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I. Semih Akçomak
Bas ter Weel

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İ. Semih Akçomak
Maastricht University, UNU-MERIT

Bas ter Weel
CPB Netherlands Bureau for Economic Policy Analysis, UNU-MERIT, Maastricht University and IZA

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

The Impact of Social Capital on Crime: Evidence from the Netherlands*

This paper investigates the relation between social capital and crime. The analysis contributes to explaining why crime is so heterogeneous across space. By employing current and historical data for Dutch municipalities and by providing novel indicators to measure social capital, we find a link between social capital and crime. Our results suggest that higher levels of social capital are associated with lower crime rates and that municipalities' historical states in terms of population heterogeneity, religiosity and education affect current levels of social capital. Social capital indicators explain about 10 percent of the observed variance in crime. It is also shown why some social capital indicators are more useful than others in a robustness analysis.

JEL Classification: A13, A14, K42, Z13

Keywords: social capital, crime, the Netherlands

Corresponding author:

Bas ter Weel
CPB Netherlands Bureau for Economic Policy Analysis
Department of International Economics
PO Box 80510
2508 GM The Hague
The Netherlands
E-mail: b.ter.weel@cpb.nl

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"The larger and more colorful a city is, the more places there are to hide one's guilt and sin; the more crowded it is, the more people there are to hide behind. A city's intellect ought to be measured not by its scholars, libraries, miniaturists, calligraphers and schools, but by the number of crimes insidiously committed on its dark streets..." *Orhan Pamuk, My name is Red, p.123.*

1 Introduction

One of the most puzzling elements of crime is its heterogeneity across space and not its level or inter-temporal differences (e.g., Glaeser, Sacerdote, and Scheinkman, 1996; Sampson, Raudenbush, and Earls, 1997).[1] Even after controlling for economic and social conditions and population characteristics, there remains a high variance of crime across space. Homicide rates across comparable and more or less equally developed nations in the European Union (EU-15) in the 1990s range from on average 12 cases of homicide per million inhabitants in Sweden, to 28 homicides per million in Finland. Within a sample of Dutch municipalities (>30,000 inhabitants) crime rates per capita vary between 1.60 in Hof Van Twente (Overijssel) and 14.60 per capita in Amsterdam. Observable factors, such as population density, the youth unemployment rate, the mean level of education and income inequality can account for only a small fraction in explaining these differences.[2] For example, Utrecht has a crime rate per capita of 14.3 compared to Leiden with worse observables, which has a crime rate of only 6.3 per capita.

How can we explain these differences in crime rates across space? We argue that differences in social capital can account for a significant part of the observed differences in crime rates across cities. Criminal behaviour depends not only on the incentives facing the individual but also on the behaviour of peers or others surrounding the individual. In case of the same opportunity and expected returns from crime, an individual is less likely to commit crime if his peers and the community he belongs to punish deviant behaviour. If one individual decides not to commit crime, it is less likely that others will do so, which creates an external effect of one person's behaviour on the others. Informal social control by which citizens themselves achieve social order increases the level of well-being in a community.

[1] See Freeman (1999) for an overview of the crime literature in economics. Early contributions in economics by Becker (1968) and Ehrlich (1973) explain the level of crime and the decision to commit crime from an economic perspective.

[2] Glaeser, Sacerdote, and Scheinkman (1996) argue that only about 30 percent of the variance in crime rates across space in the United States can be explained by observable differences in local area characteristics.

This in turn raises the level of trust among citizens, altruistic behaviour (e.g., involvement in charity and voluntary contributions or donations) and participation in activities that serve the community at a more abstract level (e.g., voting). Although informal social control is often a response to unusual behaviour, it is not the same as formal regulation and it should not be equated with formal institutions that are designed to prevent and punish crime, such as the police and courts. It rather refers to the ability of groups to realise collective goals and, in our setting, to live in places free of crime.

