, Dem. Rep.	1	.339[a]	.115	.041	.0120917
	2	.348[b]	.121	-.039	.0125853
Korea, Rep.	1	.967[a]	.936	.934	.2050347
	2	.971[b]	.942	.939	.1972047
Kuwait	1	.969[a]	.940	.938	.3762691
	2	.986[b]	.973	.972	.2552523
Kyrgyz Republic	1	.842[a]	.709	.699	.3436540
	2	.894[b]	.799	.783	.2913650
Lao PDR	1	.974[a]	.948	.946	.2357871
	2	.998[b]	.997	.997	.0595802
Latvia	1	.156[a]	.024	-.030	.1994047
	2	.598[b]	.358	.282	.1664618
Lebanon	1	.992[a]	.984	.984	.1225561
	2	.995[b]	.990	.990	.0974766
Lesotho	1	.475[a]	.225	.204	.7550579
	2	.916[b]	.839	.830	.3486264
Liberia	1	.932[a]	.868	.864	.2328451
	2	.951[b]	.905	.900	.1998184
Libya	1	.973[a]	.947	.945	.4931733
	2	.974[b]	.948	.945	.4953039
Lithuania	1	.791[a]	.625	.613	.2040565
	2	.816[b]	.665	.642	.1960594
Luxembourg	1	.646[a]	.417	.401	.0811390
	2	.659[b]	.434	.401	.0811247
Macedonia, FYR	1	.990[a]	.980	.979	.0313920
	2	.991[b]	.982	.979	.0312807

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Madagascar	1	.941[a]	.886	.882	.2158682
	2	.956[b]	.913	.908	.1909986
Malawi	1	.943[a]	.890	.886	.2366567
	2	.967[b]	.935	.931	.1848549
Malaysia	1	.916[a]	.839	.835	.2870539
	2	.946[b]	.895	.889	.2355043
Maldives	1	.930[a]	.865	.861	.7202180
	2	.938[b]	.879	.872	.6915160
Mali	1	.668[a]	.446	.430	.0818925
	2	.715[b]	.511	.483	.0780298
Malta	1	.640[a]	.410	.393	.2217066
	2	.721[b]	.519	.492	.2028826
Mauritania	1	.976[a]	.953	.951	.1293248
	2	.983[b]	.967	.965	.1094324
Mauritius	1	.956[a]	.914	.911	.1522342
	2	.958[b]	.917	.912	.1514249
Mexico	1	.966[a]	.934	.932	.3122534
	2	.977[b]	.954	.951	.2644110
Micronesia, Fed. Sts.	1	.968[a]	.937	.933	.1137601
	2	.980[b]	.961	.956	.0923843
Moldova	1	.779[a]	.606	.591	.2985995
	2	.978[b]	.957	.953	.1007201
Mongolia	1	.743[a]	.552	.528	.3923354
	2	.800[b]	.640	.600	.3612206
Montenegro	1	.995[a]	.990	.989	.0046708
	2	.995[b]	.990	.988	.0048597
Morocco	1	.992[a]	.984	.984	.1783171
	2	.992[b]	.984	.983	.1807600
Mozambique	1	.979[a]	.958	.957	.0749670
	2	.982[b]	.965	.963	.0696208
Myanmar	1	.972[a]	.944	.942	.2330002
	2	.986[b]	.971	.969	.1696988
Namibia	1	.930[a]	.864	.860	.3975779
	2	.990[b]	.981	.980	.1512936
Nepal	1	.957[a]	.917	.914	.3047707
	2	.987[b]	.973	.972	.1749208
Netherlands	1	.318[a]	.101	.076	.0990641
	2	.339[b]	.115	.064	.0997091
New Zealand	1	.486[a]	.236	.215	.1527743
	2	.590[b]	.348	.310	.1432239
Nicaragua	1	.983[a]	.966	.965	.2635821
	2	.996[b]	.992	.992	.1269754
Niger	1	.880[a]	.775	.768	.0332371
	2	.951[b]	.904	.897	.0221313
Nigeria	1	.816[a]	.665	.656	.1767400
	2	.896[b]	.804	.792	.1372761

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Norway	1	.041[a]	.002	-.026	.1226945
	2	.054[b]	.003	-.054	.1243622
Oman	1	.827[a]	.685	.676	1.2419363
	2	.984[b]	.968	.966	.4030654
Pakistan	1	.972[a]	.944	.942	.2766369
	2	.993[b]	.986	.985	.1395821
Panama	1	.983[a]	.966	.965	.1204039
	2	.984[b]	.968	.966	.1185303
Papua New Guinea	1	.991[a]	.982	.982	.0872094
	2	.991[b]	.982	.981	.0883683
Paraguay	1	.981[a]	.962	.961	.1588358
	2	.998[b]	.995	.995	.0580152
Peru	1	.976[a]	.952	.951	.2404742
	2	.976[b]	.952	.949	.2437732
Philippines	1	.964[a]	.929	.927	.2161374
	2	.965[b]	.931	.927	.2170191
Poland	1	.941[a]	.886	.883	.1485126
	2	.975[b]	.950	.948	.0993101
Portugal	1	.942[a]	.886	.883	.1447831
	2	.942[b]	.888	.881	.1460271
Qatar	1	.991[a]	.982	.981	.1413393
	2	.993[b]	.986	.985	.1257604
Romania	1	.746[a]	.556	.541	.3049887
	2	.861[b]	.741	.723	.2370338
Russian Federation	1	.516[a]	.266	.239	.3112487
	2	.922[b]	.850	.838	.1433778
Rwanda	1	.724[a]	.525	.512	.9132525
	2	.988[b]	.977	.976	.2032626
Samoa	1	.952[a]	.905	.898	.0294083
	2	.952[b]	.907	.891	.0303986
Sao Tome and Principe	1	.574[a]	.330	.309	.6149072
	2	.849[b]	.721	.703	.4032532
Saudi Arabia	1	.993[a]	.987	.986	.1552672
	2	1.000[b]	.999	.999	.0356774
Senegal	1	.911[a]	.830	.825	.3722529
	2	.974[b]	.948	.945	.2088020
Sierra Leone	1	.945[a]	.893	.890	.2201366
	2	.962[b]	.925	.921	.1866049
Singapore	1	.806[a]	.650	.640	.2008608
	2	.835[b]	.696	.679	.1898655
Slovak Republic	1	.667[a]	.444	.410	.1369812
	2	.673[b]	.453	.380	.1403820
Slovenia	1	.500[a]	.250	.203	.1042036
	2	.670[b]	.449	.376	.0922569
Solomon Islands	1	.876[a]	.768	.762	.4950711
	2	.974[b]	.949	.946	.2355593

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Somalia	1	.868[a]	.753	.736	.1401362
	2	.960[b]	.922	.910	.0817468
South Africa	1	.308[a]	.095	.056	.4926059
	2	.986[b]	.972	.969	.0891055
South Sudan	1	.994[a]	.988	.987	.0555526
	2	1.000[b]	1.000	1.000	.0056622
Spain	1	.900[a]	.811	.805	.2450045
	2	.909[b]	.826	.816	.2384704
Sri Lanka	1	.968[a]	.937	.935	.1458620
	2	.968[b]	.937	.934	.1479305
St. Lucia	1	.936[a]	.877	.872	.2741800
	2	.979[b]	.959	.955	.1617724
St. Vincent and the Grenadines	1	.803[a]	.644	.632	.3156904
	2	.975[b]	.951	.948	.1189946
Sudan	1	.990[a]	.980	.979	.1064148
	2	.993[b]	.986	.985	.0902962
Suriname	1	.853[a]	.727	.709	.0775946
	2	.882[b]	.779	.747	.0723000
Swaziland	1	.209[a]	.043	.017	1.1882347
	2	.900[b]	.809	.798	.5380695
Sweden	1	.008[a]	.000	-.028	.1799364
	2	.821[b]	.673	.655	.1043193
Switzerland	1	.741[a]	.549	.536	.0570234
	2	.843[b]	.710	.694	.0463191
Syrian Arab Republic	1	.986[a]	.972	.971	.2652209
	2	.987[b]	.974	.973	.2583946
Tajikistan	1	.875[a]	.765	.755	.3486161
	2	.933[b]	.871	.860	.2639627
Tanzania	1	.882[a]	.778	.772	.2173593
	2	.953[b]	.909	.904	.1412520
Thailand	1	.951[a]	.904	.901	.3220618
	2	.961[b]	.923	.919	.2918123
Timor-Leste	1	.707[a]	.500	.464	.4223872
	2	.735[b]	.540	.470	.4201567
Togo	1	.964[a]	.929	.927	.2474982
	2	.966[b]	.933	.929	.2442680
Tonga	1	.955[a]	.911	.909	.1713744
	2	.965[b]	.932	.928	.1523691
Trinidad and Tobago	1	.944[a]	.891	.888	.2228077
	2	.989[b]	.979	.978	.0992286
Tunisia	1	.978[a]	.957	.956	.3093267
	2	.994[b]	.988	.987	.1692411
Turkey	1	.982[a]	.964	.963	.1911354
	2	.984[b]	.968	.966	.1845155
Turkmenistan	1	.878[a]	.771	.759	.3305379
	2	.993[b]	.986	.985	.0828794

Table 4.8 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Uganda	1	.959[a]	.920	.917	.0781785
	2	.982[b]	.965	.963	.0521278
Ukraine	1	.591[a]	.349	.324	.2926026
	2	.977[b]	.954	.950	.0795602
United Arab Emirates	1	.917[a]	.840	.836	.5915815
	2	.982[b]	.964	.962	.2864136
United Kingdom	1	.195[a]	.038	.011	.0939659
	2	.388[b]	.151	.102	.0895465
United States	1	.831[a]	.690	.681	.0639874
	2	.890[b]	.792	.780	.0531537
Uruguay	1	.985[a]	.970	.969	.0490003
	2	.987[b]	.974	.973	.0458875
Uzbekistan	1	.812[a]	.660	.641	.3588507
	2	.955[b]	.911	.901	.1886231
Vanuatu	1	.945[a]	.892	.889	.2490094
	2	.980[b]	.960	.958	.1531165
Venezuela, RB	1	.998[a]	.996	.996	.0468692
	2	.998[b]	.996	.996	.0475304
Vietnam	1	.977[a]	.955	.954	.3200669
	2	.978[b]	.956	.954	.3191115
West Bank and Gaza	1	.972[a]	.944	.941	.2040416
	2	.974[b]	.948	.942	.2021939
Yemen, Rep.	1	.663[a]	.440	.425	1.1677224
	2	.825[b]	.681	.662	.8944882
Zambia	1	.369[a]	.136	.112	.5197569
	2	.426[b]	.181	.134	.5132193
Zimbabwe	1	.475[a]	.225	.204	1.2228277
	2	.908[b]	.825	.815	.5890809

a. Predictors: (Constant), IMR DI 99.99% (5 year moving average)
b. Predictors: (Constant), IMR DI 5 Year average 99.99%, Lag of 10 years
c. Dependent: Total Fertility Rate

