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Criminality, Social Cohesion and Economic Performance

Horst Entorf
Hannes Spengler

Preface

The present publication results from the research project "Development and validation of scientific indicators of the relationship between criminality, social cohesion and economic performance" which has been commissioned and financed by the European Commission, Directorate-General Employment and Social Affairs.

The results obtained within the framework of the project do not necessarily represent the opinion of the European Commission nor can the Commission be held responsible for the contents of the study. The aim of launching the research project was to contribute to a better understanding of the interactions between criminality, economic performance, social cohesion and the socio-economic situation of the population. We have tried to achieve this aim by employing adequate multivariate statistical methods to European data from different levels of regional disaggregation. When interpreting our empirical results, it has to be taken into account that the estimated coefficients of some variables might be affected by the use our regional data set. Since the Commission was primarily interested in the use of replicable official data, no individual survey data have been collected. Thus, some results might suffer from unobservable heterogeneity or the omission of relevant (but unavailable) variables. In the project report as well as in the present paper, we have made all potential results of this nature quite clear by hinting at these problems (see, for instance, the interpretation of crimes committed by "foreigners"). In spite of the fact that empirical investigations are performed with great care, it seems advisable to make this note of caution, because otherwise superficial reading might lead to potential misinterpretations. Moreover, it might be important to note that channels of influence are crime-specific. This implies that for types of crime which are not subject of our study, as, for instance, white-collar and organised crime, no conclusions can be drawn.

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Non technical summary

According to the European Parliament, unemployment, social disintegration, the lack of an integrative policy, and the worsening of urban services and living conditions cause frustration and despair, especially among economically and socially disadvantaged groups, and constitute unfavourable conditions that might lead to delinquent behaviour. Furthermore increasing poverty and inequality are supposed to be crime-enhancing factors. Based on this view, the European Commission has put out to tender a research project titled "Development and validation of scientific indicators of the relationship between criminality, social cohesion and economic performance" which has been executed by ZEW during the period 1/12/1998 – 29/2/2000. The present paper provides an overview of central results obtained from this project.

The paper intends to contribute to a better understanding of the interactions between criminality, economic performance and social cohesion. We try to achieve this aim by evaluating the existing economic and criminological research (with a special focus on quantitative research) and by carrying out own empirical investigations on the basis of a panel consisting of national time series from the 15 EU member states, an international cross-section of nations and an unique set of regional panel data originating from eight EU member states.

Our empirical results about causes of crime reveal the crime reducing potential of intact family values. A smaller number of divorces and earlier marriage significantly reduce delinquency. By the same token, less efficient child care as a consequence of lacking family cohesion might explain the crime enhancing effects found for increasing female labour force participation rates. Further evidence supporting the interdependence of crime and the labour market show up in significant parameter estimates for indicators of unemployment, fixed-term contracts and part-time working. Furthermore, we find that higher wealth is associated with higher property crime rates and more drug-related offences, and that in turn drug offences foster the incidence of property crime.

Compared to studies assessing causes of crime, investigations on its consequences are rare. In order to contribute to the closure of this gap, a special focus of our analysis is to investigate the impact of crime on economic performance. Using highly disaggregated regional data we find evidence that employment as well as GDP growth rates are negatively affected by the incidence of criminality. Interestingly, this result does not show up when the analyses are performed with data from the national level.

Regarding the importance of social cohesion on criminality and the strong evidence of reversal effects of crime on economics, one may conclude that fighting crime should not only be a matter of domestic policy, but also of social policy and of selfish economic interests, i.e. of economic policy.

Criminality, Social Cohesion and Economic Performance

Horst Entorf* and Hannes Spengler**

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Abstract. The paper intends to contribute to a better understanding of the interactions between criminality, economic performance and social cohesion. We try to achieve this aim by evaluating the existing economic and criminological research and by carrying out own empirical investigation on the basis of international panel data sets from different levels of regional aggregation. Our empirical results with respect to the causes of crime clearly reveal the crime reducing potential of family cohesion and the link between crime and the labour market. Furthermore, we find that higher wealth is associated with higher rates of property crime and of drug-related offences. Drug offences themselves turn out to be robust factors of property crimes. Compared to studies assessing the causes of crime, investigations on its consequences are relatively rare. In our analysis, we investigate the impact of crime on economic performance. We find evidence that employment as well as GDP growth rates are negatively affected by the regional incidence of criminality.

Key words: Crime, socio-economic factors, demographics, European panel data
JEL Classification: K42

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1 Introduction

In the view of the European Parliament unemployment, social disintegration, the lack of an integrative policy and the worsening of urban services and living conditions cause frustration and despair, especially among economically and socially disadvantaged groups, and constitute unfavourable conditions causing delinquent behaviour. Furthermore, increasing poverty and inequality are supposed to be crime-enhancing factors (European Commission 1998:2).

Based on this estimation, the European Commission has put out to tender a research project titled "Development and validation of scientific indicators of the relationship between criminality, social cohesion and economic performance" which has been executed by ZEW during the period 1/12/1998 – 29/2/2000. The present paper provides an overview of central results obtained from the project. The extensive project report (Entorf and Spengler 2000a, hereafter abbreviated as *E&S*) is published as *ZEW Dokumentation*.

