Determinants of regional homicide mortality patterns in Post-Soviet Russia

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Paper presented to IUSSP Committee on Emerging Health Threats,
Seminar 1: Determinants of Diverging Trends in Mortality

Session 8: Diverging regional trends in mortality within countries

Abstract{tc \l1 "Abstract}

The dissolution of the Soviet Union and the shift toward rule of law and a free market economy have resulted in severe shocks to Russian society and its institutions, including the economy, the family, education, and health. These conditions have been accompanied by a dramatic increase in interpersonal violence. One positive benefit of this transition has been a slowly widening transparency that has increased the availability and validity of social, economic, and vital statistics data for scientific research. In this study, these newly available Russian data are employed to estimate the cross-sectional effects of social structural characteristics on the spatial distribution of homicide rates among the 89 Russian regions. The results reveal that poverty and other elements of social disorganization are significantly associated with homicide victimization rates, as are levels of alcohol consumption, and that the low homicide rates in the Northern Caucasus and the high rates in the regions east of the Ural mountains do not appear to be explained solely by the structural features examined here.

Introduction

This paper examines social structure and homicide in post-Soviet Russia. The dissolution of the Soviet Union and the shift toward a rule of law and a free market economy in Russia make available criminal statistics and socioeconomic and mortality data that before were inaccessible. In this study, the structural covariates of homicide commonly tested in the United States are employed with these new Russian data in order to evaluate the cross-sectional effects of these structural factors on the variation of homicide rates in Russia.

The ongoing structural changes in Russia have resulted in social, economic, and demographic shocks that are unrivaled in the history of the United States, including the Great Depression (Heleniak 1995). At the same time, homicide victimization rates have risen 300% in the last decade - to a rate of over 32 homicides per 100,000 residents in 1995 (the year for which this analysis is completed) - and are now more than three times higher than in the United States, according to data from the Ministry of Public Health of the Russian Federation (1998). The increasing availability and validity of data related to these phenomena make a study such as this possible for the first time.

Why Russia?

The use of Russia as a country in which to evaluate Western theories of violence is important for several reasons. First, one of the strongest assets of any scientific theory is its ability to generalize to widely disparate settings. As an urban and industrial nation, Russia shares many similarities with developed Western nations. However, Russian historical, cultural, and contemporary experiences are distinctly non-Western, presenting a rigid test of models developed to explain violence in Western cultures. Three recent major changes provide unique

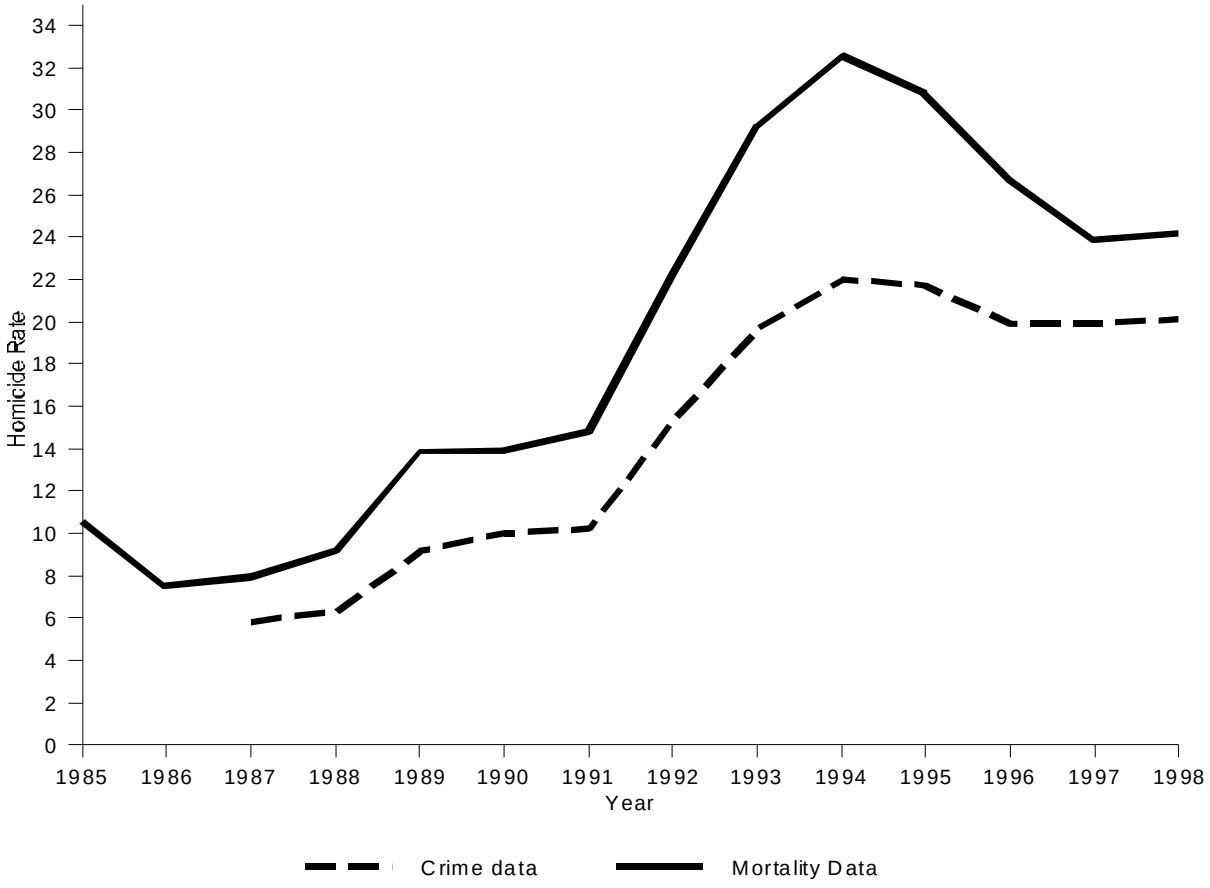
opportunities for the study of violent crime in Russia: massive structural change, expanded socioeconomic variation, and newly available data.

