

# Expressive Crimes in Post-Socialist States of Estonia, Latvia and Lithuania<sup>1</sup>

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## Abstract

This article presents trends in expressive crimes in Estonia, Latvia, and Lithuania from 1993 to 2000 and examines how demographic, socio-economic, land use, and institutional factors relate to their geography in 2000. Geographical Information System (GIS) and spatial regression models are employed in the study, which make use of country regions as the unit of analysis. Issues concerning crime data

availability and quality are discussed. While police official statistics show a significant rise in rates of expressive crime in the Baltic countries during the 1990s (with the exception of homicide), victimization crime surveys indicate that there have been no significant changes in crime levels and composition. Results also show that indicators of regions' social structure, such as divorce rate, more strongly

predict the variation of 2000's expressive crime ratios than other indicators, such as land use and economic covariates. Most of these covariates function in ways which are predicted by Western literature on crime geography.

**KEY WORDS:** Assault, Crime geography, GIS, Homicide, Post-socialist countries, Regression models, Trends, Vandalism

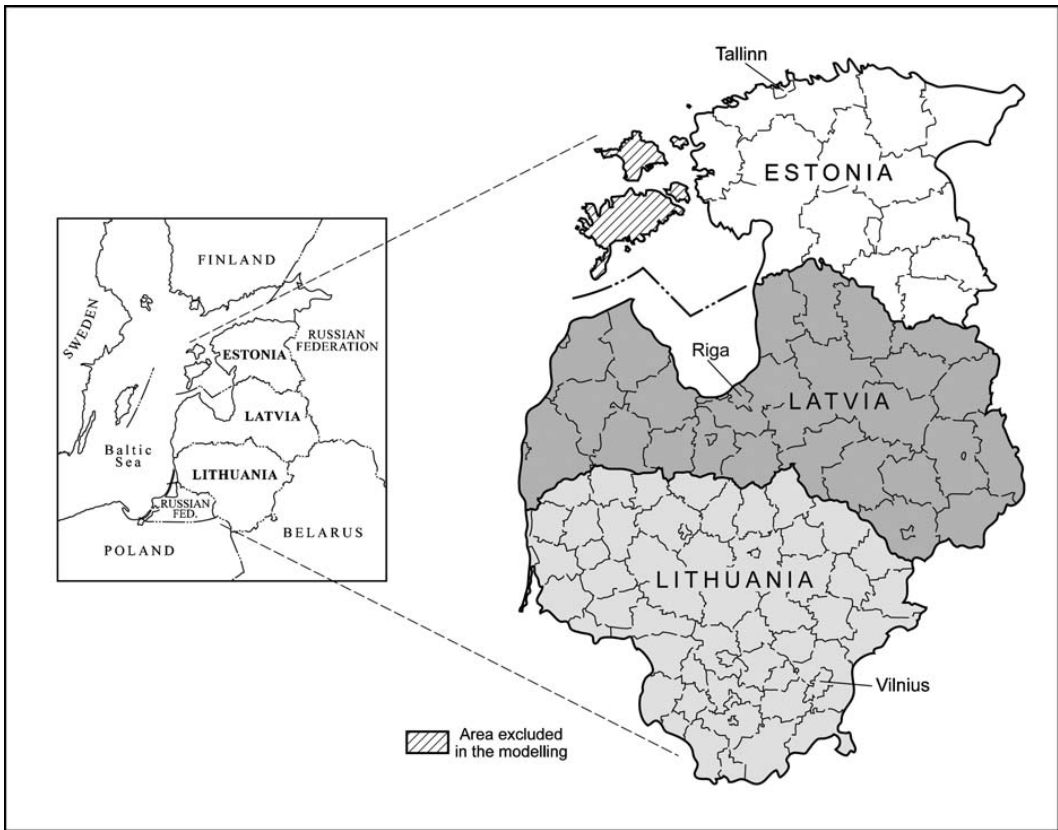
## Introduction

The Baltic states of Estonia, Latvia, and Lithuania have experienced striking but not identical increases in the number of reported offences during the last decade (Nordic Criminal Statistics 2003; Interpol 2003). The highest increase was reported in Estonia, where the rate increased from 245 reported offences per 10,000 inhabitants in 1993 to 421 in 2000, followed by Lithuania, where it rose from 162 to 235 reported offences, and Latvia, where it rose from 155 to 209 reported offences (Appendix 1). However, relatively little is known about the composition and geography of crime

in these states during this period, or the changes that have taken place, and why (but see, for example, Butler 1992; Aromaa 1998; Lehti 1998; Van Duyne 2001; Rawlinson 2001; Ahven 2004).

These three Baltic countries represent interesting case studies for scientific and policy-related research into the geography of crime (Fig 1). First, since the collapse of the Soviet Union, these states have undergone a period of profound political, economic, and social change. These changes are expected to have implications for the level and composition of offences as well as their geographies. Second, Estonia, Latvia, and Lithuania have recently joined the EU. Historically they have been transit countries between East and West (Ulrich 1994); however, now they have become border states on the critical eastern border of the EU. They are required to

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**Figure 1.** *The study area: Estonia, Latvia, and Lithuania.*

adopt a rigorous approach towards maintaining border security. EU enlargement increased the need for knowledge that provides the basis for policies to deal with crime in Europe as a whole when the three Baltic states became part of that larger picture.

This paper has two objectives. The first is to present crime trends in Estonia, Latvia and Lithuania covering the years following their independence and transition from a planned to a market economy (1993 to 2000). The analysis will focus on *expressive crimes* because the rates of expressive crime have remained consistently high in these countries (see Appendix 1). Expressive crimes are defined as criminal acts that

serve to vent rage, anger, or frustration. In this paper, expressive crime refers to homicide, assault, and vandalism.<sup>2</sup> Moreover, expressive offences are associated with stress and social disorganization. In Russia and Eastern European countries, economic and political transition has been associated with uncertainty and social instability which has

<sup>2</sup>As in other previous studies (e.g. Western et al. 2003:47; Perry 2003:287) vandalism is regarded as an expressive crime because it is a form of expression. Vandalism reflects youths' 'expressive emotional outlets' in a social situation when they experience frustration (Mays 1970:53), expressed by acts that serve to vent rage and anger. As Sampson and Raudensbush (1999:609) suggest, 'vandalism does not directly cause other more serious crime but creates a neighbourhood environment where they are more likely to occur', indicating they may share the same geography.

generated grounds for violence. Recent studies in Russia and Eastern Europe suggest that social stress and disorganization during transition from a planned to a market economy are related to increases in suicide, homicide, and overall mortality (Leon and Shkolnikov 1998; Gavrilova et al. 2000; Pridemore and Spivak 2003). Official police data from the Baltic countries are compared with those of Europe, as well as other data sources, such as victimization surveys.

The second objective is to assess how demographic, socio-economic, and institutional factors relate to the geography of expressive offences in the Baltic region in 2000. Geographical Information System (GIS) and spatial regression models are used, with 'country regions'<sup>3</sup> serving as the unit of analysis. Since they constitute three independent countries, national differences are also tested in the analysis. The novelty of this article comes from its inclusion of the spatial dimension of crime, which is often neglected in the recent literature devoted to the post-socialist countries. Until recently, spatial crime analysis in these nations in transition was rare simply because data were not systematically available for all regions, or data quality was still a major limiting factor. As Pridemore (2000) suggests, one benefit of this transition has been an improvement in transparency

that has increased the availability and validity of social, economic and vital statistics data for scientific research. The study also contributes to the issues of data availability and quality by gathering information through a survey of experts in each country who work directly with crime statistics.

The structure of this article is as follows. It begins by discussing issues on data availability and quality in the Baltic countries, particularly crime data. General trends in expressive crimes are presented as a background for the conceptual framework for the case studies of Estonia, Latvia, and Lithuania. The relationship between crime and the process of change is discussed and hypotheses of study are suggested. This is followed by the modelling section, where results are discussed. The article concludes with implications of the findings and directions for future work.

### Crime data in the Baltic countries

No recommendations have yet been made to unify data collection, processing methods, or analytical procedures for European crime statistics. Each European country uses its own system of definitions, with distinct rules for collecting data (Gruszczynska and Gruszczynski 2004).<sup>4</sup> For a discussion of the common problems with police-recorded data, see the European Sourcebook of Crime and Criminal Justice Statistics (1996, 2003). Another common problem with crime data from this source is under-reporting.

<sup>3</sup>They are polygons from SABE 2004—Seamless Administrative Boundaries of Europe (Eurogeographics 2005), which is a pan-European data set containing the geometry and semantics of the administrative hierarchies of 36 European countries. The average population size in 2000 for the regions in the three Baltic countries was just under 70,000. These regions are administrative units at county level, such as in Estonia, and in some cases municipality administrative regions, such as in Lithuania. Although they differ in administrative level, they are territorially very similar in size.

<sup>4</sup>Particularly for homicides, mortality data are commonly considered to provide a basis for comparison with police crime records (e.g. Stickley and Mäkinen 2005). Since they often show the same trends, including for the Baltic countries (see e.g. Ahven 2002), we are going to focus this analysis only on police official statistics.

According to the International Crime Victimization Survey (ICVS) (Del Frate and Van Kesteren 2004) the percentage of crime reported to the police was considerably lower in Central and Eastern European countries than in Western Europe throughout the 1990s.

In the particular case of the Baltic countries, crime records were influenced by political and administrative changes following independence and are still affected by changes in criminal codes and police practices, including corruption. Most of the major systematic changes are well known (e.g. changes in penal codes and recording systems), but the difficulty lies in estimating how minor (perhaps local) changes affected levels of recording. According to Gruszczynska (2004), in many Central and Eastern European countries international projects play an important role in improving their statistical standards.