As articulated by the European Commission, the object of the project is to improve the knowledge of the interactions between criminality, economic performance and social cohesion. We try to achieve this aim by evaluating the existing "criminometric" research and by carrying out own empirical investigations on causes and consequences of crime. Much attention has been paid to the collection of adequate data. We finally succeeded in creating data sets consisting of a panel of national time series from the 15 EU member states, an international cross-section of nations and a unique set of regional panel data originating from eight EU member states.

The paper is structured as follows. Section 2 summarises recent quantitative research on socio-economic causes and consequences of crime. Section 3 provides an overview of data and methods we used in our empirical analyses. In the two following sections panel estimation results from the national (Section 4) as well as from the regional level (Section 5) are presented. Section 6 provides a synthesis and interpretation of results. Section 7 reports on our investigations of the consequences of crime and Section 8 concludes with some policy implications.

2 Summary of recent empirical crime research

The focus of the existing crime literature is on causes of crime. More than 90 per cent of all studies under investigation deal with questions concerning this issue. In contrast, the number of studies investigating the consequences of crime and/or its interactions with other variables is rather small. This ongoing specialisation might be due to the fact that there is still no full agreement neither on the determinants of crime nor on their relative importance. By investigating a large number of recent papers in leading criminological, sociological and economic journals and by considering significant monographs and anthologies, we have tried to identify the most important determinants and consequences of crime.

Since the authors of this Report are economists and have already been engaged in crime research for several years, the contributions in leading economic journals (*The Journal of Political Economy*, *The Quarterly Journal of Economics*, *The American Economic Review* etc.) can be regarded as fully covered from the onset of economic crime research in the late sixties. In order to capture the non-economic contributions adequately it is advisable to investigate criminological journals, since these bring together the work of crime researchers from all other fields. The major criminological journals are *Criminology*, *The Journal of Quantitative Criminology*, *Journal of Research in Crime and Delinquency*, *The Journal of Criminal Law and Criminology* and *British Journal of Criminology*, among which *Criminology* and *The Journal of Quantitative Criminology* have a main focus on quantitative research. These journals have been systematically searched for relevant papers since 1990. As quantitative crime research is a domain of sociologists, many of their contributions are also published in generally oriented sociological journals, among which *American Sociological Review* and *The American Journal of Sociology* are the most important ones. These journals have been searched since 1985. Apart from the systematic investigation of the leading criminological and sociological journals, we have also closely examined other promising sources obtained from an intensive electronic databank search and by e-mail and postal questioning of national and international experts in the field of quantitative crime research.

Since today the empirical literature on crime has reached an enormous extent, it is recommendable that a survey is structured in some way. This can be done, for example, with regard to the underlying theories. Since we are restricted to non-individual (official) data according to the empirical tasks of the project, two (out of eight) theories extensively discussed in *E&S* seem to be suitable for our purpose. The first is the social disorganisation theory. Following this theory, delinquency emerges as a consequence of a distorted complex system of friendship and kinship networks, damaged roots in family life and malfunctioning socialisation processes. At the “macro” level (which could be a regional level)

low economic status, family disruption and urbanisation are important indicators of crime according to this line of thought.

The economic theory of crime, based on Gary Becker's (1968) seminal article, is the second important theory to be mentioned. According to this theory, individuals form expectations of their legal and illegal income opportunities. Criminal activities become more likely, when illegal income opportunities are higher than opportunities from legal work. Expectations of uncertain illegal income opportunities depend on the potential loot, but also on the probability of being arrested and convicted, and on the severity of the punishment if convicted. Extensions of the model (see, in particular, Ehrlich 1973) introduce inequality as an indicator of crime. Higher inequality would diminish legal income opportunities and increase incentives to commit crimes because of the presence of lucrative targets. Following these arguments, empirical indicators of economic crime theories are "wealth" (often measured by GDP per capita), which might cover both legal income opportunities and illegal income opportunities (i.e. potential targets), deterrence (clear-up rates, conviction rates, form and severity of punishment) and inequality (Gini coefficients, for instance). The unemployment rate or other variables of underemployment should also be present in empirical investigations of the economic crime model, because it measures exclusion from legal work, and, thus, lacking legal income opportunities.

The complete survey of the literature is summarised in Table 1 (Table 11 in *E&S*). The survey focuses on empirical applications and presents a long list of potential indicators and consequences of crime. The table is organised as follows: Column 1 contains variables which are of central importance to empirical crime research. The expected impact of the respective variable on crime based on theoretical and empirical knowledge is depicted in column 2, where "+" ("-") means that a higher value of the variable is expected to increase (decrease) crime. The same logic applies to column 3, where the feedback effect of higher crime on the respective variable is considered. Apart from "+" and "-" , the cells of columns 2 and 3 may also be empty (an effect does not exist), or they may be filled with a "?" (no evidence could be derived from the literature). In cases in which the cells contain a combination of + and -, crime theories provide ambiguous predictions. In such cases effects which are more likely according to empirical findings[1] come first. Column 4 contains measures which are generally used as indicators of theoretically motivated variables. When a cell remains

[1] Example: Routine activity theory expects a negative sign of the impact of unemployment on crime. Economic and other theories expect a positive sign. Looking through empirical results there are mainly positive effects. Thus, in Table 1 we code the effect of unemployment on crime with ("+/-").

empty, measuring this variable is straightforward (e.g. unemployment). Column 5 gives a general characterisation of the type of variable. Finally, in column 6, we refer to corresponding discussions in the subsections of *E&S*. It has to be stressed that our list of indicators is organised according to the demanded macro focus of the project.[2] Thus, indicators which are explicitly tied to the individual level are not included in Table 1.