Massive structural change{*tc \l3 "***Massive structural change***}**. The shifting political and economic landscape in Russia has resulted in massive structural change within the country. Although neither transition is complete, a totalitarian government is being replaced by a representative democracy based upon the rule of law, and free-market reforms are being substituted for the centrally planned "command" economy of the past. The moorings of the Soviet way of life have been uprooted. The move toward a less intrusive government, protected personal freedoms, and a market economy now seems inevitable, if painfully slow. Unfortunately, these positive advances have not been without alarming costs to a new Russia and her people. Among others, these costs include a dramatic increase in nearly all types of crime, especially violent crime and homicide (Figure 1 on the following page presents homicide rates in Russia - according to both police and mortality data - from 1985 to 1998).

Expanded socioeconomic variation{*tc \l3 "***Expanded socioeconomic variation***}**. These massive structural changes have increased socioeconomic and demographic variation throughout Russia. Although socioeconomic variation certainly existed in the former Soviet Union at a level not in accordance with official ideology, it was not as extreme as it is today. These differences are interesting to researchers because such wide variation is rarely experienced in Western societies. For example, most research on social structure and violence examines how homicide covaries cross-sectionally with concepts such as poverty, inequality, social disorganization, and subcultures among U.S. cities. Given the similar histories of cities in the United States and cultural diffusion within the country over time, especially with the advent of

mass media, the range of variation on these concepts is limited in American cities. In Russia, however, a truly vast area, poor communications, dozens

Figure 1. Homicide mortality in Russia per 100,000 population, 1985-1998.



of relatively large ethnic and religious groups, the disparate histories of many regions, the changes created by the transition, and the widely varying pace of change across the country have resulted in a much broader range of variation on the factors under examination.

Newly available data and research*{tc \l3 "***Newly available data and research***}*. One of the results of Russia's changing political orientation is the increasing availability of data relating to Russian society, its economy, the health of its citizens, and crime. Yet another

valuable opportunity is the chance to work with Russian scholars who are experts on each of these topics and the data related to them. The change from a totalitarian regime - under which access to these data was strictly controlled and much of the information was classified as state secret - to a more transparent government based

upon rule of law has meant the increasing availability and validity of data sources (Heleniak, 1996). Statistical systems must adjust to new political and economic systems, and governmental data collection agencies in Russia have made appreciable gains in data compilation and presentation (World Bank, 1996).

New research is beginning to appear concerning crime in the former Soviet Union and Russia using this newly available data (see Butler, 1992; Dashkov, 1992; Nalla and Newman, 1994; Shelley, 1987; and Williams and Serrins, 1995), but results thus far are unclear and the problem of criminal violence deserves greater attention. Further, I am aware of no study that scientifically examines the structural correlates of homicide rates in the country.

Theory

The scientific study of the relationship between social structure and homicide has a long history. Although there is no basic model that is agreed upon by researchers, the theoretical and empirical discussion during the last 30 years has resulted in three general theories that attempt to explain the spatial variation of homicide rates: violent subcultures, absolute and relative deprivation, and social disorganization.

In the United States, cultural theories have concentrated upon the heightened rates of violence in the South and among blacks, arguing that members of these demographic groups maintain subcultural values that either promote violence or condone its use in specific interpersonal situations. Empirical studies of subculture and homicide have had difficulty

operationalizing subculture in terms of values and have instead often relied on regional location or group membership as a proxy for subculture. The inconsistent findings relating subculture and homicide rates do not mean that culture has no effect on violent crime, but instead challenges researchers to discover and agree upon an empirically valid method of measuring culture so that its impact on homicide rates can be discerned.[1]

At the structural level, strain theories are usually represented by models based upon absolute or relative economic deprivation. In the case of the former, prolonged poverty is expected to result in violence, due to strains on both communities and the individuals living within them. The positive relationship between poverty and homicide rates is the most consistent finding in the literature on the structural covariates of homicide. Moreover, these positive findings are consistent across time periods, levels of analysis, various measures of poverty, cross-sectional and longitudinal analyses, and model and relationship specifications.

Inequality theorists, on the other hand, argue that economic distress itself is not the cause of increased violence, but instead that comparing one's economic status with others will lead to feelings of inequity for the have-nots, which will likely increase frustration and raise levels of conflict and violence. Empirical evidence for positive effects of inequality on homicide rates have been neither as strong nor as consistent as those of poverty. In fact, the reasons most often cited for this inconsistency are the same ones through which the poverty findings hold up:

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[1]Since the hypotheses generated by these examples are specific to the United States, they are not tested here. The same is true of other emerging research hypotheses, such as the effects of segregation on homicide. Given the ethnic and cultural landscape of Russia, as well as the distribution of these ethnic groups, similar hypotheses can certainly be tested in the Russian context, and I intend to do so. This exercise, however, is beyond the scope of the current study.

disparate samples, differing operationalizations, varying levels of analysis, incorrect specifications, and multicollinearity.