Table 4.9 Detrended Five Year Moving Average Regression Results

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Afghanistan	1	.821[a]	.674	.665	.15532705
	2	.849[b]	.721	.705	.14575493
Albania	1	.816[a]	.667	.641	.08737420
	2	.999[b]	.998	.998	.00648363
Algeria	1	.345[a]	.119	.095	.52875536
	2	.936[b]	.876	.869	.20121941
Angola	1	.372[a]	.138	.088	.04099632
	2	.877[b]	.769	.740	.02190020

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Antigua and Barbuda	1	.825[a]	.681	.636	.11466931
	2	.981[b]	.962	.949	.04275021
Argentina	1	.345[a]	.119	.087	.11953913
	2	.828[b]	.685	.662	.07279160
Armenia	1	.237[a]	.056	.011	.20987478
	2	.668[b]	.446	.390	.16480477
Australia	1	.582[a]	.339	.320	.22122312
	2	.834[b]	.696	.678	.15219347
Austria	1	.628[a]	.395	.378	.18893520
	2	.860[b]	.739	.724	.12580601
Azerbaijan	1	.398[a]	.158	.102	.13425475
	2	.506[b]	.256	.150	.13060954
Bahamas	1	.628[a]	.394	.373	.07098598
	2	.863[b]	.745	.726	.04690488
Bahrain	1	.700[a]	.490	.476	.15065083
	2	.762[b]	.580	.556	.13860604
Bangladesh	1	.905[a]	.819	.813	.18139099
	2	.975[b]	.950	.947	.09638919
Barbados	1	.932[a]	.868	.864	.15851294
	2	.982[b]	.964	.962	.08431299
Belarus	1	.986[a]	.972	.971	.03484066
	2	.989[b]	.978	.975	.03224991
Belgium	1	.916[a]	.839	.835	.10052671
	2	.980[b]	.960	.957	.05099289
Belize	1	.879[a]	.773	.762	.08644302
	2	.908[b]	.824	.807	.07785967
Benin	1	.752[a]	.565	.553	.23364403
	2	.763[b]	.583	.559	.23205407
Bhutan	1	.670[a]	.449	.430	.29315233
	2	.978[b]	.957	.954	.08293796
Bolivia	1	.300[a]	.090	.064	.13176492
	2	.805[b]	.649	.628	.08303510
Bosnia and Herzegovina	1	.593[a]	.352	.302	.05880787
	2	.975[b]	.951	.943	.01679389
Botswana	1	.735[a]	.540	.527	.23648695
	2	.988[b]	.976	.975	.05451491
Brazil	1	.645[a]	.416	.400	.16757519
	2	.668[b]	.446	.414	.16551333
Brunei Darussalam	1	.517[a]	.267	.218	.07398977
	2	.886[b]	.785	.754	.04151726
Bulgaria	1	.435[a]	.190	.167	.17914166
	2	.529[b]	.279	.238	.17130634
Burkina Faso	1	.743[a]	.551	.539	.20231277
	2	.807[b]	.651	.631	.18106252
Burundi	1	.123[a]	.015	-.012	.22998209
	2	.538[b]	.289	.249	.19814544

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Cambodia	1	.937[a]	.877	.872	.17187057
	2	.990[b]	.981	.979	.06909541
Cameroon	1	.860[a]	.739	.732	.19804251
	2	.871[b]	.759	.746	.19302527
Canada	1	.686[a]	.471	.456	.25207253
	2	.845[b]	.714	.697	.18796232
Cape Verde	1	.703[a]	.494	.476	.12559531
	2	.950[b]	.902	.895	.05629362
Central African Republic	1	.717[a]	.515	.501	.11187985
	2	.744[b]	.553	.527	.10892316
Chad	1	.424[a]	.180	.150	.12006530
	2	.573[b]	.328	.278	.11065091
Chile	1	.801[a]	.642	.632	.25391592
	2	.916[b]	.839	.829	.17288890
China	1	.746[a]	.557	.541	.25118487
	2	.760[b]	.577	.546	.24989843
Colombia	1	.897[a]	.805	.799	.18506577
	2	.974[b]	.949	.946	.09634971
Comoros	1	.636[a]	.405	.383	.30487053
	2	.857[b]	.735	.714	.20745589
Congo, Dem. Rep.	1	.762[a]	.580	.565	.14111140
	2	.978[b]	.957	.954	.04605674
Congo, Rep.	1	.178[a]	.032	.005	.22076461
	2	.968[b]	.936	.932	.05750919
Costa Rica	1	.447[a]	.199	.174	.28653453
	2	.844[b]	.712	.693	.17463164
Cote d'Ivoire	1	.921[a]	.848	.843	.13859324
	2	.991[b]	.981	.980	.04951293
Croatia	1	.446[a]	.199	.149	.08723869
	2	.463[b]	.215	.110	.08922351
Cuba	1	.561[a]	.315	.296	.46670344
	2	.906[b]	.820	.810	.24255247
Cyprus	1	.502[a]	.252	.211	.10930894
	2	.897[b]	.805	.783	.05738089
Czech Republic	1	.707[a]	.500	.469	.16757217
	2	.713[b]	.508	.442	.17177475
Denmark	1	.794[a]	.630	.620	.17632667
	2	.850[b]	.723	.707	.15496057
Djibouti	1	.585[a]	.343	.311	.21127259
	2	.730[b]	.533	.486	.18251101
Dominican Republic	1	.930[a]	.864	.861	.14704437
	2	.981[b]	.962	.960	.07849506
Ecuador	1	.947[a]	.897	.894	.06607951
	2	.971[b]	.943	.940	.04966910
Egypt, Arab Rep.	1	.216[a]	.047	.020	.16784313
	2	.749[b]	.561	.536	.11548935

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
El Salvador	1	.894[a]	.800	.794	.03260088
	2	.927[b]	.859	.851	.02773358
Equatorial Guinea	1	.500[a]	.250	.200	.03244408
	2	.707[b]	.500	.428	.02742513
Eritrea	1	.876[a]	.768	.760	.07104622
	2	.950[b]	.902	.895	.04693327
Estonia	1	.635[a]	.403	.368	.25721804
	2	.899[b]	.808	.784	.15018805
Ethiopia	1	.976[a]	.953	.952	.07285446
	2	.979[b]	.959	.956	.06958242
Fiji	1	.016[a]	.000	-.028	.27951545
	2	.710[b]	.504	.475	.19977030
Finland	1	.740[a]	.548	.536	.16203354
	2	.941[b]	.885	.879	.08274663
France	1	.806[a]	.650	.640	.14373592
	2	.890[b]	.792	.780	.11228010
Gabon	1	.310[a]	.096	.048	.28344897
	2	.366[b]	.134	.037	.28508435
Gambia	1	.564[a]	.318	.299	.15291251
	2	.829[b]	.687	.669	.10497905
Georgia	1	.775[a]	.601	.556	.07377642
	2	.781[b]	.609	.512	.07741065
Germany	1	.173[a]	.030	-.003	.14674981
	2	.743[b]	.553	.521	.10141733
Ghana	1	.840[a]	.706	.697	.12928278
	2	.854[b]	.730	.715	.12555953
Greece	1	.437[a]	.191	.168	.17812829
	2	.891[b]	.794	.783	.09105613
Grenada	1	.963[a]	.928	.922	.06638327
	2	.998[b]	.996	.996	.01567287
Guatemala	1	.896[a]	.802	.797	.09401064
	2	.971[b]	.942	.939	.05161174
Guinea	1	.620[a]	.384	.367	.23797888
	2	.640[b]	.409	.376	.23637797
Guinea-Bissau	1	.177[a]	.031	-.015	.24785064
	2	.977[b]	.955	.950	.05482957
Guyana	1	.801[a]	.641	.631	.32365028
	2	.929[b]	.862	.855	.20334818
Haiti	1	.807[a]	.652	.642	.24033476
	2	.809[b]	.654	.634	.24307162
Honduras	1	.698[a]	.487	.473	.10532458
	2	.854[b]	.729	.714	.07760640
Hungary	1	.068[a]	.005	-.023	.18122110
	2	.568[b]	.323	.284	.15162113
Iceland	1	.803[a]	.645	.635	.18728076
	2	.892[b]	.796	.784	.14391642