Besides demographic factors like age and gender (a high share of all crimes is committed by young males, aged 14 to 25), we consider the following six indicators of crime to be of particular importance: urbanisation, family disruption, the influence of peer groups, poverty and unemployment, deterrence and wealth. Arguments behind the relevance of "urbanisation", "family disruption" and "peer groups" mainly originate from sociologically oriented contributions to the scientific literature (for instance, from theories of social disorganisation, differential association/ social learning and social control), whereas "poverty and unemployment", "deterrence" and "wealth" play a more prominent role in the economic theory of crime. Sharp distinctions, however, are difficult to make. Poverty and unemployment, for instance, are also crucial to the understanding of social disorganisation theory as well as of strain theory, whereas the contributions of peer groups and of neighbourhood effects belong to the most discussed fields in modern economics.

The influence of peer groups is widely acknowledged but hardly measurable in any macro setting that has to be based on official data. Deterrence, at least in the form of changing clear-up rates, seems to be effective according to many (but not all) authors, though the deterrence effect of more severe sentences is still under debate. The authors have contributed to this field in a recent article (Entorf and Spengler 2000b), but unfortunately there were no European data of sufficient quality and comparability available that could have been used in the present study. The impact and measurement of family disruption, wealth, unemployment and urbanisation is included in our empirical investigations discussed below.

The literature is relatively silent about the consequences of criminality on economic performance, social cohesion - as well as on the costs of crime. Given its obvious importance to economists, there is surprisingly little evidence on how location decisions of firms and households might be affected by criminal factors. Recent work on 629 neighbourhoods (municipalities) in Los Angeles (Willis 1999), however, provides a remarkable exception. Willis has shown, for instance, that a one per cent increase of violent crime is responsible for the loss of 14 jobs per square mile. Two of these 14 jobs are lost, in the relatively attractive

[2] In the project description (European Commission 1998) it is emphasised that empirical research has to be carried out using data from official statistics.

manufacturing sector and nine are lost in services and other employment. One job is lost in wholesale trade and public utilities respectively. The employment in retail trade and in construction seems to be insensitive to crime.

There are more studies investigating the impact of crime on social cohesion – in particular on crime-induced population flight. A very recent and accurate study of that kind is Cullen and Levitt (1999). Using data of 137 U.S. cities to analyse the relationship between crime and "urban flight", Cullen and Levitt find that each additional reported crime in a central city is associated with a net decline of about one resident. The economic consequence is reinforced by the drain of high income households: These households are five times more responsive than those of the poor, and the households with children are twice as responsive as those without children. Other studies investigating the impact of crime on population flight find similar results.

Estimates of the costs of crime are difficult to make. Costs of crime do not only include property losses, medical costs and pay losses due to injury. They also include costs of public and private efforts made to prevent and reduce future crime rates, as well as costs of the criminal justice system. Moreover, there are intangible costs such as those resulting from shattered lives and from a lack of full participation in life because of fear of crime. Nevertheless, estimates of the costs of crime, even if they represent approximate values, are indispensable for an efficient use of public policy. Estimations have been provided mainly for non-European countries (only few exceptions can be found for Europe, see, for instance, Palle and Godefroy (1998)). Many authors present figures for total costs of crime that amount to something like 4-6 per cent of GDP. The highest estimate is given for the U.S. by Anderson (1999), who has tried to make a comparison with the ideal state in which there is no occurrence of criminal behaviour at all. His cost estimate then would even amount to 13 per cent.

Table 1: Summary of crime related indicators proposed in the literature

Variable (1)	I→C (2)	C→I (3)	Indicator proposed in the literature (4)	Variable type (5)	Relevant sections in *E&S* (6)
Wealth (absolute)	+/-	-	Median family income, Gross domestic product per capita etc.	Economic	2.1.2, 2.1.3, 2.1.9
Poverty	+	+	Percentage of population below the poverty line Percentage of families below half of median family income Share of social welfare recipients in the population Infant mortality rate Percentage of individuals aged 25 with less than five years of education Percentage of individuals below 18 years of age living with one parent Unemployment Female headed households etc.	Economic	2.1.2, 2.1.3, 2.1.10
Inequality	+	+	Gini coefficient Ratio of the percentage of total income received by the top 20 per cent of families to the percentage received by the lowest 20 per cent of families Share of income received by the top 20 per cent etc.	Economic	2.1.2, 2.1.3, 2.1.10, 2.1.11
Social Security	-	?	Sum of all welfare payments divided by state population Number of recipients of all welfare programs divided by state population Sum of all welfare payments divided by state population etc.	Economic	2.1.3, 2.1.12
Wages (in general)	+/-	-/+	Mean wage in the population etc.	Labour market	2.1.2, 2.1.3, 2.1.11
Youth wages	-	-/+	Mean youth wage etc.	Labour market	2.1.3, 2.1.11
Minimum wages	-	?	Mean wage for low skilled workers etc.	Labour market	2.1.3, 2.1.11
Job quality	-	-	Wages Working hours per day etc.	Labour market	2.1.3, 2.1.11
Unemployment rate	+/-	?		Labour market	2.1.3, 2.1.11
Educational attainment	-	-	Share of the college educated in the population Share of illiterate individuals in population	Labour market	2.1.1, 2.1.15

