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International Journal of Conflict and Violence

urn:nbn:de:0070-ijcv-2014272

IJCV: Vol. 8 (2) 2014

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Vol. 8 (2) 2014

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ISSN: 1864-1385

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Since its introduction, social support theory has received generally consistent empirical support. Tests of social support theory have, however, mostly been cross-sectional and restricted to U.S. and Western European analyses. Measures of social support have tended to be inconsistent across studies and narrowly operationalized. The present project offers a longitudinal test of Cullen's (1994) social support theory using a more broadly defined measure of social support that is comparable across both Eastern and Western European countries. Using data gathered by Eurostat, this study applies "hybrid" regression panel analysis to test the effects of social support on homicide rates across European regions for 2000, 2005 and 2009. Results provide evidence for an effect of social support on homicide between Western and Eastern European regions and within those regions over time. The analyses also indicate that social support moderates the effect of economic deprivation on homicide across Western European regions, though not Eastern European regions.

In his presidential address to the Academy of Criminal Justice Sciences, Francis T. Cullen (1994) proposed a theory to provide an organizing framework for the field of criminology. While it has often been neglected by criminologists, the concept of *social support* has implicitly informed criminological theory since the early twentieth century, he argued. Cullen's ideas are drawn primarily from the work of the scholars of the Chicago School, who emphasized that "organized networks of human relations can assist people in meeting both expressive and instrumental needs" (Colvin, Cullen, and Vander Ven 2000, 24). While these traditional theories tend to focus on the deleterious effects of the breakdown of human relations networks (in other words, the negative phenomena that cause crime), Cullen shifts his focus to the forces that work to maintain, and even strengthen, these networks (the positive phenomena that work to prevent crime). Cullen conceptualizes these positive phenomena as social support, which, he argues, can explain variation in levels of social control, individual involvement in crime, and aggregate crime rates (Cullen 1994; Chamlin and Cochran 2003). Specifically, according to Cullen's theory, social support is hypothesized to be negatively associated with crime (Cullen 1994).[1]

The potential buffering effect of social support in the form of economic assistance – the most popular conceptualization of the concept – is of salient concern to criminological scholars interested in investigating the effects of global neoliberalization on cross-national rates of violent crime. Since the late 1970s, governments worldwide have adapted to growing post-industrial economic instability by way of instituting neo-liberal economic and social policies, which necessitate the retrenchment of social welfare programs (Harvey 2005; Esping-Andersen 1996). Following this worldwide neoliberal trend, the traditionally social democratic nations of Western Europe and the historically socialist nations of Eastern

This work was supported in part by the Harry F. Guggenheim Foundation. We would like to thank our anonymous reviewers for their constructive and insightful input.

1 Since Cullen's (1994) introduction of social support theory, the theory has been expanded to incorporate the theme of coercion. While Colvin, Cullen, and Vander Ven's (2002) differential social support and coercion theory provides a valuable theoretical expansion of Cullen's (1994) original formulation, the current project, along with much of the scholarly research investigating the effects of social support on crime, will focus exclusively on Cullen's social support paradigm.

Europe have been compelled to restructure social policy in an effort to maximize economic growth and competitiveness in the global economy (Esping-Andersen 1996). This restructuring has often involved the dissolution of the social and economic safety nets upon which the citizens of these countries have depended. Throughout this period of increasing austerity, European nations have seen growing levels of unemployment, poverty, and inequality (Esping-Andersen 1996; Standing 1996). During this same period, neo-liberal adaptation has weakened the institutionalized social support that, according to social support theory, should work to ease economic strain. For example, from 2001 to 2008, total unemployment benefits paid to citizens in the European Union decreased by approximately 0.4 percent (Eurostat 2014). The rate of change across countries, however, varies as some countries, particularly those of Eastern Europe, have seen much steeper decreases in expenditures on unemployment benefits. For instance, Poland has seen an 8.1 percent decrease in unemployment expenditures throughout this time period; Slovenia reports a 6.1 percent decrease in unemployment expenditures; and Romania has seen a 3.5 percent decrease (Eurostat 2014). Following the logic of social support theory, then, we should expect European crime rates to increase in association with the shrinking levels of social welfare across the continent. As such, the aim of the current project is to offer a longitudinal examination of social support theory in the European context.

An assessment of the body of literature examining Cullen's (1994) social support theory reveals that the theory and its underlying concepts have enjoyed generally consistent empirical support. While tests of theories related to social support theory (such as social disorganization, collective efficacy, social capital, social bonds, and institutional anomie) have provided partial support for social support theory, there have been relatively few direct tests of the theory (Kim and Pridemore 2005). To date, research by Chamlin and Cochran (1997), Chamlin, et al. (1999), Pratt and Godsey (2002, 2003), and Kim and Pridemore (2005) constitute the body of studies framed as direct empirical examinations of social support theory.

Although the majority of these studies offer evidence supportive of social support theory, further empirical examination of the theory is warranted. For example, the statistically null findings reported by Kim and Pridemore (2005) in their examination of social support in Russia highlight the need to further explore the effects of social support within transitional, unstable political and economic contexts (such as post-communist Eastern Europe) – a cross-national context not yet explored by scholars. What is more, these studies do not offer a consistent measure of social support and the measures used to test the theory tend to be rather narrowly conceptualized. And perhaps most importantly, extant tests of the theory employ cross-sectional data, which fail to capture the dynamic nature of the relationship between social support and crime over time.

In light of these limitations, the present project contributes to this body of research in a number of ways. Beyond testing social support theory among European countries, the present study also contributes methodologically to extant analyses of the relationship between social support and homicide. First, it offers a test of Cullen's (1994) original formulation of social support theory based on a more inclusive measure of the concept that comprises both public and private contributions and, therefore, incorporates dimensions of social support generally not considered in prior research. The measure of social support employed herein is also comparable across Eastern and Western Europe. Second, this study offers a cross-national test of social support theory at a level of aggregation lower than the country-level. Specifically, this study utilizes data for European regions, which allows one to take advantage of intra-country variation in levels of social support and crime, thereby extending cross-national studies of crime beyond the country-level (which currently dominates cross-national homicide research). This allows the researcher to assess the robustness of extant studies using country-level data to determine whether country-level findings apply to lower levels of analysis. Third, the present study offers a cross-national analysis of twenty-three European countries – moving beyond Western European countries typically represented in European studies of crime, to include Eastern European countries, as well. Fourth, the present study utilizes historical data, which allow for examination of the dynamic nature of changing levels of social support on crime rates over time. Therefore, the present

study examines the relationship between social support and homicide across 247 European regions at the time points: 2000, 2005 and 2009, representing a total of 605 region-years. Eurostat's data archive is a rich source for social and economic indicators for European regions used for these analyses as they provide information for various levels of aggregation at the region-level as well as for countries and cities.[2] Finally, as opposed to using a conventional panel model with a fixed or random effects regression design, we employ a "hybrid" regression model to estimate the unique effect of social support on homicide (1) across regions of Europe and (2) within those regions over time. The hybrid model allows for the estimation of both the "over time" effects of social support on homicide – that is, the within-region or region effect over time, and the effects of social support on homicide across regions – that is, the between-region, comparable to cross-sectional, effects (Allison 2005; Phillips 2006). The benefits related to these methodological issues are elaborated in related discussions below.

1. Social Support Theory

While the concept of social support is implicit in traditional theories and underlies a number of contemporary criminological theories, including institutional anomie (Messner and Rosenfeld 1993), collective efficacy (Sampson, Raudenbush, and Earls 1997), and general strain theory (Agnew 1992), Cullen offers the most precise interpretation of the concept and of the foundational assumptions of these theories. Although many theories following this tradition assume that social support works to alleviate crime, Cullen makes this assumption explicit. Simply stated, Cullen argues that social support – in any form – reduces crime rates at both the aggregate and individual levels.