Finally, social disorganization theorists argue that the absence of social integration, together with poor social control mechanisms, frees community members to commit acts of crime and violence. The last decade and a half has seen a renewal of interest in social disorganization theory and research. Although the theory dictates that community-level concepts serve to mediate the structural effects of crime, structural analogs of social disorganization variables are often shown to be associated with crime rates. Factors such as residential mobility, poverty, heterogeneity, population density, and family instability are expected to create impediments to local integration and to the realization of commonly agreed upon goals, such as community attachments and informal control, and rates of criminal violence are thus expected to increase with the levels of disorganization.

The social disorganization model has proven to be more consistent in explaining the spatial variation of violence rates than subcultural and relative deprivation models. Absolute population size of a city, family disruption, and residential mobility all show relatively consistent positive effects on homicide rates.

Data and methodology

Since most of the data employed in this study are new to Western researchers, considerable space is devoted here to their explanation. Even so, this is an abridged discussion and most of the citations are to Russian-language sources. Therefore, further information on these measures is available from the author.

Unit of analysis

This is a cross-sectional study of Russian regions; the unit of analysis is the Russian region in 1995.[2] In 1995, the Russian Federation contained 89 first-order administrative units, which are referred to in Russian as "regiony," or regions. Among these 89 regions are 50 oblasts, 21 republics, 11 autonomous okrugs, 5 krais, and two federal cities (Moscow and St. Petersburg). In general, the republics often contain a large proportion of indigenous ethnic groups, while the autonomous okrugs are smaller regions located entirely within a larger administrative unit, such as an oblast or krai, and are also usually populated mostly by local ethnic groups.

Dependent variable

The dependent variable in this study is the regional homicide victimization rate in 1995. A homicide is defined here as any purposeful killing of one person by another, whether or not the act is defined as criminal.

Information on homicide is available from both crime and mortality data in Russia. Crime data are collected for each city and town by regional offices of the Russian Ministry of Internal Affairs (MVD). This information is aggregated to the regional level then forwarded to Ministry headquarters in Moscow, where it is reported annually in *Prestupnost' i pravonarusheniya* ("Crime and criminality"). These data include the absolute number and rate of criminal homicides and attempted homicides recorded by the police in each region. Mortality data, on the other hand, contain information on the cause of death, as recorded on the death certificate by a physician. The Soviet classification system is still employed in Russia, but the causes themselves correspond to the World Health Organization's *International Classification of*

[2]Unless otherwise noted, all data are for 1995.

Diseases (Andreev, Scherbov, and Willekens, 1995; Kingkade and Arriaga, 1997).[3] These data are aggregated to the regional level, forwarded to Moscow, and published annually in the Ministry of Public Health's *Smertnost' naseleniya Rossiiskoi Federatsii* ("Population mortality of the Russian Federation").[4] In the United States, mortality data are commonly considered to provide a better representation of the total number of homicides than crime data (Fox and Zawitz, 1999; LaFree, 1999; Rokaw, Mercy, and Smith, 1990), and this is true for Russia, as well. Thus, homicide victimization, as recorded by mortality data, is employed for this analysis.

According to Ministry of Public Health data, there were a total of 44,069 homicides in Russia in 1995. This ranged from a high of 2,278 in Moscow to a low of 22 in the Chukot Autonomous Okrug. The mean regional homicide rate in the Russian Federation in 1995 was 30.8 homicides per 100,000 population. According to mortality data, the highest rate was in the Republic of Tyva, in which there were 135.1 homicides per 100,000 population, and the lowest rate was in Voronezh Oblast, in which there were 5.6 homicides per 100,000.

Independent variables

Poverty{tc \l4 "Poverty}. In this study, poverty is defined in terms of the monetary income needed to purchase the basic requirements of a healthy existence. To this end, poverty is measured here as the percentage of the region's population living below the poverty line. This is called "prozhitochnii minimum" in Russian, meaning subsistence minimum, and is defined as the

[3]ICD items E960-E978 contain deaths due to homicide and injury purposely inflicted by other persons, including legal interventions and executions (in 1995, there were less than ten executions in the Russian Federation). The corresponding code in the Russian classification system is 184.

[4]This manner of data collection makes it difficult to obtain homicide and explanatory data in Russia at a level of aggregation lower than the administrative region. City-level information is available, but collecting it requires contact with each of the 89 regional offices of the respective Ministries.

percentage of the population who report an income that is less than that needed to purchase the basic requirements (i.e., food, goods, and services) for survival (Goskomstat, 1998; Personal communication, Dmitri Tikhonov, Centre for Regional Analysis and Forecasting, April, 1999). The subsistence minimum varies by region, depending upon local prices. In non-census years, this information is collected by Goskomstat - the Russian State Statistical Committee - through the use of sampling techniques. The data are available from Goskomstat's *Rossisskoi Statisticheskii Ezhegodnik.*

Table 1 on the next page lists the measures for the independent and dependent variables employed in this analysis, together with a brief definition and descriptive statistics for each.