The empirical part of this research focuses on municipalities (>30,000 inhabitants) in the Netherlands. We employ a variety of social capital measures. Previous work in economics and sociology treats social capital as a positive sum.[3] Instead of measuring social capital as a positive value, it might be easier to measure the absence of social capital through traditional measures of social dysfunction such as, family break down, migration and erosion in intermediate social structures (Fukuyama, 1996). This approach hinges on the assumption that just as involvement in civic life is associated with higher levels of social capital, social deviance reflects lower levels of social capital. We benefit from different indicators such as voluntary contributions to charity, electoral turnout and blood donations as well as traditional measures of social capital. [4]

These indicators seem unrelated and plagued by measurement error if used as individual indicators of social capital. However, they turn out to be highly correlated and a common denominator of all these indicators combining several multifaceted dimensions may serve as a useful and a robust measure of social capital (e.g., Table 2 and Figure 1 below). We first tackle this problem by treating social capital as a latent construct and form several social capital indices by using principal component analysis (PCA). Second, we show that social capital, both represented by individual indicators and by an index, is an important determinant of crime after controlling for other covariates. We also show that the historical state of a municipality in terms of population heterogeneity, religiosity and education has an impact on the formation of current social capital. Our findings reveal that on average a one standard deviation increase in social capital would reduce crime rates by 0.32 of a standard

[3]Higher social capital is associated with higher economic growth (e.g., Knack and Keefer, 1997); more investment in human capital (e.g., Coleman, 1988); higher levels of financial development (e.g., Guiso, Sapienza, and Zingales, 2004); more innovation (e.g., Akçomak and ter Weel, 2006) and lower homicide rates (e.g., Rosenfeld, Messner, and Baumer, 2001).

[4]Various indicators have been employed to proxy social capital, e.g., generalized trust and membership to associations, gathered from different surveys like the World Values Survey (WVS) and the European Social Survey (ESS). Although these indicators result in consistent and robust findings, their use has received criticism due to inherent measurement error.

deviation and that social capital explains about 10 percent of the total variation in crime rates.

Our approach contributes to the literature in several aspects. First, we treat social capital as a latent construct and we measure both the presence (e.g., blood donations, voluntary giving and trust) and absence of social capital (e.g., family breakdown and population heterogeneity), which differentiates our study from the existing literature. Simple correlations between various survey and non-survey indicators of social capital display quite high coefficients. For instance, the average of the correlation coefficients between survey based *trust* and non-survey based social capital indicators − *charity*, *blood* and *vote* − is roughly 0.40. Second, we try to provide an explanation for how social capital forms. This aspect is largely ignored in the literature and only took attention recently. In line with Tabellini (2005) and Akçomak and ter Weel (2006) we argue that the history of a municipality a century ago does have a significant impact on current levels of social capital. Third, though crime is a global phenomenon most of the literature is based on the evidence from the United States (US), the United Kingdom (UK) and Canada.[5] The Netherlands has an interesting setting with homogeneous economic conditions, high concentration of foreigners and a free market for soft drugs. Finally, our units (municipalities) are much smaller in scale and much more homogeneous when compared to other studies. So, the results are less likely to be affected from differences in government policies, laws and regulations. Given the high level of homogeneity, the probability of finding a significant correlation between social capital and crime is low, making us confident of the robustness of our estimates.

This paper proceeds as follows. Section 2 presents the conceptual framework and develops our arguments. We present information on the data in Section 3. The empirical strategy is presented in Section 4. Section 5 presents the estimates and a number of robustness checks. Section 6 concludes.

2 Conceptual framework

Our conceptual framework to study the link between social capital and crime to explain the heterogeneity of crime through space is based on social capital as a source of control and community organization. To explain this concept we first explain how we define social

[5]For US see for instance, Glaeser, Sacerdote, and Scheinkman (1996), Freeman (1996),Grogger (1998), Glaeser and Sacerdote (1999), Gould, Weinberg, and Mustard (2002), Levitt (2004) and Lochner and Moretti (2004). For UK see, Wolpin (1978) and Sampson and Groves (1989) and for Canada see, Macmillan (1995) and McCarthy and Hagan (2001).

capital. After that we develop our conceptual framework and the approach taken to explore the link between social capital and crime.