Drawing from extant analyses of the concept (House 1981; Lin et al. 1986; Vaux 1988), Cullen (1994), quoting Lin, defines social support as "the perceived or actual instrumental and/or expressive provisions supplied by the community, social networks, and confiding partners" (Lin 1986:18). Following this definition, social support can exist at both micro and macro levels of society and may be delivered formally or informally. Micro-level social support can come from a variety of social relationships, including family and friendship and can provide both instrumental supports, such as financial support/advice, and expressive supports, such as companionship. Macro-level support, on the other hand, originates from social networks, communities, and/or larger ecological units (Cullen 1994), and can include expressive supports received through networks and communities, such as support groups or clubs created around common interests, and instrumental support received through private organizations and/or the government, for example, welfare payments or complimentary financial advising. Informal delivery of social support occurs through relationships with individuals not affiliated with any state/official agency, while formal social support is delivered through formal organizations, such as schools, government welfare programs, and even the criminal justice system.

The crux of Cullen's thesis (1994) is the hypothesis that all forms of social support are negatively related to criminal behavior. Cullen suggests that social support might reduce criminal involvement in a variety of ways, including: reducing criminogenic strains (also see Cullen and Wright 1997); fostering effective parenting and nurturing strong family units; supplying both the human and social capital required to desist from crime; creating opportunities for prosocial modeling; strengthening informal and formal social control; and reducing opportunities for victimization. In addition to the direct effects social support has on reducing criminal involvement, and more pointedly relevant to macrolevel analyses, Cullen (1994) and Chamlin and Cochran (1997) note that the relationship between economic deprivation (poverty, economic inequality) and crime should be more pronounced in areas with limited social support (Pratt and Godsey 2003). They explain that, in addition to the established criminogenic effects of econ-

2 The current Eurostat archive contains region-level data for thirty-five European countries between 1990 and 2013, drawing on widely available data from country statistical agencies such as population totals. Data are more readily available between 2000 and 2010 for indicators used in these analyses. Data for many of these regions are missing, particularly for the social support indicator and especially for many Eastern European countries for the years leading up to 2000. Data for some regions are not available until 2006.

omic deprivation, social support should diminish the deleterious effects of economic deprivation on crime; that is, areas with high levels of social support will inhibit the impact of deprivation on crime and areas with low levels of social support will amplify the influence of economic deprivation on crime (Chamlin and Cochran 1997; Cullen 1994; Pratt and Godsey 2003). Therefore, the theoretical mechanisms outlined by Cullen imply both a direct relationship between social support and crime and a moderating relationship through the capability of social support to reduce the impact of criminogenic strain.

The aspects of Cullen's theory upon which the present study focuses include macro-level instrumental social support delivered by both formal and informal means. These institutionalized social supports are typically manifested in government welfare programs such as assistance to the unemployed, elderly, disabled, and family dependents. Basic healthcare also protects residents from financial hardship and poverty when costly medical treatment is required. Government-subsidized daycare supports single-parent households and households requiring two sources of income. Agencies often provide opportunities to acquire subsidized housing, and benefits are sometimes available to immigrant populations who are at risk of social exclusion and isolation. These benefits are provided by national and local government agencies, as well as by private organizations seated at both the local/community and nation levels, the level of development of which may indicate the extent to which the philosophy of social support has been institutionalized. As such, we are interested in the social supports available to individuals through government programs and both public and private community-level agencies, which work to reduce economic strains and provide individuals with human and social capital. The existence of programs and agencies responsible for providing social benefits allows individuals to anticipate assistance during times of economic downturn, and stress associated with financial hardship can be moderated by these systems of institutionalized social support.

1.1. Empirical Tests of Social Support

Relatively few studies have offered direct empirical tests of social support theory. Among economic indicators examined as explanations of crime rates, however, social support has received the most consistent theoretical support (Stamatel 2009). With the exception of the work of Chamlin et al. (1999), who found a positive relationship between social support and U.S. violent crime rates, and the work of Kim and Pridemore (2005), who found no association between social support and homicide in Russia, the results of these studies are consistent with the expectations of social support theory. Regardless of conceptualization and measurement, social support has been found to be statistically significant and negatively related to homicide rates (DeFronzo 1983, 1997; Messner and Rosenfeld 1997; DeFronzo and Hannon 1998; Savolainen 2000; Pratt and Godsey 2003).

Consistent with Cullen's social support theory, Messner and Rosenfeld (1997) demonstrated how levels of government social support were negatively related to homicide rates among a sample of countries using 1990 data. According to Messner and Rosenfeld's (1997) institutional anomie theory (IAT), the American economic institution dominates social life in such a way that it limits the ability of other institutions to insulate individuals from the pressure to achieve economic success by any means. In their cross-national test of IAT, the decommodification index, a measure of the ability of governments to insulate citizens from deleterious market forces, is negatively related to homicide rates among forty-five countries. Messner and Rosenfeld attempted to incorporate Esping-Anderson's concept of decommodification into their index, which includes three general dimensions of social support: (1) absolute and relative levels of expenditure for social support programs; (2) the sources of funding for those programs; and (3) the distribution of funding across types of social support programs (for instance, unemployment expenditures, family/dependents expenditures, workers' compensation, etc.). These dimensions are operationalized by way of an index comprised of social welfare expenditures as a percentage of GDP, annual benefits payments per capita, and the percentage of expenditures allocated to employment injuries. Similarly, in a re-examination of Messner and Rosenfeld's data and test of institutional anomie theory, Savolainen (2000) reported a significant negative relationship between homicide and welfare as it interacts with inequality.

Pratt and Godsey (2003, 621) confirm these earlier findings, revealing in a more comprehensive examination of forty-six countries that the percentage of total GDP spent on healthcare – a measure argued to represent the value placed on social institutions that may work against the criminogenic effects of "certain social-structural arrangements" – is negatively related to country-level homicide rates. Pratt and Godsey's measure of social support represents (1) the financial relief upon which a citizen can rely from their government when a family member requires medical attention, and (2) the extent to which the government allocates a proportion of the country's GDP to welfare benefits for its citizens. The former relates to the individual impact social support has on recipients and the latter represents the relative importance in governmental spending patterns. Pratt and Godsey also find empirical evidence for the moderating influence of social support as it acts to relieve the deleterious effect of economic inequality on homicide rates.

These generally consistent findings at different points in time and across various levels of analysis lend confidence to the validity of social support theory as a social force affecting crime rates (both directly and indirectly). Nevertheless, an examination of the theory in an even wider variety of political and economic environments and using a more generalized measure of social support is warranted. As explained below, such exploration will allow for the investigation of social support theory's generalizability across time and social environments.

2. Dynamic Effects of Social Support across Europe

As outlined above, the present study investigates the effects of social support on crime rates across regions within Europe – including European Union members, candidate countries, and members of the European Free Trade Association. The countries investigated in both Western European and post-communist Eastern European states, which is significant due to the differences in their economic and political conditions before and since the fall of communism in 1989. The transition from socialism to a democratic market economy was severely disruptive, as the economic transformation led to mass unemployment, rising mortality, and alarming increases in poverty and inequality (Kim and Pridemore 2005; Stamatel 2009; Standing 1996). Following a global trend of neoliberalization, Western European countries have also experienced a turbulent economic and social policy transitions (Esping-Andersen 1996; Harvey 2005). However, unlike Western European countries, which have been able to rely on institutionalized welfare programs (despite rising unemployment and austerity measures that have reduced welfare support), significantly weakened Eastern European governments have been unable to quell intensifying economic deprivation (Esping-Andersen 1996).