Inequality. Relative deprivation is defined here as the inequitable distribution of wage income among the working population, and the Gini coefficient is employed to measure this construct. Also called the index of income concentration, the Gini coefficient ranges from zero (which represents perfect equality) to one (which would mean that one person in the population earned all the income, while everyone else earned none). Data on the distribution of income (by deciles) in each region is available from Goskomstat.

Mobility*{tc \l4 "*Mobility*}*. Mobility is defined here as the movement into and within each region. Data on migration in Russia are based upon registration records maintained by the militia (Andreev, Scherbov, and Willekens, 1995) and are obtained from Goskomstat's *Demograficheskii ezhegodnik* (1996) and *Regiony Rossii* (1997). For this study, a measure of mobility is calculated by adding two figures: the number of persons moving into the region and the total movement of persons within the borders of the region. This sum of inflow and within-region movement is divided by the total population of the region and multiplied by 1,000 to create the total mobility rate.

Table 1. Descriptive statistics for independent and dependent variables.

Variable	Description	Regional Mean	Standard Deviation
Homrate	Homicide victimization rate (1995)	31.77	19.00
Poverty	Percentage of population living below subsistence minimum (1995)	30.93	11.53
Infntmrt	Number of deaths of children younger than 12 months old per 1,000 live births (1995)	18.57	3.68
Unemployed	Percentage of the active labor force that is unemployed (1995)	10.24	3.75
Gini	Gini coefficient of income inequality (1994)	0.31	0.03
Mobility	Persons per 1,000 population who moved into, out of, or within the region (1995)	29.94	11.22
Single	Percentage of single-parent households (1994)	15.65	2.06
Diversity	Probability that randomly paired people within the region will be of different ethnic background (1989)	0.30	0.20
Urban	Percentage of the population living in cities greater than 100,000 population (1995)	38.26	17.29
Livespace	Square meters of living space per person (1995)	17.98	1.72
Alcohol	Deaths per 100,000 population due to alcohol poisoning (1995)	31.69	19.15
Males25-54	% of the population male and between 25 and 54 (1995)	31.69	19.15

Family disruption*{tc \l4 "*Family disruption*}*. The measure of family disruption employed in this study is the proportion of the regional population that live in households with a single adult and at least one child under the age of 18, which is a common measure in structural-level analyses of social disorganization and crime in the United States. In Russia, information on

divorce and single-parent households is maintained by *Zapis' aktov grazhdanskogo sostoyaniya* - or "Registry of Acts of Civil Status," commonly referred to as ZAGS (Andreev, Scherbov, and Willekens, 1995). The data on single-parent households employed here are for 1994 and are available in several publications from Goskomstat.

Heterogeneity*{tc \l4 "***Heterogeneity***}*. Heterogeneity is defined here in terms of ethnicity. Although more than 80% of Russian citizens are ethnic Russians, the country is home to dozens of different ethnic groups. Lieberson's (1969; see also Greenberg, 1956) measure of "population diversity" is employed in this study to gauge ethnic heterogeneity in each region. This measures the likelihood that any two randomly paired persons within a region are of different ethnic backgrounds (Greenberg, 1956; Lieberson, 1969). The measure ranges from zero, where every person would have the same ethnicity, to one, where each person would have a different ethnicity. It is calculated as follows:

$$A_w = 1 - \sum_{i=1}^{N} p_i^2$$

Where A_w = the within group population diversity (i.e., the probability that any two randomly paired persons will have a different ethnic status) and p = the proportion of the regional population that is in each ethnic group, i. Thus, the higher the score on A_w, the higher the level of ethnic heterogeneity within a region. For this study, data on the ethnic composition of the regions comes from the 1989 Russian census.

Density*{tc \l4 "***Density***}*. It makes little sense to speak of population density when aggregating to the regional level. As an element of social disorganization, however, the density element is concerned theoretically with the loss of social cohesion that occurs in densely populated urban areas. This element is thus measured here as the percentage of the region's population living in cities with a population of at least 100,000 people. In order to create this measure, I used the Goskomstat (1998) publication *Rossiiskii statisticheskii ezhegodnik* to find all the cities in each region with a population of at least 100,000 on January 1, 1995. The

populations of each of these cities are simply added together and the sum divided by the total population of the region.

Control variables

Three other variables are included in this model in order to control for other issues sometimes thought to influence homicide rates. The first is alcohol consumption. In Russia, registration habits make it common to classify alcohol-related deaths in more proximate categories without reference to latent alcoholism (Shkolnikov and Mesle, 1996). As a result, most deaths due to alcoholism are recorded as "poisonings" (Shkolnikov, Mesle, and Vallin, 1996; Treml, 1997), and this category usually contains well over 80% of all alcohol-related deaths annually. Levels of alcohol consumption in this study are thus measured as the rate of deaths due to alcohol poisoning in each region in 1995. This cause of death is coded as number 165 in the Ministry of Public Health's death classification system, and these data are available from the annual Ministry publication *Smertnost' naseleniya Rossiiskoi Federatsii*.

