

REASONS FOR RUSSIA'S HIGH ADULT MORTALITY RATE:
CORRELATIONS WITH HEALTH CARE, THE ECONOMY
AND INDIVIDUAL BEHAVIOR

by

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THESIS ABSTRACT

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Russian men are over two and a half times more likely to die before 60 than are Russian women. Aggregate national indicators of state policy, health care and individual behavior are examined in a time-series analysis of male and female mortality rates from 1990 to 2008. Data come from the Russian State Statistical Office (Goskomstat) and the World Bank. There is a debate in both demographic literature and that on post-Soviet transition about changes in mortality in post-socialist society. Hypotheses about the relative impact of individual behavior such as alcohol consumption, the effect of changes to the healthcare system and economic stability are studied. A goal of this study is to understand the relative contribution of each factor to gender-based inequality in mortality rates. The findings show that the different types of variables – health care, the economy and human behavior – vary in their level of significance and in effect.

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CHAPTER I

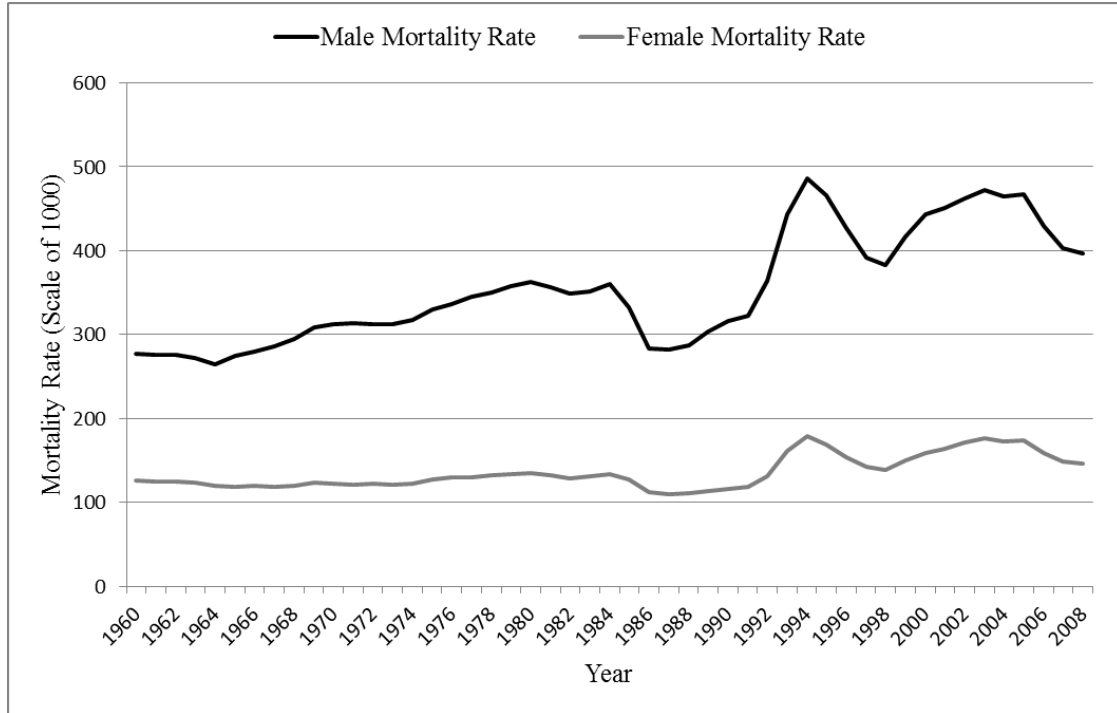
INTRODUCTION

Research Question

The adult mortality rates in Russia have been fluctuating dramatically over the last several decades (Goskomstat). Prior to the 1980s the male rate had consistently risen, whereas the female rate had remained nearly constant. Since that time the fluctuations in male and female adult mortality rates have followed the same trends. Although these fluctuations have mirrored the key national and international events which have occurred during the time period the question still arises as to why. This research looks to answer the question of fluctuations within the adult mortality rates of Russia over the past several decades. Thereby the research question guiding this thesis is what are the key indicators which have caused the fluctuation in the last few decades to occur within the Russian adult mortality rates?

More specifically, this research looks at changes in the adult mortality rates (both male and female) as dependent variables, and attempts to determine what factors have had significant effects on the mortality over the given time period. Specifically the factors which I found as possibly significant fall into three broad categories. The first category is those variables which deal with employment and the state of the economy. The second category of variables is those based around the healthcare system. Finally, several variables, regarding individual behavior, deal with the level of alcohol consumption of the country.

Figure 1.1. Russian gender-based mortality rates.



This research provides a means by which to judge what factors are most crucial in dealing with the ever increasing problem of adult mortality in Russia. By better understanding the state of things as they truly are, policy can be more appropriately planned. It is for this reason that I established this research into the three broad categories listed above. If, for example, changes in the alcohol consumption levels have a high correlation with changes in the mortality rates, it might be appropriate for policy to be enacted which would effectively limit alcohol consumption.

On July 8th of 2000, upon being elected as the President of the Russian Federation, Vladimir Putin gave a speech discussing the dire situation in which Russia found itself. He explained:

Before Talking about priorities and setting tasks, let me list for you the most acute problems facing our country. Population decline threatens the survival of the nation.... Russia is first and foremost people. People who look on it as their home. Their welfare and a worthy life for them are the main task facing the powers that be – whoever these may be.... As each year goes by there are fewer and fewer of us citizens of Russia. For Several years past the population of the country has been diminishing on average by 750,000 a year. And if we are to believe the forecasts... then in 15 years from now there may be 22 million fewer Russians. I ask you to ponder this figure – one seventh of the country’s population. If the present tendency continues there will be a threat to the survival of the nation. We are under a real threat of becoming a drifting nation. Our demographic situation today is an alarming one. (quoted in Herd 2002 p. 8)

The Russian population had been declining at the same rate for several years since that speech, and following this specific speech the Russian government formed a commission with the express purpose of addressing the demographic problems which threatened Russia’s existence as a State. Although this is likely an overstatement of a political pundit, it shows the desire of Russia to develop policy which effectively addresses adult mortality rates.

To represent the importance of this research it is necessary to understand the degree to which the total Russian population has shrunk. In 1991 the population of Russia reached a peak at 148,689,000. As of the 2010 census, the population is 142,905,200 (Goskomstat). That is a 4% decrease in the population in less than twenty years. With a population that has shrunk by as much as Russia has, curbing this decline is very key in Russia regaining their world power status which is quickly disappearing along with their population. Professor Graeme Herd explains this point in the book

Russian Regions and Regionalism, “If population size has traditionally been used as one of the determinants of state power, then the protection and sustainability of the population is a litmus test for the effectiveness of the state” (Herd, 2003). I would further this concern only by stating that if the litmus test Professor Herd would use is controlling the size of population, then to know what measures would be most effective in undertaking that control would be a crucial first step in progress toward the stability of the population size. Knowing what indicators lead to changes in mortality rates will help reduce mortality rates for males and females. For this reason this research focuses on changes in mortality rates, rather than the absolute level.

Russia had essentially gotten used to being the key player in the Soviet Union in sheer numbers as well as politically and economically, and thereby was dealing with a big blow when the Soviet Union fell apart. In 1990 it was estimated that approximately 291 million people lived in the Soviet Union. In 1992 the fall of the Soviet Union led Russia to have a population of 148 million people. This obviously was one of a tremendous number of changes. This change took the Soviet Union, which was the third largest country, and created Russia, which was then the sixth largest country in the world. In 2000 it was still holding on to the sixth spot, but by 2010 it has fallen to the ninth spot. According to the U.S. Census Bureau it will likely fall to the thirteenth spot by the year 2040.

The initial hypothesis is that a collection of these factors are strongly correlated with the declining population due to an increasing mortality rate. The scholarship on the topic seems to point to a variety of causes, but alcoholism is perhaps among the favorites (Pridemore, 2008, Herd, 2002 and Shkolnikov and Mesle, 1996). Indeed

Nicholas Eberstadt, senior Adviser to the National Bureau of Asian Research claimed in 2005 that, “As it happens, in recent decades variations in alcohol consumption seem to track fairly closely with changes in Russian mortality (and especially with male mortality)”. Among other factors which have been considered are the state of the health care system (Rozenfeld, 1996, and The World Bank, 2005) and, to a lesser degree, the economic and political transition (Cornia and Panizza 2000). The research regarding the transition has largely been graphical interpretations rather than statistical analysis, and has regarded international comparisons with all Eastern European countries undergoing transition.