Social support theory should explain variation in crime rates across these varied political and economic contexts. Although all of the European countries included in the current analysis are facing economic and political challenges, the degrees to which their economic prosperity and welfare policies are strained by the changes vary. This variation provides an excellent opportunity to test the effectiveness of social support to reduce crime rates in a variety of economic climates. Moreover, if social support theory is to be upheld, regional levels of social support should also explain the variation in crime rates across time; changes in levels of social support should be negatively associated with changes in rates of crime. Therefore, the present study examines the effects of social support across three time points – 2000, 2005, and 2009 – among a sample of Eastern and Western European regions. The current analysis is restricted from examining more recent time points because of limited data availability for the 2010 time period (at the time analyses were conducted, data were not available for 2010).

3. Hypotheses

While social support theory applies to both individual and higher levels of aggregation, this analysis restricts itself to instrumental social support applied at the macro-level and delivered by government and private agencies. The following hypotheses are derived from the conceptual discussion:

> *H1: The association between region social support and crime will be negative. This refers to the direct relationship between social support and crime across regions.*

H2*: The association between intra-region change in social support and change in crime will be negative. This refers to the direct relationship between social support and crime over time, within regions.*

H3*: Between regions, social support will moderate the relationship between economic deprivation and crime: the effect of economic deprivation on crime will be less pronounced in regions with high levels of social support. This refers to the interaction between social support and economic deprivation across regions.*

H4*: Within regions, social support will moderate the relationship between economic deprivation and crime: as regional levels of social support increase, the effect of economic deprivation on crime will become less pronounced. This refers to the interaction between social support and economic deprivation over time, within regions.*

Hypotheses H_1 and H_3 concern the universality of the relationship between social support and homicide rates (across the varied political climates of European countries). Hypotheses H_2 and H_4 specify the effects of social support on homicide rates over the time frame (2000, 2005, and 2009).

4. Data and Methods

4.1. Data Source and Sample

All data included in this analysis are from Eurostat. As far as possible, Eurostat's data are standardized across countries (Eurostat 2014). One of the great advantages of Eurostat is the availability of data at sub-national levels of aggregation, which enables a cross-national test of social support theory at the region level. This allows the researcher to take advantage of variation in both the independent and dependent variables across these regions – that is otherwise masked in country-level measures. The units of analysis for this study are therefore regional areas of European Union member and candidate nations and EFTA countries.[3]

In addition to the availability of data for subnational levels of aggregation, yet another advantage to Eurostat data is the availability of data from Eastern European nations. While Pratt and Godsey's (2002, 2003) cross-national analyses included several nations outside of Europe, their sample did not include any Eastern European nations. Kim and Pridemore (2005) offered an analysis of the effects of social support on homicide rates in Russian regions but did not examine social support theory in any other post-communist contexts. Fortunately, Eurostat currently offers data from many Eastern European nations. Although the limited availability of comparable data necessitates the omission of much of the former Soviet Bloc, the countries included in this analysis represent a variety of economic and political climates.

While the availability of regularly updated data from both Western and Eastern European countries allows for an investigation of the effects of social support across a variety of political and economic contexts, the data available through the Eurostat archives are by no means complete. Therefore, the sample of regions included in the present study has been significantly restricted by the limits of Eurostat data (particularly at lower levels of aggregation).[4] Furthermore, because Western and Eastern European countries have distinct political and economic histories, the sample of European regions is divided according to a Western/Eastern categorization and examined separately. Preliminary analyses employed a dichotomous measure for Eastern European regions, but this measure was omitted in the final analysis (in favor of the split sample) due to its collinearity with the social support measure, GDP per capita, and the percent of the population aged 65 and over. After accounting for listwise deletion of cases and omitting influential outliers, the two samples include 197 Western European regions with 487 region-years and 50 Eastern European regions with 118 region-years across the three time points.

Table 1 offers an account of the number of regions in each country for each time point that are included in the analyses. Of the 35 countries in Eurostat's archives reporting population data, Austria, the Czech Republic, Germany, the Netherlands, Poland, Spain and Sweden provide more

3 Eurostat regional statistics are organized under the "Nomenclature of Statistical Territorial Units" (NUTS) classification system. The current project utilizes statistics documented for NUTS level 2 regions, hereafter referred to simply as "regions" (Eurostat 2014).

4 Region-level homicide rate indicators are available for thirty countries starting circa 1995 and ending 2009, and there are twenty-seven countries represented in the region-level data for the social benefits measure.

complete representation of region-level data (at least 80 percent) for our indicators of interest across all study time periods. Twelve countries represented in the Eurostat data holdings are omitted from our analyses because of a lack of complete data across the study years. These are Croatia, Cyprus, Denmark, Iceland, Lichtenstein, Luxembourg, Macedonia/Yugoslavia, Malta, Montenegro, Slovenia, Switzerland and Turkey.

Table 1: European regions (NUTS Level 2) represented in analyses and total number of regions

	2000	2005	2009
Austria	7/9	9/9	9/9
Belgium	4/11	11/11	11/11
Bulgaria*	0/6	6/6	4/6
Croatia*	0/3	0/3	0/3
Czech Republic*	7/8	8/8	7/8
Cyprus	0/1	0/1	0/1
Denmark	0/5	0/5	0/5
Estonia*	0/1	0/1	1/1
Finland	1/5	1/5	4/5
France	20/26	21/26	21/26
Germany	32/39	36/39	36/39
Greece	0/13	0/13	13/13
Hungary*	0/7	7/7	7/7
Iceland	0/1	0/1	0/1
Ireland	0/2	0/2	2/2
Italy	11/21	0/21	18/21
Latvia*	0/1	0/1	1/1
Lichtenstein*	0/1	0/1	0/1
Lichtenstein*	0/1	0/1	1/1
Luxembourg	0/1	0/1	0/1
Macedonia*	0/1	0/1	0/1
Malta	0/1	0/1	0/1
Montenegro	0/1	0/1	0/1
Netherlands	12/12	12/12	12/12
Norway	0/7	0/7	7/7
Poland*	15/16	15/16	15/16
Portugal	2/7	5/7	6/7
Romania*	0/8	6/8	6/8
Slovakia*	0/4	4/4	3/4
Slovenia*	0/2	0/2	0/2
Spain	16/19	18/19	18/19
Sweden	6/8	8/8	8/8
Switzerland	0/7	0/7	0/7
Turkey*	0/26	0/26	0/26
United Kingdom	28/32	31/32	30/32

* Eastern European countries (plus Turkey)

While Table 1 clearly illustrates the limitations of the Eurostat data holdings for the purposes of this study, the final sample remains substantial and represents countries characterized by widely varying political and economic characteristics. The study sample consists of 247 regions within twenty-three countries (fourteen Western and nine Eastern European). 162 regions are included for the year 2000; 200 regions for the year 2005; and 243 regions for 2009, representing a total of 605 region-years. Fortunately, nine of the twelve Eastern European countries remain in the sample: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia. The remaining regions are located in fourteen Western European countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom. Whereas the findings from this study may not be generalizable across all European countries, these regions provide a good sample of regions across Europe.

4.2. Dependent Variable

The primary focus of this study is on the effects of social support on rates of homicide across regions within European countries. Because homicide is defined most similarly across countries, it is considered to be the most appropriate measure of violent crime for cross-national studies (LaFree 1999). Nevertheless, there are some differences across European countries regarding police recording practices. Therefore, the number of homicide victims obtained from cause of death statistics will serve as the measure for homicide.