2.1 Defining social capital

Our definition of social capital is based on four different measures from several different literatures.

First, social capital is an increasing function of participation in civic life. For instance, higher voter turnout and more voluntary donations to charity contribute to a community's social capital. Voter turnout is hypothesized to capture civic involvement and participation in community decision making. This indicator is also used by Putnam (1993, 1995), Rosenfeld, Messner, and Baumer (2001) and Gatti, Tremblay, and Larocque (2003). Voluntary contributions in money terms are supposed to capture the strength of intermediate social structures such as charities, clubs and churches and could be employed as another indicator that measures the presence of social capital. We use a city's voter turnout rate and its monetary contribution per household to charity as indicators for social capital.

Second, social capital is higher when people care more for each other or are more altruistic. To measure this dimension of social capital, Guiso, Sapienza, and Zingales (2004) suggest to use voluntary blood donations as an indicator for social capital. Although charity and blood seems to measure similar phenomena there is one particular difference. Experimental research reports that voluntary contributions may incorporate elements of warm glow (e.g., Andreoni, 1995) and reciprocity at the same time. For instance, most charity organizations send or give small gifts (pens, postcards, etc.) and it has been shown that the contributions increase with the size of the gift (Falk, 2004). However monetary compensations for donating blood may even crowd out blood donation as suggested by Titmuss (1970) and recent studies have shown that this could well be the case (e.g., Mellstrom and Johannesson, 2008). In the Netherlands there is no monetary compensation of any kind for donating blood, so we suggest that blood donation captures a pure warm glow effect. We use voluntary blood donations per capita as a measure of social capital.

Third, security and trust increase the stock of social capital. When there is more conformist behaviour, more respect for each other and when norms are institutionalized, the level of social capital is higher. Trust has been identified as a source of social capital. Economists defined the concept in a rather lax way, as an optimistic expectation regarding other agents behaviour (Fafchamps, 2004). Both sociologists and economists have benefited

from the survey-based 'generalized trust' indicator as a proxy to social capital, which measures the degree of opportunistic behaviour and as an alternative indicator to social relations in general (e.g., Putnam, 1995; Knack and Keefer, 1997; Zak and Knack, 2001; Rosenfeld, Messner, and Baumer, 2001; Messner, Baumer, and Rosenfeld, 2004). The trust indicator is found to be highly correlated with other measures of social capital such as memberships to associations, extent of friendship and neighbourhood networks and voting (Putnam, 1995).[6] We use a generalized trust index and trust in the police as indicators for social capital.

Finally, informal controls and the extent of informal contacts and acquaintances increase social capital. So far our indicators assume to measure the presence of social capital. However, the absence of social capital can be measured by using measures of population heterogeneity and family structure. First, the literature on disadvantaged youth and juvenile crime suggests that most criminals come from single-parent households (e.g., Case and Katz, 1991). Social capital in single-parent households is supposed to be low because of the fact that they lack a second parent and because they change residence frequently. It has been shown that single-parenthood has a negative impact on various outcomes, such as educational attainment, juvenile crime and teenage pregnancy, affecting children's social development (e.g., McLanahan and Sandefur, 1994; Parcel and Menaghan, 1994). Second, population heterogeneity is an important factor that affects social capital and trust as it breaks closure. We use divorce rates and the percentage of foreigners as indicators of (lack of) informal control and population heterogeneity.

Empirically, we view social capital as a latent construct that consists of these elements. In Section 3 the empirical methodology is described in great detail.

2.2 Social control and community organization

Studies of the social environmental characteristics of crime have shown that there exists a lot of heterogeneity. Disadvantaged neighbourhoods and communities are not equally plagued by high crime rates. Sampson and Groves (1988) have developed a theory of social organization in which communities are empowered through their trust in each other to take action against crime and to join with formal control, such as the police.[7] Consistent with this theory, Sampson, Raudenbush, and Earls (1997) report significantly lower crime levels and self-reports of victimization in neighbourhoods characterized by social or collective efficacy

[6] Research has shown that the survey-based trust question may measure trustworthiness (Glaeser, Laibson, Scheinkman, and Soutter, 2000) or well-functioning institutions (Beugelsdijk, 2005) rather than trust itself.