Background

Men are expected to have a shorter life span than are women in the majority of societies in the world. In fact of the roughly 200 countries for which data was gathered as part of the CIA World fact book estimates for 2011, only seven countries have a male population which has a longer life expectancy than females. Although Russia follows this same pattern – of women outliving men – the difference, in the case of Russia, is the extremity of the gap. Russia has the largest gap in life expectancy between men and women. Men live on average to 59.33 years while women live to be 73.14 years old. This difference of nearly 14 years is surpassed by none. In fact the world average is only 4.24 years. Although the gap is an interesting fact, and perhaps a good question for future research, it existed well before the period I will analyze. The question here is not what caused the gap, but rather what are the causes of the current fluctuations. Russian adult male mortality is not only much higher than the female rate,

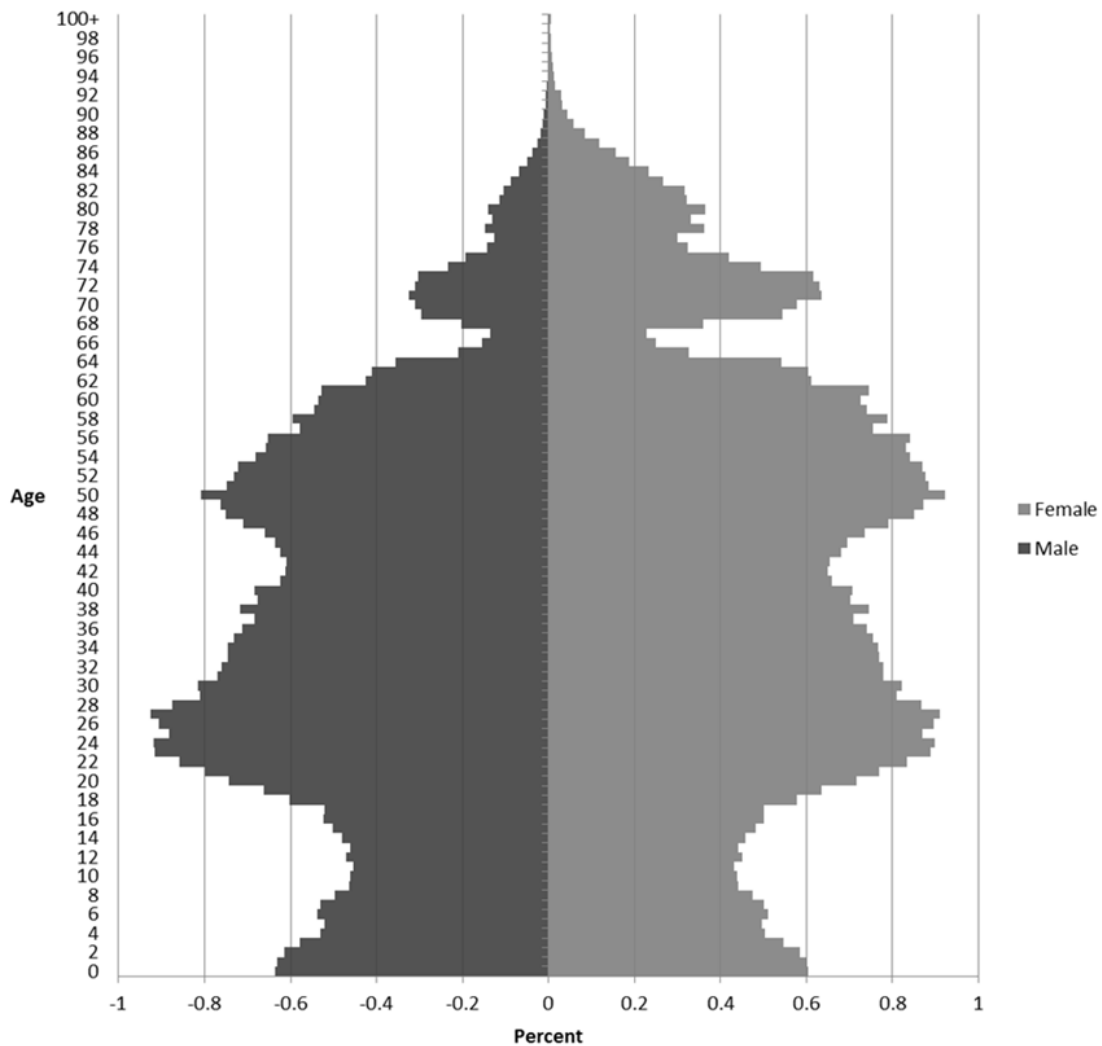
but also fluctuates much more wildly. Furthermore, the question is whether policy can be implemented to decrease the mortality rates.

A useful tool to help in clarifying this set of concerns and thereby drawing closer to the answer is the demographic pyramid. What a demographic pyramid does essentially is represent the portion of a population that falls into each age group by gender. The reason for the title of demographic pyramid is simply that in an ideal situation the male and female portions of the pyramid would be even throughout the various ages, and that the portion of the population at a given age should be less than the portion at the age directly younger than itself. Using demographic pyramids, we can see a lot about any particular population. The various booms of procreation can be seen, as well as the busts of devastating wars and plagues.

Russia is able to tell us a lot through the uneven nature of the pyramid. Visible are the remains of the purges of the 1930s, and the devastating effect World War II had on the population. On the other hand one can find the baby boom following the gap left by World War II. These characteristics are common among many nations. Bumps and divots in the demographic pyramid are very common, but Russia has one characteristic which is more unique. The male percentage of the population falls off very quickly and dramatically during the adult working years. It is this dramatic decrease in the adult male population which defines my research question. The adult male mortality rate in Russia is approximately two and a half times the corresponding female mortality rate. My thesis will attempt to determine what factors have combined to produce such an extremely high rate for men, while leaving the corresponding

female rate at a lower level. This will be done by looking at what factors have played a key role in leading to changes in gender-based mortality rates.

Figure 1.2. Russian population pyramid based on January 1, 2011 estimates.



In 1960 the Russian male mortality rate was at 277.05. That is to say that a 15 year old Russian had just over a 27% chance of dying before reaching the age of sixty if subject to the then current age specific mortality rates. The 2008 data for this same

statistic show over a 39% chance of death before 60. Unfortunately the 2008 data are not even the worst. In 1984 the adult male mortality rate topped out at 486.42. Aside from being astounding in sheer numbers – Russian men had only about a 50/50 shot at making it past 60 years old – it poses an interesting question. What is the reason behind the shifts in the Russian adult male mortality?

Interestingly the high and low points in the Russian adult mortality rates have followed the same pattern across genders with only one major exception. From 1960 to 1984 the female rate remained relatively low, drifting in the 120s. Over the same period the male rate increased from about 270 to nearly 360. However, in 1984 the two both followed the same trends year to year. In 1984 the male rate had already reached an astounding 359, and the female rate had reached its highest to date, which was only 134. In 1987 they had both come back down to a new low (282 and 110 respectively). They both trended upward through 1991 when the rate of increase sped up. By 1994 they had both reached their maximum points at 486 for men and 178 for women. They then dropped until 1998, grew through 2003, and dropped until the most recent data in 2008.

The majority of these major trends can be connected to financial, political or social changes which occurred. A few examples should suffice here. In 1985 Gorbachev implemented an anti-alcohol campaign, aimed at reducing the level of alcohol consumption across the nation. This corresponds with a dramatic downturn in the number of deaths. In 1987 the campaign was eliminated, which corresponds with the reversal of the previous trend. In 1991, when the rate of increase sped up, the entire socio-economic and political system changed as the Soviet Union collapsed. 1998

marks an increase in adult mortality rates which, as would be expected, corresponds with the Russian financial crisis. It is quite likely that the international recession of the last few years has created a spike in the adult mortality rates that will be analyzed in the future.

Overview

The thesis is comprised of a total of five chapters, the first of which is this introductory chapter. This chapter is intended to have acquainted the reader with the appropriate level of understanding essential for the remainder of the chapters. The following four chapters include three substantive chapters and a concluding chapter. This work has a strong founding in recent history, but is not intended merely as a historical piece of literature. The intention is to investigate the recent trends in Russian adult mortality through the use of time-series regression analysis.

Chapter II, the first substantive chapter will act as a review of the current relevant literature. This chapter organizes the scholarship already written into the three main categories which correspond with those categories already established. The first category again is the relationship between the health care system and the mortality rates. The second category is the literature which looks at the correlation between the economic system and the mortality rates. The final category discusses the rate of alcohol consumption with the relevant mortality levels. All of this literature serves to set up my hypotheses, which are presented at the end of the chapter.

Chapter III covers several main points. The first portion of the chapter is dedicated to the terminology of the research. The second category is the data and

measures which were used in the analysis. Here a brief discussion is presented as to the method by which Goskomstat retrieve their data, and to their reliability as a source. The third section of this chapter discusses the model and the process of estimation. Finally the results of the model are presented.

Chapter IV will be the findings of the study, and is divided into three main sections. First, a conclusion is rendered for each of the hypotheses discussed in chapter two. Following that the research questions are revisited and answers are given to the best of my ability given the data and the results of the test. Finally the summary of the results is looked into.