The second control variable is unemployment. For this study, official unemployment data are combined with indicators of hidden unemployment to get an adjusted rate. Both sets of data are available from the Center for Regional and Economic Forecasting (1999) and are for mid-1995. The indicator of hidden unemployment represents the sum of the share of employees in part-time work and the share of employees in forced vacations. I have added this overall level of hidden unemployment to the official rate in order to create the adjusted rate of unemployment. The adjusted regional mean of 9.9% is much closer than official government reports to estimates provided by Labour Market=s (1997) *Russian Economic Trends*, which employs the International Labour Organization method of calculating unemployment rates.

The final control variable is the percentage of young males aged 15-29 in each region. It is commonly accepted that young males compose a large percentage of both the victims and perpetrators of violent crimes. A demographic interpretation of this relationship suggests that the larger the proportion of the overall population that are young males, the larger the homicide rate. These data were obtained from *Chislennost' naseleniia Rossiiskoi Federatsii po polu i vozrasty na 1 yanvarya 1995 goda: Statisticheskii Byulleten* (Goskomstat, 1995).

Model estimation

Data for nine of the Autonomous Okrugs are actually reported as part of the larger Oblast or Krai in which they are embedded, and two regions - the Ingush and Chechen Republics - are dropped from this study. This leaves 78 cases for analysis. Three of these regions - Dagestan, the Jewish Autonomous Oblast, and the Chukot Autonomous Okrug - have missing data on selected variables. Replacing these values was accomplished by estimating their scores from the other variables in the model. The other independent variables can be used as instruments to predict these missing observations if we assume that they correlated with each of the variables that have missing values and that they are uncorrelated with the error term (Pindyck and Rubinfeld, 1998). Case by case, the variable with the missing observation was regressed on all of the other independent variables for which data were available for that case. This produced a fitted value for that case on that variable, and I used this value to replace the missing observation.

Table 2 on the following page displays the correlation matrix. With two exceptions, the bivariate correlations of the independent variables with the homicide victimization rate are in the expected direction. This is not the case, however, with the unemployment rate and urbanization. First, the bivariate correlations suggest that as both the unemployment rate and the percent of a

Table 2. Correlation matrix of logarithmically transformed variables (n=78).

	Homicide	Poverty	Gini	Unemp	Space	Mobility	Diversity	Single	Urban	Alcohol	Males
Homicide	1.000										
Poverty	.042	1.000									
Gini	.273	.382	1.000								
Unemp	-.078	.568	.205	1.000							
Space	-.237	-.538	-.425	-.347	1.000						
Mobility	.372	.115	.501	-.015	-.171	1.000					
Diversity	.123	.403	.489	.390	-.567	.205	1.000				
Single	.523	-.134	.072	.090	.002	.064	.024	1.000			
Urban	-.216	-.355	-.315	-.355	.267	-.352	-.233	-.194	1.000		
Alcohol	.527	-.324	-.105	-.246	.144	.257	-.265	.239	.063	1.000	
Males	.324	-.334	.191	-.144	.153	.325	.025	.400	.027	.237	1.000

region's population living in cities greater than 100,000 population increase, the homicide rate decreases. This is discussed further in terms of the multivariate results.

Ordinary Least Squares regression is employed here in order to determine the influence on regional homicide rates of each of these structural correlates, while at the same time accounting for the effects of the other theoretical elements hypothesized to partially explain the variation in these rates. A log-log model provides a better fit to the data than a model containing the original values. Also, taking the natural logarithm of the original values results in a more normal distribution for many of the variables, since several are positively skewed, and it helps to pull the few extreme values closer to the rest of the distribution. Further, the log-log model also allows for an intuitive interpretation of the estimates, with the slope representing the percent change in the dependent variable associated with a one-percent change in the independent variable. Finally, transforming the data in this manner often makes them conform more closely to the assumptions of the linear model. The equation to be estimated is as follows:

$$\text{Ln Homrate} = \alpha + \beta_1 (\text{Ln Poverty}) + \beta_3 (\text{Ln Unemployment}) + \beta_2 (\text{Ln Gini}) + \beta_4 (\text{Ln Mobility}) + \beta_5 (\text{Ln Diversity}) + \beta_6 (\text{Ln Single-parent households}) + \beta_7 (\text{Ln Percent urban}) + \beta_8 (\text{Ln Alcohol consumption}) + \beta_9 (\text{Ln Percent males aged 25-54}) + e$$

Though not an exact replication, this is consistent with most models estimated to examine the relationship between social structure and homicide in the United States. Table 3 on the following page displays these results as Model 1. Remember that this is a log-log model, and thus the slope estimates are interpreted in terms of percentage changes. The results are discussed below in terms of each of the theories.

Table 3. Results for homicide victimization rates regressed on strain, social disorganization, and control variables (continues on following page).[a]