Although this article recognizes that the quality of crime data has improved since independence, little is documented about data quality in these countries (e.g. differences arising from the variable structure of police authorities, from regional ethnic language differences, or from technological barriers which would complicate the implementation of new recording systems). To provide a better picture of data quality, a survey was performed with a small group of professionals dealing with crime data.<sup>5</sup>

<sup>5</sup>The questionnaire used in this survey is available on request. Fourteen experts answered the questionnaire, which includes questions on availability and quality of data from the early 1990s to the present from co-ordinate (x,y) to the national level, changes in penal code, police organization, processes of data gathering and systematization, and boundary/administrative changes in police units over time. A list of the experts who participated in this survey is shown at <http://www.infra.kth.se/sp/Research/Transition/analytic1.htm>

The following paragraphs describe what these experts reported about how and when different factors or events may have affected crime data quality. Experts from each country were also invited to modify crime definitions of the selected expressive offences (initially based on the European Sourcebook of Crime and Criminal Justice Statistics) according to the local penal codes. This paper focuses on expressive crime, but the discussion about crime data quality encompasses other types of offences as well.

In Estonia, crime data are gathered by central criminal police. According to experts, there have been two major changes in the way crime has been defined following independence. In 1992 the Estonian criminal code was adopted, abolishing the differentiation between crimes against state property and crimes against private property, a hall-mark of the Soviet criminal code. The Soviet code also included some crimes which were in essence political crimes—all such articles were abolished with the new code. The second major change took place in 2002. After 1st September, a new penal code replaced the criminal code and part of the administrative code was completely dissolved and its provisions transferred to or replaced by other laws. Repeated use of illicit drugs or possession of a small amount of illicit drugs for personal use was decriminalized and reclassified as misdemeanours. However, the total number of drug offences regarded as criminal (e.g. drug possession with intent to supply, drug trafficking) and misdemeanours (drug abuse or possession of a small amount for personal

use) is comparable to those under the previous code. Changes in the definition of assault from the criminal to the penal codes make data related to assault incomparable between the two. General statistical comparisons are also possible for thefts (including subtypes by objects), although there were some changes in wording. The recorded rates of several offences have been affected by these changes. A significant increase in the number of drug offences reflects the police's increased capacity to tackle drug crime as well as an actual increase in drug use and trafficking. Driving under the influence was criminalized in 1999, increasing the number of recorded offences in the following years. The criminal code for robbery and a subsection for aggravated unconcealed theft were 'related', and such crimes are now described in the penal code as robbery. Therefore the total number of robberies increased rapidly after implementation of the last penal code in 2002.

In Latvia, the Information Centre of the Ministry of the Interior is responsible for systematizing crime data. According to experts, the most significant changes took place between 1994 and 1996. These changes focused on criminal procedures, such as which authorities would deliver indictments or prosecution, rather than the recording of crime data, which was only minimally affected. In 1999 the new Criminal Law came into force but started to be applied from 2000 onwards. According to the new Criminal Law, criminal offences have two types: criminal violations (warranting no more than two years' deprivation of liberty) and crimes (less serious, serious, and especially serious).

The structure and content of this criminal code differed from the Soviet criminal code (1961–1999) in supporting historical traditions of independent Latvia (1918–1940) and the state's political ambitions to join the EU. After independence, new criminogenic conditions required new crime codes, such as smuggling, while some offences no longer qualified as crimes, for instance buying and selling goods in order to earn money (making profit). According to the experts, the major changes in recorded crime occurred when the Latvian system of recording offences replaced the Russian one. Experts believe that crime data quality has improved since the implementation of this 'new system' (when paper records were replaced by a computerized system).

In Lithuania, crime data are systematized by the Ministry of the Interior. This is a centralized registration system which has been responsible for formatting crime data, controlling the quality, and making data public since 1971. These records contain data on the criminal offence, investigation results, charges, investigation procedure and, since 2003, the victim. Crime recording had already begun to shift into a digital format in the 1980s, when Lithuania was still part of the Soviet Union. All criminal offences that took place in Lithuania were recorded on 'cards' and later sent to the Ministry of the Interior. Crime recording became computerized as early as 1994 but was not nationalized until 2003, before which all police commissariats had unique data systems. On May 1st, 2003, a new penal code changed the method of recording police crime data in Lithuania, which partially

explains the increase in the number of registered crimes in international statistics. In most cases, this was due to changes in crime definitions or in the status of certain activities as criminal (e.g. smuggling of goods, misdemeanour). Theft was most affected; before 2003 minor thefts were regarded as administrative offences but now qualified as criminal offences. Moreover, after 2000 there were several territorial changes in Lithuania (e.g. number and boundaries of the municipalities) that might have affected the recording of crime data at a municipal level.

### **Trends in expressive crimes in the Baltic countries**

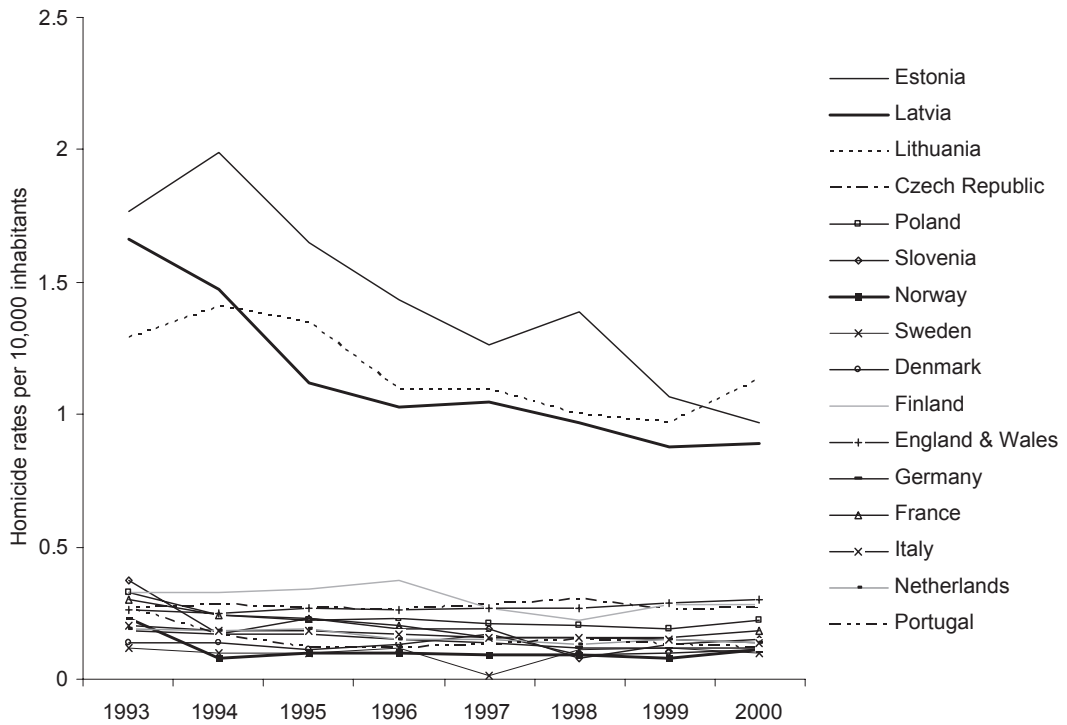
The analysis will concentrate mostly on police-recorded data from 1993 to 2000 because this represents a period of relative stability following the countries' independence. Before that, it is difficult to ascertain the quality of the data, which was often filtered by the authorities because a rise in crime was interpreted as a threat to the former political system (see e.g. Butler 1992; Lehti 2001; Gruszczynska 2004). After 2000, changes in the penal codes in these countries have affected the way offences are recorded. Moreover, there have been territorial changes in the Baltic countries that may have affected the way crime is recorded (this is particularly true for Lithuania).

In order to gain a general understanding of crime trends, police official statistics in the Baltic countries are first compared with trends in police data from Western European countries (see Appendix 1), then crime trends based on police data are compared with trends in data for victimization surveys.

Estonia, Latvia, and Lithuania had significantly higher homicide rates than other countries in Europe throughout the 1990s (Fig 2). The lowest rates were found in Sweden, Denmark, Norway, and the Netherlands. According to the European Sourcebook (2003), homicide rates vary significantly between countries, even when attempted homicide is excluded. Other variations in definitions may influence homicide rates but do not, by themselves, explain these differences (see Appendix 1). However, in the last 50 years Estonia, Latvia, and Lithuania had relatively low homicide rates compared to Russia, for instance (Stickley and Mäkinen 2005).

Among the Baltic countries, Estonia has historically shown higher homicide rates than its Baltic neighbours (Lehti 2001). In the particular case of Estonia, Ahven (2004) indicates that a factor contributing to the rise in homicides in the beginning of the 1990s was that the availability of alcohol increased markedly after 1992. While conflicts in the criminal underworld are also considered a leading cause of the increase in homicide in the early 1990s, later analyses have shown that such conflicts account for less than 20% of homicides. Nearly two-thirds of homicides were committed by acquaintances or family members after drinking together. Since 1995, homicides have decreased considerably, reaching the same level as at the beginning of the 1990s.