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
India	1	.620[a]	.384	.367	.03868770
	2	.747[b]	.558	.533	.03325292
Indonesia	1	.111[a]	.012	-.015	.25214781
	2	.120[b]	.014	-.042	.25546313
Iran, Islamic Rep.	1	.686[a]	.471	.453	.52258331
	2	.871[b]	.759	.743	.35855368
Iraq	1	.808[a]	.653	.644	.14759793
	2	.869[b]	.755	.741	.12573751
Ireland	1	.644[a]	.415	.398	.20041177
	2	.848[b]	.719	.703	.14086047
Israel	1	.336[a]	.113	.074	.11646528
	2	.795[b]	.632	.598	.07671623
Italy	1	.889[a]	.790	.784	.10621601
	2	.924[b]	.854	.845	.08988986
Jamaica	1	.828[a]	.686	.678	.20438913
	2	.885[b]	.782	.770	.17265087
Japan	1	.237[a]	.056	.030	.11605869
	2	.371[b]	.138	.088	.11251320
Jordan	1	.786[a]	.618	.607	.22458700
	2	.969[b]	.939	.935	.09098955
Kazakhstan	1	.785[a]	.616	.602	.15465472
	2	.949[b]	.900	.892	.08059665
Kenya	1	.786[a]	.618	.608	.19678611
	2	.895[b]	.802	.790	.14390416
Kiribati	1	.137[a]	.019	-.008	.42678144
	2	.440[b]	.194	.148	.39230526
Korea, Dem. Rep.	1	.847[a]	.718	.694	.04882859
	2	.882[b]	.778	.737	.04525755
Korea, Rep.	1	.917[a]	.841	.837	.21101348
	2	.918[b]	.842	.833	.21349162
Kuwait	1	.587[a]	.345	.327	.60955448
	2	.807[b]	.651	.631	.45121927
Kyrgyz Republic	1	.557[a]	.311	.285	.19112257
	2	.678[b]	.460	.418	.17240947
Lao PDR	1	.018[a]	.000	-.052	.41675131
	2	.984[b]	.968	.964	.07694322
Latvia	1	.890[a]	.793	.781	.15048603
	2	.945[b]	.893	.880	.11144011
Lebanon	1	.851[a]	.724	.716	.03504118
	2	.856[b]	.733	.718	.03491774
Lesotho	1	.816[a]	.667	.657	.13681129
	2	.951[b]	.905	.900	.07398036
Liberia	1	.220[a]	.048	.022	.32404345
	2	.855[b]	.730	.715	.17490484
Libya	1	.764[a]	.584	.573	.50326881
	2	.976[b]	.953	.951	.17125212

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Lithuania	1	.326[a]	.107	.077	.12553771
	2	.501[b]	.251	.199	.11690477
Luxembourg	1	.054[a]	.003	-.026	.25412637
	2	.315[b]	.099	.044	.24521691
Macedonia, FYR	1	.649[a]	.421	.385	.03573048
	2	.880[b]	.774	.744	.02305806
Madagascar	1	.293[a]	.086	.057	.17555205
	2	.396[b]	.157	.103	.17124497
Malawi	1	.467[a]	.218	.194	.29398255
	2	.898[b]	.806	.794	.14860855
Malaysia	1	.404[a]	.164	.140	.24728541
	2	.837[b]	.701	.684	.15001311
Maldives	1	.189[a]	.036	.009	.79555478
	2	.299[b]	.090	.038	.78402196
Mali	1	.939[a]	.882	.879	.03624818
	2	.944[b]	.891	.885	.03532338
Malta	1	.008[a]	.000	-.028	.22595458
	2	.379[b]	.143	.094	.21210637
Mauritania	1	.864[a]	.747	.740	.05691606
	2	.927[b]	.860	.852	.04295611
Mauritius	1	.467[a]	.218	.196	.51739581
	2	.915[b]	.837	.828	.23947767
Mexico	1	.674[a]	.455	.440	.28446223
	2	.751[b]	.563	.538	.25821553
Micronesia, Fed. Sts.	1	.019[a]	.000	-.062	.10120338
	2	.875[b]	.766	.735	.05054149
Moldova	1	.941[a]	.885	.881	.07348194
	2	.961[b]	.924	.918	.06083607
Mongolia	1	.814[a]	.662	.645	.28995751
	2	.954[b]	.910	.900	.15376852
Montenegro	1	.710[a]	.505	.467	.06207978
	2	.981[b]	.963	.957	.01762924
Morocco	1	.678[a]	.459	.444	.15633233
	2	.942[b]	.887	.881	.07247018
Mozambique	1	.756[a]	.571	.558	.06026033
	2	.984[b]	.969	.967	.01639459
Myanmar	1	.091[a]	.008	-.026	.22778956
	2	.526[b]	.276	.225	.19802774
Namibia	1	.515[a]	.265	.241	.25685109
	2	.697[b]	.486	.451	.21838324
Nepal	1	.673[a]	.453	.438	.24184667
	2	.919[b]	.845	.836	.13070533
Netherlands	1	.944[a]	.892	.889	.13030993
	2	.970[b]	.940	.937	.09849248
New Zealand	1	.141[a]	.020	-.007	.37636232
	2	.383[b]	.147	.098	.35616757

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Nicaragua	1	.381[a]	.145	.121	.24241769
	2	.987[b]	.974	.972	.04291874
Niger	1	.740[a]	.547	.532	.04882508
	2	.960[b]	.921	.915	.02075419
Nigeria	1	.638[a]	.407	.391	.16825077
	2	.649[b]	.421	.388	.16861464
Norway	1	.514[a]	.265	.244	.26210599
	2	.519[b]	.270	.228	.26490973
Oman	1	.916[a]	.839	.835	.47015205
	2	.954[b]	.910	.905	.35639391
Pakistan	1	.445[a]	.198	.176	.39750048
	2	.475[b]	.226	.182	.39612681
Panama	1	.969[a]	.939	.938	.07214684
	2	.986[b]	.973	.971	.04919480
Papua New Guinea	1	.244[a]	.059	.033	.12649432
	2	.735[b]	.541	.515	.08963430
Paraguay	1	.289[a]	.084	.058	.15328715
	2	.783[b]	.614	.592	.10096019
Peru	1	.742[a]	.550	.538	.11172831
	2	.764[b]	.584	.561	.10893979
Philippines	1	.761[a]	.580	.568	.10426358
	2	.761[b]	.580	.556	.10571421
Poland	1	.128[a]	.016	-.011	.18581172
	2	.312[b]	.097	.046	.18054802
Portugal	1	.760[a]	.578	.566	.13420777
	2	.771[b]	.595	.572	.13336255
Qatar	1	.758[a]	.575	.560	.15850641
	2	.762[b]	.581	.550	.16029858
Romania	1	.325[a]	.106	.075	.22953275
	2	.380[b]	.145	.083	.22844679
Russian Federation	1	.753[a]	.568	.552	.15487099
	2	.897[b]	.804	.789	.10612040
Rwanda	1	.039[a]	.002	-.026	.56633800
	2	.509[b]	.259	.217	.49466172
Samoa	1	.441[a]	.195	.133	.05242150
	2	.998[b]	.996	.995	.00387210
Sao Tome and Principe	1	.274[a]	.075	.046	.23629151
	2	.927[b]	.859	.850	.09383555
Saudi Arabia	1	.085[a]	.007	-.032	.32195381
	2	.994[b]	.989	.988	.03496201
Senegal	1	.602[a]	.362	.344	.29628504
	2	.911[b]	.829	.819	.15552614
Sierra Leone	1	.932[a]	.868	.864	.14072065
	2	.934[b]	.872	.865	.14057326
Singapore	1	.734[a]	.539	.526	.43335849
	2	.796[b]	.634	.612	.39196830

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Slovak Republic	1	.662[a]	.438	.403	.13567667
	2	.941[b]	.885	.870	.06325311
Slovenia	1	.846[a]	.716	.698	.03728966
	2	.904[b]	.817	.793	.03089486
Solomon Islands	1	.891[a]	.794	.788	.20764515
	2	.970[b]	.941	.937	.11300912
Somalia	1	.809[a]	.654	.631	.10810541
	2	.810[b]	.656	.607	.11149012
South Africa	1	.671[a]	.450	.426	.11973438
	2	.961[b]	.923	.916	.04568795
South Sudan	1	.426[a]	.181	.136	.09121370
	2	.823[b]	.677	.639	.05892818
Spain	1	.368[a]	.136	.112	.25656329
	2	.477[b]	.227	.183	.24599843
Sri Lanka	1	.576[a]	.332	.313	.23450151
	2	.801[b]	.642	.621	.17412874
St. Lucia	1	.838[a]	.702	.691	.08082884
	2	.839[b]	.703	.681	.08217006
St. Vincent and the Grenadines	1	.486[a]	.236	.209	.25527614
	2	.943[b]	.889	.881	.09902963
Sudan	1	.631[a]	.398	.381	.18767586
	2	.886[b]	.785	.772	.11384328
Suriname	1	.512[a]	.262	.213	.27897302
	2	.961[b]	.924	.913	.09279926
Swaziland	1	.861[a]	.742	.735	.21176383
	2	.986[b]	.972	.970	.07094546
Sweden	1	.885[a]	.783	.777	.10692935
	2	.885[b]	.783	.770	.10844162
Switzerland	1	.892[a]	.796	.791	.11397253
	2	.944[b]	.891	.885	.08442016
Syrian Arab Republic	1	.835[a]	.697	.688	.23555489
	2	.950[b]	.903	.898	.13499348
Tajikistan	1	.405[a]	.164	.131	.13738485
	2	.535[b]	.287	.227	.12953015
Tanzania	1	.160[a]	.026	-.001	.13072041
	2	.910[b]	.827	.818	.05578648
Thailand	1	.842[a]	.709	.701	.26839993
	2	.842[b]	.709	.692	.27220163
Timor-Leste	1	.701[a]	.492	.455	.47742119
	2	.952[b]	.906	.891	.21360477
Togo	1	.956[a]	.914	.911	.12442212
	2	.993[b]	.986	.985	.05083823
Tonga	1	.286[a]	.082	.056	.26161793
	2	.684[b]	.468	.438	.20187932
Trinidad and Tobago	1	.210[a]	.044	.017	.23060920
	2	.226[b]	.051	-.003	.23303302

Table 4.9 Continued

Country Name	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Tunisia	1	.076[a]	.006	-.022	.25726111
	2	.862[b]	.743	.729	.13256937
Turkey	1	.761[a]	.579	.567	.13280544
	2	.850[b]	.722	.706	.10952889
Turkmenistan	1	.870[a]	.757	.745	.08646985
	2	.898[b]	.807	.786	.07911411
Uganda	1	.826[a]	.683	.674	.06945561
	2	.829[b]	.688	.670	.06987416
Ukraine	1	.941[a]	.885	.880	.06833567
	2	.942[b]	.888	.879	.06874182
United Arab Emirates	1	.804[a]	.646	.637	.13599904
	2	.865[b]	.749	.735	.11621349
United Kingdom	1	.361[a]	.130	.106	.24650188
	2	.728[b]	.530	.504	.18371354
United States	1	.709[a]	.503	.489	.24112931
	2	.882[b]	.778	.765	.16344631
Uruguay	1	.705[a]	.497	.483	.06816288
	2	.843[b]	.710	.694	.05245049
Uzbekistan	1	.535[a]	.286	.247	.14524341
	2	.616[b]	.379	.306	.13936813
Vanuatu	1	.163[a]	.026	-.001	.07927457
	2	.876[b]	.768	.755	.03925968
Venezuela, RB	1	.638[a]	.407	.391	.22523332
	2	.881[b]	.777	.764	.14026556
Vietnam	1	.217[a]	.047	.021	.29977644
	2	.503[b]	.253	.210	.26924785
West Bank and Gaza	1	.019[a]	.000	-.111	.13177987
	2	.975[b]	.952	.939	.03078612
Yemen, Rep.	1	.992[a]	.984	.984	.13335462
	2	.997[b]	.994	.994	.08258993
Zambia	1	.635[a]	.403	.386	.14638627
	2	.757[b]	.573	.549	.12551870
Zimbabwe	1	.279[a]	.078	.052	.43729305
	2	.906[b]	.822	.811	.19501881

a. Predictors: Unstandardized Residual IMR DI 99.99% (5 year moving average).
b. Predictors: Unstandardized Residual IMR DI 99.99% (5 year moving average) 10 year lag.
c. Dependent Variable: Unstandardized Residual of TFR
d. The unstandardized residual is calculated by regressing the variable against time.