			Share of school dropouts in the population etc.		
Occupational status of residents	-	-	Share of individuals in professional and managerial positions etc.	Labour market	2.1.1, 2.1.15
Female labour force participation	+/-	?	Percentage of the female civilian labour force	Labour market	2.1.2, 2.1.3, 2.1.5, 2.1.11
Clear-up rate	-	-/+	Proportion of crimes cleared by the police	Deterrence	2.1.3, 2.1.19
Conviction rate	-	-/+	Proportion of those arrested who either plead guilty or are convicted	Deterrence	2.1.3, 2.1.19
Imprisonment rate	-	?	Proportion of the guilty persons who are imprisoned	Deterrence	2.1.3, 2.1.19
Recognisance rate	-	?	Proportion of the guilty persons who are placed on recognisance	Deterrence	2.1.3, 2.1.19
Fine rate	-	?	Proportion of the guilty persons who are fined	Deterrence	2.1.3, 2.1.19
Average sentence	-	?	Average length of the court imprisonment sentence for those imprisoned	Deterrence	2.1.3, 2.1.19
Private crime prevention	-	+	Turnover of private security firms per capita Employees of private security sector per x inhabitants	Deterrence	2.1.3, 2.1.20
Mobility of residents	+	+	Influx Move Percentage of residents brought up in the area where they currently live Percentage of households that have been in the area for less than three years etc.	Demographic/ Social cohesion	2.1.1, 2.1.16
Ethnicity	+	+	Share of foreigners in the population Probability that two randomly selected individuals of an area would be members of different ethnic groups Nationality dummies etc.	Demographic/ Social cohesion	2.1.1, 2.1.17
Family disruption	+	+	Proportion of divorced and separated adults among those who have ever married Percentage of households with single parents with children Number of children etc.	Demographic/ Social cohesion	2.1.1, 2.1.5, 2.1.13
Household size/ crowding	+/-	?	Mean household size Persons per room etc.	Demographic/ Social cohesion	2.1.1, 2.1.2
Urbanity	+	-	Population per square kilometre Share of population living in big cities Share of multiplex dwellings in all dwellings etc.	Demographic/ Social cohesion	2.1.1, 2.1.18
Friendship network (not delinquent)	-	?	Number of friends who reside in the local community	Social cohesion	2.1.1, 2.1.5
Organisational participation	-/+	-	Percentage of residents who participated in meetings of committees and clubs Number of committees and clubs per x inhabitants	Social cohesion	2.1.1, 2.1.2

Institutional control	-	-	Percentage of population that attends high school or college Percentage of population in the civilian labour force Number of families per city population etc.	Social cohesion	2.1.1, 2.1.5
Religiosity	-	-	Share of members of a church in the population etc.	Social cohesion	2.1.22
Public transportation	+	-	Per cent of the employees who use public transportation Expenditure on public transportation Presence of subways etc.	Infrastructure	2.1.2
Public leisure activities	+	-	Average sales of eating and drinking establishments per resident Concentration of Taverns and Lounges Supply (absolute or relative) of sports and entertainment establishments Number of sports clubs etc.	Infrastructure	2.1.2
Weather (the better, the more crime)	+		Average temperature (on a monthly or quarterly basis) Total rainfall (on a monthly or quarterly basis) Total sunshine (on a monthly or quarterly basis etc.)	Environment	2.1.2, 2.1.23
Number of dark hours during a day	+			Environment	2.1.2, 2.1.23
Media consumption	+/-	?	Populations' mean TV viewing intensity etc.	Techno-economic	2.1.2, 2.1.21
Age	-			Demographic/ control	2.1.17
Gender (male)	+		Share of males in the population Male/ Female dummies	Demographic/ control	2.1.17
Young male population	+		Share of the young aged 15-25 in the population	Demographic/ control	2.1.17

Source: Own representation.

3 Data and methods

The evaluation of indicators of crime and the test of causal relationships is based on statistical methods suitable for the analysis of dynamic panel data ("panel criminometrics"). Given the complex problem of criminality, the technical estimation and testing procedure is chosen in a way that multidimensional phenomena can be treated, and dynamic developments and feedback situations can be taken into consideration. Moreover, it is very important in the context of analysing crime rates to control for potential unobserved heterogeneity. It arises in the presence of different shares of unreported crimes or because of deviating definitions of crime between regions. For this reason all estimates presented in *E&S* are based on fixed-effect panel models which have undergone an extensive validation process based on statistical specification tests and checks of robustness.