Only homicides, out of three selected expressive offences, decreased during the 1990s (more than 30%). Reduction in homicide rates was also witnessed in other countries such as Germany and Finland, and in Eastern Europe, in



**Figure 2.** Homicide rates per 10,000 inhabitants, 1993–2000, in relation to other EU countries.

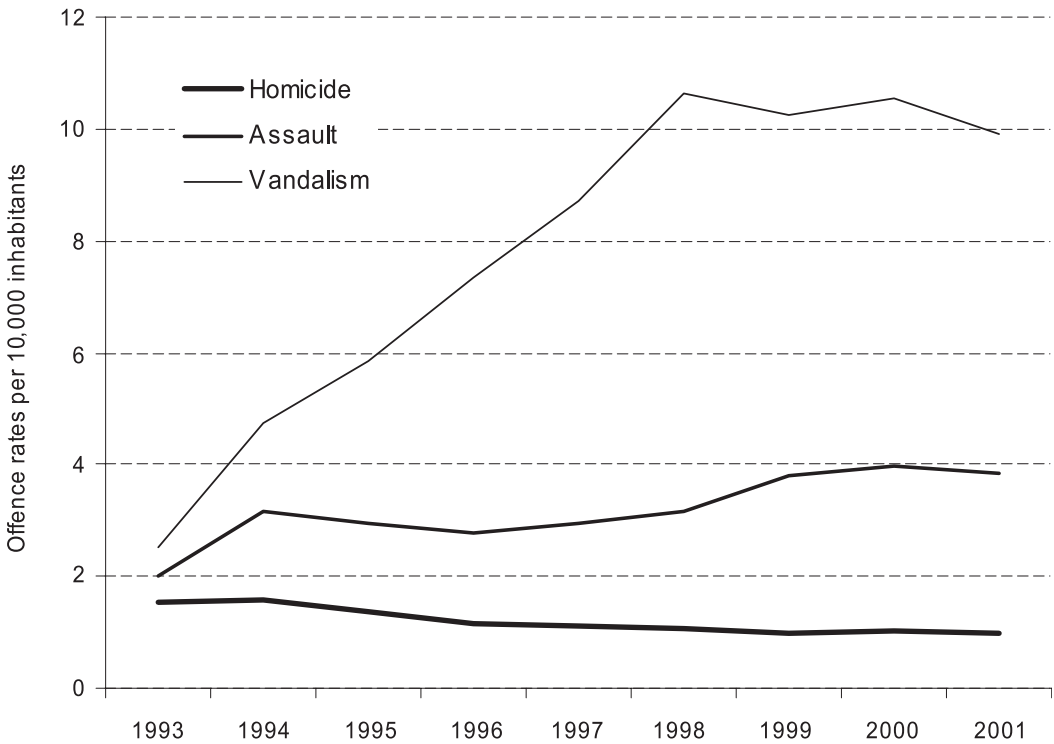
Slovenia and Bulgaria (Fig 3). However, levels of aggression as a whole did not decline in the Baltic states, indicating that violence in the 1990s may have become less lethal.

Assault, for instance, increased more than 50% according to police statistics (Fig 3), particularly in Lithuania and Estonia. A similar trend was also found in Western European countries<sup>6</sup> such as Belgium, Denmark, Finland, Norway, and France. Vandalism, which can also be considered a form of aggression, has increased more than 100% in the Baltic countries since 1993. It is also worth noting that reporting improved in the 1990s for certain crime types in Estonia,

Latvia and Lithuania, including vandalism, pick-pocketing, and drug-related crimes, resulting in significant increases in recorded rates.

According to interviewed experts, as overall living standards improved since the mid 1990s, crime levels have become more similar to the ones found in Western European countries. They believe that official figures for the early 1990s did not reflect actual crime, at least in comparison with Western or Nordic countries, due to differences in legislation, statistical procedures and the police capability and effectiveness to detect some types of crimes. Experts suggest that the police (and other criminal justice institutions) have become more efficient in targeting certain types of crimes. For instance, co-operation between private security firms

<sup>6</sup>According to the definition used by Gruszczynska and Gruszczynski (2004), this includes old European Union members, plus Norway and Switzerland.



**Figure 3.** *Expressive crime rates per 10,000 inhabitants in Estonia, Latvia, and Lithuania, 1993–2000.*

and the police intensified and improved their capacity in catching shoplifters. Some changes in criminal legislation and statistical procedures may also have influenced official trends (e.g. increasing registration of physical abuse). Experts tend to suggest that an increase in official statistics in the 1990s does not necessarily mean actual increase in crime—a statement that is supported by the results from victimization surveys in the three Baltic countries.

Whilst official police figures suggest crime rates increased several-fold in the Baltic states between 1995 and 2000, victimization surveys indicate there have been no essential changes. Ahven (2002) compared trends in police crime data from the second half of the 1990s with survey data for the Baltic countries from two sources: the International Crime

Victimisation Survey (ICVS) and the Living Conditions Survey (LCS).<sup>7</sup> Findings also indicate that the level and structure of crime have remained largely the same during this period of time. The LCS from 1994 and 1999 showed that reports of victimization by violent attacks and threats have decreased in Latvia and Lithuania since 1994, but showed almost no change in Estonia. These divergent trends between data from the police and victimization surveys make the interpretation of crime trends in the Baltic countries a difficult task.

<sup>7</sup>The International Crime Victimization Survey (ICVS) was carried out in Estonia in 1993, 1995 and 2000; in Latvia (Riga region) in 1996, 1998 and 2000; and in Lithuania (Vilnius) in 1997 and 2000. The Living Conditions Survey (LCS) was performed in all Baltic countries in 1994 and 1999.



A possible cause of this is the growth of crime reporting to police in the Baltic countries. In Finland, for instance, the long-term growth of the crime reporting rate was consistent with the growth of fear, the increase of the average age of the population, the on-going urbanization and the gradual improvement of the availability of police services (Heiskanen et al. 2004:24). In the light of previous studies in Great Britain, the United States and elsewhere, this trend can also be associated with an increase in victimization-related inequality (see for instance Trickett et al. 1995; Levitt 1999; Young and Mathews 2003; Nilsson and Estrada 2006). In Sweden, for instance, Nilsson and Estrada (2006) suggest that the reason behind the overall stability in victimization is the increasing polarization between different groups of society. Richer groups had their exposure to violence stabilized since the mid 1980s, whilst the proportion of those victimized has become significantly greater among the poor. For the Baltic countries, however, inequality in victimization cannot be tested since socio-economic data from victimization surveys are too limited to carry out meaningful analysis, or the sample size of respondents varies over time (some were applied to the capital cities only, whilst others covered the whole country).

*Regional patterns of crime: Estonia, Latvia and Lithuania*

In Estonia, the level of expressive crimes is highest in Tallinn and in the cities of Ida-Viru county. For an overview of crime levels in Estonia, see Saar et al. (2003) and Ahven (2004), and on violent crimes see Lehti (2001). Regional differences in

violence are related to a certain extent to differences in the population's ethnic composition. According to police statistics, the violent criminality of the non-Estonian (mainly Russian) population has been higher than the Estonian population for several decades. People of non-Estonian origin, who have made up about one-third of the population since the 1970s, have committed about two-thirds of homicides (regardless of great fluctuations in general homicide levels in the 1980s). According to police data, in 2005, people without Estonian citizenship (18% of the total population) committed 43% of solved homicides. Although this tendency also appears in the homicide survey (Lehti 1998) and was also confirmed by interviewed experts, comparisons should be interpreted with caution. One reason is that the category 'non-Estonian origin' does not necessarily mean 'foreign-born population' as in the case of most Western European countries. Moreover, this pattern of ethnic minorities and expressive crimes does not repeat itself in Lithuania. In 2000, 28% of offenders involved in homicides were ethnic minorities (the proportion of ethnic minorities in Lithuania was 17% of the whole population in the same year). Data were not available to confirm such a trend in Latvia.

Regional differences in violent crimes in Latvia are less abrupt than those found in Estonia (Lehti 2001). In districts with high unemployment rates, such as Rezekne and Preili, expressive crimes, such as assault and vandalism, tend to be higher than the national average. As in Estonia and Latvia, crime is more wide-spread in urban than in rural areas in Lithuania. The three largest urban