Eurostat provides homicide statistics in the form of cause of death data, which are classified according to the *International Classification of Diseases* codes published by the World Health Organization (Eurostat 2014). Consequently, Eurostat data are equivalent in quality to those of the World Health Organization, the database widely considered to be the most reliable and valid source of data for cross-national studies of homicide (Kalish 1988; LaFree 1999). Eurostat provides age-standardized homicide rates for three-year averages, and pertinent to our study, circa the three time periods: for 2000 (averaging 1999 to 2001 rates), 2005 (2004 to 2006) and 2009 (2008 to 2010). Our time frame for analysis is truncated to 2009 as it is the last year included in that series. Three-year averaging avoids the overly inflated and/or deflated rates that result from extreme yearly fluctuations not uncommon among rare events such as homicide. Furthermore, age-standardization allows for the comparability of homicide rates across countries, as the measure acts as a control for each country's age structure.

Detailed descriptive statistics for homicide and all predictor variables are presented in Table 2 for Western and Eastern regions for each time point. Over this ten-year period, homicide rates across Western regions averaged .7 homicides per 100,000 population with a standard deviation of .5, slightly decreasing over the study period. In Eastern regions, the homicide rate was 2.5 times higher, with an average across the time period of almost 1.9 homicides per 100,000 population, decreasing slightly between 2005 and 2009. The standard deviation averaged approximately 1.3 for the Eastern regions. The covariates comprising our model specification are described below.

Table 2. Descriptive Statistics for European Regional Homicide Rates and Predictor Variables

	2000		2005		2009	
	Western Europe	Eastern Europe	Western Europe	Eastern Europe	Western Europe	Eastern Europe
Variables in models						
Standardized homicide rate (3-year average)	.77 [.46] (.2, 3.2)	1.96 [.76] (.9, 3.4)	.71 [.59] (.1, 4.7)	1.97 [1.41] (.4, 10.0)	.67 [.48] (0, 2.6)	1.73 [1.41] (.4, 7.1)
Logged homicide rate	.19 [.31] (-.4, 1.3)	.86 [.31] (.3, 1.4)	.11 [.38] (-.5, 1.6)	.81 [.40] (-.1, 2.4)	.09 [.36] (-.7, 1.1)	.68 [.46] (-.1, 2.0)
Social benefits[a] per capita (t-3) (in thousands of euros)	3.400 [.956] (.959, 5.380)	.409 [.051] (.334, .482)	4.377 [1.072] (1.549, 6.242)	.677 [.315] (.131, 1.124)	5.169 [1.332] (2.293, 8.854)	1.010 [.406] (.3, 1.7)
GDP per capitaa (in thousands of euros)	19.352 [5.581] (9.987, 58.370)	9.207 [3.777] (5.617, 23.912)	24.793 [7.181] (14.040, 78.001)	11.82 [6.07] (6.0, 37.3)	27.318 [8.297] (16.057, 87.797)	15.852 [6.268] (8.476, 46.428)
Unemployment rate	6.82 [4.04] (1.5, 20.1)	12.50 [5.09] (3.6, 21.0)	7.42 [3.74] (2.9, 21.7)	11.55 [5.30] (3.1, 22.4)	8.21 [4.05] (1.9, 25.6)	9.07 [3.74] (3.0, 20.9)
Sex ratio	.96 [.02] (.88, 1.01)	.94 [.02] (.90, .96)	.96 [.02] (.91, 1.02)	.94 [.02] (.85, .96)	.96 [.03] (.90, 1.03)	.94 [.03] (.85, .98)
Percentage aged 65 years and over	16.32 [2.30] (8.8, 25.0)	12.56 [1.58] (10.3, 16.3)	17.16 [2.54] (8.7, 23.2)	14.29 [2.00] (10.6, 21.3)	18.00 [3.04] (8.8, 27.1)	14.96 [2.10] (11.0, 22.1)
Variables not in models						
Social benefits[a] per capita (t) (in thousands)	3.886 [.990] (1.284, 5.699)	.693 [.068] (.591, .842)	4.986 [1.101] (2.033, 6.856)	.892 [.378] (.264, 1.566)	6.008 [1.349] (3.007, 10.922)	1.492 [.508] (.633, 2.227)
Population size (in thousands)	2139.0 [1615.9] (268, 11,020)	2014.4 [1162.0] (1007, 5113)	1907.7 [1523.8] (65, 11,442)	1866.4 [964.9] (593, 5146)	1908.3 [1680.6] (73, 11,728)	1900.8 [961.1] (882, 5204)
n (listwise)	139	23	152	48	196	47

Note: [a] In constant 2005 Euros. GDP multiplied by negative one is the of measure of economic disadvantage for model estimation.

4.3. Independent Variables

The independent variables are measured at three time points – 2000, 2005 and 2009 – except for the key concept of interest, social support. It is measured as social benefits expenditures per capita and has been entered as a three-year lagged measure for each time point – that is, for 2000 (1997), for 2005 (2002) and for 2009 (2006).[5] This measurement specification is informed by McCall and Brauer (2014, 94, 101), who provide evidence that the effects of social support may have a lingering rather than an immediate or contemporaneous influence on homicide rates (Messner and Rosenfeld 1997). Therefore we estimate a series of alternative lag specification models with contemporaneous as well as one-, two-, and three-year lagged social support measures. Appendix A displays the substantive differences across these alternative models, which are discussed below.

As social support theory does not explicitly suggest a particular operationalization of social support, previous studies testing social support theory have offered a variety of measures representing the concept.[6] Scholars have typically measured social support in the form of support provided by the government as described above. While, as a whole, the measures of social support employed by these scholars are somewhat diverse, taken independently, the measures are fairly limited in their operationalization of the concept. Most studies offer only one aspect of the variety of support that can be institutionalized in a society, such as healthcare and education expenditures (Pratt and Godsey 2003; Kim and Pridemore 2005). The measure of social support provided by Eurostat allows for a broader operationalization of the concept – that is, a standardized measure of the total annual social benefits expenditures per capita (reported in thousands of euros), which is defined as "all interventions from public and private organizations to relieve households and individuals of the burden of a defined set of risks or needs" (Eurostat 2008, 9). These risks/needs include: sickness/health care, disability, old age, survivors, family/children, unemployment, housing, and "social exclusion not elsewhere classified" (Eurostat 2008, 9). This measure allows the present analysis to reliably account for a wide range of sources of social support in each region, which include supports provided by both national and subnational public and private organizations.[7] To further control for inflation across time periods, the social support measure employed herein has been transformed to reflect constant 2005 euros.[8] Across the three time points, social benefits averaged 4,417 per capita in Western regions and 758 per capita in Eastern European regions. Refer to Table 2 for details across each time period.

Following previous cross-national studies of homicide and tests of social support theory, classic structural covariates of homicide are included in the analyses (Chamlin and Cochran 1997; Kim and Pridemore 2005; LaFree 1999; Pratt and Godsey 2003, 2002). These variables include indicators of economic prosperity and economic strain – measured in the present study using Gross Domestic Product (GDP) Purchasing Power Standard per capita and the percent of males aged 15 and over who are unemployed, respectively; the sex ratio (total males to total females), and percentage of total population aged 65 years and over. The average population size of all sampled regions was

5 Data for the social support measure is available for the majority of Western European countries beginning in 2000 but not available for some of the Eastern European countries until 2006, thereby accounting for a good deal of our missing cases. Note that the current Eurostat data holdings no longer provide data that were available for earlier years in the time series; therefore, we have retrieved data available from an earlier version of the Eurostat archive for 1995 social benefit spending and use it to interpolate social benefit data for 1997 through 1999 for the present analyses.

6 Studies of the effects of economic deprivation on homicide have included welfare support as another indicator of the economic needs of an area. Although theoretical rationale makes this assumption plausible, the current project aims to control for the conceptualization of economic deprivation through the inclusion of two measures which are both negatively correlated with the measure of social support.