[7] See also Kornhauser (1978), Sampson and Groves (1989) and Bursik and Grasmick (1993).

in their study of informal social organization and violent crime in Chicago. Similarly, Bursik and Grasmick (1993) argue that the effectiveness of law enforcement and public control is higher in communities with extensive civic engagement.[8] Strong attachment and involvement in community matters also leads to strong social bonds by which conflicts are resolved in a more peaceful way compared to communities with weak social bonds (e.g., Hirschi, 1969). Hence, the cost of conflict resolution decreases and more conflicts will be solved.

Communities are stronger when there is lower population turnover and density, because turnover and density negatively affect the ability to know others and to observe and intervene in trouble making activities. Glaeser and Sacerdote (1999) explain why there is more crime in larger cities, and find that larger communities have a more transient and anonymous character, which reduces social cohesion. This makes it harder to enforce social sanctions, which reduces the cost of crime and in the end results in more crime. Similarly, Williams and Sickles (2002) find that by being caught an individual risks to loose the utility generating social capital (loss of reputation and job, divorce etc.). This means that the more social capital an individual possesses the higher the expected cost of committing crime, which reduces the probability to engage in criminal activities. So, given the probability of being caught and formal control, higher levels of social capital seem to reduce crime.

When people know each other better, they are also more likely to participate in community organizational life. This is expressed in participation in voluntary organizations and charity (e.g., Putnam, 1993) and support. The opposite is true for disadvantaged families and disadvantaged neighbourhoods in which deprivation of any kind feeds further deprivation through mechanisms of social interactions and peer effects such as learning effects, imitation and taking the peers as a role model (e.g., Case and Katz, 1991; Manski, 2000; Evans, Wallace, and Schwab, 1992). Individuals who belong to these families are more likely to be unemployed, have low incomes and education and have personal problems. In most cases divorce rates are higher and families are single-parent families headed by women. They are also more likely to live in dense areas with a heterogeneous population and more likely to change residence. Hence, disadvantaged families and persons invest and participate less in the social community they belong to.

[8]See e.g., Taylor, Gottfredson, and Brower (1984), Sampson and Groves (1989), Land, McCall, and Cohen (1990), Rosenfeld, Messner, and Baumer (2001), Lederman, Loayza, and Menendez (2002) and Messner, Baumer, and Rosenfeld (2004) for empirical evidence.

2.3 Operating the concept

An important issue is that most research on social capital struggles with causality. In this research, it could be the case that higher crime rates result in out-migration and constrain positive social interactions. It might also be the case that criminal activity erodes social capital because it engages individuals in crime networks and keeps them away from educational and occupational opportunities. We argue that social capital is a positive sum and founded by historical institutions. Institutions promoting the formation of social capital in the past are positively correlated with current levels of social capital. Finally, higher levels of social capital now, result in lower crime rates.

We apply an instrumental variable strategy in which we instrument a city's current social capital with its past level education, population heterogeneity and religiosity. Recent studies have shown the validity of such an approach (Tabellini, 2005; Akçomak and ter Weel, 2006). We argue that population heterogeneity, the contribution of religiosity to human and social capital investments, and education in the past contribute to the formation of a city's social capital, hence shape current social capital.