Collecting data was a major problem while carrying out the project. On the one hand, it is aspired to perform the empirical analysis for as many EU member states as possible. On the other hand, data should be as disaggregate as possible. However, at least regional data on crime are not available from international data sources. As a consequence, the regional crime data had to be collected directly from the member states. In Germany the situation was even more complicated, because the Criminal Police Offices of all 16 German states ("Landeskriminalämter") had to be contacted. Table 2 (Table 15 in *E&S*) provides information on the data at our disposal, general information on regional crime data in Europe, as well as some remarks on their availability. In contrast to regional data, national data are available from international sources, but they sometimes lack reliability (see Interpol and UN statistics, for instance).

When inspecting the regional data in more detail, it turned out that data from Denmark, Germany and Italy are without obvious shortcomings.[3] They are all observed on the NUTS 3 level; the respective number of regions is high (Germany and Italy), and/or the average population size and land area of the regions is rather low. Results from other countries should be interpreted with some care (see Section 4.3 in *E&S* for details).

National crime data have been taken from the European Committee on Crime Problems (CDPC). Solely CDPC (1999:9) has proved to be aware of the absolute necessity of a thorough check on the data delivered by national sources.

Since the aim of the project is to identify and quantify causes and consequences of criminality, we have also included a large set of socio-economic variables. The New Cronos database from Eurostat turned out to be very useful. It does not only contain

[3] This may also apply to the Greek crime data. Unfortunately, this data could not be used in the project since it arrived after the submission of the Final Report.

very detailed national statistics for all EU member states, but also a number of important variables on different regional levels. As far as statistics on the national level are concerned, we also used data from the World Bank.

Table 2: Availability of regional crime data from the EU member states

Country	Does the country collect regional crime data?	Did the country deliver regional crime data on request?	Available period	Could provided data be used in the analyses?	Remarks concerning the non-availability of data
Belgium	Yes	Yes	1994-1998	No	
Denmark	Yes	Yes	1982-1998	Yes	
Germany	Yes	Yes	Irregular*	Yes	
Greece	Yes	Yes	1991-1998	No	
Spain	Yes	Yes	1980-1998	Yes	
France	Yes	No	---	---	First NUTS 3 level data was promised and also announced; this data did never arrive; after several inquiries NUTS 3 level data was refused, and NUTS 2 level data was promised instead; until today no data has arrived.
Ireland	No	---	---	---	Until today Ireland has not collected regional crime data; regional data will be available after finishing the present change of the statistical system.
Italy	Yes	Yes	1983-1998	Yes	
The Netherlands	Yes	Yes	1983-1998	Yes	
Austria	Yes	No	---	---	NUTS 3 and NUTS 2 level data was refused and NUTS 1 level data was promised; no data has arrived until today.
Portugal	Yes	Yes	1984-1998	No	
Finland	Yes	Yes	1980-1998	Yes	
Sweden	Yes	Yes	1988-1998	Yes	
UK	Yes	Yes	1982-1997	Partly	

Note: * Baden-Württemberg (1984-1998), Bavaria (1983-1998), Berlin (1980-1998), Brandenburg (1995-1998), Bremen (1980-1998), Hamburg (1989-1998), Hessen (1984-1998), Mecklenburg-Vorpommern (1993-1998), Northrhine-Westfalia (1980/81-1998), Lower Saxony (1980-1998), Rhineland-Palatinate (1994-1998), Saarland (1980-1998), Saxony-Anhalt (1997-1998), Schleswig-Holstein (1980-1998), Thuringia (1993-1998).

4 Evaluation of the causes of crime based on national data

Table 3 (Table 25 in *E&S*) provides a summary of "Crime in the Europe of Nations", i.e. of results based on a cross-section of national time series from the 15 EU member states. We summarise Tables 18 to 24 of *E&S* with respect to relevant indicators of crime, direction and magnitude of influence. For each relevant indicator we present all affected categories of crime. The magnitude of the effect is presented as elasticity, i.e. increasing the indicator by one per cent would translate into a change of crime by the amount listed in the table. For instance, increasing unemployment by one per cent would increase burglary by 0.4 per cent.[4]

The consistency of results presented in Table 3 allows us to draw some general conclusions. First, wealth (GDP p.c.) varies positively with crime against property and negatively with intentional homicides. Drug abuse very likely is a problem of wealthy societies. Unemployment, long-term unemployment and, in particular, youth unemployment increase the number of property crimes as well as the crime rate of assaults. Juvenile delinquency also seems to be the main driving force behind the positive variation of the share of young foreigners with the theft of motor vehicles, burglary and intentional homicide.[5]

Higher participation rates lead to higher crime rates. This result simply reflects the fact that more active people magnify the pool of potential criminals.[6] The crime enhancing effect of the female labour force participation is somewhat more difficult

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[4] One has to focus one's attention on the fact that increasing unemployment by one per cent is different from increasing the unemployment rate by one percentage point. A rise of unemployment by one percentage point from, e.g., 2% to 3%, would result in an increase of unemployment by 50%. The same note of caution applies to all variables expressed as ratios, i.e. unemployment, labour force participation, workers with fixed term contracts, part-time working, foreigners and divorces.