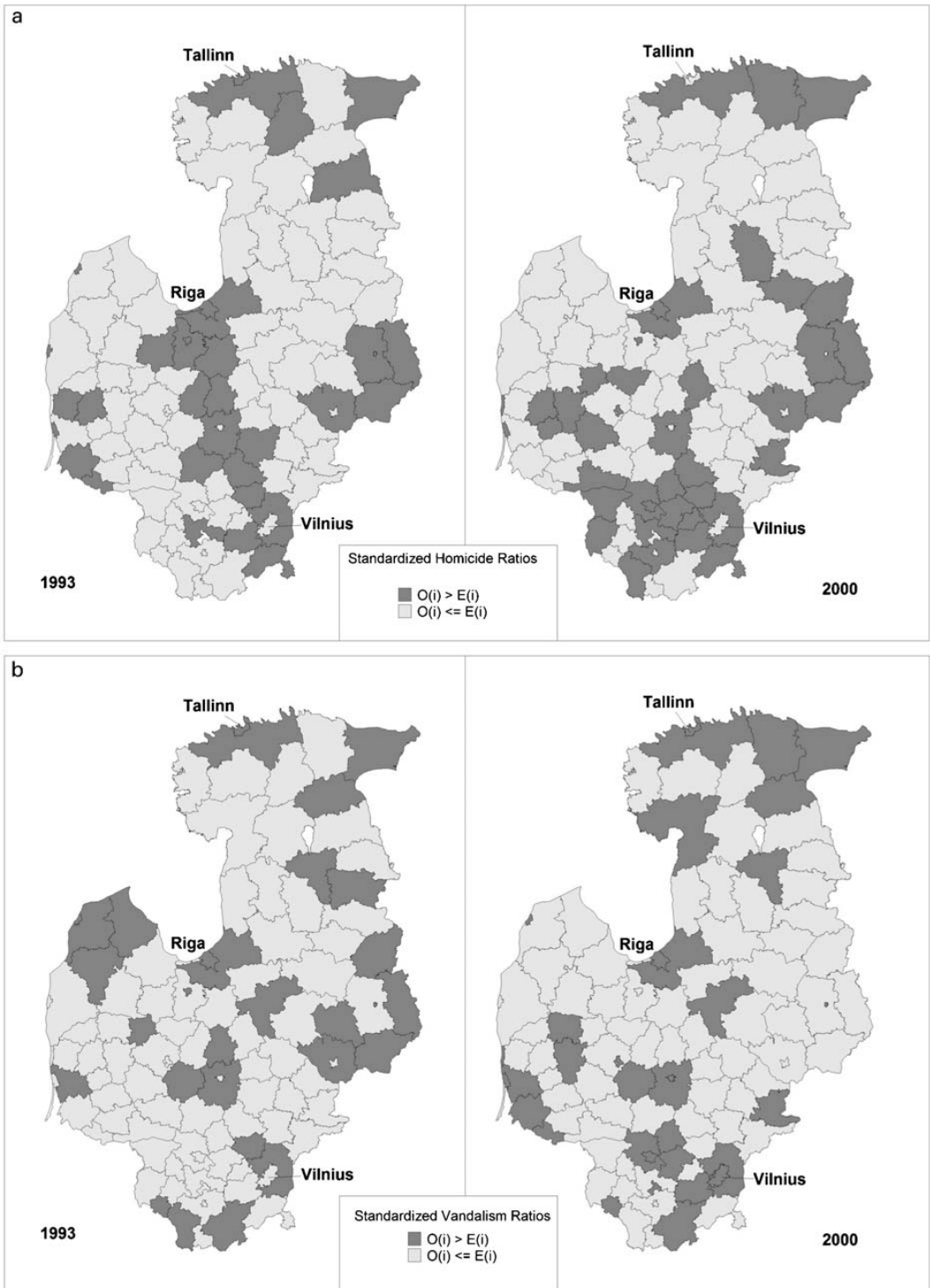
areas (Vilnius in the south-east of the country, Kaunas in the centre and Klaipeda at the Baltic Sea coast) are densely populated, relatively affluent, and experience some of the highest rates of reported offences in the country. The Baltic countries' location also accounts for organized crime groups involved in trafficking different goods, including illegal weapons, stolen vehicles, and contraband products such as cigarettes, clothes, furniture, counterfeit money, and illegal immigrants (Europol 2004), which might also have an effect on the level of expressive crimes.

Standardized offence ratios were calculated in order to identify regions that run a relatively high risk for certain expressive crimes, taking into account the overall distribution of crime in the Baltic countries. Ratio is a useful way of representing data for a set of regions where the areas differ in size, as in this case (absolute values would tend to over-emphasize large areal units), and where it is necessary to allow for differences in population characteristics (on the advantages of using ratios instead of rates, see Haining 2003). The standardized offence ratio (SOR) for region  $i$  is the ratio between the observed number of offences and the expected number of offences. In this analysis, an average offence rate was obtained by dividing the total number of offences by the total size of the chosen denominator. For each area  $i$ , this average rate is multiplied by the size of the chosen denominator in area  $i$  to yield  $E(i)$ . Wikström (1991) pointed out the difficulty of defining appropriate denominators and suggested a list composed of best denominators and those which are

available for the calculation of crime rates. Total population was the chosen denominator for calculating SORs for all expressive offences. Using resident population as a denominator is not problem-free since there are regions, such as the capital cities and other holiday resorts, that receive a significant flow of temporary population during certain periods of year, mostly the summer. Since crime ratios are calculated based on resident population, the risk of victimization might not be accurate for these regions. Fig 4 illustrates standardized ratios for homicides and vandalism. Shifts have occurred in the geography of both homicides and vandalism between 1993 and 2000. The regions in dark grey reported more offences than expected, while the regions in light grey reported fewer offences than expected, taking into consideration the whole Baltic region. For homicide, note that Vilnius is the only capital city where the observed number of homicides was lower than expected both in 1993 and 2000.

### **Crime and processes of change in the Baltic countries**

Although the heightened levels of criminality in post-socialist countries have historic roots, as suggested by Lotspeich (1995), there are reasons to believe that recent transformations in the Baltic countries have also impacted their criminogenic conditions. The international literature has a long tradition of searching for links between changes in countries' socio-economic structural conditions and crime. Durkheim (1897) was the first to argue that rapid social change creates anomie, which can have a negative impact on society and may lead to crime. The link between social change



**Figure 4(a).** Standardized homicide ratios for Estonia, Latvia and Lithuania.

**Figure 4(b).** Standardized vandalism ratios for Estonia, Latvia and Lithuania.

and crime occurs because rapid transformations (here associated with the industrial society) produce a chronic state of deregulation, in which valued goals become discounted and society fails to place normative limits on peoples' desires. For American theorists, such as Merton (1967), anomie is caused by a lack of adequate means to fulfil society's culturally sanctioned goals (Orrù 1987) conceptualized as 'the American Dream'. Regardless of these theoretical differences, 'normlessness' translates into a lack of or weakening of social controls which are fundamental for the functioning of social institutions such as family, education, and polity, and therefore may be associated with changes in crime levels in societies in transition. Messner and Rosenfeld (1994, 1997) suggest that in a dominant capitalist society, social institutions tend to be devalued in comparison to economic institutions (what has been called 'institutional anomie') and lose their power to positively influence crime rates. In other words, the power of more socially oriented institutions that have a potential control effect on crime becomes reduced. However, there is empirical evidence that negative market forces can be moderated by social institutions in countries that have strong social capital (e.g. Chamlin and Cochran 1995) or maintain their pro-social systems (e.g. welfare) despite the market's dominance (e.g. Savolainen 2000).

In this section a set of criminogenic features are discussed in relation to conditions in the Baltic countries in the 1990s. The focus is on the impact of these processes of change on expressive crime and how they may have helped to delineate crime ratios in the year 2000.

Although these macro-changes are presented separately, they should be regarded as simultaneous, creating particular crime conditions both at national and regional levels.

### *Demography*

Estonia, Latvia and Lithuania have followed the same trends as Russia and other Central and Eastern European countries, experiencing low fertility, high mortality, and high divorce rates, as well as emigration significant enough to reduce the population (see for example Philipov and Dorbritz 2003). Since gaining independence, these countries have made an effort to reintegrate their ethnic minorities but challenges remain (see e.g. Vetik 1993). Differences in life-style and long-term socio-economic marginalization have generated greater crime rates amongst certain ethnic groups (e.g. Russians in Estonia (Lehti 2001) and Slavic minorities in Latvia (Aasland and Flotten 2001)). These demographic trends had a negative impact on the population of the Baltic countries, their internal spatial distribution and certainly the socio-economic features associated with this development. Violent crime is expected to be higher in areas characterized by population decrease and social instability, which does not necessarily mean rural areas only. In Russia, for instance, trends in fertility, mortality, and migration have been associated with anomic social conditions and crime (e.g. Kim and Pridemore 2005). Therefore, *it is expected that in the Baltic countries, anomic feelings will generate violence and disorder where population decay and signs of deprivation and social isolation are evident.*

### *Socio-economic and welfare characteristics*

Another factor stimulating criminality is the deterioration of economic conditions. In the early 1990s, complex shifts in the type and level of economic activity caused significant drops in economic production and an increase in unemployment. In economies such as the former Soviet republics, the process of decline in the manufacturing industry cannot be dissociated from the process of privatization of state companies. At the same time, the information economy has emerged and had profound impact in more prosperous areas. Despite relatively high GDP per capita in these countries, unemployment remains a challenge (World Bank 2005a, 2005b). The market economy stimulates patterns of consumption that are not attained by all segments of society. This is expected to cause frustration arising from the discrepancy between the goals of the free market economy and the 'real' capacity to obtain them. The chaotic economic conditions that characterize the transition process engender criminal behaviour in a number of ways, particularly in the domain of expressive crimes. Income support via welfare, such as pensions and allowances, has decreased significantly. Some areas became more market-oriented, privatizing many basic services, while others struggled to maintain their welfare system. This impacted most significantly on those regions characterized by high unemployment rates and poor government support (e.g. few measures to improve labour force skills or low municipal expenditure on social care). There is evidence that social institutions moderate negative structural effects and therefore help reduce crime

(Pampel and Gartner 1995; Kim and Pridemore 2005). *This evidence suggests that crime levels would be lower in areas with high expenditure in social care, despite negative socio-economic development (e.g. high unemployment rate). In regions where there are negative structural developments, crime levels are moderated by 'collectivistic' approaches to supplying public resources.*

### *Social cohesion*

The literature on social cohesion has long suggested the importance of social institutions in moderating the negative effects of structural problems in society, including crime. Chamlin and Cochran (1995) show evidence of the suppressing effect of social cohesion on poverty as a motivation for property crime in the US. Findings revealed that a lower divorce rate, higher voter turn-out, and greater church membership reduced the effect of poverty on property crimes. Divorce rate, an indicator of family structure, has been suggested as a strong predictor of offending. Sampson (1986) studied American cities with populations above 100,000 and found that the lower a city's divorce rate, the lower its crime rate. One of the mechanisms that links broken families to offending is the increase in poverty, particularly following a divorce (Corcoran and Chaudry 1997). Compared to other EU member states, divorce rates are relatively high in the Baltic countries (Eurostat 2003). *It is expected that regions with higher divorce rates will experience higher levels of expressive crimes.*