Table 4.10 Comparing Methods And Model Results

		Model	MIN	MAX	MEAN	Std Dev
R^2	No Detrending	1	0.00049	0.99679	0.70466	0.28686
		2	0.01855	0.99928	0.84997	0.18023
	Detrended	1	0.00029	0.98264	0.41748	0.28188
		2	0.05024	0.99088	0.67224	0.22902
	5 Year Averaging	1	0.00007	0.99961	0.71586	0.30638
		2	0.00288	0.99988	0.83117	0.23166
	5 Year Averaging Detrended	1	0.00007	0.98417	0.43363	0.29189
		2	0.01434	0.99831	0.69776	0.25279
Change in R^2	No Detrending	1 & 2	0.01805	0.00249	0.14531	-0.10663
	Detrended	1 & 2	0.04995	0.00825	0.25477	-0.05286
	5 Year Averaging	1 & 2	0.00280	0.00027	0.11531	-0.07472
	5 Year Averaging Detrended	1 & 2	0.01427	0.01413	0.26413	-0.03911
	No Detrending &Detrended	1	0.00020	0.01415	0.28719	0.00499
		2	-0.03169	0.00840	0.17773	-0.04879
	No Detrending & 5 Year Averaging	1	0.00042	-0.00282	-0.01120	-0.01951
		2	0.01567	-0.00060	0.01880	-0.05143
	Detrended & 5 Year Averaging Detrended	1	0.00022	-0.00154	-0.01615	-0.01002
		2	0.03590	-0.00742	-0.02552	-0.02377
S.E.E.	No Detrending	1	0.01685	1.28551	0.31524	0.23728
		2	0.00872	0.90373	0.21258	0.16733
	Detrended	1	0.03905	0.70081	0.21562	0.12711
		2	0.01119	0.62501	0.15758	0.10059
	5 Year Averaging	1	0.00116	1.24194	0.24603	0.23032
		2	0.00124	0.89449	0.16668	0.14131
	5 Year Averaging Detrended	1	0.03244	0.79555	0.19272	0.12271
		2	0.00387	0.78402	0.13425	0.10076

Tables 4.6 through 4.10 demonstrate the improvements made by Model 2 and the importance of factoring for lag. In a few countries Model 1 preformed so poorly that Model 2 was able to make tremendous increases to the R^2 value. Model 2 was successful in increasing the R^2 in both groups of countries that have completed their demographic transition as well as those who have not.

Table 4.11 Detrended Calibration and Validation Comparison

				N	B 0	B1	R	R2	F
Lag -10			Aggregate	2.4E+11	1.811	40.5	0.836	0.698	5.5E+11
		IMR	Calibrate	1.7E+11	1.813	39.9	0.84	0.706	4.3E+11
	Non-detrended		Validate	6.4E+10	1.792	42.3	0.825	0.68	1.3E+12
			Aggregate	2.4E+11	-1.753	1.889	0.85	0.723	6.3E+11
		D.Ins. 99.9%	Calibrate	1.7E+11	-1.718	1.87	0.853	0.728	4.8E+11
			Validate	6.4E+10	-1.879	1.954	0.844	0.712	1.6E+11
			Aggregate	2.4E+11	-0.064	-9.428	0.129	0.017	4.2E+09
		IMR	Calibrate	1.7E+11	-0.058	-8.918	0.126	0.016	2.9E+09
	Detrended		Validate	6.4E+10	-0.081	-11.015	0.138	0.019	1.2E+09
			Aggregate	2.4E+11	-0.063	-0.492	0.122	0.015	3.7E+09
		D.Ins. 99.9%	Calibrate	1.7E+11	-0.057	-0.434	0.11	0.012	2.2E+09
			Validate	6.4E+10	-0.08	-0.645	0.15	0.023	1.5E+09
Lag -5			Aggregate	2.4E+11	1.612	38.106	0.85	0.723	6.3E+11
		IMR	Calibrate	1.7E+11	1.596	37.783	0.855	0.732	4.9E+11
	Non-detrended		Validate	6.4E+10	1.645	39.259	0.838	0.702	1.5E+12
			Aggregate	2.4E+11	-1.795	1.797	0.856	0.732	6.6E+11
		D.Ins. 99.9%	Calibrate	1.7E+11	-1.788	1.785	0.86	0.74	5.1E+11
			Validate	6.4E+10	-1.834	1.836	0.845	0.714	1.6E+11
			Aggregate	2.4E+11	-0.043	10.639	0.152	0.023	5.7E+09
		IMR	Calibrate	1.7E+11	-0.034	8.517	0.123	0.015	2.7E+09
	Detrended		Validate	6.4E+10	-0.068	15.633	0.22	0.048	3.2E+09
			Aggregate	2.4E+11	-0.044	0.398	0.102	0.01	2.4E+09
		D.Ins. 99.9%	Calibrate	1.7E+11	-0.035	0.263	0.068	0.005	8.9E+08
			Validate	6.4E+10	-0.071	0.734	0.184	0.034	2.2E+09
No Lag			Aggregate	2.4E+11	1.47	35.118	0.856	0.734	6.6E+11
		IMR	Calibrate	1.7E+11	1.46	34.992	0.861	0.741	5.1E+11
	Non-detrended		Validate	6.4E+10	1.49	35.604	0.844	0.713	1.6E+12
			Aggregate	2.4E+11	-1.729	1.676	0.854	0.73	6.5E+11
		D.Ins. 99.9%	Calibrate	1.7E+11	-1.757	1.681	0.859	0.738	5.0E+11
			Validate	6.4E+10	-1.655	1.644	0.839	0.704	1.5E+11
			Aggregate	2.4E+11	-0.02	15.403	0.212	0.045	1.1E+10
		IMR	Calibrate	1.7E+11	0.002	15.218	0.208	0.043	8.0E+09
	Detrended		Validate	6.4E+10	-0.081	15.634	0.226	0.051	3.4E+09
			Aggregate	2.4E+11	-0.021	0.513	0.126	0.016	3.9E+09
		D.Ins. 99.9%	Calibrate	1.7E+11	0.001	0.438	0.106	0.011	2.0E+09
			Validate	6.4E+10	-0.084	0.728	0.193	0.037	2.5E+09

a. D.Ins. = Descendant Insurance

Table 4.11 Continued

				N	B0	B1	R	R2	F
Lead 5	Non-detrended	IMR	Aggregate	2.4E+11	1.288	33.149	0.853	0.728	6.4E+11
			Calibrate	1.7E+11	1.277	32.994	0.857	0.734	5.0E+11
			Validate	6.4E+10	1.309	33.784	0.843	0.711	1.6E+12
		D.Ins. 99.9%	Aggregate	2.4E+11	-1.777	1.595	0.842	0.71	5.9E+11
			Calibrate	1.7E+11	-1.82	1.603	0.848	0.719	4.5E+11
			Validate	6.4E+10	-1.667	1.577	0.827	0.684	1.4E+11
	Detrended	IMR	Aggregate	2.4E+11	-0.032	8.335	0.111	0.012	2.9E+09
			Calibrate	1.7E+11	-0.009	10.435	0.135	0.018	3.3E+09
			Validate	6.4E+10	-0.094	3.107	0.046	0.002	1.3E+08
		D.Ins. 99.9%	Aggregate	2.4E+11	-0.032	0.2	0.047	0.002	4.8E+08
			Calibrate	1.7E+11	-0.01	0.251	0.058	0.003	5.3E+08
			Validate	6.4E+10	-0.094	0.074	0.019	0.037	2.5E+09
Lead 10	Non-detrended	IMR	Aggregate	2.4E+11	1.148	30.992	0.841	0.707	5.8E+11
			Calibrate	1.7E+11	1.122	31.066	0.844	0.712	4.4E+11
			Validate	6.4E+10	1.217	30.874	0.834	0.695	1.5E+12
		D.Ins. 99.9%	Aggregate	2.4E+11	-1.771	1.508	0.826	0.682	5.2E+11
			Calibrate	1.7E+11	-1.845	1.523	0.83	0.688	3.9E+11
			Validate	6.4E+10	-1.582	1.47	0.816	0.666	1.3E+11
	Detrended	IMR	Aggregate	2.4E+11	-0.025	10.945	0.139	0.019	4.7E+09
			Calibrate	1.7E+11	-0.009	11.895	0.148	0.022	4.0E+09
			Validate	6.4E+10	-0.071	7.639	0.106	0.011	7.1E+08
		D.Ins. 99.9%	Aggregate	2.4E+11	-0.025	0.455	0.102	0.01	2.4E+09
			Calibrate	1.7E+11	-0.009	0.498	0.109	0.012	2.2E+09
			Validate	6.4E+10	-0.071	0.292	0.072	0.005	3.2E+08

a. D.Ins. = Descendant Insurance

The results of the calibration and validation test (Table 4.11) show that the relationship is mostly similar when the data is split randomly split into two groups consisting of 75% and 25% of the entire dataset. The R2 value is significantly lower in the detrended portion that reveals further evidence that the downward trend of both dependent and independent variables does affect the relationship. Another observation is that IMR is competitive with Descendent Insurance in the random sample test (Table 4.11).