[5] In our econometric specifications the foreigner variable needs to be present in order to avoid the omitted-variable bias. Moreover, the effect of young foreigners is in accordance with results known from the social disorganisation theory (see Section 2.1.1 in *E&S*). Nevertheless, the underlying reason for this result should be interpreted with care. There are many reasons why foreigners are over-represented in the group of suspects. First, they may be more often wrongly suspected than the native population. Second, there are some laws - like the foreigner and asylum laws - which can, by definition, only be broken by foreigners. Third, foreigners who reside in Europe are to a higher percentage young men. Fourth, some foreigners may be in European countries after fleeing their homeland, because they were offenders there. Finally, most foreigners enter European countries, because they had no economic success in their home country. The latter may be due to factors that foster crime, for example, lack of education. These points should be kept in mind when judging the coefficients of the foreigner variable in our estimations.

[6] For males the elasticity of the participation rate ranges between 2.1 and 2.3 with respect to total theft (see Tables 18 to 25 in *E&S*). This result is not included in Table 3 because it does not clearly confirm to be significant for other crime categories, and because Table 3 is restricted to both significant and robust results.

to interpret. On the one hand, the argument might be the same as for males, i.e. data on participation rates reflect nothing but the part of the population that most likely is involved in criminal activities. Since, however, only a small part of all criminals are women, the interpretation has to be different from that of males. The positive sign might indicate that a higher active share of women in the population also provides a larger pool of potential victims.

Table 3: Crime in the Europe of Nations: Indicators and their effects

Indicator	Range of (mean) elasticities	Endogenous crime categories
Real GDP p.c.	0.6 – 0.9	Theft of motor vehicles
	0.7 – 1.0	Robbery
	0.6	Assault
	-1.8	Intentional homicide
	1.1	Drug offences
Unemployment	0.4	Burglary
	0.01*	Robbery
Youth unemployment	0.3	Total theft
	0.1* – 0.2*	Theft of motor vehicles
	0.1*	Robbery
	0.2*	Assault
	0.5	Drug offences
Long-term unemployment	0.2	Total theft
	0.3	Robbery
Female labour force participation, 15-64	0.7 – 1.1	Burglary
	1.3	Robbery
Male workers with fixed-term contracts	-0.6 – -0.5	Total theft
	-0.2	Burglary
	-0.3	Robbery
Male workers working part-time	0.6	Robbery
	0.8	Drug offences
Young foreigners, 15-24	0.3	Theft of motor vehicles
	0.2	Burglary
	0.2 – 0.3	Intentional homicide
Age of males at time of first marriage	2.6	Theft of motor vehicles
	2.0	Assault
	3.4	Intentional homicide
Divorces per 100 marriages	0.4 – 0.5	Total theft
	0.2 – 0.3	Burglary
	0.2	Assault
	0.4 – 0.6	Intentional homicide
	0.9	Drug offences

Notes: Summary of panel estimates presented in Tables 18 to 24 in *E&S*. Entries are based on coefficient estimates that are significant at least at the 5%-level. Furthermore, indicators are only included if they are relevant for at least two different types of crime. Preliminary results (e.g. results based on estimations without fixed-effects) are omitted. Semi-elasticities are transformed to elasticities on the basis of respective sample averages. *) indicates elasticities based on quadratic impact curves evaluated at the sample mean of the indicator variable.

On the other hand, however, there are arguments pointing out that the merits of increasing female labour force participation might come along with the unpleasant cost of higher crime rates. Recently, a number of authors have focused their attention on this important and often overlooked aspect of crime (Donohue and Siegelman 1998, Greenwood 1998, Wilson 1998 and Witt and Witte 1998). According to them, the influx of women into the labour market (without a simultaneous fall of the male participation rate) bears the danger of declining family values associated with changing social norms, ineffective childhood socialisation, lowering social attachments and deteriorating parental supervision.[7]

Other - more direct - indicators of family disruption confirm the crucial role of causal crime factors embedded in family values. Table 3 shows significant results for "age of males at time of first marriage" and, in particular, for "divorces per marriage". All estimates show unanimous signs, indicating that intensified family values would lower crime rates. Here "more family" more specifically means taking responsibility at younger age (as regards marriage and childbirth), as well as sticking by the bonds of marriage. Coefficients on these variables reveal substantial quantitative effects.

Finally, male fixed-term contracts and male part-time working have opposite effects. It seems that the provision with full-time jobs is crime preventing, even if the duration is limited by fixed-term contracts, whereas part-time jobs leave enough free time and "better" possibilities for illegal work and worse possibilities for legal work.