If social capital is an asset paving the way to community governance (Bowles and Gintis, 2002) or to achieve goals that could be not be achieved or could be achieved only at an higher cost (Coleman, 1988), then any factor that would lead to disorganization and dis-attachment in the community would eventually reduce social capital. Population heterogeneity is such a factor that may trigger dis-attachment as higher levels of heterogeneity would break closure, reduce acquaintance among residents and may result in lower trust among members of the community (e.g., Rose and Clear, 1998; Rosenfeld, Messner, and Baumer, 2001). The effects of racial and/or ethnic heterogeneity on socio-economic outcomes are well documented in the literature. It is shown that heterogeneity has an effect on corruption (Mauro, 1995), rent seeking and low educational attainment (Easterly and Levine, 1997), and lower provision of public goods (Goldin and Katz, 1999). However, our argument in this paper is that ethnic and religious heterogeneity may result in circumstances where formal and/or informal institutions are not binding. Therefore, our argument is more in line with the literature that links heterogeneity to social capital in the wider sense. For instance, both Easterly and Levine (1997) and Alesina, Baqir, and Easterly (1999) argue that ethnic fragmentation may increase polarization in a community and create difficulty in the provision of public goods such as public education, libraries, and sewer systems. In a similar vein Alesina and La Ferrara (2000) argue that racial composition affects the degree in participation in social

activities. Zak and Knack (2001) and Rupasingha, Goetz, and Freshwater (2002) also show that higher levels of ethnic diversity may result in less trusting societies.

We argue that Protestant belief may have a dual effect on the formation of social capital, which is beyond simply saying that being more religious is associated with higher social capital. First, Beyerlein and Hipp (2005) differentiate between bonding and bridging social capital and argue that groups characterized by bonding social capital are not effective in creating an environment of informal social control to deal with the threat of crime, whereas groups with extensive bridging social capital are more effective in creating such foundations.[9] The results show that crime rates are lower in societies with higher levels of bridging social capital. Given this finding that mainline Protestants are more likely to be involved in community wide volunteering, which in turn refers to higher levels of social capital, we argue that communities where more Protestants reside are characterized by a certain environment and 'ethic' to paraphrase Max Weber, in which social capital may nurture. This view stresses the institutional aspect of Protestantism. A second link is the human capital aspect (Becker and Woessmann, 2007). The argument here is that Protestant instructions to read the Bible in ones own language and the support for universal schooling boosted the literacy levels early on and hence created human capital as a side effect. Previous research by Coleman (1988) and Goldin and Katz (1999) helps to explain differences in human capital by relating it to historical differences in social capital. [10]

The interaction between human and social capital is well documented in the literature (e.g., Coleman, 1988; Goldin and Katz, 1999). Here we base our argument on the fact that human capital affects social capital with a lag. For instance, Goldin and Katz (1999) show that high school movement in the 1930s in various states in the U.S affects current levels of social capital. Recent analyses by Tabellini (2005) and Akçomak and ter Weel (2006) support this finding. They show that for different samples of European regions literacy rates in 1880s do have an impact on current levels of social capital and on a set of cultural indicators. The idea here is that education builds human and social capital at the same time. As shown

[9]Bonding social capital are links mainly or exclusively among members of the same group, whereas bridging social capital links members of different groups among communities. Bonding social capital increases community social capital within groups, but may also reduce overall social capital by restricting links among groups. Beyerlein and Hipp (2005) use the percentage of mainline Protestant and Catholics as a proxy for bridging social capital as they involve in community wide volunteering, and the percentage of Evangelical Protestants as a proxy for bonding social capital because Evangelical Protestants are more likely to involve in voluntary activities within their group but not in a wider community.

[10]A possible third mechanism may be the 'guilt' mechanism. As suggested by Fafchamps (1996) and Platteau (1994), contractual obligations could be enforced via several mechanisms such as loss of reputation and guilt. Starting from Max Weber numerous studies emphasized how religion might play a role in individual or firm decision making.

by Gradstein and Justman (2000, 2002) education affects social capital because education is an important socializing instrument as it builds common norms and facilitates interaction between community members who might be different along cultural, religious or ethnic lines.

3 Data and Descriptives

The data span 142 municipalities with more than 30,000 inhabitants in the Netherlands. We employ the 2002 geographical definition of Dutch municipalities with each municipality matched to a NUTS regional definition.[11] Most of the socio-economic variables come from Statistics Netherlands (CBS). We restrict our analysis to municipalities with populations of more than 30,000. For smaller municipalities and for earlier years some variables are unavailable. Table 1 presents summary statistics for all variables we use in the empirical analysis. We discuss the most salient details of the most important variables below, and other variable definitions, sources and details in Appendix 1.