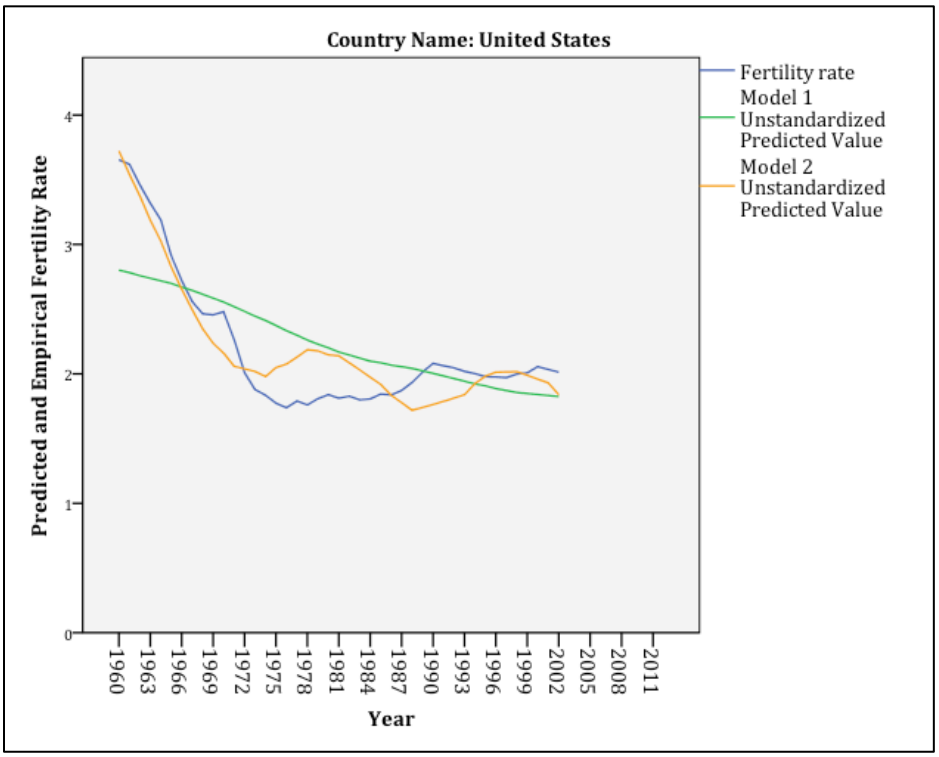

Figure 4.2 United States: Comparison of Standard Models

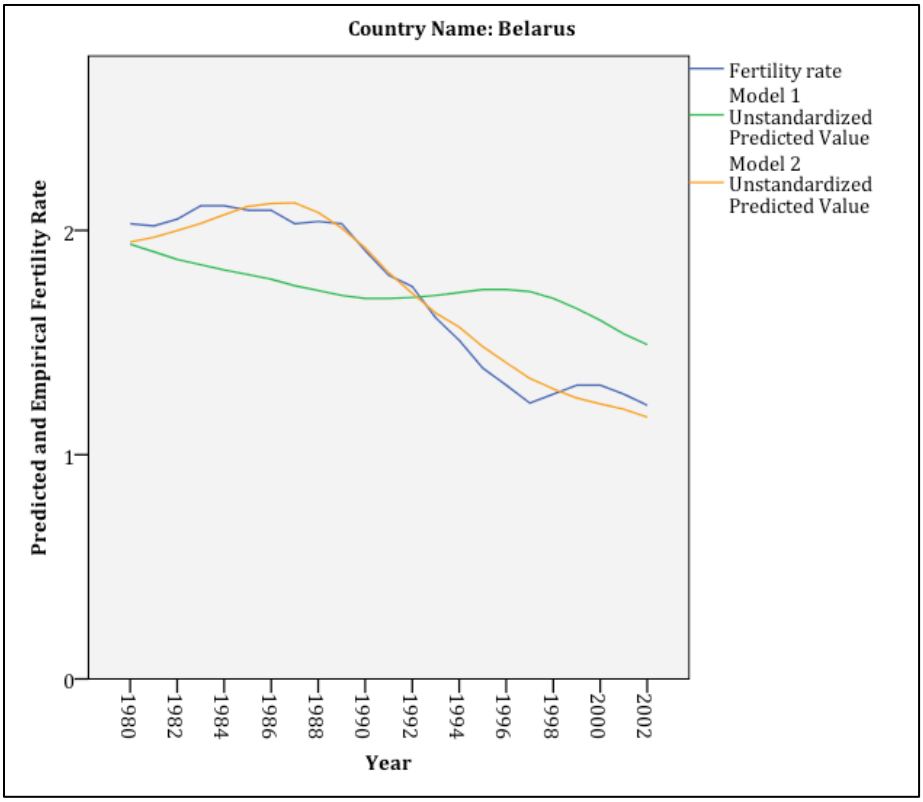

Figure 4.3 Belarus: Comparison of Standard Models

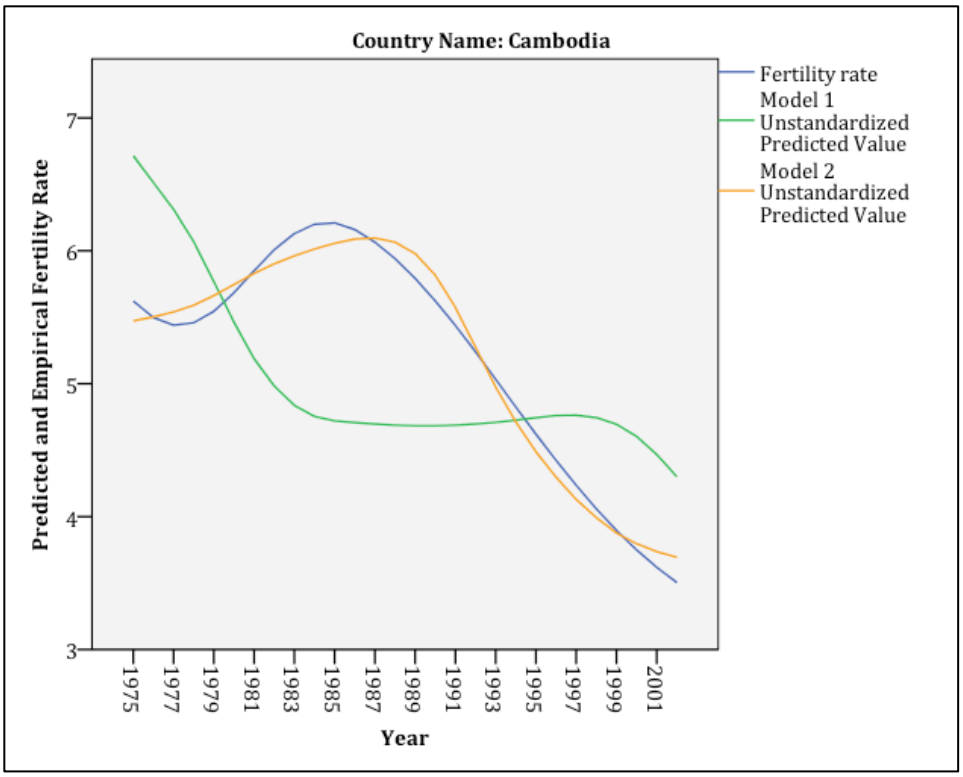

Figure 4.4 Cambodia: Comparison of Standard Models

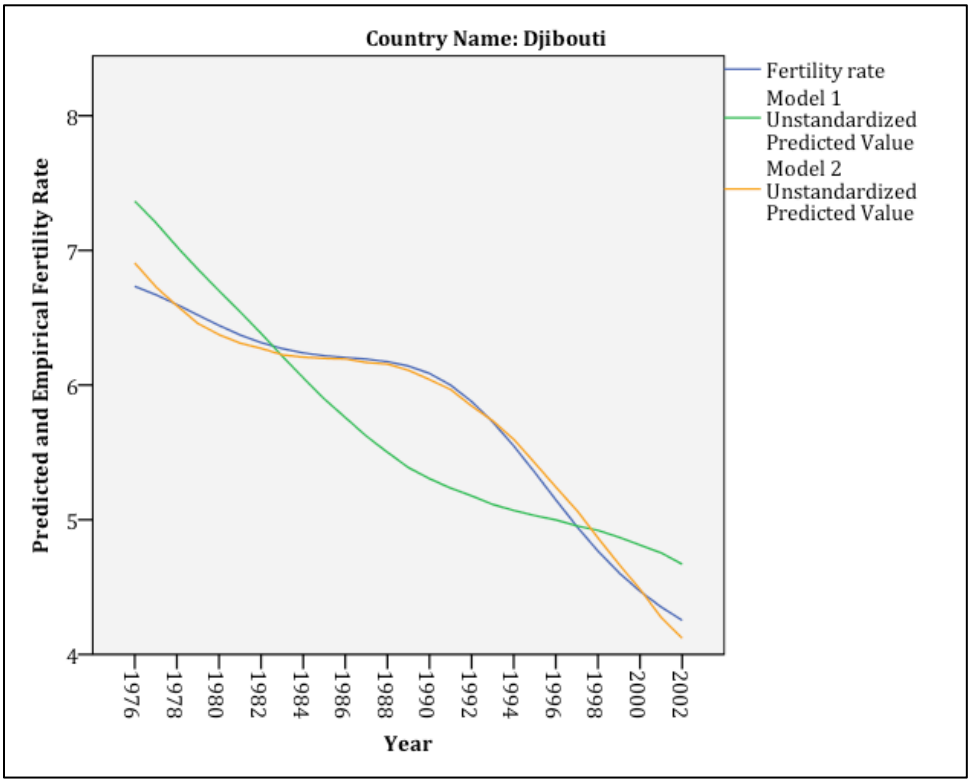

Figure 4.5 Djibouti: Comparison of Standard Models

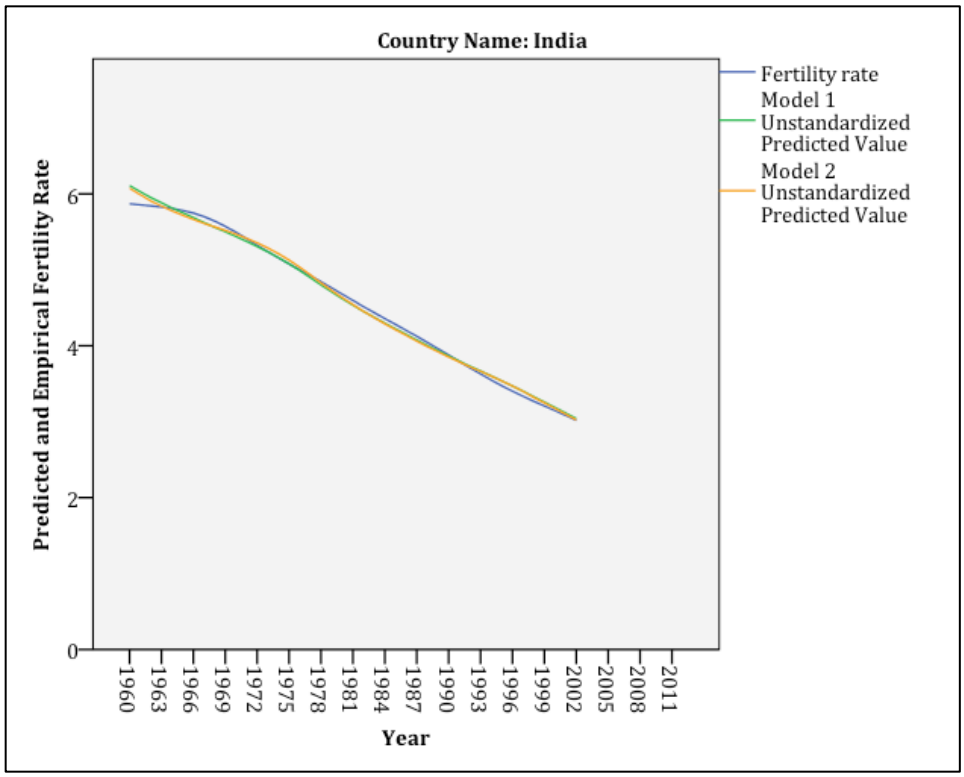

Figure 4.6 India: Comparison of Standard Models

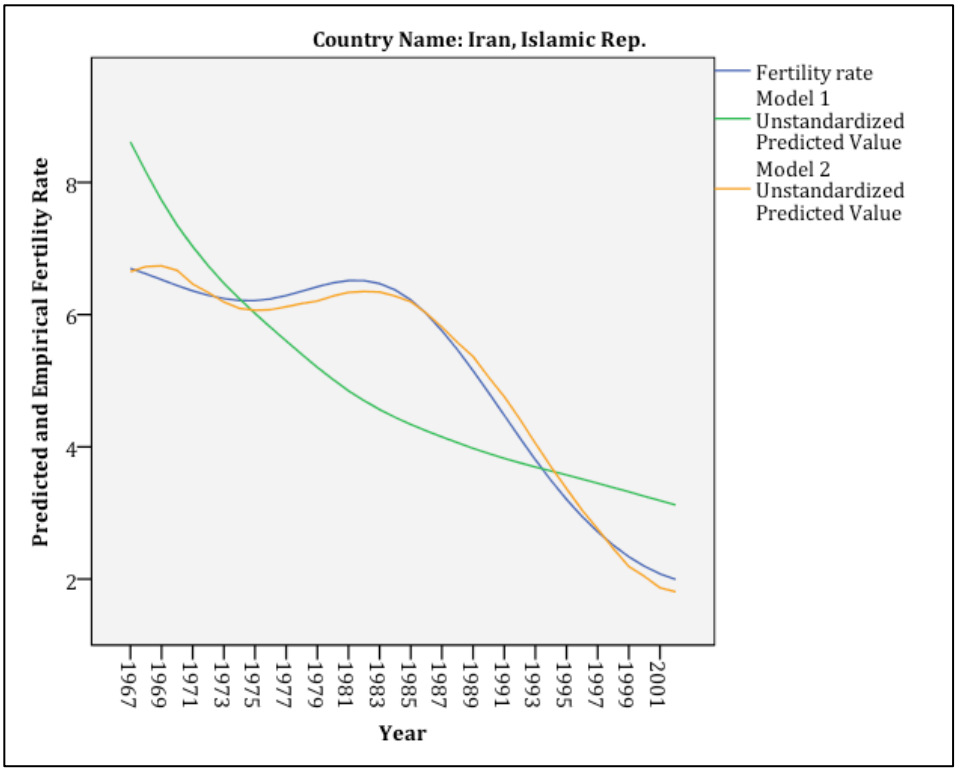

Figure 4.7 Iran: Comparison of Standard Models

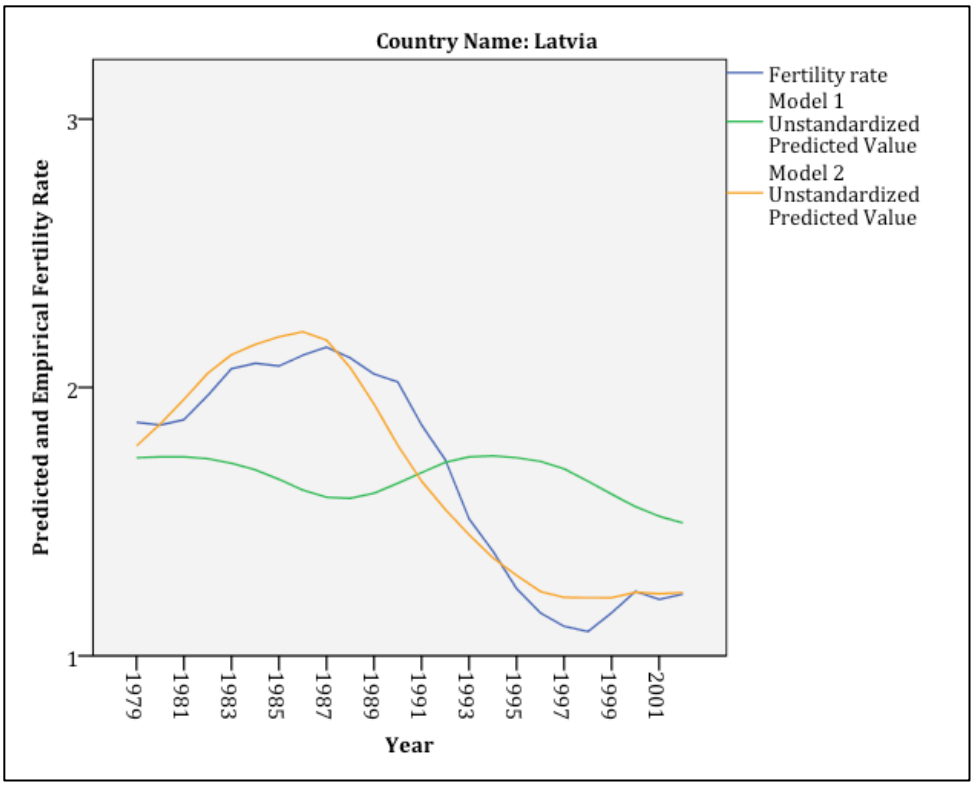

Figure 4.8 Latvia: Comparison of Standard Models

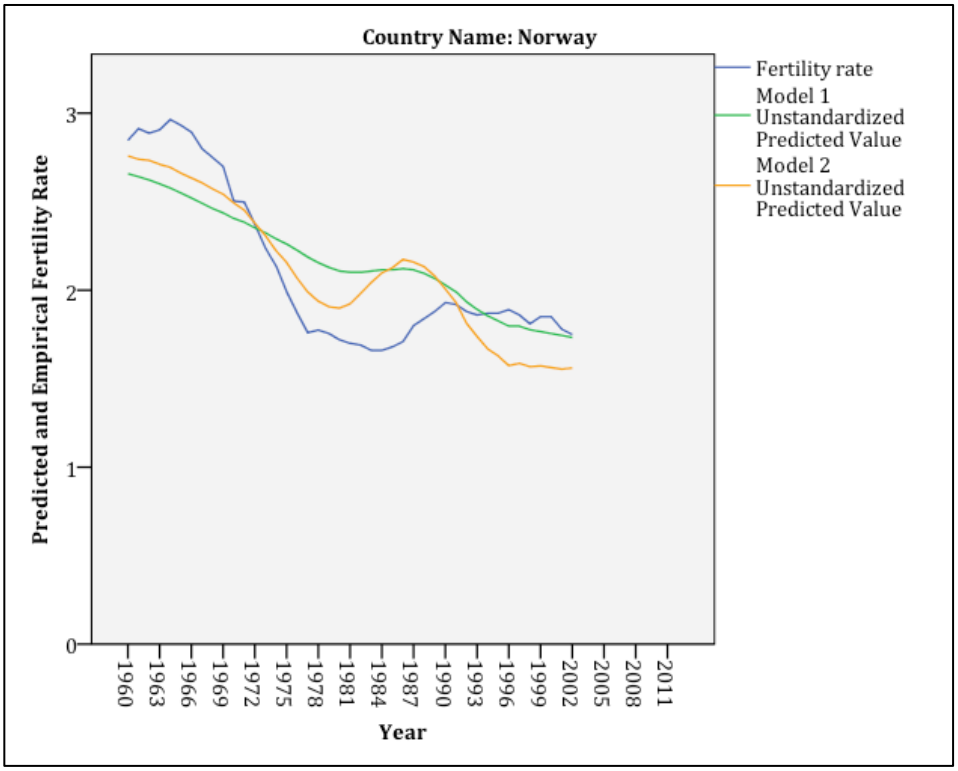

Figure 4.9 Norway: Comparison of Standard Models