Chapter V contains three main components. The first section contains the implications of the research. These will largely be focused toward future policy implications that can be used in reducing the adult mortality rate. Following that a discussion is presented as to any alternative explanations which might explain the findings of the test. Finally a section which invites others to continue this research is presented. This includes areas where the research could potentially be improved or expanded upon.

CHAPTER II

LITERATURE REVIEW

Vladimir Shkolnikov states that the excessive male mortality in Russia is “probably the highest in the world.” (1995, p. 129). Although the Russian gender specific birth percentage is approximately equal to the rest of the world, with slightly more male babies than female babies. This trend is only the case until approximately halfway through their working lives. Sergei Vassin, a colleague of Shkolnikov’s at the Russian Academy of Sciences, estimates that among the age group of 60 and over, there are only 390 males for every 1000 females (1995, p. 180). These numbers have improved since 1995 to 460 males to every 1000 females.

The purpose of my thesis is to determine what causes have affected the mortality rates of men and women. This section fulfills the role of looking at the literature which is currently available, and showing that my model will effectively pit several of the competing hypotheses against one another. Specifically this chapter will discuss the literature which argues for three categories which cause the mortality rates to be such as they are. First, the literature is reviewed on the importance of the economic prosperity of the country as a whole. Following this, scholarship on the state of the health care system is analyzed. Then the literature regarding the Russian alcohol consumption levels is discussed. Finally, the hypotheses which I seek to discuss are developed from the three categories.

Economy

The state of the economy is a variable which is discussed to a minimal degree in the literature, but which I feel may have an effect on the mortality rates in Russia. From my research into the scholarship of others, it seems that the economic variables of Russia are being ignored. The reason for this tendency being that other variables are more exciting not that they are more relevant. One such point comes from the work of Nicholas Eberstadt, in his work *Russia, the Sick man of Europe*. Here he explains that the dismal health record of Russia can be explained through a multiplicity of issues. He lists “pervasive smoking; poor diets; sedentary life styles; increasing social atomization and anomie; the special economic stresses of Russia’s ‘transition’; the unimpressive capabilities of the Soviet medical system and the limited coverage of its successor”. He explains that it is impossible, even given all this, to overlook “the Russian love of vodka” (p. 13). Although he gives a listing of other variables, the remainder of his discussion on the cause of the high death rate is dedicated to this relationship which Russians have with vodka.

Furthermore, there seems to be some evidence which would seem to point one, initially at least, away from the economy as a cause for mortality. According to a 2005 report conducted by The World Bank, “In recent years, prosperity has increased due to rapid economic growth, but demographic and health trends remain worrisome – even alarming.” (p. xiii). Although this recent trend seems to show no correlation – with the economy trending to prosperity, and the health trends continuing on their dismal course – it is only one part of the overall picture. The time period discussed in this specific example is following the 1998 financial crisis, and as such only covers

roughly a six year span. One final reason I feel it would be important to include the overall state of the economy as a variable is the brief international comparison with the other former Soviet nations.

Cornia and Panizza do represent the economy as being a relatively important factor. They conclude their research with a suggestion that policy aimed at improving employment and reducing stress were most successful at limiting the post-Soviet mortality crisis. They use the example of the Czech Republic and other East European countries to show that countries which have managed to maintain low unemployment have also generally had lower mortality rates. They explain that “In the Czech Republic overall mortality fell in line with the persistence of unemployment at very low levels, and provincial data exhibit a positive association between changes in male mortality and the provincial rate of unemployment” (p. 15).

Cornia, in a separate article finds a strong association between male mortality rates for Russia and unemployment. My addition to this current body of work is an effort to show that, from data on post-Soviet Russia, economic well-being does play a key role in both changing adult male and female mortality rates. Furthermore, I have used the measure of disposable household income to represent the economic well-being of the citizens. My hope here is that the disposable household income can be an improved measure of well-being as compared to unemployment. This is in consideration of the fact that Russia is transitioning from a quasi- full employment society.

Healthcare

Before the 1990s Russia was part of the Soviet Union, and thereby had a socialized healthcare system. The World Health Organization in 2000 gives a brief description of this system. “After the Bolshevik revolution in 1917, it was decreed that free medical care should be provided for the entire population, and the resulting system was largely maintained for almost eight decades. This was the earliest example of a completely centralized and state-controlled model” (World Health Report, 2000). It was structured in a way which was designed to provide free health care for all of its citizens. Indeed, Article 41 of the Russian constitution guarantees the continuation of this guarantee of healthcare free of charge to all Russian citizens. As a result of the Soviet style system there was success in some areas – largely the controlling of communicable diseases – and had failure in some others. As with other industries in the Soviet Union the problem arose concerning external growth instead of internal growth. Russia to this day holds some of the weight from this system in that they have among the largest number of doctors and hospital beds per capita of any country in the world. The World Bank estimates that hospital beds per capita in Russia ranks third in the world, behind Japan and Belarus with just under ten beds per 1000 people (World Development Indicators).

In the Soviet period there was a slogan which briefly explains the paternalistic nature of the Soviet healthcare system. “The State cares for the health of its citizens.” (Rozenfeld 1995, p. 164). Although it follows general international standards that any state ought to look after the well-being of its own citizens, this idea put an enormous amount of the weight of health care off of the individual and onto the State. The result

is a system where the obligation of a citizen to see to their own health is completely removed, and an irresponsible attitude was adopted. Furthermore, the Soviet system was ideologically minded. As such, the goals which were introduced were oriented toward governmental goals rather than aimed at the individual, and the citizens were not able to look for other service. The system in the USSR paid attention to the ideology, as opposed to the level of development, demand and medical problems at hand. Perhaps this is why the system was able to effectively minimize communicable diseases as well as it did.

As mentioned above, Russia has a tremendous number of both doctors and beds per capita when compared to the rest of the industrialized world. The United Nations Development Program estimates that Russia has 425 physicians per 100,000 people. The United States has only 256. On the other hand the World Health Organization estimates that the United States spends over six thousand USD per capita compared to only 583 in Russia. Although the system in the United States is arguably full of waste and high cost, this illustrates the difference between the growth of the USSR with another industrialized nation. Whereas the United States system has been one striving for intensive growth through advances in research and methods of care, the health care system in Russia is one which is characterized by extensive growth through increasing raw numbers of doctors and hospital facilities rather than intensive growth.

Alcohol Consumption

It is necessary in looking at the pathetic state of male mortality to include a representation of the Russian love for alcohol. Alcohol does, without any doubt affect the health of the male population dramatically worse than it affects the female portion of the population. Jacek Moskalewicz summarizes the thoughts of several authors by stating simply, “According to many authors, alcohol played a crucial role in the rise in mortality, especially among middle-aged men” (2000, p. 94). His research then goes on to show a relationship in the countries of Eastern Europe between alcohol and several causes of death. His work looks at six main causes of death – from car accidents and suicide to liver cirrhosis and alcohol poisoning – and their relationship to alcohol consumption. It was mentioned above that Russian male mortality is more prone to react to changes in society than is female mortality. Part of this reaction is due to increased or decreased alcohol consumption among the male population.

Although the Russian political system has been unable to create health care policy which has been effective in the last two decades, during Soviet time the government had one very note-worthy experiment with direct policy against the social illness of alcoholism. This policy was the 1985 anti-alcohol campaign championed by Prime Minister Mikhail Gorbachev the Soviet leader beginning in 1985. Prior to Gorbachev Russian leadership had varying views with respect to alcohol. There have been anti-alcohol campaigns dating clear back to Tsarist times. However, just as some leaders have sought to do away with alcohol, others have used the alcohol consumption as a boost for the state economy. The Soviet leadership, just like the Tsars before them, had varying views on alcohol. Initially there was an attempt to do

away with alcohol. Stalin then established a state monopoly to help with funding of the government. Several of the immediate predecessors of Gorbachev tried to limit alcohol, but none were nearly as successful. William Pridemore of Indiana University has done extensive research on this, and is able to show a correlation between alcohol consumption, suicide and homicide (2008). His work shows a noticeable dip in all three variables from 1985 until the start of 1987 and a maintained level until an incredible boom in 1991-1993.

Alcoholism has definitely played a role in the high mortality rates in the Russian Federation over the past several decades. The above discussion – of Gorbachev’s anti-alcohol campaign – provides an example from the history of Russia where a definite correlation exists. Pridemore has done extensive research on the subject, and shows more than the previously mentioned correlation between violent mortality and the anti-alcohol campaign. One of the studies by Pridemore used a regional analysis looking at alcohol consumption and compared it to regional homicide rates. Of all variables in the model, alcohol’s role in homicide was the greatest. In a related study, Pridemore found that in the Udmurt Republic the daily distribution of alcohol-related deaths was similar to the distribution of homicide mortality (2008, p. 7). He reported having found a close correspondence between the two.