5 Investigating the causes of crime by use of regional data

Regional data have the advantage that they are closer to the scene of the crime. Our regional data base consists of approximately 550 European regional time series from 8 different countries. The problem, however, is that for data of such high spatial detail there are only few variables left in our international data source that could be used as explanatory factors of crime.[8] In particular, variables on family disruption, which played a prominent role for the explanation of crime in the "Europe of Nations", are almost missing. We were only able to include the gross birth rate, but

[7] Of course, some of the disagreeable effects of the increasing female labour force participation rate discussed in our Report might perhaps be offset by a simultaneous fall of the male participation rate. However, such cases escape from our analysis as they are not visible in aggregate data sets. Since our empirical work has to follow a positive research strategy, we can only deal with and comment on matters of statistical evidence.

[8] At the beginning of the project we intended to complete the Eurostat variables with data from national sources in order to obtain as much of the indicators from Table 1 as possible. However, some requests directed to national statistical offices quickly revealed that this strategy was not compatible with the budget and running time constraints of the project. Thus, our empirical investigations in exclusively rely on data from the Eurostat New Cronos Regio database.

most coefficient estimates on this indicator turned out to be rather unsatisfactory, with the exception of fraud.

On the other hand, results are based on a high number of observations, thus statistical uncertainty can be reduced substantially. Panel estimates, each of which was optimised with respect to the lag structure of explanatory variables after checking 2187 possible permutations (see Section 4.3.1, and Tables 34 to 45 in *E&S*), show that real GDP per capita can be identified as a robust European indicator for serious assault (+)[9], robbery and violent theft (+), theft of motor cars (+) and drug offences (+). The unemployment rate is a European indicator for serious assault (+), total theft (-), theft of motor cars (-) and drug offences (+). The activity rate (work force participation rate) is a European indicator for breaking and entering (+) and drug offences (+). The gross birth rate is a European indicator for fraud (-). The share of employment in the agricultural sector is a European indicator for sex offences (-) and serious assault (-). Finally, the number of drug offences per 100,000 inhabitants is a European indicator for robbery and violent theft (+), breaking and entering (+) and fraud (+). One might conclude that these results are largely in accordance with our expectations.

6 Summary of national and regional evidence

As a synthesis of our investigations performed on both national and regional data sets, Table 4 (Table 49 in *E&S*) presents a summary of the most robust empirical findings with respect to the evaluation of causal indicators of crime. Besides demographic factors like age and gender, the main socio-economic causes of criminality are covered by indicators of family disruption, drug influence, the activity rate of the population (i.e. the labour force participation rate) and urbanity (measured indirectly by the share of the labour force employed in the agrarian sector).

First, the total labour force participation rate is most likely associated with higher crime rates, simply because it represents the "active" part of the population. The potential of being "active" implies to work in a regular job or to search for such a job, but it likewise increases the probability of being "active" in the illegal sector. Moreover, since active people have to be mobile and do not stay at home, they more often are victims of criminal activities, too. Such reasoning holds a fortiori for the most "active" part of the population, i.e. the share of the young.

The share of the population working in the agrarian sector represents the inverted degree of urbanity in a society. The crime enhancing influence of urban factors is particularly strong for assault and drug offences.

[9] "+" indicates that higher values of the indicator foster crime, "-" indicates that higher values of the indicator reduce crime.

Many estimations based on the "Europe of Nations" confirm the crucial role of causal crime factors embedded in family disruption for almost all types of crime. Significant results have been found for "divorces per marriage" and other indicators of family disruption. These results are in line with theories stressing the lowering parental supervision of youth, the declining value of conventional norms and the decreasing social capital within industrialised countries, since more and more people act in own short-term self-interest.

Table 4: Main socio-economic causes of crime and their directions of influence

General	Murder	Serious Assault	Total Theft	Robbery and violent theft	Theft of motor cars	Drug offences
Family disruption (+) Drugs (+) Activity rate (+) Urbanity (+)	Family disruption (+)	Wealth (+) Unemploy-ment (+) Family disruption (+) Urbanity (+)	Wealth (+) Family disruption (+) Drugs (+)	Wealth (+) Drugs (+)	Wealth (+) Share of the young (+)	Wealth (+) Family disruption (+) Unemploy-ment (+) Activity rate (+) Urbanity (+)

Note: Summary of the most robust findings based on estimations in the Report.

Many offences are related to drugs. This conclusion becomes clear from the analysis of theft, in particular from the analysis of "robbery and violent theft". The explanatory factors of drug offences themselves are "wealth (+)", "family disruption (+)", "unemployment (+) ", "labour force participation (+)" and "urbanity (+)". Hence, drug problems most probably arise in the urban climate of cities, which is accompanied by social problems due to (structural) unemployment and disruption of family cohesion.

The incidence of theft and related categories of crime (robbery and violent theft, theft of motor cars) can be best understood by consulting the economic theory of crime. Better illegal income opportunities lead to higher property crime rates, as can be seen from the presence of "wealth (+)" for the respective types of crime. It should be noted, however, that wealth does not exist in a one-to-one relation to real GDP per capita, because wealth might also mean absence of unemployment. To a certain extent, this is a problem of regional data sets. One can see from our disaggregate data set of the "Europe of regions" (see above) that, in areas where both low unemployment and high GDP coexist, higher crime rates for theft, in particular for theft of motor cars, can be observed, because these regions provide lucrative

targets.[10] Thus, in the cases of "total theft" and "theft of motor cars" (see Table 4), we interpret high "wealth" as being associated with regions of high GDP and low unemployment.