7 Cullen's ideas about the macro effects of social support may be realized from the very existence of government (and private) programs and agencies which provide benefits in times of need. Consistent with that logic, a region rich in institutionalized social support available to various demographic groups is one in which residents can anticipate assistance when the need arises, thereby reducing general levels of stress as well as strain related to economic hardship. Eurostat's measure only offers an overall total measure of support and does not offer information by type; therefore, we are not able to include specific types of support which may seem more obviously connected to reducing homicides, such as unemployment and social exclusion.

8 The European Council uses the Harmonized Indices of Consumer Prices (HICP-CPI), which is comparable to our Consumer Price Index http://ec.europa.eu/eurostat/cache/metadata/en/prc_hicp_esms.htm.

1,900,000, and ranged from about 65,000 to 11,700,000 in Western European regions and from almost 60,000 to over 5,200,000 in the Eastern regions. These provide a wide variation in populations represented across these regions.

Scholars have struggled to incorporate valid indicators of economic deprivation or impoverishment in cross-national research (Messner et al. 2010). Hence, due to data limitations and collinearity problems characteristic of cross-national measures of absolute and relative deprivation, cross-national studies have most often included indicators of overall economic development (such as GDP and/or the human development index) and/or measures of relative deprivation (such as the Gini index) (Pridemore 2008; Messner et al. 2010). While Messner et al. (2010) find that measures of relative deprivation better predict cross-national rates of homicide, Eurostat does not supply the income-based data necessary to compile such measures at the regional level. Therefore, we are not able to capture this aspect of economic strain as a predictor of homicide rates in these analyses. As sufficient region-level measures of income inequality or poverty are unavailable from Eurostat, GDP per capita and male unemployment are included as traditional, cross-national measures of economic prosperity and economic strain.[9] In the present study, GDP is multiplied by -1 – henceforth, referenced as "negative GDP" – and represents the economic disadvantage of a European region. This is done to create an indicator consistent in sign with the posited direction of the relationship between economic deprivation and crime, and also eases the interpretation of the findings.

To test the moderating influence of social support on economic disadvantage as posited in hypotheses H_3 and H_4, an interaction term, using the product of social benefits per capita and negative GDP per capita, is incorporated into the analyses.[10] According to the conceptual discussion, support for this moderating mechanism of social support will be demonstrated with a negative, statistically significant coefficient for this interaction term. That is, the positive relationship between economic disadvantage and homicide will be diminished in regions with high levels of social support.

Finally, the percentage of the population aged 65 and over is included to control for growing aging populations that are likely to have great social support needs. As a reflection of the unique needs of elderly individuals, those countries with larger populations of individuals falling within the elderly age groups may have higher demands and, thereby, offer higher levels of social support.

4.4. Preliminary Analyses

Indications of both heteroskedasticity and collinearity among variables included in the analyses led to concerns over model specification and data transformations. An examination of residuals plotted against fitted values generated using ordinary least squares regression at each cross-section (2000, 2005, and 2009) led to the detection of heteroskedasticity, the correction for which involved the log transformation of the homicide rate (a common transformation in aggregate-level studies of homicide). Residual analysis conducted after log transformations indicated no patterns of unequal error variance. Additionally, inspection of bivariate correlation matrices (available upon request) indicates moderately high correlations among some of the study variables. One would anticipate that regions with high levels of social need (including high rates of poverty) are likely to exhibit high levels of social support.[11] Not surprisingly, strong correlations are found among these variables (especially between social support and negative GDP per capita). Even though the highest bivariate correlation is only .55, results of models presented herein are interpreted with caution to ensure the unique effects of predictor variables are identified and not masked by the effects of other highly correlated predictors. An analysis of variance inflation factor values (VIF) estimated for each time period

9 Eurostat's household income per capita indicator was considered for our measure of economic deprivation, but was too highly correlated with the other more conventional measures of economic wellbeing.

10 GDP per capita is used as a measure of economic prosperity, but for conceptual consistency with social support theory, GDP is multiplied by –1 to represent economic disadvantage for the region and, as such, serves as the component of the interaction term. This was chosen over using unemployment for the interaction measure because GDP is arguably a more reliable measure than unemployment.

11 Negative bivariate correlations between the homicide rate and social support provides initial support for the hypotheses and also indicates that social support is not an indicator of a region's economic deprivation, which would be positively correlated with homicide.

indicated that no VIF value exceeded 4, suggesting that multicollinearity is not an issue. Cook's distance values were examined and influential outliers were identified only in the Eastern region sample; therefore, cases with Cook's D values greater than the cutoff (4/n) were omitted from the Eastern European region analyses.[12]

4.5. Statistical Technique

In order to test the hypothesized relationships between social support and homicide, a series of panel models (also referred to as pooled time series), or more specifically, "hybrid" panel analysis regression models, were estimated. The Eurostat data provide for measures of change over the five-year period between 2000 and 2005 and for the four-year period between 2005 and 2009; recall that the available homicide rate data limited the time series for our analyses. Although greater detail and variation over time is afforded with annual time series analyses, which would capture the more nuanced covariation of trends between social support and homicide rates, the panel model allows the researcher to estimate change among regressors and avoids statistical challenges associated with annual time-series analyses, such as meeting assumptions of stationarity and serial independence (Ostrom 1990). In addition, limitations of data availability in cross-national research make the panel design attractive, as despite the absence of annual measures of social and economic indicators, researchers are able to model change over time. Researchers using a panel model design are nevertheless faced with issues related to assumptions of independence of error terms and omitted variable bias.

Fixed effects and random effects regression models are the two more commonly used methods for panel studies, or the analysis of cross-sectional time-series data – that is, data characterized by multiple measures of units over time (Allison 2005; Phillips and Greenburg 2008). Each of these models, however, suffers from significant limitations. Fixed effects models allow only for estimation of the within-region over-time effects of social support on homicide – treating the between-region effects as fixed and estimable. One benefit of the fixed effects model is its ability to control for unobserved (stable) traits. Here, dummy measures for each case (minus one) are used to control for unobserved, stable traits and can serve as a substitute for omitted variables, hence relieving problems associated with omitted variable bias.

Random effects models treat the between-region effects as independent and randomly distributed, estimating parameters that represent the combined effects of between- and within-region components (Phillips 2006). One condition of random effects models that is difficult to satisfy is that the error term is not correlated with any of the independent variables in the model (omitted variable bias). Therefore, many researchers opt for using the fixed effects model design. Yet, neither fixed effects nor random effects models allow the researcher to estimate the unique between-region *and* within-region over-time effects of regressors (Phillips 2006, 956–57).

In order to bypass the limitations of fixed effects and random effects regression models and following extant criminological literature, the present study employs a "hybrid model" (Allison 2005; Horney, Osgood, and Marshall 1995; Phillips 2006; Ousey and Wilcox 2007). The hybrid model allows for the estimation of parameter coefficients that are equivalent to those yielded by the fixed effects model (within-unit over time estimates, which are net of the effects of time-invariant characteristics of regions) and, unlike the random effects model, allows for the separation of these within-region effects from between-region effects. The hybrid model, then, takes the following form:

$$y_{jt} = \alpha + \beta X_j + \eta(x_{jt} - X_j) + \nu_j + \varepsilon_{jt}$$

The dependent variable y_{jt} represents the logged, age-standardized homicide rate for region *j* and year *t*, where signifies the intercept, β indicates the parameter estimates for the between-region component, X_j represents the mean

12 Eastern region influential outliers which were excluded from the analyses are, for 2000: LT00, LV00, PL31; for 2005: EE00, LT00, RO21, RO32; and for 2009: BG32, PL51, RO21, RO32, SI01, SI02, SK01. See Eurostat (2014) for region names associated with these region codes.

values over time for the predictors for region *j*, η represents the parameter estimates for the effects of the within-region component, and x_{jt} represents the predictor for region *j* at time *t* (Bryk and Raudenbush 1992; Johnston and DiNardo 1997; Judge et al. 1985; Phillips 2006). The region-specific error term is represented by v_j, while the ε_{jt} denotes the model error term that contains the random variation within regions over time. The inclusion of v_j in the model acts as a control for unique, region-specific characteristics, such as war or other political and/or economic transitions and also acts to correct for omitted variable bias as mentioned earlier.