3.1 Social capital

We benefit from several indicators to proxy social capital. Information on voluntary giving, *charity*, is obtained from the national fundraising agency (Centraal Bureau Fondsenwerving, CBF). The original data is available in euro terms and defined as voluntary contributions per household averaged over the term 2000-2005.[12] For the electoral turnout we use the voter turnout for the elections of the Lower House (Tweede Kamer) in 2003. Following Guiso, Sapienza, and Zingales (2004) we collected data on blood donations. The data set is for 2005 and comprises information on the number of donations. We define *blood* as the blood donations per 100 inhabitants. Higher values of *charity*, *vote* and *blood* are associated with higher levels of social capital.

To support our data and for robustness purposes we have also gathered data from ESS – a database designed to measure persistence and change in people's social and demographic characteristics, attitudes and values. These survey-based indicators are widely used in the

[11] The 2002 geographical definition of Dutch municipalities is available at Statistics Netherlands (CBS), http://www.cbs.nl. The NUTS definition is available at eurostat http://ec.europa.eu/eurostat. The Netherlands are divided into 4 NUTS 1, 12 NUTS 2 and 40 NUTS 3 regions. See Appendix 4 for details.

[12] We also calculated voluntary givings per inhabitant for each year and then averaged the data over time to see whether there is any significant difference between the two measures. As expected there is no effect on the results. This calculation introduces some bias because the municipality definitions change every year from 2000 to 2005 and for this reason we use correspondence tables to match municipalities and in cases that we have missing population or household information we interpolate the data. Due to these shortcomings we use the original version of the indicator as available from the source.

social capital literature. To increase the sample size we merged the first and the second round of ESS conducted in 2002 and 2004. The merged data include information on more than 4,000 individuals. The data is adjusted by population weights to reduce the possibility of complications that might arise due to over-sampling. We construct an equal weight trust indicator from the answers to the following three questions and label it *trust*, (*i*) *ppltrust* is formed from the answers to the following statement: "Most people can be trusted or you can't be too careful", (*ii*) most people try to take advantage of you, or try to be fair (*fair*), (*iii*) most of the time people are helpful or mostly looking out for themselves (*help*). For all three indicators higher values represent higher levels of social capital. To capture the confidence in institutions we use "trust in police" (formed from the question "How much you personally trust the police") from the same source. Unfortunately all these five indicators are only available for 40 NUTS 3 regions and it is not possible to collect similar information at the municipality level. However, we include these measures in our analysis by creating variables that have the same value for municipalities in the same NUTS 3 regional definition.[13]

We also measure the absence of social capital using traditional measures of heterogeneity and family structure. We first collected information on the percentage of foreigners in each municipality as a proxy to population heterogeneity.[14] Related to this measure we formed *movers* to represent mobility in a municipality. We define *movers* as the sum of the absolute value of immigration and emigration divided by the population. To capture erosion in family induced social capital divorce rates are used as an indicator.[15]

The correlations among all these indicators are displayed in Table 2 and depicted in Figure 1. The simple correlations suggest that measures of social capital are strongly correlated. Correlations between the individual indicators, *charity*, *blood*, *vote*, *trust*, *foreign* and *divorce*, are in a range between 0.01 to -0.74 with an average of 0.36.[16] As shown in Appendices 2 to 5 these observations are not restricted to a specific group of municipalities and hold for different subsamples.[17]

[13]For instance, Heerlen (917), Sittard (1883), Maastricht (935), Landgraaf (882) and Kerkrade (928) are all in Zuid-Limburg, hence all five municipalities share the same value for the above indicators from the ESS database.

[14]To support this measure we also collected data on immigration, emigration and detailed data on foreigners differentiating between males and females and between first and second generation immigrants. Introducing such differences does not yield different results.