This pattern of GDP and unemployment does not coincide with the pattern of drug offences and serious assault, where the simultaneous existence of high GDP and (given the high level of GDP) relatively high unemployment seems to provide the unfavourable and unbalanced social situation that leads to high levels of crime. Our results reflect the widely discussed and unsolved problem in the scientific literature of how to interpret the effect of unemployment on crime. We suggest to have a closer look at the type of crime, in particular when using regional crime data.

Due to data restrictions, there was no possibility to include measures of inequality, which are not available from international sources at the regional level and on a yearly basis over a long period of time. To a certain degree, i.e. depending on size and direction of the correlation, results on "wealth" might be influenced by this missing variable. However, in a recent publication (Entorf and Spengler 2000b) the simultaneous use of wealth and an indicator of inequality does neither change the sign of the absolute wealth variable nor does it render its coefficient insignificant.

7 Consequences of crime

One of the most innovative contributions of the project is the assessment of the negative impact of crime on economic performance based on an international cross-section of nations, a panel consisting of national time series from the 15 EU member states, and a set of regional panel data originating from 8 different countries. Our great investment in searching adequate regional data has brought substantial returns. It turned out that data of a higher spatial detail in fact entail a higher statistical power for the discovery of reversal crime effects. In contrast with previous attempts known from the scientific literature, and in contrast with testing procedures carried out on aggregate data (see Sections 4.2.2 and 4.2.3 in *E&S*), causality tests based on the NUTS 2 level and, in particular, on the NUTS 3 level have shown that growth rates are indeed negatively affected by the regional incidence of crime.

Table 5 (Table 50 in *E&S*) summarises the main findings. First of all, the incidence of theft and related crime categories (theft of motor cars, aggravated theft, robbery and violent theft) vary negatively with growth of real GDP per capita and with growth of employment. Crime against the person, too, deters growth, but to a lesser extent. Nevertheless, our results suggest that the potential dangers of "serious assault" and "rape" in the neighbourhood of workplaces do hamper economic performance.

[10] Which does not necessarily mean that offenders live in that particular region. Crimes, however, are recorded in the region where they are committed.

Table 5: Criminality indicators of economic performance

Criminality Indicator	Affected Countries In parentheses: measures of economic performance: Y = GDP growth, L = employment growth
Serious assault	Germany (Y)
Rape	Denmark (L)
Theft (total)	Denmark (L, Y), Germany (L, Y), Italy (Y), Sweden (L)
Aggravated theft	Germany (L, Y), Italy (Y)
Robbery and violent theft	Denmark (Y), Germany (L, Y), Italy (Y)
Theft of motor cars	Germany (L,Y), Italy (Y), Europe (investment/GDP ratio)
Fraud	Germany (Y (positive sign ?))
Drug Offences	Italy (L, Y), Finland (L, Y (positive sign?))

Note: Summary of most significant and robust results from Tables 27 to 32, Tables 47 and 48 in *E&S*. Entries are based on data from the NUTS 3 level (if not available: NUTS 2). In order to be included signs have to be unambiguous and t-values need to show significance at least at the one per cent level. All but two effects are negative, (unreasonable) exceptions are provided with "?".

Denmark, Germany and Italy can be identified as most affected countries, mostly by property crimes. However, as has become very clear from the comparison of highly aggregate and disaggregate data, the link from crime to economic performance is very difficult to unveil using aggregate data. Hence, countries not mentioned in the list above may nevertheless suffer from crime distortions, but so far they may have escaped detection because of insufficient data quality.

8 Policy conclusions

Though drawing policy conclusions does not belong to the primary goals of the project, some remarks are straightforward. It seems that in European (and other industrialised) societies a further growth of wealth comes with the cost of family disruption, as, for instance, can be concluded, from the growing number of divorces throughout Europe. Changing family structures, however, are an important and often overlooked cause of crime. According to a number of recent contributions to the scientific literature, the female labour force participation is an important factor of family disruption, and it is found to vary positively with crime rates (in this project, too, we have found a positive association with burglary and robbery). The main reasons for these empirical findings might be seen in the lacking supervision and the degrading social attachment of children and in the rising negative influence of peer groups, which substitute for traditional family bonds. However, before final conclusions on these hypotheses can be drawn, more empirical evidence based on individual data would be needed.

Since the message learned from our results cannot be to reduce the female participation rate, other measures of family (re-)integration have to be taken, and substitutes of parental supervision seem to be relevant to prevent crime. Many pupils of working mothers and fathers have to take care of themselves after school, since teachers do not have enough time at their disposal to supervise homework, for

instance. The need for after school care centres is even much stronger for children in female headed households.

Regarding the importance of social cohesion on criminality and the strong evidence of reversal effects of crime on economics, one may conclude that fighting crime should not only be a matter of domestic policy, but also of social policy and of selfish economic interests, i.e. of economic policy.

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