In order to employ the hybrid model approach, the time-varying predictors must be separated into their respective between-region and within-region components. The between-region component of each predictor is acquired by calculating a mean score for each region – regional scores are averaged over the three study years (denoted X_j). This between-region component offers an examination of the effect of predictors across place; in other words, the between-region component is comparable to a cross-sectional analysis. The within-region component of each predictor is computed by calculating the difference between the value of the predictor at each time point and the mean score of the predictor for each region over the three time points (denoted $x_{jt} - X_j$). Distinct from the between-region component, the within-region component of the hybrid model offers an estimation of the effect of explanatory variables across time. Both the between-region and within-region components are included in a random-intercept regression model predicting the logged, age-standardized homicide rate. Additionally, in order to better control for possible year effects, dummy variables representing 2005 and 2009 are included in the models (2000 is omitted as reference year). Tests of hypotheses H_1 and H_3 are made possible through the between-region components of this model, as estimates indicate the effect of social support across regions. The within-region component of this hybrid model provides the tests for hypotheses H_2 and H_4, as estimates indicate the effects of social support within regions over time. Stata/SE 12.0's xtreg procedure is used with robust standard errors to estimate the coefficients and statistical tests for our ordinary least square random-effects regression analyses. The findings from the hybrid regression models are discussed below.

5. Results

In an effort to test the hypothesized relationships between social support and homicide between regions and within regions over time, to determine the optimal lag specification for social benefits per capita, and to explore the robustness of the findings – including the posited relationship of social support acting as a moderating influence on negative GDP per capita – a series of four hybrid models was estimated for each lag model specification: contemporaneous, one-, two-, and three-year lagged social benefits measures. After carefully examining the findings, the three-year lag model specification seems to be the most appropriate to capture the temporal effect of social support on homicide (recall, social benefits per capita measured in 1997 with all other predictor variables measured in 2000). Appendix A shows the regression coefficients and robust standard errors for social benefits per capita and for the interaction term (social benefits multiplied by negative GDP per capita) for all four lag specification models. Support for the hypotheses is reflected in the statistically significant negative regression coefficient for the social benefits per capita measure and the significant positive coefficient for the interaction term. Reviewing these findings from the contemporaneous through the three-year lag model specification, the numbers of statistically significant effects supporting the hypotheses increase across the models. These findings are consistent with McCall and Brauer's (2014) cross-national, longitudinal study of European homicide trends. The analyses were also conducted using the more conventional fixed-effects regression technique, with the comparable substantive findings denoted in bold in Appendix A.[13] More consistent findings appear among the three-

13 Of the twenty-four coefficients shown in the "Within" column (comparable estimates using fixed-effects regression), twenty (83 percent) are substantively comparable to the hybrid method findings. The robust findings across the lag specification provide support for the hypothesized relationships between social support and homicide.

year lag model. We interpret the three-year lag model because the relationship between social support and homicide appears to be strongest with this lag structure and because there is greater comparability between the results from the hybrid and the fixed effects regression techniques.

The results of the hybrid regression analyses used to test the hypotheses are presented in Table 3 with between-region effects in the top half of the table and within-region effects in the lower half. R-square values for the between- and within-region components of the models are also presented.

Table 3. Hybrid random intercept regression three-year lag specification panel models predicting homicide rates in European regions for 2000, 2005, and 2009

	Western Europe		Eastern Europe	
	Model 1	Model 2	Model 3	Model 4
Between-region predictors				
Social benefits per capita[a]	-.041* (.021)	-.149** (.046)	-.771** (.134)	-.953** (.260)
GDP per capita[a] (multiplied by –1)	-.005 (.005)	.018** (.009)	.013* (.006)	.025† (.016)
Unemployment	.034** (.008)	.033** (.008)	-.002 (.011)	.003 (.011)
Percent 65 years and over	-.018* (.009)	-.019** (.009)	.013 (.022)	.006 (.024)
Sex Ratio	-.363 (.943)	-.698 (.929)	–11.542** (1.580)	–11.608** (1.646)
Social benefits-GDP interaction term	--------	-.004** (.002)	--------	-.014 (.015)
Within-region predictors				
Social benefits per capita[a]	-.181** (.034)	-.119** (.050)	-.108 (.178)	-.263 (.327)
GDP per capita[a] (multiplied by –1)	.003 (.004)	-.004 (.008)	.018† (.012)	.029† (.020)
Unemployment	-.001 (.004)	-.001 (.004)	.003 (.006)	.005 (.007)
Percent 65 years and over	-.032** (.013)	-.025* (.013)	-.004 (.061)	-.009 (.063)
Sex Ratio	–6.725** (1.617)	–6.352** (1.596)	–1.252 (3.846)	–3.034 (5.203)
Social benefit-negative GDP interaction term	--------	.001 (.001)	---------	-.007 (.010)
2005	.126* (.054)	.069 (.063)	-.128 (.130)	-.070 (.166)
2009	.274** (.088)	.173* (.100)	-.183 (.238)	-.074 (.317)
Intercept	.485 (.998)	1.394 (1.018)	12.296** (1.750)	12.506** 1.838
R^2 (overall/within/between)	.18/.32/.19	.20/.33/.23	.60/.68/.62	.60/.68/.63
N (regions/region-years)	197/487	197/487	50/118	50/118

Note: **p<.01; *p<.05; †p<.10 (one-tailed test if in hypothesized direction).
[a] In constant 2005 euros.

The regression results displayed in models 1 and 3 represent tests for H_1 and H_2, for Western and Eastern European regions, respectively. These two models display the regression coefficients and effects of social support and the other predictors across the three time points: 2000, 2005, and 2009. Consistent with hypothesis H_1, the results of model 1 indicate that, net of the controls, social support is found to be statistically significant and negatively related to the homicide rate between Western European regions. Male unemployment and percent of the population aged 65 and over are also found to be statistically significantly related to homicide between regions in the theoretically predicted directions. Additionally, according to within-region effects of predictors presented in model 1 and supporting H_2 for Western Europe, changes over the three time periods in levels of social support are negatively related to changes in homicide rates and statistically significant.[14] Even with relatively limited change in social support over the ten-year time span, we find evidence that changes in social support are linked to changes in homicide rates in Western European regions. Changes in the percent of the population aged 65 and over and the sex ratio are also related to changes in homicide rates. On the other hand, changes in negative GDP and the percent unemployed males are not significantly related to changes in homicide rates. Model 3 shows the results for Eastern European regions and the related hypothesis tests of the direct effects of social support. The effect of social benefits per capita is also significant across regions (H_1), but not over time (H_2). Negative GDP per capita and the sex ratio are also significant between regions in this model, but none of the other regressors attain statistical significance. Accordingly, these results confirm both H_1 and H_2 in the Western model as social support explains variation in between-region homicide and within-region homicide, and provides support for H_1 in the Eastern model as the effect of social support is found in the between-region measure.