[15]We also experimented with using the percentage of single parent families/households, which yields similar results.

[16]The average calculated by taking the absolute value of each correlation. For NUTS 3 regions the correlations range from 0.19 to -0.86, with an average of 0.46.

[17]We have replicated the analysis for municipalities with more than 40,000 and 50,000 inhabitants respectively, for 40 NUTS 3 regions and for 22 largest agglomeration in the Netherlands.

To get an idea of how regions and municipalities are distributed along these social capital indicators we ran a k-means cluster analysis to see whether the data differentiates between regions with high and low social capital. If the analysis is restricted to two groups there is a clear distinction between the north and east of the Netherlands, which are rich in terms of social capital and the south and the west, which are relatively poor in terms of social capital. If the cluster groups are increased to 4 this distinction still prevails although it is not that clear anymore. Municipalities in the northern part of the Netherlands tend to have values that are above the mean for *charity*, *blood*, *vote* and *trust* and values below mean for *foreign* and *divorce*. In the southern part this pattern is the other way around. In the west and the east we have mixed groups. This simple preliminary analysis gives another hint that the social capital indicators tend to move together supporting simple correlations.

Our fundamental premise in this paper is that these variables capture different dimensions of social capital and even though they may not be very good proxies for social capital individually, a common denominator of them may stand as a good indicator of social capital. The final goal is to treat social capital as a latent construct and to form social capital indices by using principal component analysis (PCA). First, we performed PCA including *charity*, *blood*, *vote*, *trust*, *foreign* and *divorce* and saved the first principal component as *SC1* which explains about 55 percent of the total variation. This is an overall index merging both presence and absence of social capital in one measure. Then we formed another index in a similar way, *SC2*, only capturing the presence of social capital hence including the first four indicators above. Due to reasons we have mentioned above about the availability of *trust* at the municipality level, we formed a final index, *SC3*, including only *charity*, *blood* and *vote* for robustness reasons. The first component explains more than 60 percent of the variation in these three variables. Further details on the social capital indicators, the principal component loadings and the explained variance for all included indicators are presented in Appendix 1.2.

3.2 Crime

Information about crime is constructed from the 2002 crime monitor of the *Algemeen Dagblad*. The data yield information on 27 different types of crime.

We form an overall indicator per 100 inhabitants covering all recorded crimes and label it *crime*. In the literature there is a tendency to use data for crime that have minimal reporting inconsistencies such as, motor vehicle theft, robbery and burglary. This is indeed

important because the crime numbers include a category for bicycle theft, but especially in the Netherlands bicycle theft is so common that many people do not even report if they are victim of bicycle theft. In a similar vein, crime numbers on handling soft drugs could also be biased since there is a relative free market for soft drugs in the Netherlands. On the other hand, citizens are more likely to report if their car is stolen. Therefore, as well as analyzing overall crime rates we have specified nine categories of crime according to the 2006 European Sourcebook of Crime and Criminal Justice. These are homicide, serious assaults, rape, robbery, theft, motor vehicle theft, burglary, domestic burglary and drug related crimes. Appendix 1.3 defines each of these categories and presents descriptive statistics for a number of subsamples. The most important categories of reported crime for our preferred sample of cities with more than 30,000 inhabitants are robberies and drug related crime. Least important are burglary and rape.

A more detailed investigation of the crime data produces two main insights. First, most recorded crime falls into one or two subcategories. For example, overall theft is roughly 55 percent of all recorded crime and roughly 11 percent consists of assaults; whereas serious crime such as rape and homicide is only 1 percent of overall crime rate. Second, in the Netherlands most criminal activities take place in larger agglomerations. For instance, among all recorded homicides 51 percent occurred in the 22 largest cities and about 85 percent were observed in municipalities with more than 30,000 inhabitants. In extreme cases like robbery and drug related crime 3 out of 4 attempts are observed in the 22 largest Dutch cities. This pattern more or less prevails for all categories and even for overall crime rates as 53 percent of all recorded crime is observed in the 22 largest agglomerations and 83 percent occurs in municipalities with more than 30,000 inhabitants Table A1.3.2 provides the distribution of criminal activities for different subsamples. It seems appropriate to argue that criminal activity in the Netherlands is an urban phenomenon, which supports our choice of sample. The selection of 142 municipalities represents only about 35 percent of all the municipalities in the Netherlands but covers over 90 percent of overall crime.