Low voter turn-out is often regarded as an indication of weak social cohesion (e.g. Putnam 1995). In industrialized

democracies, low participation in elections is linked to mistrust in society, economic inequality, and a 'weakening of the norms governing behaviour' (Sampson et al. 1997:41). Declining participation in recent elections has characterized newly democratic Eastern European countries, even when compared to participation rates in the West. The participation in parliamentary elections in the Baltic countries dropped significantly just after independence into the late 1990s. In Estonia, for instance, in regions such as Ida-Viru, participation in parliament elections was as high as 70.1% in 1992, dropped to 67.2% in 1995, and reached 57.9% in 1999. Low participation in elections is interpreted here as a sign of weakening social bonds, a lack of engagement in the newly implemented democratic process, and general mistrust in society. Crime becomes an option when 'social bonds' are weak and one's connection to society fails. *The lower a region's voter turn-out is, the higher its crime rate.*

#### *Other factors*

An important characteristic of post-socialist countries is the changing nature of law enforcement (e.g. penal code), police practices and organization, and, perhaps more importantly, the 'inability of criminal systems to adjust rapidly' to imposed transformations. As Lotspeich (1995) indicates, police agencies and courts faced a new set of challenges in the 1990s accommodating new laws and actions to protect private property. This state of confusion made criminal activity more attractive by reducing the likelihood of being caught and convicted. Another challenge these countries faced

was a reduction in resources for government activities, including law enforcement. These and a number of other aspects of post-socialist countries, such as a region's location and geography (e.g. differences in land use), degree of urbanity and the country's relative position to organized crime, create conditions conducive to crime (see e.g. Christie et al. 1965; Ulrich 1994; Ceccato and Haining 2004). All these aspects are considered intervening factors affecting crime levels in the Baltic countries and regarded as control variables.

#### **Modelling expressive crimes**

##### *Dependent variables*

The dependent variables in this study are the standardized offence ratios presented above (*Trends in expressive crimes in the Baltic countries*), which create a cross-sectional measure of relative risk for homicide, assault and vandalism. Crime data from the year 2000 were chosen for two reasons. First, changes in penal codes in Estonia, Latvia and Lithuania make any comparison of crime levels after 2000 very difficult. Second, Baltic countries have experienced an increase in total crimes, and looking at crime levels in the year 2000 provides a reasonable time frame for assessing how demographic, land use, economic and social transformations might have affected crime since independence in the early 1990s.

The set of standardized offence ratio values showed a highly skewed distribution. The raw ratios were transformed using the square root or reciprocal transformation to produce a data set more nearly normal. The first column in Table I

indicates which transformation has produced the best result and was therefore used as dependent variable. In order to test for spatial autocorrelation on the residuals, a row-standardized binary weight matrix ( $W$ ) was used that comprised non-zero entries where  $i$  and  $j$  refer to areas that are adjacent. Only contiguous regions were used in the analysis, which excluded, for instance, the Estonian islands. This was done in order to build a weight matrix that allowed the testing of spatial autocorrelation on residuals and go further to other models (e.g. spatial error, spatial lag), if necessary (as suggested by Kim and Pridemore 2005:93). The regression analysis was implemented using GeoDa 0.9.5-1 (Anselin 2003) since the software has regression modelling capabilities with a range of diagnostics that are not available in standard statistical packages (e.g. Moran's  $I$  test of spatial autocorrelation on residuals).

### *Independent variables*

These models include individual variables with data from 2000 providing a cross-sectional picture of these covariates.<sup>8</sup> The list of independent variables to be tested in the model encompasses some of the key correlates of crime rates suggested by the current literature (Appendix 2). Country dummies were added to test

<sup>8</sup>Measures of 'change' from 1993 to 2000 were tested as covariates (indices of economic, social and welfare change), but the results were poor in explaining 2000's expressive crimes ratios. Although some of these indices were significant in predicting assault and vandalism, none of them were significant in explaining variations of ratios of homicides. Social change described only 10% of the variation in assault ratios. For vandalism, the indices of social and economic change were significant and explained 28% of 2000's vandalism ratios. Problems of non-normality, heteroskedasticity and autocorrelation on residuals were present in these models.

whether countries are statistically different, after controlling for country-specific differences in the demographic, socio-economic composition of the population. This kind of model has slopes that vary according to the country (Lithuania was used as a base country). The inclusion of country dummies significantly increased the number of covariates in the models, which made modelling virtually impossible due to high correlation between some of the covariates and their dummies. The strategy was then to run models by each covariate to identify the most important covariates from each group (demography, socio-economic and welfare characteristics, social cohesion and other factors). The next step was then to try simultaneously the most important covariates from each measure as well as its country dummies (say, from Welfare, number of hospital beds per inhabitant and its country dummies were chosen). This procedure has proven successful for all offences, allowing a pre-selection of covariates for the final modelling runs. Nine variables (highlighted in Appendix 2) were used in the final models.

### **Results and discussion**

Table I summarizes the findings of regression models, including the significant variables. Despite performing transformations to try to correct skewness of the dependent variable, non-normality of the residuals was still a problem in two out of three of the models (homicide and assault). For assault, the Ordinary Least Squares regression model diagnostics revealed significant spatial autocorrelation on the residuals. Spatial error models were then fitted to address

Table 1. Results of the regression analysis: Y = standardized offence ratios 2000.

	Significant variables	Regression diagnostics
<b>Homicide</b>	OLS model	Multicollinearity condition number 8.16
Reciprocal	0.074 - 0.36 DivorceRateLatv + 0.009 NonNativePopLatv + 0.06 YoungMalePopLatv (2.49) (-5.14) (3.36) (4.60)	Test of normality of errors <i>Jarque-Bera</i> Value 315.97; $p=0.00$
	t-values in brackets	Test of heteroskedasticity <i>White</i> Value 5.64; $p=0.77$
	$R^2 \times 100 = 23.2\%$	Test of spatial dependence of errors <i>Lagrange Multiplier</i> Value 0.09;
	All covariates are significant at the 1% level	$p=0.92$
<b>Assault</b>	OLS model	Multicollinearity condition number 16.89
Square root	9.61 - 0.0006 PopDens + 1.29 DivorceRate - 0.051 VoterTurnout (5.88) (-1.78) (3.70) (-2.59)	Test of normality of errors <i>Jarque-Bera</i> Value 20.78; $p=0.00$
	t-values in brackets	Test of heteroskedasticity <i>White</i> Value 14.05; $p=0.12$
	$R^2 \times 100 = 24.7\%$	Test of spatial dependence of errors <i>Lagrange Multiplier</i> Value 6.19;
	All covariates are significant at the 1% level	$p=0.01$
	Spatial error model <sup>a</sup>	Test of heteroskedasticity <i>White</i> Value 9.25; $p=0.03$
	8.98 - 0.0006 PopDens + 1.41 DivorceRate - 0.047 VoterTurnout + 0.262 (5.26) (-1.84) (4.40) (-2.04) (2.18)	Test on spatial error dependence and non-normality test are not available in GeoDa for this model
	t-values in brackets	
	$R^2 \times 100 = 29.3\%$	
	DivorceRate is significant at the 1% level, Voterturnout is at the 5%, and PopDens is at 10%	



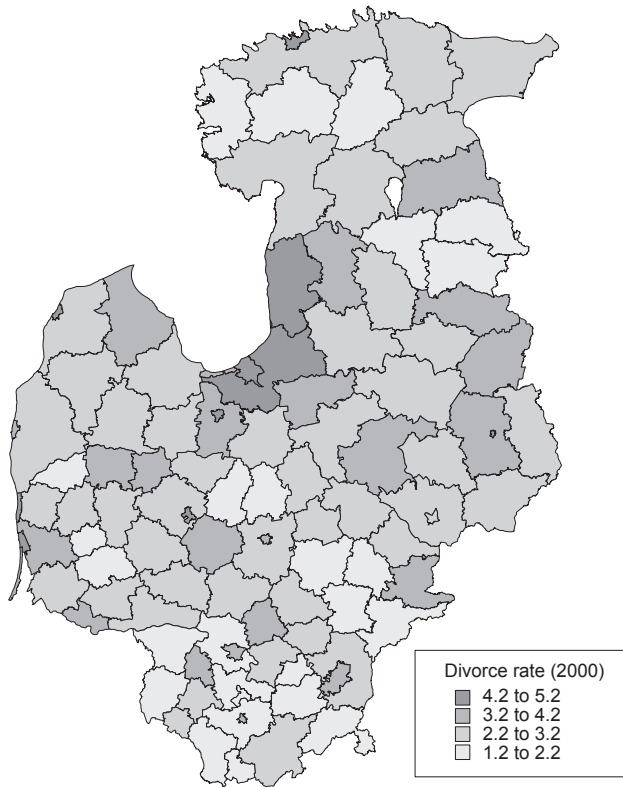
Table 1. Continued.

	Significant variables	Regression diagnostics
<b>Vandalism</b>	OLS model	Multicollinearity condition number 7.46
Square root	4.86+1.60DivorceRate-0.02HospitalBedsLatv (6.57) (6.08) (-5.06)	Test of normality of errors <i>Jarque-Bera</i> Value 2.26; $p=0.32$
	<i>t</i> -values in brackets	Test of heteroskedasticity <i>White</i> Value 5.70; $p=0.34$
	$R^2 \times 100=42.5\%$	Test of spatial dependence of errors <i>Lagrange Multiplier</i> Value 3.05; $p=0.10$
	All covariates are significant at the 1% level	

<sup>a</sup>Spatial lag model was tested but showed poorer performance than the error model.

these problems, but heteroskedasticity still remained a problem.