Focusing on the interaction terms added in Models 2 and 4, limited support for the moderating influence of social support on homicide is found in both Western and Eastern European samples. In fact, support for a moderating effect of social support is found only between Western European regions (H_3), as the interaction term is not statistically significant in either the Eastern European sample or the within-region, over-time components of the Western and Eastern European samples (H_4). These models show limited evidence for the moderating impact of social support on the economic influence of negative GDP on homicide rates.

6. Discussion and Conclusion

This project has presented a test of Cullen's (1994) social support theory that not only allowed for the broadening of the operationalization of social support but also for an investigation of the effects of social support over time and across a group of European regions characterized by varied political and economic contexts. Extant literature examining social support has been limited in both scope and measurement, whereas the present study provides a more comprehensive measure of institutionalized support characterizing these regions. In addition to testing the direct effect of social support on homicide, we examine the moderating influence of social support on strain produced by economic deprivation, which is also related to criminal offending. Hybrid regression panel techniques simultaneously provide estimates of both the variance explained in homicide rates across European regions and variance explained in homicide trends within regions over time. Results from the analyses of the time periods – 2000, 2005, and 2009 – offer mixed support for the research hypotheses. The findings suggest that, when controlling for the effects of economic deprivation, sex ratio, and the percent of the population aged 65 and over, social support is systematically related to homicide between and within regions in the manner consistent with Cullen's theory – statistically significant and negative. The robust support for the direct effects of social support is not matched by the evidence for its moderating effect. The interaction term measuring the moderating influence of social support on economic disadvantage measured with negative GDP per capita is demonstrated only between Western

14 Although the between-region component of the hybrid model is subject to the same potential biases as traditional random effects models, as between-region predictors are assumed not to be correlated with the error term (Allison 2005; Phillips 2006), within-region estimation is not affected by this assumption. Therefore, we can have confidence in the reported within-region estimates.

European regions. The negative coefficient indicates that the crime-inducing effect of economic disadvantage on homicide is lessened in areas with higher levels of social support.[15] This relationship is also proposed by Messner and Rosenfeld's (1997) institutional anomie theory and by Agnew's macrolevel general strain theory (1999).

The present study's findings are consistent with previous cross-sectional tests of the theory, as the between-region component of the hybrid panel model is, in essence, equivalent to a cross-sectional analysis (for example DeFronzo 1983, 1997; Messner and Rosenfeld 1997; DeFronzo and Hannon 1998; Savolainen 2000; Pratt and Godsey 2003). What is more, the present study offers robust evidence at the regional level (further substantiating research that has found support at the country level) and evidence for the direct effect of social support over time within regions, from 2000 to 2009.

Cullen's theory suggests that social support may act as a buffer against the deleterious effects of economic deprivation on crime – a proposition that receives support in our study across Western European regions, but not among Eastern regions and not over time. Whereas one might expect to find support among Eastern European regions as they lack the social support enjoyed by their Western counterparts, failure to achieve statistical significance could be attributed to the relatively small sample of Eastern European regions in our study; but perhaps the fundamental difference between ours and earlier support is related to our measure of economic disadvantage. No measure of economic inequality was available for regions in Eurostat's archive, and a test of Cullen's causal argument would benefit from such a measure. Even without that measure, our findings are consistent with the evidence Pratt and Godsey (2003) present in their cross-national, cross-sectional analysis of forty-six countries (which excluded Eastern European countries).

Although the present study does not offer longitudinal support for the theory across all models, as evidence is found only for Western European regions over time, the explanatory power of social support theory to account for longitudinal variation in crime rates cannot be wholly discounted. The varying results across the between-region and within-region component of the hybrid model may be attributed to the distinction between the effects of explanatory variables across place as opposed to over time – the stock vs. the flow effects of a predictor (see Phillips 2006). Scholars have noted differences in the stock effects of explanatory variables captured via cross-sectional analyses and the flow effects of explanatory variables most often captured via time-series analyses (Koreman and Miller 1997; Teachman, Paasch, Day, and Carver 1997; Phillips 2006). Alternatively, the absence of support for the effects over time may be the result of limited variation in homicide rates over the study period. While regional homicide rates are generally decreasing for this sample of regions, the magnitude of change may not offer a great deal of variation to explain. As future waves of data become available, additional data points and greater variation in homicide rates between regions and over time may reveal the deleterious effect that welfare retrenchment has on changes in homicide.

In addition to the limited range of values among variables, the limited availability of key covariates of homicide, and the limited range of longitudinal data points for regions over time, a number of further limitations suggest that the present study's results should be interpreted with caution. As previously discussed, while the study sample includes European regions characterized by varying social and political contexts, the limited number of countries represented in the analysis does not allow for the results to be generalizable across all European countries. While a number of Eastern European countries are represented, the bulk of the regions included in the analyses are located within Western Europe. Given the turbulent social, political, and economic histories of Eastern European countries, it seems plausible that social support may behave differently in these societies than in those of Western Europe. A more complete representation of regions (particularly in post-communist Eastern European countries) would allow for a more thorough investigation of the universality of social support theory and the mechanisms through which social support works to sup-

15 The results for the two-year lag specification model shows additional support for the interaction term for Eastern regions and should be interpreted with caution. We choose to interpret the evidence from the three-year lag model as its findings are more consistent with the fixed effects analyses.

press crime. Limited numbers of regions representing Eastern European countries also restricts the power of the Eastern region analyses and, thereby, merits caution in interpreting these findings with this caveat in mind.

In spite of data limitations, the results of the across-region test presented herein offer support for Cullen's social support theory, thereby warranting the attention of future research. The Eurostat archives have the potential to offer an invaluable resource for criminological scholars, especially as more complete data for a larger number of European regions and a greater number of time points become available. Scholars should take advantage of future data expansions.

References

Agnew, Robert. 1992. Foundation for a General Strain Theory of Crime and Delinquency. *Criminology* 30:47–87.

Agnew, Robert. 1999. A General Strain Theory of Community Differences in Crime Rates. *Journal of Research in Crime and Delinquency* 36:123–55.

Allison, Paul. 2005. *Fixed Effects Regression for Longitudinal Data Using the SAS System*. Cary, NC: SAS Institute.

Bryk, Stephen S., and Anthony W. Raudenbush. 1982. *Hierarchical Linear Models: Applications and Data Analysis Methods*. Newbury Park: Sage.

Chamlin, Mitchell B., and John K. Cochran. 1997. Social Altruism and Crime. *Criminology* 35:203–28.

Chamlin, Mitchell B., Kenneth J. Novak, Christopher T. Lowenkamp, and John K. Cochran. 1999. Social Altruism, Tax Policy, and Crime: A Cautionary Tale. *Criminal Justice Policy Review* 10:429–46.

Colvin, Mark, Francis T. Cullen, and Thomas Vander Ven. 2000. Coercion, Social Support, and Crime: An Emerging Theoretical Consensus. *Criminology* 40:19–22.

Cullen, Francis T. 1994. Social Support as an Organizing Concept for Criminology: Presidential Address to the Academy of Criminal Justice Sciences. *Justice Quarterly* 11:527–59.

DeFronzo, James. 1983. Economic Assistance to Impoverished Americans: Relationship to Incidence of Crime. *Criminology* 21:119–36.

DeFronzo, James. 1997. Welfare and Homicide. *Journal of Research in Crime and Delinquency* 34:395–406.

DeFronzo, James, and Lance Hannon. 1998. Welfare Assistance Levels and Homicide Rates. *Homicide Studies* 2:31–45.

Esping-Andersen, Gosta. 1996. After the Golden Age? Welfare State Dilemmas in Global Economy. In *Welfare States in Transition: National Adaptations in Global Economies*, ed. Gosta Esping-Andersen, 1–31. London: Sage.