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	-1.658 (-0.774) (0.221)	-6.905 (-2.298) (0.013)	-7.460 (-2.506) (0.008)	-5.734 (-1.846) (0.035)	-5.669 (-2.055) (0.022)
Poverty	.473 (2.623) (0.006)	1.682 (2.861) (0.003)	1.638 (2.825) (0.003)	1.557 (2.633) (0.005)	1.212 (2.205) (0.016)
Gini	.531 (0.957) (0.171)	.622 (1.152) (0.127)	.740 (1.380) (0.086)	.684 (1.270) (0.104)	-.051 (-0.097) (0.923)
Unempl	-.427 (-2.536) (0.007)	-.177 (-1.172) (0.123)	-.088 (-0.562) (0.288)	-.220 (-1.433) (0.079)	-.135 (-0.978) (0.462)
Mobility	.103 (0.577) (0.283)	.069 (0.386) (0.351)	.127 (0.708) (0.241)	.071 (0.399) (0.346)	-.005 (-0.032) (0.488)
Diversity	.104 (1.512) (0.068)	.119 (1.744) (0.043)	.128 (1.907) (0.031)	.082 (1.119) (0.134)	.112 (1.807) (0.038)
Singles	1.710 (4.638) (<.001)	1.597 (4.380) (<.001)	1.558 (4.332) (<.001)	1.421 (3.696) (<.001)	1.259 (3.664) (<.001)
% Urban	-.036 (-0.734) (0.233)	.005 (0.099) (0.461)	.029 (0.561) (0.289)	-.009 (-0.172) (0.432)	4.9×10^{-4} (0.011) (0.496)
Alcohol	.275 (5.343) (<.001)	.266 (5.253) (<.001)	.211 (3.573) (<.001)	.257 (5.071) (<.001)	.263 (5.713) (<.001)
M25-54[b]	.421 (0.648) (0.260)	-.208 (-0.343) (0.367)	-.652 (-1.004) (0.160)	-.169 (-0.281) (0.390)	-.554 (-0.989) (0.163)
M15-29[b]	BBB	BBB	BBB	BBB	BBB

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Caucasus[b]	BBB	BBB	-.355 (-1.748) (0.043)	BBB	BBB
Chernozem[b]	BBB	BBB	BBB	-.275 (-1.364) (0.089)	BBB
East[b]	BBB	BBB	BBB	BBB	.430 (3.850) (<.001)
Adj. R^2	.555	.562	.596	.568	.636
N	78	78	78	78	78

Note. Numbers below each slope coefficient are t-statistics and p-values (one-tailed test), respectively.

[a]Model 2 is a reestimation of the original model using fitted values of poverty. Models 3-6 each use the fitted values of poverty.

[b]The "M25-54" represents the proportion of a region=s population that is male and between the ages of 25 and 54. "Caucasus" is a dummy variable coded 1 for regions in the Northern Caucasus Economic Region and 0 otherwise. "Chernozem" is a dummy variable coded 1 for regions in the Central Chernozem Economic Region and 0 otherwise. "East" is a dummy variable coded 1 for regions in the Western Siberia, Eastern Siberia, and Fareastern Economic Regions and 0 otherwise.

Strain

Poverty{tc \l4 "Poverty**}**. Poverty is defined here as the proportion of the regional population living below subsistence minimum. This variable is found to be positively and significantly related to the variation of homicide victimization rates among the Russian regions (b = .473, p = .006).[5] The coefficient suggests that an increase of one percent in the proportion of a region's population living in poverty results in an increase of about one-half of one percent in that region's homicide rate.

[5]Given the hypotheses for each theory, all p-values reported in the tables and text are for one-tailed tests.

Unemployment. The level of unemployment within a region likely influences the level of poverty. Beyond the economic impact, more people with fewer legitimate means of spending their time might create a problem of social control within communities (see Chiricos, 1987). Both possibilities lead to a prediction of a positive relationship between unemployment and crime, though empirical studies of this relationship have been inconsistent.

This model produces a result that is the opposite of the one expected. The relationship between the unemployment rate and the variation of homicide in Russia is negative and significant ($b = -0.427$, $p = .007$). The slope coefficient suggests that a one percent increase in the unemployment rate in the Russian regions results in a decrease of about one-half of one percent in the homicide victimization rate. Given the theories of both motivation and social control that suggest the opposite effect, this finding may seem counterintuitive. Cantor and Land (1985), however, argue that unemployment may have both a positive *and* a negative relationship with violence, the latter due to an opportunity effect. For example, following the logic of Cohen and Felson (1979), a higher rate of unemployment may create increased levels of guardianship over property. Since homicide is often the result of robbery and other similar property-related crimes, Cantor and Land argue that an increase in unemployment may increase guardianship, thereby creating a decrease in property crimes. Since homicide is often the result of robbery and other similar property-related crimes, a decrease in property crimes may thus lead to a decrease in property-related violent crimes. This hypothesis cannot be tested here, but it is one possible explanation of this unexpected finding.

Inequality{tc \l4 "Inequality}. Inequality is operationalized here as the Gini coefficient of income inequality. Several theorists suggest that it is not the presence of absolute poverty that creates strain, but that anger and stress occur when one compares him- or herself with others who

are better off economically. The results here indicate that inequality is not a significant factor (p = .171) in the variation of homicide rates in Russia. This is consistent with the literature on this topic, which shows that the results of tests for the relationship between inequality and homicide rates have been inconsistent at best.

Social disorganization{tc \l3 "Social disorganization}

The commonly tested elements of disorganization theory are poverty, mobility, ethnic heterogeneity, family instability, and density. The results of poverty were already discussed above; the findings for the other components of disorganization are described below.

Mobility{tc \l4 "Mobility**}**. The influx of migrants into a region may result in a decrease in community cohesiveness. These newcomers have been cut off from their friends and relatives in their former place of residence and have yet to forge strong bonds with their new neighbors. It is also likely that they have moved for economic reasons, and thus may have low or no incomes and move into areas with like others. It is thus expected that higher rates of mobility will generate higher rates of violence due to a lack of social control that results from weak bonds within the community. This is found not to be the case in Russia, where there seems to be no relationship (p = .283) between the mobility rate and the variation of homicide rates.