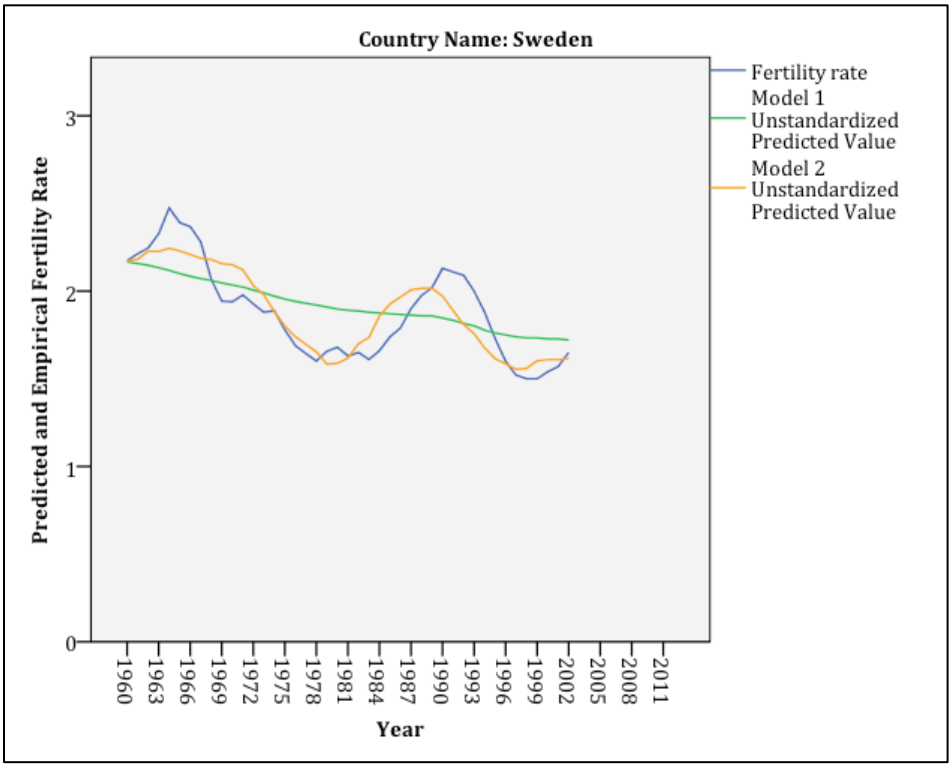

Figure 4.10 Sweden: Comparison of Standard Models

In Figures 4.2 through 4.10 empirical TFR and the predictions of the pre-detrended Models 1 and 2 are graphed to demonstrate a comparison. In all of the examples, it is clear that the predictions of Models 2 and 3 are more accurate than Model 1. The graph for India in Figure 4.6 is the only example listed where Model 1 does nearly as well as Models 2 and 3. The lack of improvement made by Model 2 is listed in Table 4.6 where the change in R^2 is listed as .996 in Model 1 and .997 in Model 2. The reason for countries like India having high R^2 in Model 1 is because in the period of the study data India is undergoing a major demographic transition as the TFR dropped from 6 to 3.