Eurostat. 2008. *ESSPROS Manual: The European System of Integrated Social Protection Statistics (ESSPROS)*. Luxembourg: Office for Official Publications of the European Communities.

Eurostat. 2014. *Eurostat Regional Yearbook 2014*. Luxembourg: Office for Official Publications of the European Communities.

Harvey, David. 2005. *A Brief History of Neoliberalism*. New York: Oxford University Press.

Horney, Julie, D. Wayne Osgood, and Ineke H. Marshall. 1995. Criminal Careers in the Short Term: Intra-Individual Variability in Crime and Its Relation to Local Life Circumstances. *American Sociological Review* 60:655–73.

House, James S. 1981. *Work Stress and Social Support*. Reading, MA: Addison-Wesley.

Johnston, Jack, and John DiNardo. 1997. *Analysis of Panel Data*. Cambridge: Cambridge University Press.

Judge, George G., William E. Griffiths, R. Carter Hill, Helmut Lutkepohl, and Tsoung-Chao Lee. 1985. *The Theory and Practice of Econometrics*. New York: Wiley.

Kim, Sang-Weon, and William A. Pridemore. 2005. Social Support and Homicide in Transitional Russia. *Journal of Criminal Justice* 33:561–72.

LaFree, Gary. 1999. A Summary and Review of Cross-National Comparative Studies of Homicide. In *Homicide: A Sourcebook of Social Research*, ed. M. Dwayne Smith and Margaret A. Zahn, 125–45. Thousand Oaks: Sage.

McCall, Patricia L., and Jonathan R. Brauer. 2014. Social Welfare Support and Homicide: Longitudinal Analyses of European Countries from 1994 to 2010. *Social Science Research* 48:90–107.

Messner, Steven F., Lawrence E. Raffalovich, and Gretchen M. Sutton. 2010. Poverty, Infant Mortality, and Homicide Rates in Cross-National Perspective: Assessments of Criterion Validity and Construct Validity. *Criminology* 48:509–37.

Messner, Steven F., and Richard Rosenfeld. 1993. *Crime and the American Dream*. Belmont, CA: Wadsworth.

Messner, Steven F., and Richard Rosenfeld. 1997. Political Restraint of the Market and Levels of Criminal Homicide: A Test of Institutional-Anomie Theory. *Social Forces* 75:1393–1416.

Ostrom, Charles W. 1990. *Time Series Regression: Quantitative Applications in the Social Sciences*. Thousand Oaks, CA: Sage.

Ousey, Graham C., and Pamela Wilcox. 2007. Interactions between Antisocial Propensity and Life-Course Varying Correlates of Delinquent Behavior: Differences by Method of Estimation and Implications for Theory. *Criminology* 45:401–42.

Phillips, Julie A. 2006. Explaining Discrepant Findings in Cross-Sectional and Longitudinal Analyses: An Application to U.S. Homicide Rates. *Social Science Research* 35:948–74.

Phillips, Julie A., and David F. Greenberg. 2008. A Comparison of Methods for Analyzing Criminological Panel Data. *Journal of Quantitative Criminology* 24:51–72.

Pratt, Travis C., and Timothy W. Godsey. 2002. Social Support and Homicide: A Cross-national Test of an Emerging Criminological Theory. *Journal of Criminal Justice* 30:589–601.

Pratt, Travis C., and Timothy W. Godsey. 2003. Social Support, Inequality, and Homicide: A Cross-National Test of an Integrated Theoretical Model. *Criminology* 41:611–43.

Pridemore, William A. 2008. A Methodological Addition to the Cross-National Empirical Literature on Social Structure and Homicide: A First Test of the Poverty-Homicide Thesis. *Criminology* 46:133–54.

Sampson, Robert, Stephen Raudenbush, and Felton Earls. 1997. Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy. *Science* 277:918–24.

Savolainen, Jukka. 2000. Inequality, Welfare State, and Homicide: Further Support for the Institutional Anomie Theory. *Criminology* 38:1021–42.

Stamatel, Janet. 2009. Correlates of National-Level Homicide Variation in Post-Communist East-Central Europe. *Social Forces* 87:1424–48.

Standing, Guy. 1996. Social Protection in Central and Eastern Europe: A Tale of Slipping Anchors and Torn Safety Nets. In *Welfare States in Transition: National Adaptations in Global Economies*, ed. Gosta. Esping-Andersen, 225–55. London: Sage.

Teachman, Jay D., Kathleen M. Paasch, Randal D. Day, and Karen P. Carver. 1997. Poverty During Adolescence and Subsequent Educational Attainment. In *Consequences of Growing Up Poor*, ed. Greg Duncan and Jeanne Brooks-Gunn, 382–418. New York: Russell Sage Foundation.

Vaux, Alan. 1988. *Social Support: Theory, Research, and Intervention*. New York: Praeger.

Appendix A. Unstandardized regression coefficients (and robust standard errors) using various social support lag specifications: Eastern and Western Europe

	Hybrid Components		N Regions, Region-years
	Between	Within[a]	
Contemporaneous social support (t)			
Social support (Western Europe)	-.014 (.024)	.018 (.027)	201, 500
Social support (Eastern Europe)	-.387 (.089)*	**.027 (.079)**	51, 134
1-year lagged social support (t-1)			
Social support (Western Europe)	.007 (.024)	-.050 (.035)†	201, 491
Social support (Eastern Europe)	-.290 (.076)*	**-.003 (.112)**	51, 118
2-year lagged social support (t-2)			
Social support (Western Europe)	-.024 (.021)	**-.166 (.037)***	200, 490
Social support (EasternEurope)	-.436 (.107)*	**-.080 (.135)**	50, 117
3-year lagged social support (t-3)			
Social support (Western Europe)	-.041 (.021)*	**-.181 (.034)***	197, 487
Social support (Eastern Europe)	-.771 (.134)*	**-.108 (.178)**	50, 118
Contemporaneous social support (t)			
Social support (Western Europe)	-.157 (.049)*	**.086 (.040)***	201, 500
Social support*-GDP (Western Europe)	-.005 (.001)*	**.002 (.001)**	
Social support (Eastern Europe)	-.745 (.220)*	**.078 (.106)**	51, 134
Social support*-GDP (Eastern Europe)	-.028 (.014)*	**.003 (.003)**	
1-year lagged social support (t-1)			
Social support (Western Europe)	-.143 (.049)*	**-.042 (.048)**	201, 491
Social support*-GDP (Western Europe)	-.004 (.001)*	.002 (.001)*	
Social support (Eastern Europe)	-.521 (.200)*	**.095 (.151)**	51, 118
Social support*-GDP (Eastern Europe)	-.014 (.010)†	**.004 (.005)**	
2-year lagged social support (t-2)			
Social support (Western Europe)	-.153 (.054)*	-.076 (.054)†	200, 490
Social support*-GDP (Western Europe)	-.005 (.002)*	**.002 (.001)**	
Social support (Eastern Europe)	-.790 (.233)*	**-.118 (.226)**	50, 117
Social support*-GDP (Eastern Europe)	-.021 (.011)*	**-.003 (.007)**	
3-year lagged social support (t-3)			
Social support (Western Europe)	-.149 (.046)*	**-.119 (.050)***	197, 487
Social support*-GDP (Western Europe)	-.004 (.002)*	**-.001 (.001)**	
Social support (Eastern Europe)	-.952 (.260)*	**-.263 (.327)**	50, 118
Social support*-GDP (Eastern Europe)	-.014 (.015)	**-.007 (.010)**	

Note: * p<.05, † p<.10 (one-tailed test of significance if sign in predicted direction).
[a] Bolded values substantively consistent with fixed effects estimates.

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