In terms of social disorganization theory, there is at least one Russia-specific reason why mobility might not have the expected effect on homicide rates. Given the forced migrations of ethnic groups during the Soviet era, some of the current migration may be of non-ethnic Russians back to their native areas. Arriving into a community of like others may create more cohesion, not less, thereby negating the expected positive effect of mobility on homicide.

Heterogeneity.{tc \l4 "Heterogeneity} Ethnic heterogeneity is also expected to decrease social control, since communities that are culturally diverse may find it difficult to create shared

understandings. Lieberson's (1969) measure of population diversity is employed here to measure ethnic heterogeneity and the variable is found to have a non-significant ($p = .068$) relationship with the variation of homicide rates in Russia, though the p-value suggests that we take a closer look at this relationship, and there are a few reasons why it may deserve further attention. Most importantly, the only available data for this measure are from the last census, which was in 1989 (the next census in Russia is scheduled for 2002). Without the rigid controls of the Soviet government, it is now easier for Russians to move from place to place, and migration has thus increased. This migration has likely changed the ethnic composition of many regions. The changing ethnic composition in certain areas as a result of this migration, together with increased levels of poverty and thus a sharpened struggle for scarce resources, may create ethnic tension where before it was latent. Further, though not significant at the .05 level, the diversity measure has a significance value of $p < .10$ in four of the six models estimated. Thus it would be prudent to employ more reliable data before making any strong inferences about this relationship.

Density{tc \l4 "Density**}**. Since the level of aggregation is so high in this study, it makes more sense to speak in terms of urbanization than population density, and thus this concept is operationalized as the proportion of a region's population living in cities greater than 100,000 population. The results suggest that in Russia there is no relationship between the proportion of urban dwellers in a region and its homicide victimization rate ($p = .233$). Given the findings for previous relationships, one potential reason for the lack of an effect may be that the problems of urbanization are offset by the reduction of poverty in regions with higher proportions of the population living in urban areas.

Family disruption.{tc \l4 "Family disruption} The measure of family disruption in this study is the proportion of a region's population that is single and living with at least one child

under the age of 18. This measure is not simply one of supervision of adolescents within the community, but a more general measure of social cohesion. Single parents, both male and female, tend to have fewer community ties than married parents. Thus single parents have both fewer familial attachments and fewer community attachments, and social disorganization theory argues that as local ties are weakened, it becomes more difficult for the community to control the behavior of its members.

The results in Table 3 show that the proportion of single-parent households is positively and significantly related to the variation of homicide victimization rates ($b = 1.710$, $p < .001$). The estimated slope coefficient suggests that a one-percent increase in the proportion of single-parent households in a region increases its homicide rate by 1.7%. Given the consistent results of this concept of social disorganization as a significant predictor of offending rates in the United States, this is an expected finding.

Controls{tc \l3 "Controls}

Two variables were added to the general model as controls, the proportion of a region=s population that is male and between the ages of 25 and 54 and a measure of the level of alcohol consumption in the region.

Proportion of males aged 25-54.{tc \l4 "Proportion of males aged 25-54} Analyses not presented here several that both homicide victims and offenders tend to be older in Russia than in the United States. In particular, males in the 25-34, 35-44, and 45-54 age groups have much higher homicide victimization rates than other sex and age categories in the country. In order to control for this, a variable is included in the model that measures the proportion of this sex and age cohort in a region's population. Though the finding may be a result of the small

range of variation on this measure, the results suggest that there is no effect of this control variable on the level of homicide rates in a region ($p = .260$).

Alcohol consumption. Alcohol consumption in this study is measured as the rate per 100,000 population of deaths due to alcohol poisoning in each region. Controlling for all of the other structural variables in the model, the results suggest that as the level of alcohol consumption in a region increases so does its homicide rate ($b = .275$, $p < .001$). The estimated slope coefficient shows that a one-percent increase in the level of alcohol consumption increases the homicide rate by more than one-quarter of one percent.

Alternative models

This section describes alternative models to the one just discussed. First, an alternative measure for poverty is discussed. Second, dummy variables are included in the model in order to see if the wide disparity in homicide rates - especially the very low rates in the Central Chernozem and the Northern Caucasus and the very high rates in the regions beyond the Urals - is accounted for by the structural variables in the model or if these differences remain significant even when these variables are controlled.

Measurement error and the use of an instrumental variable.**{tc \l4 "Measurement error and the use of an instrumental variable}** Measurement error in an independent variable will create both biased and inconsistent estimates because it violates the assumption that the regressors are independent of the error term.**{tc \l3 "**because it violates the assumption that the regressors are independent of the error term.**}** I am especially concerned about measurement error in the independent variable poverty. One way to overcome this problem and to obtain consistent estimates of the regression parameters is through the use of an instrumental variable.

Regional infant mortality rate is employed as an instrumental variable for poverty and a two-stage least squares (2SLS) procedure is used to estimate the model.[6] In the first stage, the instrumental variable is employed to estimate the level of poverty in each region, thereby making the correlation between poverty and the error term zero. The natural log is taken of these fitted values for poverty, and then the second stage is simply a reestimation of the original model using these fitted values. The results of this reestimated model are shown as Model 2 in Table 3.