According to Vladimir Shkolnikov, of the Russian Academy of Sciences, and France Meslé, of the National Institute of Demographic Studies (INED), “Gorbachev’s anti-alcohol campaign... caused a break from the long term trends.” (1995, p. 122). They further argue that “the anti-alcohol campaign of 1985-1987 provides the unique possibility to extract a pure effect of alcohol abuse on mortality.” (p. 131). The reason

they argue that Russia is able to provide us this unique perspective is the type of drinking which occurs most commonly in Russia. Where most other nationalities consume a fair portion of their alcohol in social settings – such as restaurants, bars and parties – where a limited amount of low alcohol content beverages are consumed, Russians are known for drinking highly alcoholic beverages, drinking in private settings and binge drinking. In effect Russia is providing us such a pure view because of how quickly they are able to die from alcoholism. Where in the United States liver cirrhosis and other alcohol related diseases can take years to develop and slowly kill the victim, acute alcohol poisoning, homicide and suicide work more quickly.

Estimates concerning the attribution of mortality to alcoholism vary somewhat. Pridemore estimates that one third of all deaths in Russia can be either directly or indirectly associated with alcoholism. Previously in this article data was used from the World Health Organization which estimated 11.9 percent of deaths are directly related to alcohol. That is if only the acute alcohol poisoning deaths are taken into account. A high portion of liver cirrhosis, suicide, homicide and traffic accidents have alcohol to blame. The degree to which alcohol is correlated with these deaths is not minimal, as shown by the previously mentioned work.

Although the Gorbachev era anti-alcohol campaign effectively reduced alcohol consumption, and all the ills that follow, this effect was incredibly temporary in nature. The campaign consisted mainly of restriction of public access to alcohol. However, this campaign did nothing to affect the attitudes of people toward alcoholism. In effect, where the anti-alcohol campaign stopped people from drinking, it did so by reducing their access to alcohol, and it did not take away their desire to drink. Much like the

United States prohibition, Russians started to brew their own alcohol more commonly. This alcohol was less safe, and the trend of samogon continues today.

Hypotheses

The three categories discussed in this chapter all seem to have a reasonable explanation for their relationship with mortality. Alcohol seems to be among the favorites of many scholars, and with good reason. Several of the authors have found definite correlation between the two variables. The state of the healthcare system also seems to be a good argument, and shows that overall it has in the past had quite a bit of correlation. Finally, the economy is one topic which – although addressed in the literature – has not had much formal research performed to determine its relationship with mortality. However, my research has broken the overall relationship into several specific gender-based hypotheses dealing with each of the three categories.

The Economy:

H₁: Changes in disposable income have a negative effect on changes in adult male mortality.

H₂: Changes in disposable income have a negative effect on changes in adult female mortality.

H₃: The effect of changes in disposable income on changes in adult male and adult female mortality will be approximately equal

Healthcare:

H₄: Changes in the infant mortality rate have a positive effect on changes in adult male mortality.

H₅: Changes in the infant mortality rate have a positive effect on changes in adult female mortality.

H₆: The effect of changes in the infant mortality rate on changes in adult male and adult female mortality will be approximately equal.

Alcohol Consumption:

H₇: Changes in crimes committed while intoxicated have a positive effect on changes in adult male mortality.

H₈: Changes in crimes committed while intoxicated have a positive effect on changes in adult female mortality.

H₉: The effect of changes in crimes committed while intoxicated will be greater on changes in adult male mortality than on changes in adult female mortality.

My first set of hypotheses regard the economy. My hypothesis is that the economy (here measured by the disposable household income) has had an equal effect on both genders, and that this effect is a negative effect. That is to say, that an increase in disposable household income of Russia would cause a decrease in the mortality rates of both genders. Furthermore, the decrease in the female mortality rate would not be different from the decrease experienced by the male mortality rate. My reason that

the economy should affect men and women equally is the high employment rates of women in Russia, and thereby they should be more directly affected by the state of the economy than in other countries where women perform a more traditional role.

The second set of hypotheses deals with the state of the healthcare system. Here I hypothesize that an increase in the infant mortality rate would lead to an increase in the adult mortality rates of both genders. Like my first set of hypotheses, here I believe that the decrease in the adult male mortality rate would be affected to an equal degree when compared to the adult female mortality rate if given the same change in the infant mortality rate. Here I am choosing to use the infant mortality rate as my measure of the healthcare system, because, although it is rough, it is fairly consistent in the mechanism of effect over the given time period. This measure is more able to avoid the conflicts inherent in measuring with the number of doctors or the number of hospital beds. Where both of these measures have had dramatic changes in their effect, the infant mortality rate has remained relatively constant. Both measures fail to take into account changes in technology and medical advances. The hypotheses essentially say that the healthcare system ought to have an equal effect on both the male and female portions of the population. My reason for this assumption deals with child bearing. Since this is the only major difference experienced by women with regards to the healthcare system, it would make sense that if the healthcare system were to affect women differently it would be in child bearing. Over the past several decades over 99% of all births have been attended by a medical professional. With this sort of consistency, it is unlikely that a change in the healthcare system would have a greater effect on women than on men.

My final set of hypotheses agrees with the majority of the literature (Moskalewicz et al 2000; Shkolikov and Cornia 2000; Pridemore 2008). Here, I agree that the mortality rate of adult men should be more strongly affected by changes in alcohol consumption. Here the correlation will be a positive one. That is to say that an increase in the alcohol consumption would cause an increase in the mortality rates of both men and women. Using the measure here of crimes committed while intoxicated allows for a rough measure of changes in actual alcohol consumption. The key factor in choosing this over actual alcohol sales was samogon. Here I am assuming that crimes committed while intoxicated will be a closer measure of the actual consumption than will be sales because sales only tracks absolute sales of legal alcohol.

CHAPTER III

MODEL

This chapter is comprised of three main sections, and covers the data used and the tests which were performed. The first section of this chapter is on the data and measures which were used during this research. This section discusses the validity of Goskomstat as a source, and the method by which the data were gathered by Goskomstat which I in turn used. The second section contains the model, and the method of estimation which was used. This section discusses the model, and process of estimation. Finally a section stating the results of the model is provided. This section is only a brief outline of the results, as the overall discussion of the results is given in chapter four of this thesis.

Data and Methods

Goskomstat is a name still commonly used for the Russian State Statistical Office. The term comes from the old title of Gosudarstvenii Komitet po Statistike (The State Committee for Statistics) which was the predecessor for the Russian State Statistical Office. The basic functions of Goskomstat and its predecessor have been the collection, analysis, publication and distribution of state statistics, including economic, social, and population statistics. The specific publication which I used was the Russian Statistical Yearbook. This publication has been distributed in the Russian Federation since the fall of the Soviet Union under that name. Data contained in the yearbook dates back several decades, and thereby also allows for some historical context on the tests which were performed on the data. Prior to the year 1992 the Yearbook simply

did not represent the unemployment levels. This is answered simply by the fact that according to Soviet era standards unemployment essentially was ignored and assumed to not exist. How I dealt with this is discussed later. However, all the other data seemed to follow the patterns that would be expected.

The data which were collected and used from the Goskomstat Russian Statistical Yearbook fall in to four categories. First, I used statistics dealing with the state of the Russian healthcare system. The data in this category were hospital beds and doctors measured on a per capita basis, as well as the infant mortality rate. The second category was statistics dealing with the overall state of the Russian economy. Here unemployment data by gender, the gross domestic product and the amount of disposable household income were used. Finally, statistics were gathered that dealt with Russian alcohol consumption. These included alcohol sales by volume, crimes committed while intoxicated and deaths caused by accidental alcohol poisoning. Here again a problem arises with the data. Russia has a high amount of samogon alcohol (home brew) which is not calculated in the official statistics. The final category is the dependent variables. These are the adult male mortality rate and the corresponding adult female mortality rate.

The Russian population data are collected and estimated by the following process. The registration of such events as births, deaths, marriages and divorces are received on the basis of annual processing of data contained in the records on birth, death, marriages and divorces respectively filed by the civil registrar offices. Only live births are recorded in the birth rate. The source of information on the causes of death is represented by inscriptions in the death certificates issued by physicians concerning

diseases, accidents, homicides, suicide or other external causes as being the cause of death. The inscriptions are then sent to state statistical bodies for compilation and tabulation. The death rate by causes is a ratio of deaths by causes specified to mid-year present population (by current estimates). Infant mortality rates are computed as a sum of two components, the first of which shows the ratio of the number of deaths under one year from the generation born in the year for which the rate is computed, and the second component shows the ratio of deaths under one year of infants from the generation born in the preceding year, to the total number of births of the preceding year. Before January 1, 1999 records of deaths by causes of death were compiled according to the then current Abbreviated Mortality List which was developed by the World Health Organization. Since January 1, 1999 the records of deaths by causes of death have been compiled according to the Abbreviated Mortality List which was revised and expanded (Statistical Yearbook).