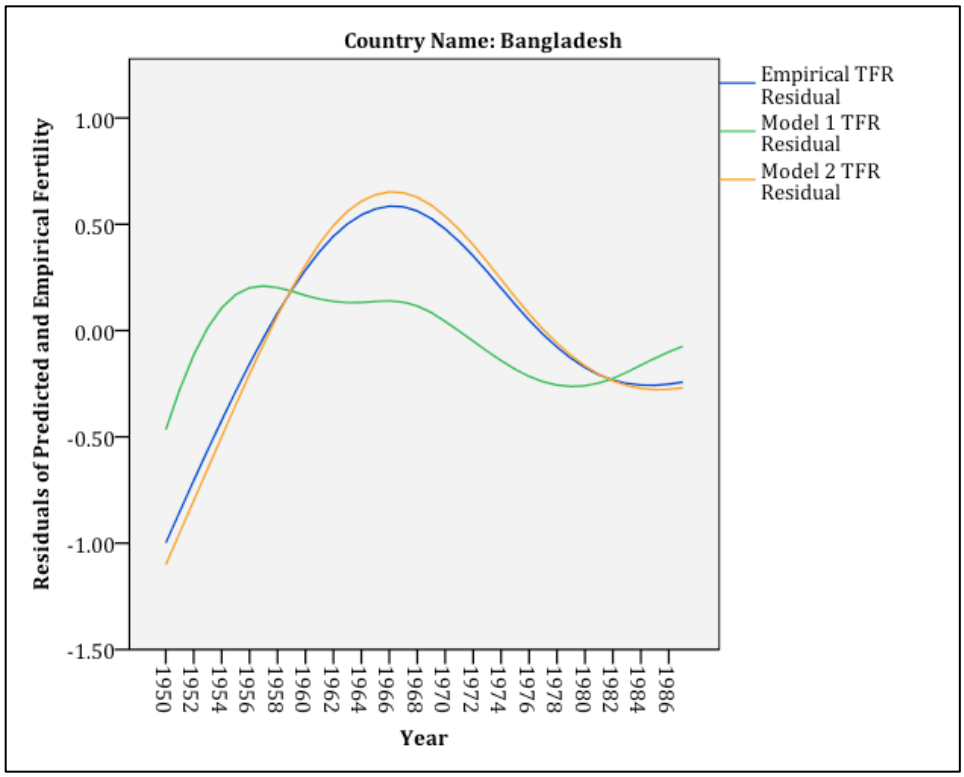

Figure 4.11 Bangladesh: Comparison of Detrended Model Residuals

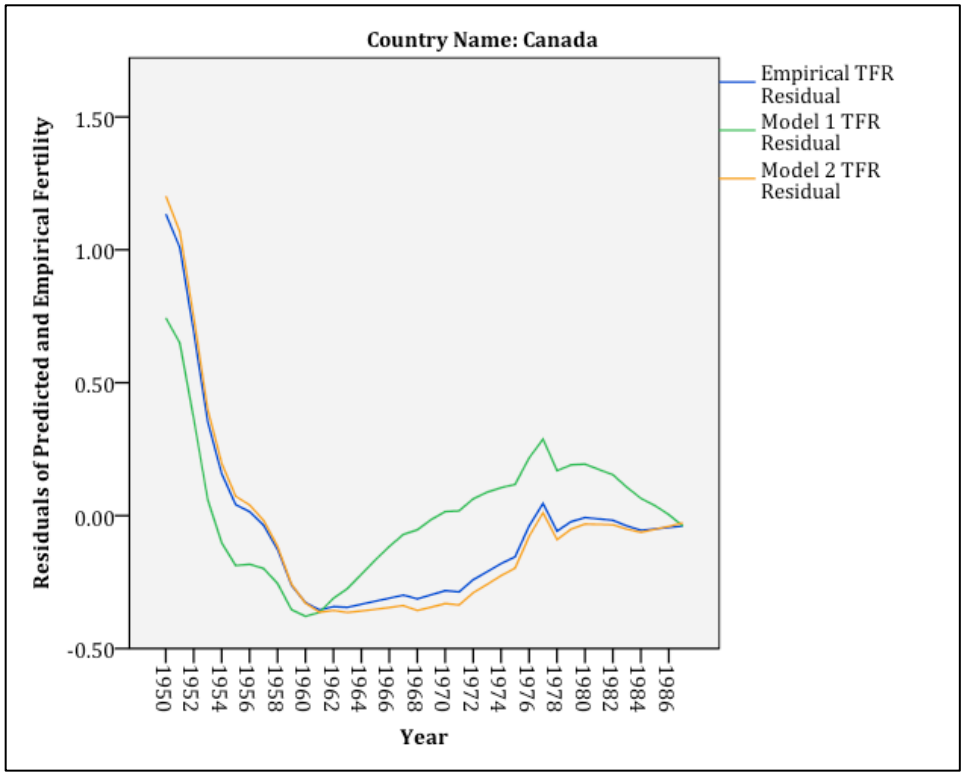

Figure 4.12 Canada: Comparison of Detrended Model Residuals

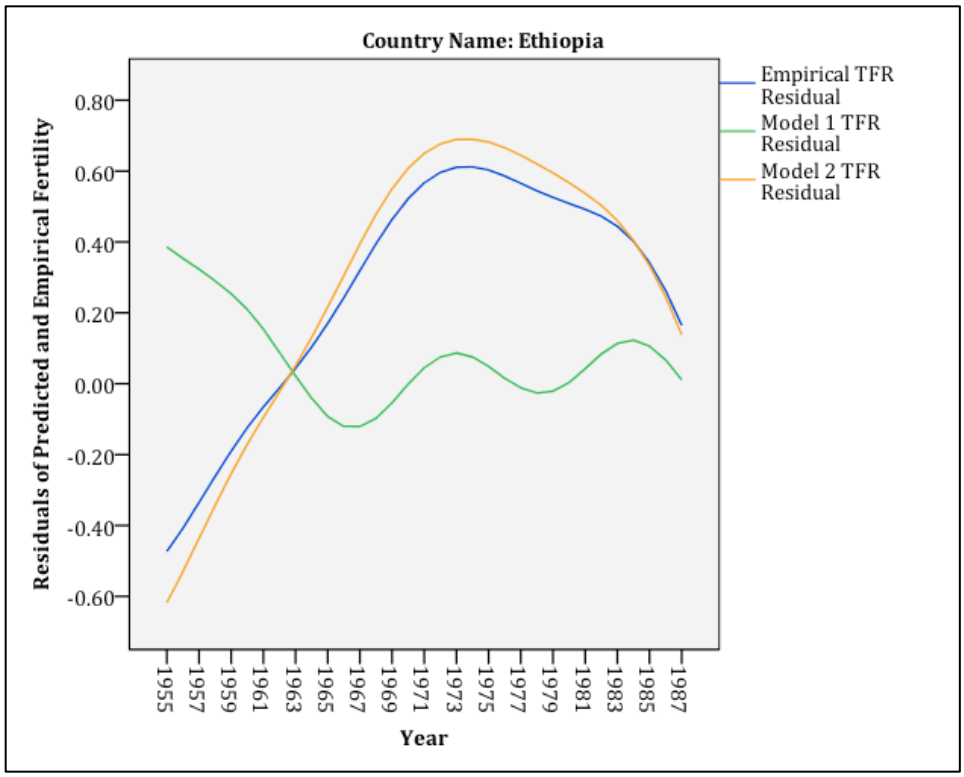

Figure 4.13 Ethiopia: Comparison of Detrended Model Residuals

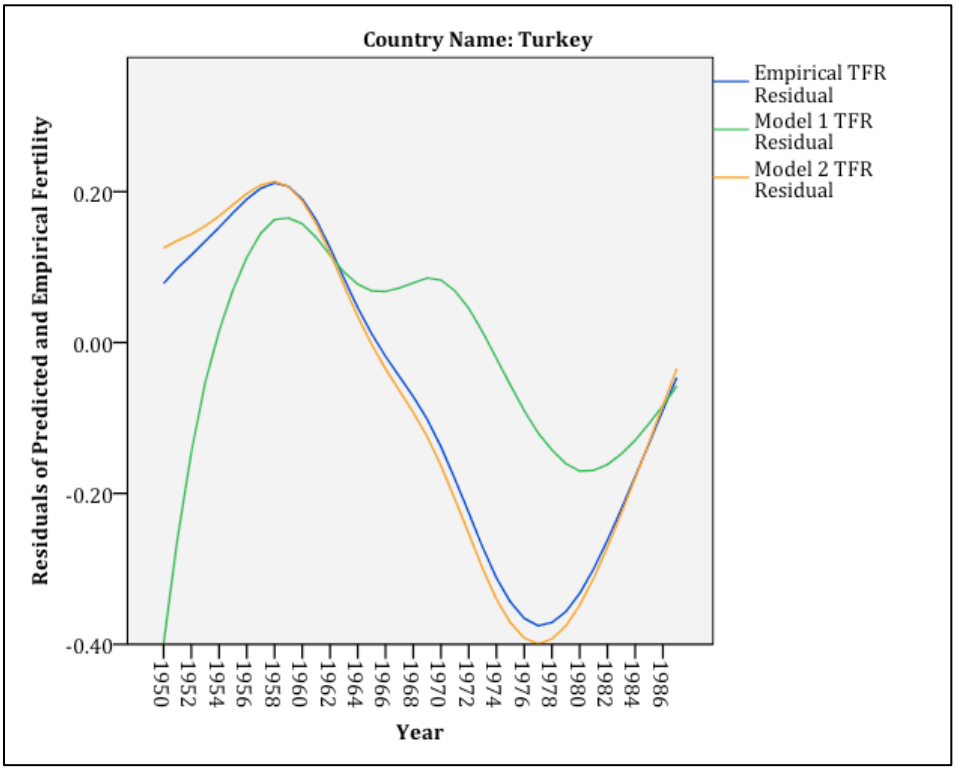

Figure 4.14 Turkey: Comparison of Detrended Model Residuals

Figures 4.11 through 4.14 compare the detrended model residuals. In each of these examples Model 2 follows more closely the residuals of empirical fertility. Canada is a good example of a developed nation as Model 1 is more accurate in comparison with less developed nations.

CHAPTER 5

DISCUSSION

One of the most important observations found reviewing the fertility and mortality data from the past half-century is the progress humans have made in reducing youth mortality and fertility rates. Several countries began with the average woman having almost 8 births and child mortality rates as high as 35% in 1960. Over the course of the available data, child mortality rate decreased to approximately 5% and the fertility rate to less than 3 births. These observations indicate that the wellbeing of the human population is improving to a sustainable condition.

5.1 Discussion of Research Questions

Research Question 1: How does descendant insurance integrate with demographic theory and how is it quantified?

Descendant insurance integrates very well with the overall trend that demographic theory is evolving towards. A greater focus on mortality and infant mortality has been requested from within the demographic community and descendant insurance is based entirely on infant/child mortality and how the variable affects fertility.

Comparing the original demographic transition theory with the descendant insurance concept there are intrinsic similarities, though this is the case with most theories. The original demographic transition theory focused on total fertility and general mortality rates. This relationship remains important as it outlines the principal concept of populations and how they change in size. Like all of the other theories that have been explored since the original demographic transition theory, descendant insurance is more

focused on specific drivers of fertility transitions rather than general estimation of population size.

Relative to other demographic transition theories the specific scope of descendant insurance allows it to be quantified and tested now that historical data have been improved. This is the first time in history that it has been possible to explore an idea like descendant insurance due to the availability of data and the technology available to process those data. The analysis has produced predictions of fertility rates for 182 countries, most of which showed a very small amount of error.

The promising results of the analysis are based on the fairly simple equation that quantifies descendant insurance. The two basic variables include infant mortality rates and the assumption that parents want to assure the survival of a descendant. Using this information, predictions were tested on the historical data, and although many predictions were strongly improved by factoring in different rates of change in perception held by parents of descendant insurance, the general idea is confirmed .

Research Question 2: Does descendant insurance help explain 20th and 21st Century fertility decline?

The available data show many countries that appear to demonstrate a significant relationship between estimations of descendant insurance fertility and empirical fertility. There are some countries that present less evidence of this relationship, and then there are a few that demonstrate little to no relationship at all. For the countries that demonstrate little to no relationship, factoring for a lag drastically changes the results, which is

discussed in Question #3. The global aggregate analysis suggests that the relationship is significant at the 0.01- level (Figure 4.2).

The time period and the country's transition status is an important factor to take into consideration. Once a country has decreased fertility below a certain threshold, the relationship weakens greatly. The United States is an example of reaching a low and falling IMR, but TFR has not continued to fall correspondingly. Most developed countries, however, present a stronger relationship when the time period is limited to data prior to 1980. Many of the nations that are stereotypically described as developed have a higher correlation when the study window is focused (Table 4.5). The sample duration comparison presented (Table 4.5) shows that developed countries have a stronger relationship when focused on a time period closer to their transition period, but without compensating for lag, the theory does not preform well in developing nations that have not begun their transition.