For all expressive crimes, divorce rate is significant in all models (Fig 5). Divorce rates had a strong increase between 1990 and 2000 in the Baltic countries: in Estonia they rose from 49 per hundred new marriages to 77 (the highest within the EU), in Latvia they rose from 46 to 67, and in Lithuania from 35 to 64. The highest divorce rates are in large cities (e.g. Tallinn, Tartu), among ethnic Russians, and in ethnically mixed families (for more details, see Philipov and Dorbritz 2003). There are reasons to believe that in the Baltic countries social changes caused by the transition from a planned to a market economy have affected key social institutions, such as the family. The previously stated hypothesis that regions with a high proportion of juveniles from broken families would have higher rates of crime and acts of violence can be corroborated by these findings. Findings show that high ratios of expressive crimes and more motivated offenders are concentrated in regions with high divorce rates. However, for Latvia, although divorce rate is significant, it is negatively related to homicide rates. Homicide ratios are relatively high in certain less urbanized regions, such as Rezekne, Ludza, and Kraslava districts. In Latvia, high homicide rates are also related to a high proportion of young males (e.g. Daugavpils district, Jelgava city) and a high proportion of non-native population (e.g. in Riga and Rezekne). Young males are regarded both as potential offenders and victims for violent crimes. Regarding non-native populations, differences in life-styles and



**Figure 5.** *Divorce rates in the Baltic countries, 2000.*

long-term socio-economic marginalization of minority ethnic groups have historically generated particular propensities to offending, such as amongst Slavic minorities in Latvia (see e.g. Aasland and Flotten 2001).

As previously hypothesized, more assaults are found in areas with low participation in elections. As in Western countries, low voter turn-out is an indicator of weak social cohesion. In post-socialist countries, low participation in elections is related to the maturity of the voting process, but as suggested by Bernhagen and Marsh (2007) it involves a diverse array of combined explanatory factors, such as political resources directed to voting and election processes, deprivation, political

culture, and the state of civil society (see e.g. Lewis 1997; Berglund et al. 2001). Assaults are also concentrated in regions with low population density but relatively high divorce rates (in Estonia e.g. Pärnu district, in Lithuania e.g. Zarasai district). The negative sign for population density in the model of assaults as an indicator of urban areas is surprising, since the literature showed plenty of evidence that crime is more wide-spread in urban than in rural areas (Christie et al. 1965) and tends to increase with the size of the urban area. Ceccato (2006) found that crime levels in Lithuanian regions were highly determined by ‘urban areas’, both directly by the variable ‘urban areas’ and by other covariates that correlated with it (e.g. number of hospital beds per

inhabitant). One explanation for this inverse relationship between regions' population density and assault could be that degree of urbanity affects acquisitive crimes more than expressive ones. At regional level, it is acceptable to assume that urban areas are often more criminogenic than rural areas, not because they concentrate lots of people per area but because urban areas offer more opportunities for crime (e.g. stock of goods) than rural ones.

High divorce rates also tend to explain high vandalism ratios. As in the case of lethal violence, individuals from broken families are more likely to be involved in acts of property damage. It may be a form of entertainment among groups of young people (Mahoney and Stattin 2000) or a way to express dissatisfaction triggered by 'relative deprivation' (Burton et al. 1994). As Sampson and Raudensbush (1999:609) claim, predatory crimes, such as vandalism, may not directly 'cause' other more serious crimes, but they do share the same explanatory processes (as, in this case, homicides), with the difference that they can be observed by everybody in the area: residents, visitors and potential offenders.

In the case of Latvia, regions with low numbers of hospital beds per inhabitant were also associated with high vandalism ratios. Hospital beds per inhabitant was used in this analysis as an indicator of how well regions cope with the challenge of adapting to market-oriented principles and, at the same time, keeping some of the core welfare services, such as public health. The previously stated hypothesis that regions with low numbers of hospital beds per inhabitant would have high ratios of expressive

crimes has some grounds in these findings, at least for vandalism in Latvia. Although the variable hospital beds per inhabitant does not help in explaining the variation of homicide ratios in the Baltic countries, there are reasons to believe that improvement in health care and emergency services in the 1990s might be related to the reduction of deaths caused by non-natural causes in the region as a whole.

### Final considerations

Although Estonia, Latvia, and Lithuania became independent republics in the early 1990s and have since experienced profound political, economic and social changes (including EU membership), very little is known about these countries' crime levels and geography. This article aims to address this gap by improving the knowledge base regarding the levels and spatial distribution of expressive crimes in Estonia, Latvia and Lithuania between 1993 and 2000. It also provides an analysis of intra-regional variation of expressive crime ratios in relation to demographic, socio-economic and social cohesion variables after controlling for other covariates.

Estonia, Latvia and Lithuania had significantly higher homicide rates than other European countries, but lethal violence is the only expressive crime analysed here that has been in decline in the 1990s. Causes of relatively high homicide rates in the Baltic countries include differences in their demographic composition (e.g. higher propensity among certain ethnic minorities, at least in Estonia), increasing anomic conditions (e.g. following an increase in economic disparities), life-style (e.g.

alcohol consumption) and conflicts between organized crime groups. Whilst police official statistics on expressive crimes such as assault and vandalism have increased several-fold in the Baltic countries, victimization crime surveys indicate that there have been no significant changes in crime levels and composition in the 1990s. A possible explanation for the mismatching between police statistics and victimization surveys is a rise in reporting to the police as a consequence of increasing trust in public institutions during the 1990s. An alternative reason behind the overall stability in victimization is the increasing polarization between different groups of society. Although data are not available to check the causes behind this stability in the Baltic countries, there is a chance that, as in the UK and Sweden, this is caused by the fact that the proportion of those victimized has become significantly greater among the poor and has stabilized among the richer groups of society.

Expressive crimes are often more wide-spread in urban than in rural areas in the Baltic countries. Internal regional differences in rates were influenced by social disorganization risk factors, such as differences in a region's economic structure and employment, social exclusion, and by life-style factors, such as alcohol and drug abuse—factors that are often more tangible in urban areas. Differences in land use, such as the presence of shopping centres, large retailers and recreational areas, as well as differences in regions' functionality (e.g. capital cities, holiday resorts, industrial towns) and locational factors (e.g. border regions), are also expected to affect human interactions and, as a

consequence, crime levels. In order to test how these factors affect regional crime patterns in the Baltic states, regression models were used to explore the significance of a set of variables as predictors of expressive crime ratios in the year 2000 in different regions in Estonia, Latvia and Lithuania. Results show that covariates related to regions' social structure (e.g. divorce rate, non-native population, young male population) are more powerful to describe expressive crime ratios in the year 2000 than other regional (economic covariates, such as foreign direct investment per capita) or locational indicators (being a border/non-border region). With very few exceptions, covariates function in ways which would be predicted by Western literature on crime geography. For instance, divorce rate is significant in all models for expressive crimes. In Latvia, however, divorce rate is negatively related to homicide rates. Although the mechanisms relating lethal violence and low divorce rate are unknown at an individual level, it is likely that at an aggregate level divorce rate mimics the behaviour of missing covariates in the model. To approach the question of the mechanisms underlying such a relationship, it would be beneficial in future analysis to integrate individual level data, such as data on offence, victim and offender. Another alternative would be to investigate specific cases of murders in Latvia to check whether and how they differ in nature from the ones in Estonia and Lithuania.

An important area of study that has not been covered by this article is the effect of organized crime on expressive crimes in the Baltic countries. Evidence shows that organized crime contributed

considerably to the high number of homicides and other violent crimes in the Baltic countries in the early 1990s but that its influence waned by the end of the decade (e.g. Saar et al. 2003). It would be useful to investigate whether there are still any links between local/regional organized crime and levels of violence.

By incorporating the spatial dimension using GIS, this analysis allows an assessment of how social contexts and land use structures interact at a regional level to produce different patterns of crime. However, one limitation with this study is that the regression analysis is based on a cross-sectional framework (one-year database) which might be considered too narrow a time period for drawing final conclusions on these countries' criminogenic conditions for expressive offences. Because there is evidence that change is still occurring in many post-socialist countries, future studies should consider using a longitudinal design, even though this type of research framework would be highly dependent on the availability of good and comparable quality data. The incorporation of new variables (not available for this analysis) in the models, such as

alcohol consumption, would certainly shed light on the nature of expressive crimes in the Baltic countries, particularly of homicides. Moreover, new modelling approaches could be tested, for instance by excluding the most extreme areas from the rest of the data set to check how these areas impact on the results. Although this article recognizes that the quality and availability of data have improved since these countries' independence (including both crime and socio-economic statistics) much still needs to be done to meet the requirements of a rigorous long-term research design.