In the report *Dying Too Young*, by the World Bank, they determine that the data quality is not a problem, and give the following explanation. “Poor data quality has been ruled out as an explanatory because demographic data are considered reliable: Russia’s registration of vital events is nearly complete and its coding of broad categories of death is reasonably accurate” (2005, p. xiii).

Model

The model which I derived started with the following variables. The mortality rates are simply the likelihood of a person who is 15 at the time dying before the age of 60. This data is collected by gender for the simple purpose of testing the

hypothesis that different factors affect each gender differently. For this reason the tests are all set up to compare the male mortality rate to the female mortality rate over the given time period holding all else constant.

Infant mortality rate is the likelihood of an infant dying before their first birthday. I have chosen to use this measure to track the state of the health care system. It is my assumption here that the infant population are those least likely to die due to external causes such as alcohol and car accidents, and most likely to die due to poor health care availability. Under this assumption it is reasonable than to say that the infant mortality rate should track the overall state of the healthcare system.

Both the beds and doctors measurements are also used to track the state of the health care system. The flaw in this approach will be discussed in more detail in the final chapter. Namely, this flaw is that during the Soviet era bigger was considered better throughout all industries. This issue of extensive growth led to a country with nearly the highest number of hospital beds and doctors per capita. However, these again should track – albeit to some lesser degree – the overall state of the healthcare system as well. Furthermore, the healthcare system was originally disbursed through the workplace during the Soviet period, and has since gained a large private sector, and disbursement of public healthcare has shifted away from the workplace. With so many changes, it is difficult to use beds or doctors as a measure of the quality of healthcare. For this reason I chose to use the infant mortality rate as my measure.

The remaining variables (economic and behavior) all require a bit more description. To measure the economic activity of Russia at a given time I initially

chose the variable of unemployment. This variable worked well as it could be broken down into gender-based unemployment, but had one key concern. Prior to 1992 unemployment was not recorded in the Soviet Union, although it did exist. Rather than attempt to measure unemployment by some other means – labor force activity rates or the like – I chose to use the overall GDP of the country to show the economic well-being of the citizens. During the 1998 financial crisis the ruble was drastically devalued. I used the same method which Goskomstat used to establish a standard. Up until and including 1998 the ruble is counted in billions, following 1998 it is counted in millions. However, my final decision was to use the measure of disposable household income. This allowed me to account for the fact that Russia, as a major exporter of oil, has a large portion of GDP which is not spread among the citizens.

The alcohol variables also caused more than a few issues with respect to measurement. Alcohol sales, as previously mentioned, only counts the legal sale of alcohol. For this reason I included in two additional variables. The first variable included is deaths caused by alcohol poisoning. The second variable included was crimes committed while under the influence of alcohol. These two variables would reasonably follow the trend of actual alcohol consumption and include in them the consumption of samogon. In the end I chose to use the measure of crimes committed while intoxicated. This measure would more accurately portray the actual consumption of alcohol than would alcohol sales per capita, as it takes into account samogon. Furthermore, it doesn't simply estimate all deaths by measuring one type of death as the acute alcohol poisoning deaths does.

In the end my choice on which data to use came from their correlation with the adult mortality rates for each gender. These correlations can be seen in the chart below. My choice for a variable from the healthcare system field was the difference in the infant mortality rate from two years prior to the current year. From the macroeconomic indicators variables I chose to use the general measure of the difference in disposable household income from two years prior to the current year. This was done – instead of using gender-based unemployment – with two reasons in mind. Firstly, it allowed the test to keep the seventeen observations instead of losing an additional two observations. Secondly, even when tested for correlation, the disposable income seemed to be the better indicator. Finally the measure of alcohol consumption used was the change in crimes committed while intoxicated for the current year. This measure seemed to have the strongest correlation of any of the alcohol related variables with the exception of deaths due to acute alcohol poisoning. The measure of deaths caused by alcohol poisoning was not chosen due to the previously mentioned concern of measuring one type of death.

The data used were primarily for the dates from 1990 to 2008. This was chosen purely on the availability of the data. Although some of the variables, such as mortality rates and health care availability, were measured clear back to the 1940s without a skipped year, the majority of them, alcohol and unemployment, were only given consistently back to 1990 every year, with five or even ten year increments prior to that time. The tests are done only on the primary time period, dating back to 1990. However, I performed the same analysis on the more sparse data which dated back

Table 3.1. Correlations of the Rates of Change of the Dependent Variables with the Rates of Change of Independent Variables with Lags up to Three Years

	Changes in Each Variable from the Same Year										
	Infant Mortality Rate	Hospital Beds	Doctors	Alcohol Poisoning Deaths	Intoxicated Crimes	Alcohol Sales	Total Unemployment	Male Unemployment	Female Unemployment	GDP	Disposable Income
Change in Male Mortality Rate	-0.0556	0.2288	-0.4693	0.9516	0.2199	0.4338	-0.462	-0.4902	-0.4489	-0.099	-0.122
Change in Female Mortality Rate	-0.0493	0.1785	-0.466	0.9516	0.1336	0.467	-0.4037	-0.4306	-0.3975	-0.1205	-0.1269
	Changes in Each Variable from the Previous Year										
	Infant Mortality Rate	Hospital Beds	Doctors	Alcohol Poisoning Deaths	Intoxicated Crimes	Alcohol Sales	Total Unemployment	Male Unemployment	Female Unemployment	GDP	Disposable Income
Change in Male Mortality Rate	0.0289	-0.043	-0.6799	0.6747	-0.3488	-0.0579	-0.0724	-0.1669	-0.0254	-0.2232	-0.2473
Change in Female Mortality Rate	-0.0893	-0.0057	-0.6901	0.7047	-0.397	-0.1085	-0.1509	-0.2438	-0.1156	-0.2266	-0.2342
	Changes in Each Variable from Two Years Previous										
	Infant Mortality Rate	Hospital Beds	Doctors	Alcohol Poisoning Deaths	Intoxicated Crimes	Alcohol Sales	Total Unemployment	Male Unemployment	Female Unemployment	GDP	Disposable Income
Change in Male Mortality Rate	0.2416	-0.4714	-0.202	0.0353	-0.7227	-0.2919	-0.0735	-0.1225	-0.1008	-0.3332	-0.3172
Change in Female Mortality Rate	0.272	-0.4217	-0.2117	0.0603	-0.6739	-0.2318	-0.1337	-0.2024	-0.181	-0.3267	-0.2847
	Changes in Each Variable from Three Years Previous										
	Infant Mortality Rate	Hospital Beds	Doctors	Alcohol Poisoning Deaths	Intoxicated Crimes	Alcohol Sales	Total Unemployment	Male Unemployment	Female Unemployment	GDP	Disposable Income
Change in Male Mortality Rate	-0.1802	-0.4409	0.279	-0.5267	-0.6367	-0.4892	-0.0893	-0.0561	-0.1039	-0.1238	-0.1804
Change in Female Mortality Rate	-0.2052	-0.4168	0.2001	-0.4657	-0.5769	-0.4888	-0.1226	-0.0844	-0.1291	-0.0946	-0.1824

farther. No anomalous information was found in the tests which included data from 1960 onward, so the primary period from 1990 to 2008 was kept.

Only having seventeen observations is not considered ideal in any science. However, dealing with policy issues and the social sciences, it is necessary to make decisions on occasion with the data which are available. In my discussion at the end this issue is opened more fully. It is sufficient here to state that the lack of data in no means detracts from the importance of the research. It is hoped that this research can be expanded in the future to include the regions of Russia or a quarterly measure of the relevant data.

The two models used were the following:

$$\Delta y_t = 14.43 + (-6.39)(\Delta x1)_{t-2} + (0.3098)(\Delta x2)_t + (-0.0122)(\Delta x3)_{t-2}$$

$$\Delta y_t = 5.47 + (-2.207)(\Delta x1)_{t-2} + (0.1069)(\Delta x2)_t + (-0.0044)(\Delta x3)_{t-2}$$

the variables are as follows.

y – adult male mortality rate for the first equation

y – adult female mortality rate for the second equation

x1 – infant mortality rate

x2 – crimes committed while intoxicated

x3 – disposable household income

Table 3.2. Determinants of the rate of change of adult male and adult female mortality.

Equation	Period	Constant	ΔI_{t-2}	ΔA_t	ΔD_{t-2}	Adj. R ²
Male	1990-2008	14.43 (10.47)	-6.387 (10.68)	0.3098 (0.163)	-0.01216 (0.0090)	0.2262
Female	1990-2008	5.469 (4.25)	-2.207 (4.33)	0.1069 (0.066)	-0.0044 (0.0036)	0.146

I = Infant Mortality Rate. A = Crimes Committed While Intoxicated. D = Disposable Household Income

Estimated standard errors are presented parentheses below the coefficient.