Research Question 3: Is there a specific mortality age, time lag, or level of descendant insurance that optimizes the predictive efficiency of total fertility rates?

The global level results suggest that the descendant insurance estimated fertility rate calculated from infant mortality is slightly more efficient than the estimates based on child mortality, but both are highly predictive for the majority of countries (Table 4.2). After confirming that infant mortality rates were more efficient, child mortality rates were excluded from further models.

In comparing the two models and examining for change in R^2, there appears to be evidence that a lag component improves the accuracy of the prediction. Model 2 increased the prediction accuracy for every country in the database compared to Model 1, so there

were no cases where factoring for lag decreased the R^2 value. In many countries. however, the R^2 value was so high in Model 1 that there was little room for improvement to be made possible by Model 2.

For the countries that Model 1 produced very low R^2 values, there was a tremendous amount of increased accuracy produced by Model 2. This suggests that the lag time for a change to result from an increase or decrease in descendant insurance was especially relevant to the parents of the particular countries. Examples of countries who had exhibited high R^2 values and change between Model 1 and Model 2 are shown in Table 5.1 and 5.2.

Table 5.1 Examples of Countries High R^2 Values from the Detrended Analysis

Country Name	Model	R	R Square	Std. Error of the Estimate
Barbados	1	.934[a]	.872	.16699394
	2	.961[b]	.924	.13044872
Belarus	1	.940[a]	.883	.06832389
	2	.985[b]	.970	.03531939
Bhutan	1	.580[a]	.336	.37427399
	2	.975[b]	.950	.10410200
Guatemala	1	.882[a]	.777	.10316700
	2	.966[b]	.933	.05737043
Kenya	1	.835[a]	.696	.20479152
	2	.985[b]	.971	.06399129
Lao PDR	1	.058[a]	.003	.52695784
	2	.969[b]	.940	.13239137
Mozambique	1	.735[a]	.541	.06756553
	2	.977[b]	.955	.02147534
Netherlands	1	.939[a]	.883	.14007094
	2	.957[b]	.916	.12009436
Nicaragua	1	.198[a]	.039	.29096354
	2	.965[b]	.931	.07917179
Niger	1	.711[a]	.506	.06140719
	2	.964[b]	.929	.02368436

Table 5.2 Examples of Countries High R^2 Values from the Five-Year Moving Average Detrended Analysis

Country Name	Model	R	R Square	Std. Error of the Estimate
Bangladesh	1	.905[a]	.819	.18139099
	2	.975[b]	.950	.09638919
Bosnia and Herzegovina	1	.593[a]	.352	.05880787
	2	.975[b]	.951	.01679389
Botswana	1	.735[a]	.540	.23648695
	2	.988[b]	.976	.05451491
Congo, Dem. Rep.	1	.762[a]	.580	.14111140
	2	.978[b]	.957	.04605674
Guinea-Bissau	1	.177[a]	.031	.24785064
	2	.977[b]	.955	.05482957
Lao PDR	1	.018[a]	.000	.41675131
	2	.984[b]	.968	.07694322
Nicaragua	1	.381[a]	.145	.24241769
	2	.987[b]	.974	.04291874
Saudi Arabia	1	.085[a]	.007	.32195381
	2	.994[b]	.989	.03496201
Samoa	1	.441[a]	.195	.05242150
	2	.998[b]	.996	.00387210
West Bank and Gaza	1	.019[a]	.000	.13177987
	2	.975[b]	.952	.03078612

5.2 Conclusion

It is very clear that there is a complex relationship surrounding the two main variables of the proposed study, but this does not concede that the proposed evaluation of descendant insurance will not add to the understanding of demographic change. None of the reviewed literature showed conclusive proof of a relationship that quantifies the growth of our population on a global scale. It may also be concluded that there has been no previous publication that tests the entire idea of descendant insurance on the available data.

The highest aspiration for the idea of descendant insurance is to provide evidence that decreasing child mortality will result in a decrease in total fertility rates. Considering the promising results of the analysis, the idea deserves further investigation. If the data

could be somehow separated by cultures within countries, as some studies have completed, the understanding of the relationship would be greatly increased. Though descendant insurance cannot be blindly applied to every country, it may be considered a significant relationship in a large majority of the 182 countries explored.

Now that the collection of total fertility and infant mortality data has been consistently practiced for half a century, it is possible that if the idea is revisited in the future, descendant insurance could be shown in every country. Ultimately, saving infants from premature death is the obvious morally correct option, and the results of this analysis have produced strong evidence that decreasing infant mortality will result in a decrease in total fertility and an increase in infant mortality will result in an increase in total fertility. Considering the pressures caused by overpopulation, saving as many infants as possible seems to be a cause worth pursuing beyond the intrinsic honor in saving a child's life.

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