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## References

- Aasland A, Flotten T (2001). Ethnicity and Social Exclusion in Estonia and Latvia. *Europe-Asia Studies* 53:1023-49.
- Ahven A (2002). Crime in the Baltic States: comparing official statistics with survey data. In: Nieuwbeerta P (ed). *Crime Victimization in Comparative Perspective. Results from the International Crime Victims Survey, 1998-2000*. p. 67-79. Den Haag: Boom Juridische uitgevers.
- Ahven A (2004). *Public Safety and Well-being. Social Trends 3*, Tallinn: Statistical Office of Estonia.
- Anselin L (2003). *GeoDa 0.9.3 User's Guide*. Spatial Analysis Laboratory, Department of Agricultural and Consumer Economics, University of Illinois, Urbana-Champaign, Urbana, IL 6180. Available at: <https://geoda.uiuc.edu/pdf/geoda093.pdf>.
- Aromaa K (1998). *The International Victimization Survey in Finland, Estonia,*

- Latvia, and Lithuania 1995–1997. In: Aromaa K (ed). *The Baltic Region. Scandinavian Studies in Criminology*. Oslo: Pax Forlag.
- Berglund S, Aarebrot F, Vogt H, Karasimeonov G** (2001). *Challenges to Democracy*. Cheltenham: Edward Elgar.
- Bernhagen P, Marsh M** (2007). Voting and Protesting: Explaining Citizen Participation in Old and New European Democracies. *Democratisation* 14:44–72.
- Burton VS Jr, Cullen FT, Evans TD, Dunaway RG** (1994). Reconsidering Strain Theory: Operationalization, Rival Theories and Adult Criminality. *Journal of Quantitative Criminology* 35:213–39.
- Butler WE** (1992). Crime in the Soviet Union: Early Glimpses of the True Story. *British Journal of Criminology* 32:144–66.
- Ceccato V** (2006). Crime Dynamics at Lithuanian Borders. *European Journal of Criminology* 4:131–60.
- Ceccato V, Haining R** (2004). Crime in Border Regions: The Scandinavian Case of Öresund, 1998–2001. *Annals of the Association of American Geographers* 94:807–26.
- Chamlin MB, Cochran JK** (1995). Assessing Messner and Rosenfeld's Institutional Anomie Theory: a Partial Test. *Criminology* 33:411–29.
- Christie N, Andenaes J, Skirkbeck S** (1965). A Study of Self-reported Crime. *Scandinavian Studies in Criminology* 1.
- Corcoran ME, Chaudry A** (1997). The Dynamics of Childhood Poverty. *The Future of Children* 7:40–54.
- Del Frate AA, Van Kesteren J** (2004). Criminal Victimization in Urban Europe. UNICRI. Available at: <http://www.unicri.it/icvs> (accessed 18 November 2006).
- Durkheim E** (1897). *Suicide: a Study in Sociology*. New York: Free Press.
- Eurogeographics** (2005). SABE 2004—Seamless Administrative Boundaries of Europe User Guide. Version 1.0, 78. Available at: [http://www.ign.fr/telechargement/P.I/ActusAgenda/Europe/ug2001vii\\_final.pdf](http://www.ign.fr/telechargement/P.I/ActusAgenda/Europe/ug2001vii_final.pdf) (accessed 12 September 2007).
- European Sourcebook of Crime and Criminal Justice Statistics** (1996). Draft Model. European Committee on Crime Problems (chair: M. Killias). Strasbourg: Council of Europe. Available at: <http://www.europeansourcebook.org> (accessed 16 March 2006).
- European Sourcebook of Crime and Criminal Justice Statistics** (2003). Second Edition. European Council, Committee of Experts (chair: M. Killias). The Hague/London/Paris: WODC/Home Office/ESC-école des sciences criminelles, 2003. *Onderzoek en beleid* 212. Available at: [http://www.minjust.nl:8080/b\\_organ/wodc/reports/ob212i.htm](http://www.minjust.nl:8080/b_organ/wodc/reports/ob212i.htm) (accessed 16 March 2006).
- Europol** (2004). 2004 European Union Organised Crime Report. Luxembourg: Europol 26.
- Eurostat** (2003). New Chronos Database: Number of Divorces per 100 New Marriages in the Corresponding Year. Available at: <http://www.eurofound.eu.int/areas/qualityoflife/index.htm> (accessed 7 July 2006).
- Gavrilova NS, Semyonova V, Evdokushkina GN, Gavrilov LA** (2000). The Response of Violent Mortality to Economic Crisis in Russia. *Population Research and Policy Review* 19:397–419.
- Gruszczynska B, Gruszczynski M** (2004). Crime in Enlarged Europe: Comparison of Crime Rates and Victimization Risks. *Transition Studies Review* 12:337–45.
- Haining R** (2003). *Spatial Data Analysis: Theory and Practice*. Cambridge: Cambridge University Press.

- Heiskanen M, Sirén R, Aromaa K (2004).** Victimization and Fear in Finland 2003. Interim Report of the 2003 National Survey of Victimization to Accidents, Violence, Property Crime, and Fear. *Research Communications* 59.
- Interpol (2003).** International crime statistics. Available at: <http://www.interpol.int/Public/Statistics/ICS/downloadList.asp>.
- Kim SW, Pridemore WA (2005).** Social Change, Institutional Anomie and Serious Property Crime in Transitional Russia. *British Journal of Criminology* 45:81–97.
- Lehti M (1998).** Recent crime trends in Eastern Europe. In: Aromaa K (ed). *The Baltic Region. Scandinavian Studies in Criminology*. Oslo: Pax Forlag.
- Lehti M (2001).** Homicide trends in Estonia, 1971–1996. In: Ylikangas H, Karonen P, Lehti M (eds). *Five Centuries of Violence in Finland and the Baltic area*. p. 133–92. Columbus: Ohio State University Press.
- Leon DA, Shkolnikov VM (1998).** Social Stress and the Russian Mortality Crisis. *Journal of the American Medical Association* 279:790–1.
- Levitt S (1999).** The Changing Relationship between Income and Crime Victimization. *Economic Policy Review* 5:87–98.
- Lewis P (1997).** Political participation in post communist Democracies. In: Potter D, et al. (eds). *Democratization*. p. 459. Cambridge: Polity Press.
- Lotspeich R (1995).** Crime in the Transition Economies. *Europe-Asia Studies* 47:555–89.
- Mahoney JL, Stattin H (2000).** Leisure Time Activities and Adolescent Anti-social Behavior: the Role of Structure and Social Context. *Journal of Adolescence* 23:113–27.
- Mays JB (1970).** *Crime and Its Treatment*. London: Longman.
- Merton RK (1967).** *Social Theory and Social Structure*. New York: Free Press.
- Messner SF, Rosenfeld R (1994).** *Crime and the American Dream*. Belmont: Wadsworth.
- Messner SF, Rosenfeld R (1997).** Political Restraint of the Market and Levels of Criminal Homicide: a Cross National Application of Institutional Anomie Theory. *Social Forces* 75:1393–416.
- Nilsson A, Estrada F (2006).** The Inequality of Victimization: Trends in Exposure to Crime Among Rich and Poor. *European Journal of Criminology* 3:387–412.
- Nordic Criminal Statistics (2003).** OES Project 2001. One Europe or Several? Project Outline: Crime, Borders and Law Enforcement—a European Dialogue for Improving Security. Available at: <http://www.one-europe.ac.uk/cgi-bin/esrc/world/db.cgi/proj.htm?id=11>.
- Orrù M (1987).** *Anomie: History and Meanings*. Boston: Allen & Unwin.
- Pampel F, Gartner R (1995).** Age Structure, Socio-political Institutions, and National Homicide rates. *European Sociological Review* 11:243–60.
- Perry B (2003).** *Hate and Bias Crime: A Reader*. New York: Routledge.
- Philipov D, Dorbritz J (2003).** Demographic Consequences of Economic Transition in Countries of Central and Eastern Europe. *Population studies* 39, Strasbourg: Directorate General III—Social Cohesion, Council of Europe. p. 208.
- Pridemore WA (2000).** Determinants of Regional Homicide Mortality Patterns in Post-Soviet Russia. Paper presented to IUSSP Committee on Emerging Health Threats, Seminar 1: Determinants of Diverging Trends in Mortality. Available at: [http://www.demogr.mpg.de/Papers/workshops/020619\\_paper32.pdf](http://www.demogr.mpg.de/Papers/workshops/020619_paper32.pdf) (accessed 11 November 2006).
- Pridemore WA, Spivak AL (2003).** Patterns of Suicide Mortality in Russia. *Suicide*

- and Life-Threatening Behaviour 33: 132–50.
- Putnam R** (1995). Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America. *Political Science and Politics* 28:664–83.
- Rawlinson P** (2001). Russian Organised Crime and the Baltic States: Assessing the threat. Working Paper 38/01. Available at: <http://www.one-europe.ac.uk/pdf/w38rawlinson.pdf> (accessed 12 September 2007).
- Saar J, Markina A, Ahven A, Annist A, Ginter J** (2003). *Crime in Estonia 1991–2001*. 2nd ed. Tallinn: Juura. (In Estonian and English).
- Sampson RJ** (1986). Crime in Cities: The Effects of Formal and Informal Social Control. *Crime and Justice* 8:271–311.
- Sampson RJ, Raundensbush SW, Earls F** (1997). Neighborhoods and Violent Crime: a Multilevel Study of Collective Efficacy. *Science* 277:918–24.
- Sampson RJ, Raundensbush SW** (1999). Systematic Social Observation of Public Spaces: a New Look at Disorder in Urban Neighbourhoods. *American Journal of Sociology* 105:603–51.
- Savolainen J** (2000). Inequality, Welfare State and Homicide: Further Support for the Institutional Anomie Theory. *Criminology* 38:1021–42.
- Stickley A, Mäkinen IH** (2005). Homicide in the Russian Empire and Soviet Union: Continuity or Change? *British Journal of Criminology* 45:647–70.
- Trickett A, Ellingworth D, Hope T, Pease K** (1995). Crime victimisation in the eighties. *British Journal of Criminology* 35:343–59.
- Ulrich C** (1994). The growth of crime in Russia and the Baltic region: RFE/RL Research Report, 3, 23.
- Van Duyne PC, Ruggiero V, Scheinost M, Valkenburg W** (eds) (2001). *Cross-border Crime in a Changing Europe*. Huntigton: Nova.
- Vetik R** (1993). Ethnic Conflict and Accommodation in Post-Communist Estonia. *Journal of Peace Research* 30:271–80.
- Western JS, Lynch M, Ogilvie E** (eds) (2003). *Understanding Youth Crime: an Australian Study*. Aldershot: Ashgate.
- Wikström PO** (1991). *Urban Crime, Criminals and Victims: the Swedish Experience in an Anglo-American Comparative Perspective*. Stockholm: Springer-Verlag.
- World Bank** (2005a). *The Baltic Growth Acceleration—is it Sustainable? Quarterly Economic Report, Vol. 3, Part III*. Available at: [http://www-wds.worldbank.org/servlet/WDS\\_IBank\\_Servlet?pcont=details&eid=000160016\\_20050615135856](http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000160016_20050615135856) (accessed 17 March 2006).
- World Bank** (2005b). *Enhancing Job Opportunities in Eastern Europe and the Former Soviet Union*. Available at: <http://siteresources.worldbank.org/INTECA/Resources/laborstudy05-fullreport.pdf> (accessed 5 June 2006).
- Young J, Mathews R** (2003). New Labour, crime control and social exclusion. In: Mathews R, Young J (eds). *The New Politics of Crime and Punishment*. Devon: Willan Publishing.