For the most part, the inferences drawn from the original model hold here, but there are two changes in this reestimation that should be noted. First, the estimated parameters for poverty have increased, but the slope more substantially so, resulting in an increase of the t-statistic for poverty. The slope now indicates that a one-percent increase in the level of poverty leads to a one and two-thirds percent increase in homicide victimization rates ($b = 1.682$, $p = .003$), controlling for the other variables in the model. Though the mechanisms through which poverty are working to influence homicide rates are not clear, this result presents a stronger case for a relationship between the two.

The second change is that the unemployment variable is no longer a significant predictor of homicide rates ($p = .123$). One potential reason for this is multicollinearity. Though their effects on homicide are in the opposite directions, unemployment and the original measure of poverty are positively correlated at nearly .6. Using the estimated values of poverty, there is a very low correlation between poverty and unemployment ($r = .068$) and the variance inflation factors for each in the multivariate model have decreased substantially.

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[2]Another possible procedure with 2SLS is to estimate the independent variable with suspected measurement error by regressing it on the other independent variables in the model. However, this is likely to lead to problems with multicollinearity in the second stage of model estimation, which is the case here, as several variance inflation factors in the second stage were very high. This method is thus not employed here.

Regional differences.**{tc \l4 "Regional differences}** Due to large differences in the homicide rates of some economic regions, I examined three sets of potential regional differences.

First, not only does the Northern Caucasus economic region exhibit a substantially lower homicide rate (16.8 per 100,000) than most other economic regions, but much of the region is marked by a different cultural composition, as well. Most obvious is the high proportion of non-ethnic Russian Muslims in the area. Given this ethnic and religious composition, one would expect rates of violence to be lower in this region. I therefore included a dummy variable in the model to compare the Northern Caucasus region against the rest of the country. The results are shown in Model 3 in Table 3. The outcome suggests that there may be a difference between this area and the rest of the country in terms of homicide rates when the other variables are taken into account ($b = -.355$, $p = .043$). Although the levels of poverty of the regions in this area are higher than average, alcohol consumption among the Muslims is much lower and there are lower proportions of single-parent households in these regions. This group is also less mobile, and they likely have tighter bonds due to higher religious involvement. This is a good example of the interrelated nature of culture and structure, since culture differences seem to manifest themselves in structural differences, as well.

Second, the Central Chernozem economic region, which is located south of Moscow and northwest of the Northern Caucasus, has the lowest homicide rate (14.5 per 100,000) of all the economic regions in Russia. I included a dummy variable representing this region in the model in order to see if this difference is significant. The results are shown in Model 4 in Table 3. It appears as if the structural differences in the Chernozem may account for the lower levels of homicide rates there, since the estimation results show a non-significant relationship ($p = .089$) between this economic region and the rest of Russia when the structural variables are controlled. The p-value is relatively low, but there are very few administrative regions within this are on which to make a comparison, thus strong conclusions are not warranted. Given the structural

characteristics of this economic region, however, a non-significant finding would not be unexpected. This is a mostly rural agricultural area that is overwhelmingly ethnic Russian. The levels of unemployment and poverty are lower than average, as is the proportion of single-parent households in the region. Thus it appears that the low homicide rates of the regions in this area are likely accounted for via the structural variables in the model.

Finally, the three economic regions east of the Ural - Western Siberia, Eastern Siberia, and the Fareast - all have higher homicide rates than the rest of the country, especially Eastern Siberia, where the rate is 54.2 per 100,000. The final column in Table 3 above shows a model that includes a dummy variable for the regions in these three areas. With the exception of levels of alcohol consumption, which are much higher than average in these eastern regions, these areas are not remarkable in their values on the other structural variables. This is evident in the results of this model, which show that even when controlling for the structural variables, these eastern regions still have homicide rates that are significantly higher than the rest of the country. One possible explanation is that Siberia has long been thought of as a frontier in Russia, as an area where there is greater freedom from the control of the state than in other parts of the country. This general lack of formal control - along the nature of the relationships this might create - could partially explain the higher homicide rates in this area. Whatever the mechanism may be, however, this finding certainly deserves further research attention.

Summary and Conclusions

The structural transformation in Russia during the 1990s has resulted in widespread social, economic, and demographic change within the country, including a sharp rise in the homicide rate. But the shift toward a rule of law and a free market economy also provides access to more and better data on these issues than was available in the past. This study employs a set

of these newly available data in order to evaluate the cross-sectional effects on homicide victimization rates of the structural covariates of homicide commonly tested in the United States.

This preliminary analysis suggests that, despite deep historical, cultural, and contemporary differences between Russia and the United States, structural factors commonly found to covary with violence in the U.S. also seem to be associated with homicide victimization rates in Russia. For example, poverty (but not inequality) is found to be significantly related to homicide. Two further structural measures of social disorganization - heterogeneity and single-parent households, also covary with homicide victimization rates. Finally, levels of alcohol consumption - historically a serious health issue in the country - also positively and significantly covary with homicide rates.

This is an exploratory analysis, and the limitations - both those associated with the study of social structure and crime, in general, and those specifically connected to this topic in Russia - demand further scrutiny of this issue. However, this paper provides the first glimpse at a serious problem in Russia and hopefully it lead others to examine this issue.

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