The change in the male mortality rate seems, from the equation, to have a much higher constant. This indicates what is shown in the graphical representation in the appendix which shows the male rate and the female rate. Although the male rate is initially higher than the female rate, the gap expands across time. This is consistent with the results indicated from the equation. The variable infant mortality rate seems also to affect the adult male mortality rate to a greater degree than the same variable affects the adult female mortality rate. This seems to stray from what my initial hypothesis stated, that men and women would be equally affected by the state of the healthcare system. Furthermore, this hypothesis was incorrect in that the given effect was in fact negative. However, as will be discussed later, the effect was negligible. The alcohol consumption variable – in the equation measured by crimes committed while intoxicated – seems to have the greatest effect of any of the variables. This is true for both men and women. This is in keeping with my hypothesis that change in the adult male mortality rate would be more prone to changes in the alcohol consumption levels than the corresponding change for females. Likewise, this is in keeping with my hypothesis that the effect would be a positive effect. Finally, the results here show us

that the effect of the change in disposable income is nominal at best. This is not in agreement with my hypothesis that the effect would be negative, and would affect both genders' rates of adult mortality equally. The effect was equal in both genders only in that it had no significant effect on either gender.

CHAPTER IV

RESULTS

The results of my research can be broken down into their answers to the research question, and the three hypotheses established in the previous chapters of this thesis. For this chapter the discussion will begin with a breakdown of the conclusions drawn with respect to the various hypotheses. Following the hypotheses, this chapter will return to the original research questions which were established in the introductory chapter and attempt to answer those questions. Finally a discussion of the results as a whole will be attempted, including a discussion of what this thesis does and does not tell us.

Hypotheses

My first set of hypotheses was that changes in the state of the economy (as measured by the disposable income) have an equal effect on both the male and the female adult mortality rates. Furthermore, the hypotheses state that this is a negative effect. The hypotheses are broken into three equally important portions. First, a positive change in the state of the economy must have a negative effect on the adult male mortality rate. Second, any positive change in the economy would need to have a negative effect on the adult female mortality rate. Finally, the effect which a change in the economy would have on the adult male mortality rate must be greater than the effect which the same change in the economy would have on the adult female mortality rate. These three hypotheses are looked at individually.

Does a positive change in disposable income have a negative effect on the adult male mortality rate? The answer here, as seen in the chart in the appendix, is unclear. The coefficient which corresponds with the variable for disposable income is in fact negative. This would imply at first glance that the hypothesis would be correct on this point. However, the coefficient attached to that variable is incredibly small and thereby insignificant for any practical purpose. Furthermore, the chart goes on to show that the number is not in fact statistically significantly different from zero. So in effect, the answer here is that any fluctuations in the disposable income of the Russian Federation don't seem to have an effect on the adult male mortality rate.

Does a positive change in the level of disposable income have a negative effect on the adult female mortality rate? Again, looking to the appendix at the appropriate chart shows us that the answer is equally unclear here as it is in the case of male mortality rate. Here the coefficient corresponding to the variable for disposable household income is negative (as with the male rate) but is even smaller. Again, the coefficient is not significantly different from zero for either practical or statistical purposes.

The final question here is perhaps the most difficult to answer with the given information. The question is whether a change in disposable income has an equal effect on both the male and female adult mortality rates? At first glance one might be inclined to say simply that the two numbers are both not statistically different from zero, and are thereby not different from each other. Although this may in fact be the case, we cannot conclude with this test that they are in fact equal, but only that further testing would need to be done. However, we can conclude by saying that the state of

the economy, as measured by the amount of disposable household income, has little to no effect on the adult male or female mortality rates. We are unable with this test to replace any previously held belief in the relationship between the amount of disposable household income of Russia and the adult mortality rates of either gender.

The second set of hypotheses was that the state of healthcare would have an equal effect on the adult mortality rates of each gender. Furthermore, the effect is hypothesized overall to be positive for both genders. Just like the previous set of hypotheses, these hypotheses are broken down into the key components. A positive change in the healthcare system (as measured by a negative change in the infant mortality rate) would be required to have a negative effect on the adult male mortality rate. Also, a negative change in the infant mortality rate must have a negative effect on the adult female mortality. Finally, the effect which the change in the infant mortality rate would have on the adult female mortality rate would have to be approximately equal to the effect which the adult male mortality rate experiences. Again these three individual hypotheses are discussed separately.

The first question is whether a decrease in the infant mortality rate would produce a decrease in the adult male mortality rate. The data here are even more vague than with the previous hypothesis. Although the coefficient here is much larger, the standard error has also increased dramatically. In fact, the standard error is even larger than the coefficient itself. We are unable to say that a change in the infant mortality rate will have any effect on the adult male mortality rate

Would an increase in the infant mortality rate cause an increase in the adult female mortality rate? Here again we come across a relatively simple answer. The answer here is the same as for the male portion of the population. Although the coefficient is large, the standard error is even larger. Again, we are unable to say anything as to the effect that a change in the infant mortality rate would have on the female population.

The third part to this hypothesis is whether the effect caused by a change in the infant mortality rate would have an equal effect on both gender-based adult mortality rates. Here the results point to the same problem seen with disposable income. That is to say, that the adult male mortality rate and the adult female mortality rate seem to be unchanged by changes in the infant mortality rate. Overall the conclusion for this hypothesis is that my hypothesis was incorrect in several respects.

The third set of hypotheses is likewise broken down into its respective components. The hypotheses from chapter two state that a given change in alcohol consumption (measured by alcohol poisoning deaths) will have a greater effect on the adult male mortality rate than on the corresponding rate for females, and that the effect is positive. The first hypothesis is that a positive change in the alcohol consumption would have a positive effect on the adult male mortality rate. The second hypothesis states that given a positive change in the alcohol consumption, one would expect a positive change in the adult female mortality rate. Finally, the effect which a change in the alcohol consumption would have on the adult male mortality rate would be expected to be larger than the effect which the same change in the economy would have on the adult female mortality rate.

Does an increase in the alcohol consumption lead to an increase in the adult male mortality rate? This is one of the only questions of my hypotheses which can be answered with a resounding yes. Given the data which were analyzed, changes in the alcohol poisoning death rates do affect the adult male mortality rate. Furthermore the effect caused by changes in alcohol consumption is a positive effect. The coefficient here is positive, and has a very small standard error. Thereby it is safe to say that this data shows a positive effect which is statistically and practically significantly different from zero.

Given a positive change in the deaths caused by alcohol poisoning, do we see an increase in the adult female mortality rate? Here again the answer, with a slightly lower level of confidence, is yes. Given the data, changes in consumption of alcohol produce a positive change in the adult female mortality rate. Like with the male rate of adult mortality, the coefficient is positive, and has a very small standard error. We can say with relatively high confidence that our data portray a positive and significant effect on the adult female mortality rate.

The final question asked is whether the increase in adult male mortality is greater than the increase in adult female mortality when given the same increase in the alcohol consumption indicator. Again looking to the charts in the appendix, we can see that the coefficients associated with the two variables are in fact different. Not only are the coefficients different, but with such a small standard error we can safely conclude that the male rate is in fact affected to a greater degree than is the female mortality rate.

Of the three sets of hypotheses we came out with a mixed set of results. For the first set of hypotheses – with respect to the state of the economy – no conclusive evidence was put forth. Instead we were unable to say that any effect does in fact exist. For our second set of hypotheses – regarding the availability and state of the healthcare system – we were unable to make any conclusive statement given our limited data. For the final hypothesis presented – about the alcohol consumption levels measured by alcohol poisoning deaths – we were able to show that the current research is consistent with our own research. That is, that the current understanding that alcohol is a major cause of changes in the adult mortality rate for both males and females. Furthermore, the effect is greater with respect to the male rate than the female rate.