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**Appendix 1**

*Crime rates per 10,000 inhabitants, selected European countries (definitions of offences vary between countries, both due to legal differences and statistical recording methods; for a comparative definition, see Appendix 2)*

Total recorded crime per 10,000 inhabitants:

	1993	1994	1995	1996	1997	1998	1999	2000
<i>Estonia</i>	245	238	267	241	291	328	374	421
<i>Latvia</i>	155	149	156	153	149	149	181	209
<i>Lithuania</i>	162	157	164	183	211	219	218	235
Czech Republic	386	360	364	382	392	414	415	381
Poland	222	235	253	232	257	278	290	328
Slovenia	222	219	188	185	194	288	321	351
Norway	567	576	656	667	701	720	711	737
Sweden	1,366	1,267	1,298	1,329	1,346	1,332	1,346	1,369
Denmark	1,054	1,051	1,030	1,004	1,005	941	929	945
Finland	756	753	747	735	728	745	722	747
England and Wales	1,085	1,008	1,004	961	884	991	1,025	996
Germany	832	803	816	812	803	787	768	762
France	675	680	634	613	597	607	610	642
Italy	396	380	396	422	425	422	412	382
Netherlands	768	784	729	693	708	702	729	739
Portugal	308	330	326	320	322	341	361	362

Source: Crime data: Estonian Police Board, Latvia's Ministry of Interior, Lithuania's Ministry of Interior, Home Office (2003); population data: UNECE (2002).

## Homicides per 10,000 inhabitants:

	1993	1994	1995	1996	1997	1998	1999	2000
<i>Estonia</i>	1.77	1.99	1.65	1.43	1.26	1.39	1.07	0.97
<i>Latvia</i>	1.66	1.47	1.12	1.03	1.05	0.97	0.88	0.89
<i>Lithuania</i>	1.29	1.41	1.35	1.09	1.09	1.00	0.97	1.13
Czech Republic	0.27	0.28	0.27	0.26	0.28	0.30	0.26	0.27
Poland	0.33	0.24	0.22	0.23	0.21	0.20	0.19	0.22
Slovenia	0.37	0.17	0.23	0.19	0.19	0.08	0.13	0.15
Norway	0.23	0.08	0.10	0.10	0.09	0.09	0.08	0.11
Sweden	0.12	0.10	0.10	0.12	0.01	0.11	0.12	0.10
Denmark	0.14	0.14	0.11	0.13	0.17	0.09	0.10	0.11
Finland	0.33	0.33	0.34	0.37	0.27	0.22	0.28	0.28
England and Wales	0.26	0.25	0.27	0.26	0.27	0.27	0.29	0.30
Germany	0.18	0.17	0.17	0.15	0.14	0.12	0.12	0.12
France	0.30	0.24	0.23	0.20	0.16	0.16	0.16	0.18
Italy	0.20	0.18	0.18	0.17	0.16	0.16	0.15	0.14
Netherlands	0.19	0.18	0.19	0.15	0.15	0.13	0.15	0.14
Portugal	0.27	0.17	0.12	0.12	0.13	0.15	0.13	0.12

Source: Crime data: Estonian Police Board, Latvia's Ministry of Interior, Lithuania's Ministry of Interior, Home Office (2003), European Sourcebook of Crime and Criminal Justice Statistics (1996, 2003); population data: UNECE (2002).

## Assault per 10,000 inhabitants:

	1993	1994	1995	1996	1997	1998	1999	2000
<i>Estonia</i>	2.47	2.74	2.74	2.70	3.09	2.91	2.73	2.97
<i>Latvia</i>	0.50	2.81	2.39	1.89	2.05	1.75	1.77	1.76
<i>Lithuania</i>	2.78	3.45	3.27	3.31	3.47	4.17	4.56	4.80
Czech Republic	7.70	7.10	7.75	7.55	7.43	7.72	7.19	7.00
Poland	4.30	4.70	7.54	7.91	8.55	8.33	7.82	8.39
Slovenia	2.40	2.10	2.47	2.45	2.20	2.03	2.11	2.24
Norway	n.a.	n.a.	5.76	5.94	5.97	5.97	6.69	7.82
Sweden	58.4	61.1	61.62	60.65	62.17	64.14	67.55	66.32
Denmark	18.0	19.0	16.48	16.32	16.53	15.96	16.87	18.30
Finland	36.80	39.0	43.40	47.86	48.32	49.78	50.77	53.78
England and Wales	38.40	40.10	39.22	43.92	46.76	73.25	83.62	85.61
Germany	33.50	34.10	37.00	38.85	40.61	40.76	44.91	46.42
France	9.80	10.90	12.22	12.93	14.02	14.83	16.22	18.05
Italy	3.70	3.70	3.75	4.14	4.39	4.65	5.20	n.a.
Netherlands	16.10	18.10	18.05	19.31	24.08	24.20	26.77	27.75
Portugal	31.60	32.50	34.83	35.52	37.18	41.04	40.84	43.32

Source: Crime data: Estonian Police Board, Latvia's Ministry of Interior, Lithuania's Ministry of Interior, Home Office (2003), European Sourcebook of Crime and Criminal Justice Statistics (1996, 2003); population data: UNECE (2002).

**Appendix 2**  
*Characteristics of the data set*

Type of data	Description	Year	Source
	Type		
	Homicide <sup>a</sup>	Estonia: 2000, Latvia: 2000, Lithuania: 2000	Statistics Estonia
	Assault <sup>b</sup>	Estonia: 2000; Latvia: 2000; Lithuania: 2001	Central Statistical Bureau of Latvia
	Vandalism <sup>c</sup>	Estonia: 2000; Latvia: 2000; Lithuania: 2001	Statistics Lithuania
Demographic, socio-economic, social cohesion and welfare covariates	Unemployment rate	Estonia: 2000, Latvia: 2000, Lithuania: 2000	Statistics Estonia
	Divorce rate per 1000 inhabitants (DivorceRate)	Estonia: 2000; Latvia: 2000; Lithuania: 2001	Central Statistical Bureau of Latvia
	Deaths under 1 year old per 1,000 live births	Estonia: 2000; Latvia: 2000; Lithuania: 2001	Central Statistical Bureau of Latvia
	Hospital beds per 1,000 inhabitants (HospitalBeds)	Estonia: 2000; Latvia: 2000; Lithuania: 2001	Central Statistical Bureau of Latvia
	GDP per capita in Euros (GDPcap)	Estonia: 2000 (Nomenclature of Territorial Units for Statistics 3); Latvia: 2000; Lithuania: 2000	Statistics Lithuania
	Foreign direct investment per capita in Euros	Estonia: 2000; Latvia: 2001; Lithuania: 2000	Statistics Lithuania
	Proportions of:		
	Male population aged 15-29 (YoungMalePop)	Estonia: 2000; Latvia: 2000; Lithuania: 2001	Statistics Lithuania
	Non-native population (NonNativePop)	Estonia: 2000; Latvia: 2000; Lithuania: 2000	Statistics Lithuania

Appendix 2 Continued.

Type of data	Description	Year	Source
Offences	Type		
	Homicide <sup>a</sup>	Estonia: 2000; Latvia: 2000; Lithuania: 2000	
	Assault <sup>b</sup>	Estonia: 1999; Latvia: 2000; Lithuania: 2001	
	Vandalism <sup>c</sup>	Estonia: 1999; Latvia: 2002; Lithuania: 2004	
Other covariates	Natural increase (NaturalInc)	Estonia: 2000; Latvia: 2000; Lithuania: 2000	
	Net migration	Estonia: 1999; Latvia: 2000; Lithuania: 2001	
	Voter turn-out in parliament elections (VoterTurnout (Border))	Estonia: 1999; Latvia: 2002; Lithuania: 2004	
	Dummy for border regions	2004	
	Population density (PopDens)	Estonia: 2000; Latvia: 2000; Lithuania: 2005	
Geographical units	107 units for the Baltic region (Estonia: 15, 2004 excluding Hiiumaa, Saare and other small islands; Latvia: 33; and Lithuania: 59.		Eurogeographics

<sup>a</sup>Intentional homicide means intentional killing of a person. Where possible, the figures include: assault leading to death, euthanasia, infanticide. According to European Sourcebook of Crime and Criminal Justice Statistics (2003), Estonia and Latvia exclude assault leading to death and cases of euthanasia.

<sup>b</sup>Assault means inflicting bodily injury on another person with intent. Where possible, the figures exclude: assault leading to death, threats, acts just causing pain, slapping/punching, sexual assault. According to European Sourcebook of Crime and Criminal Justice Statistics (2003), Lithuania includes assault leading to death into homicide statistics. Threats are included in Latvia, whilst acts causing pain are included in Estonia and Latvia.

<sup>c</sup>Vandalism is a criminal offence involving damage to or defacing of property belonging to another person or the public. It can also be defined as a 'wilful or malicious destruction, injury, disfigurement, or defacement of any public or private property, real or personal, without the consent of the owner or persons having custody or control'. This should include damage to public and private property.