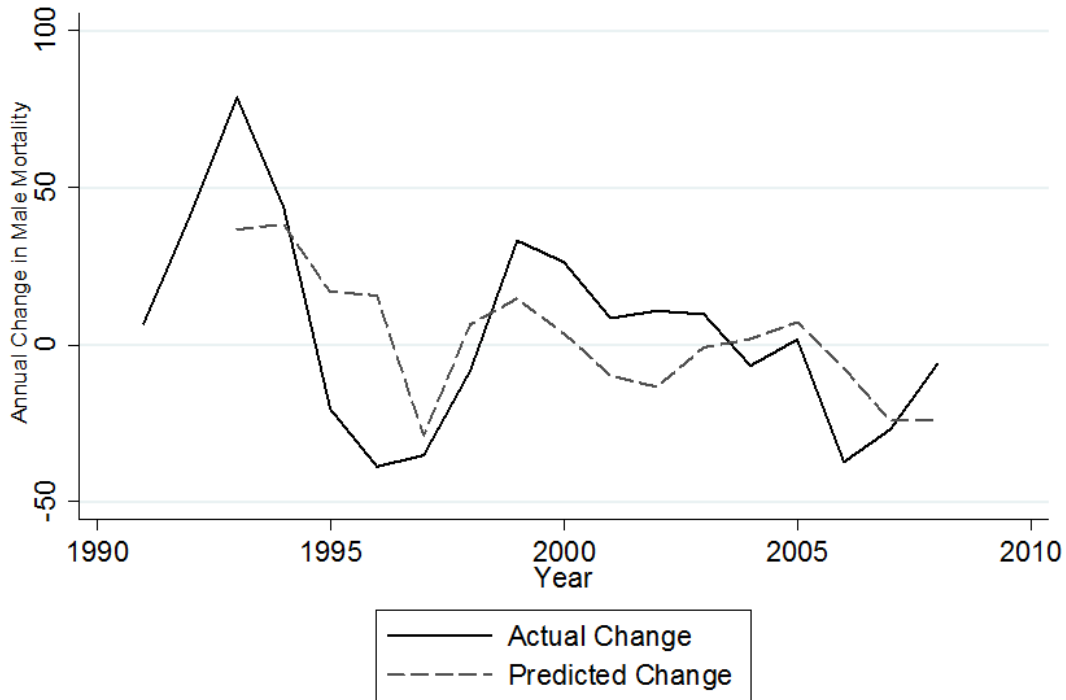
Research Questions

The initial question leading the research behind this thesis was what caused the fluctuation over the past few decades to occur within the adult mortality rates. More specifically, which set of indicators seem to affect the adult male mortality rate, and the adult female mortality rate? How do those indicators affect the mortality rates of each gender? Which of these indicators causes the greatest effect in the adult male mortality rate and the adult female mortality rate?

The changes in the male mortality rate have been most heavily affected by the changes in alcohol consumption levels over the time period. This corresponds with the previous literature on the topic which shows that alcohol consumption levels can be correlated with many types of death. However, the difference also needs to be noted that the state of the healthcare system seems to have no effect on the mortality rates of

either gender. Likewise, changes in the third variable listed (disposable income) did not seem to have any significant effect on adult male mortality.

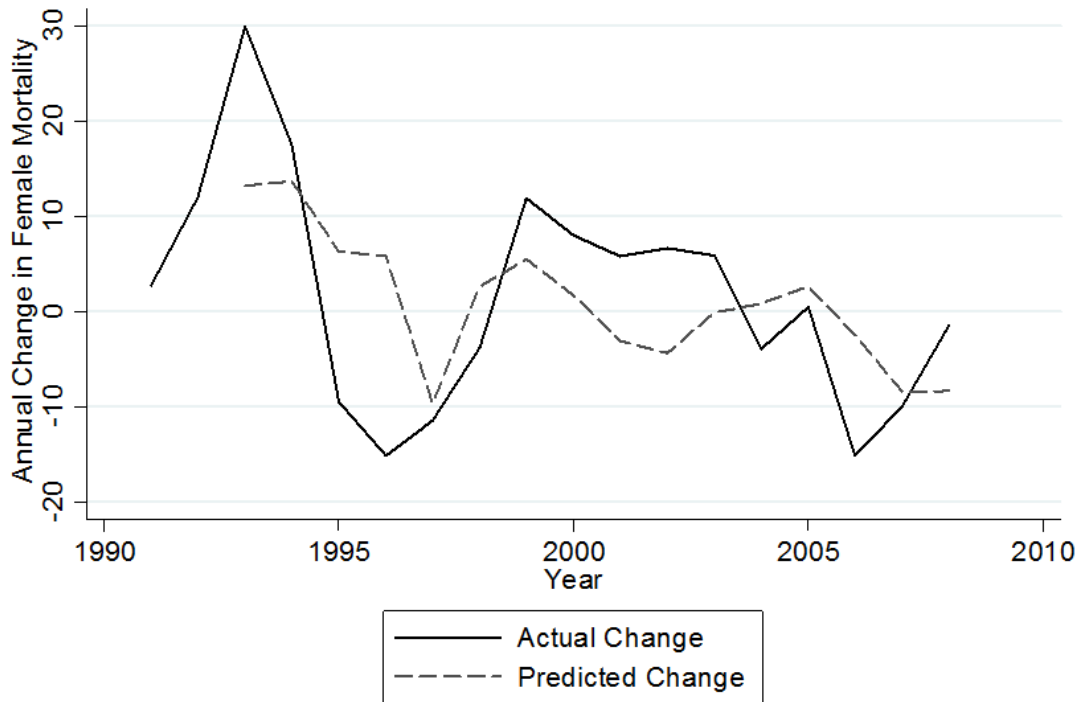
Figure 4.1. A graphical representation of the actual change in male mortality and the change predicted by the model



The changes in the adult female mortality rate were – like the corresponding male rate – most heavily affected by alcohol consumption levels over the past few decades. However, like the male rate, the changes in the female rate are seemingly not affected by changes in either the state of the healthcare system or fluctuations in the amount of disposable household income. This evidence shows that the only relevant indicator – from those which were tested here – of the male and female mortality rate

over the past several decades is the level of alcohol consumption (here measured by crimes committed while intoxicated).

Figure 4.2. A graphical representation of the actual change in female mortality and the change predicted by the model



Summary

The three initial categories of data were the macroeconomic variable of the Russian disposable income, the governmentally oriented variable of the state of the healthcare system and the individual behavior variable as measured by crimes committed while intoxicated. What we have shown overall is the important role played by individual behavior in determining mortality rates. For both men and women it was

shown that the key indicator of the level of adult mortality was the variable related to individual behavior. Unlike individual behavior, the state of the economy was not shown to have any effect on the rate of adult mortality. The final category, the state of the healthcare system, was likewise not shown to have any significant effect on adult mortality rates.

Overall, the tests performed give a good picture of not only what has happened with the mortality rates of both males and females, but has also opened the door as to why these fluctuations have existed. Although my initial hypotheses were rejected, with the exception of my hypothesis on Russian alcohol consumption affecting the adult mortality rates for both males and females, this research is still relevant in several ways. It confirms the hypothesis regarding alcohol by showing that the data collected from Goskomstat do show a strong correlation. It confirms that the problem of high alcoholism in Russia is a leading indicator of the high adult male mortality rate in Russia. This thesis has also left a lot of questions on the table. In particular these questions are with regards to the other two categories of variables.

CHAPTER V

CONCLUSION

This chapter contains a few conclusive remarks in the form of an invitation for further research. The first section is dedicated to the implications which this research puts forth. Following that is a section containing some potential alternative explanations for the results found. Finally I have included a section discussing some suggestions for further research and a brief chapter summary.

Implications

One implication of this research is that it confirms previous research on this topic. This is done through the set of hypotheses in this thesis on the effects of a change in the level of alcohol consumption on the adult male and female mortality rate. Here we are able to confirm several things. The level of alcohol consumption is directly related to the level of adult mortality for both men and women. The effect of a change in alcohol consumption is stronger with respect to the male mortality rate than the female mortality rate. Finally, this thesis expands on previous work in that it shows a strong correlation between female mortality rates and changes in the level of alcohol consumption.

Another implication of this research is that the adult male and female mortality rates do not seem to be correlated with the state of the healthcare system. This research, it is important to note, does not prove that there is no correlation, it only fails in proving that there is any correlation. As Russia has one of the highest gaps between male and female mortality, if we could see a significant reduction in male mortality

with an improvement in the health care system, this path should certainly be taken. However, since no such correlation was found, we can only conclude in stating that further research in this area is required

One final implication of this research is with regards to alcohol reform. Given that the Gorbachev led anti-alcohol campaign had a positive effect, and ending it had a very negative effect, it would seem that if a more comprehensive anti-alcohol campaign could be established, and maintained for more than two years as Gorbachev saw, this would save potentially millions of lives over the next several years. Like the research before on this subject, we saw a definite correlation between changes in crimes committed while intoxicated and changes in mortality. This again was more visible in the male mortality rate than in the female mortality rate.

In the graph on Russian gender-based mortality rates in the appendix we see three areas of importance. They are essentially three sections of the graph where the slope of the adult mortality rate is higher than normal. Two of these bumps in the graph fall into the time period analyzed, the third comes before this time period. Chronologically the first section begins around 1973 and is followed by a decrease which begins in 1984. The second period begins in 1991 and is followed by an abrupt decrease from 1994 to 1996. The final period begins in 1996 and is followed by a dramatic decrease from 2005. My research only shows the correlation with alcohol for the last two periods of interest. However, William Pridemore is able to show the same correlation for the previous period. In his work he shows a strong correlation between alcoholism, homicide and suicide. His research shows this correlation clear back to 1956. One thing to be noted, which bears an important policy implication, is that both

his research and my own show the correlation of alcohol, and show that the Gorbachev era anti-alcohol campaign was very useful in saving millions of lives.

If a plan could be put into place which was able to effectively reduce alcohol consumption, this plan could likewise effectively curb the decent of the Russian population. Furthermore, it would be able to stop the deaths of men in their working years. Essentially, this would lead to a larger working population and a greater quality of life. This would directly address the concerns of Vladimir Putin in his previously quoted address in 2000 after taking office. Such a reform would have to stray from the pattern of alcohol reform in previous generations. A reform based around prohibiting alcohol completely has been shown to be ineffective both in Russia and abroad. Instead I would posit the suggestion that the reform be based around education. As the market for alcohol is largely demand driven, the reform would have to be aimed at changing people's relationship with alcohol. Limiting advertising to certain methods, and the creation of more strict warnings containing the dangers of alcohol are just a pair of potential aids to the possible reform.

Alternative Explanations

As with any social science research, the data which are gathered have the potential (or nearly the expectation) of containing some noise. Social scientists – among others – from the very first college class are taught that we assume that all else is held constant. It is impossible to measure every potential indicator of adult mortality rates. Here are just a few of the reasons why my research may have some level of inconsistency.

The use of the variable infant mortality rate is only a loose fitting measure of the state of the healthcare system. I chose to use the measure because I felt that it could show fairly well the state of the healthcare system, but it is not necessarily the case that it does such. Over time Russia has likely followed the trend seen in the remainder of the world of expanding the field of medicine through technology. It is also possible that advances in medicine would aim at helping adults more than children, as the infant mortality rate is near world standards. It would make sense that any country, in making improvements to a medical system, would focus on the problem at hand. Here the problem is the adult mortality rate, so Russia may have made changes that effect the adult mortality rate which are not shown in the infant mortality rate.

Disposable income is likewise a measure which certainly has contained its share of anomalies. The transition to a market economy is one example of a dramatic change in the economy which would alter the disposable income of Russia in an unforeseen manner. Furthermore the fall of the Soviet Union at the same time left Russia with the remainder of the Soviet debt, and learning how to deal with the other former Soviet countries as sovereign countries. All of this would create a degree of unforeseen change in the economic wellbeing of Russian citizens, which might not be measured through the disposable income present in the economy.

Suggested Future Research

This research thesis was essentially a limited study of adult male and female mortality rates in the Russian Federation. It was taken over a relatively small period of time which only spanned from 1990 to 2008. Furthermore, it only introduced

independent variables from three key categories. As such, this research could have been improved upon in a whole variety of ways. I would like to suggest only a few here, and invite other scholars to expand on this research through developing their own hypothesis or simply extending mine. In so doing it is hoped that this will further the field of understanding with respect to the adult mortality rates in Russia.

The first suggested field for expansion of this research is simply improving the number of observations used. This type of expansion can be done through several methods. Getting data which are older would allow for the tracking of the various trends over a longer period of time. This would essentially allow the research to be performed over a broader range of time, and thereby more efficiently determine the correlation of variables. In particular the earlier period of increased slope could be included in this research. Some of the same concerns could be corrected for without having to get older data if data were able to be gathered on a more regular basis than annual data. If, for example the data could be collected at a quarterly interval, it would change the number of observations from 19 to 76. Even better here would be collecting data monthly which would allow for 228 observations.

Another way to expand the research through increased observations is through using cross sectional data instead of time series data. Here, if data were found and used, a look at the Russian regions (oblasts, krais, etc.) would perhaps further shed light on the relationship between the adult mortality rates and some of the indicators. Furthermore, this research could be combined with research from other nations. Firstly, a comparison with other former Soviet countries would perhaps shed light on an important question regarding the transition to a market economy. To be able to look

at the other former Soviet countries, would allow for an understanding possibly of the way in which the stresses of the transition from Communism have affected the adult mortality rates. Finally an international comparison with countries which were not part of the Soviet Union could allow a comparison of the transition period with countries which did not undergo such transition.

A final form of expansion for this research is in the introduction of completely different variables. These could be both within the three categories I used, or introduce new categories. Some which have been discussed in the literature, but have minimal formal research include the automotive infrastructure. Variables such as the number of accidents, the miles of paved roads or the deaths resulting from auto accidents could all potentially be good indicators of the mortality rate. Several societal issues could also be introduced. These societal issues could include educational attainment, marriages and divorces or rate of gang activity.

Summary

The research done in this thesis adds one more piece to the puzzle of adult mortality rates in Russia. The implications of this research can be used best perhaps in policy implementation. Russia is facing a depopulation crisis which Russian leaders have shown a desire to curb. Making this crisis worse is the uneven nature in which it is taking place. Taking a young man's life in the middle of his working years takes a lot away from the society as a whole. If the adult male mortality rate can be reduced to mirror the rate experienced by the female population, and by the industrialized world, this trend can be stopped and potentially reversed. This would allow the next

generations of men in Russia to chart a course to have a better level of health, and thereby a better life than the generation before them.

Over the last several decades the Russian adult male mortality rate has fluctuated dramatically. The male level has continued to remain high, and the fluctuations have been more dramatic than has the female rate. These fluctuations have occurred as a result of both specific events, and as a result of the indicators studied in this thesis. In adding one more piece to the puzzle, this research also invites other scholars to use this research and expand on it. By doing this we can hope that the field will continue to grow and the case of Russia will make strides toward improvement.

APPENDIX

TERMINOLOGY

As with any research, there exists a certain amount of language which must be introduced. In the case of this study it is both for the technical aspects of demographic language and for the historical context of the previous several decades of Russian history. The demographic terms, though commonly used in demographics, needs to be strictly defined. As Russia's history over the past several decades is relatively complicated, an understanding of the terms used therein is equally important.

Samogon: Russian term for homemade alcohol. The historical equivalent to this in the United States is the moonshine of the prohibition era.

Adult male and adult female mortality rates: The adult mortality rate (when used in reference to either gender or simply an overall rate) is the likelihood that a 15 year old will die before reaching the age of 60 given the then current age-specific death rates between those ages. In other words, it is the likelihood of dying between age 15 and age 60. This is taken out of 1,000 people, so Russia's male rate of 396 is equal to a 39.6 percent chance of a 15 year old dying before 60 years old.

Infant Mortality Rates: Much like the adult mortality rates, this rate represents the likelihood of an infant not surviving to their first birthday. However, here no estimation is necessary, as it is the number of infants who died before reaching age 1 over the last year. This number is again taken out of 1,000, so Russia's rate of 8.1, means that a child has a 0.81 percent chance of death before age 1.

Alcohol Sales: The amount of alcohol sold per capita measured in liters of pure alcohol. This number is an imperfect estimate for a few reasons. Firstly, it does not include the type of alcohol, only the pure alcohol sold by volume. Furthermore, it only includes officially produced and distributed alcohol as reported to the state. The reality is that a large amount of Russian alcohol is produced illegally (samogon). For this reason the following two measures are also used. The thought here is to measure the actual alcohol sales based on the effects of alcohol consumption.

Alcohol caused deaths: This number is in reference only to the actual number of people who die as a result of acute accidental alcohol poisoning. It does not take into account other diseases related to alcohol such as liver disease, or the deaths caused by other forces but related to alcohol consumption such as drunk driving. This statistic is taken per 100,000 people in the population.

Alcohol Related Crimes: This is the number of crimes (of all sorts) committed, in the thousands, by individuals who were under the influence of alcohol at the time the crime was committed.

Unemployment Rates: The Russian Federation bases their measurement of unemployment on what is referred to as the economically active age. This age range is between 16 and 59 for men and between 16 and 54 for women.

Gorbachev's Anti-Alcohol Campaign: In May 1985, less than two months after becoming General Secretary of the Communist Party, Mikhail Gorbachev launched a campaign against alcohol abuse. The measures used included limiting the kinds of shops permitted to sell alcohol, closing many vodka distilleries and destroying

vineyards, and banning the sale of alcohol in restaurants before two o'clock in the afternoon. To set a good example, official Soviet receptions both at home and abroad became alcohol-free. While the anti-alcohol campaign may well have resulted in a decline in alcohol consumption, it also precipitated a sharp rise in the production of samogon. The campaign was abandoned after 1987.

Russian Financial Crisis: In August of 1998 the financial crisis which had previously been taking place in Asia spread to the Russian Federation. Russia was particularly hard hit by this crisis for two main reasons. Russia was at the time a major exporter of raw materials, and was thereby very vulnerable to fluctuations in commodity prices. The second factor which contributed to the vulnerability of Russia was the fact that seven years prior to this Russia had taken on the debt of the Soviet Union. Being heavily indebted and exporting raw goods left Russia especially vulnerable to swings in world markets.

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