3.3 Instrumental variables

In line with Tabellini (2005) and Akçomak and ter Weel (2006) we suggest that historical factors do have an impact on the formation of social capital and rely on three indicators as an instrument for social capital all of which are observed at the municipality level in 1859: (*i*) population heterogeneity, (*ii*) percentage of protestants, (*iii*) number of schools. All three

variables are taken from the population archive (*Volkstellingen*), which provides historical data on household, population, occupation etc. starting from 1795 onwards. We selected 1859 because this is the earliest date for which data at the municipality level are available. More information about the population archive and the three instruments can be found in Appendix 1.4. Table A1.4 lists the data for the 142 municipalities with more than 30,000 inhabitants.

The percentage of foreigners in 1859 is used as an instrument for current social capital as it is a proxy for trust in 1859. Municipalities that were well endowed in terms of social capital 150 years ago may still be rich in social capital, which emphasizes the importance of initial presence. In this case, past social capital directly affects current social capital but has no direct impact on current crime levels. We define *foreign1859* as the percentage of foreigners living in a municipality in 1859. We define *protestant1859* as the percentage of inhabitants belonging to any of the Protestant denominations in 1859. We also collected data on the number of schools in 1859 in each municipality as a direct proxy for human capital investment different from the effect of Protestantism on human capital formation as discussed in Section 2. Although it may not be a perfect indicator for human capital in 1859 we believe that it is still a credible instrument to current social capital. *#school1859* is defined as number of schools per 1,000 inhabitants.

4 Empirical Strategy

Our empirical strategy hinges on the assertion that social capital is an important determinant of crime and that social capital is hard to measure and thus should be best treated as a latent construct. Social capital is different from other forms of capital in the sense that it is not directly observable. Therefore, our first strategy is to measure social capital as a single index composed of different indicators that could act as an individual proxy for different dimensions of social capital. To do so, we use a principal component analysis (PCA) that estimates

$$Y_i = \beta_i social\ capital + \epsilon_i, \tag{1}$$

where i corresponds to different indicators of social capital, Y is the latent construct composed of a number of social capital indicators. Estimating this equation yields a number of principal component factors and a number of principal component loadings, β_i, which could be viewed as weights. Since the indicators are highly correlated with each other we only

use the first principal component as a measure of social capital and label it SCx, where x ranges from 1 to 3 and denotes the inclusiveness of the index. As discussed above we construct three indices where $SC1$ is the most inclusive consisting of six indicators and $SC3$ is the least inclusive consisting of three indicators. Table A1.2 lists the principal component loadings and the explained variance for each index and for each sample. The first principal component explains 50 to 65 percent of the variation induced by the indicators.[18]

Having constructed the indices of social capital we start estimating the following base model with OLS using usual explanatory variables of crime:

$$\begin{aligned} crime &= \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp \\ &\quad + \beta_4 young + \beta_5 SC + \epsilon, \end{aligned} \tag{2}$$

where subscript m for municipalities has been suppressed for notational convenience, and the error term complies with the usual assumptions. *Crime* represents crime rates depending on the type or group of criminal activity. *Density* refers to population density. To normalize the data we took the natural log of population density. We expect higher crime rates in densely populated areas. *Education* is the percentage of people with medium and high levels of education. As criminal activity is concentrated within relatively younger age groups, we have included the percentage of people between 15-24 years old. *Unemp* represents the unemployed under age 30. We expect education to be negatively correlated with crime and the percentage of population 15-24 years old and youth unemployment to be positively associated with crime. SC represents not only the three indices but also the six individual indicators to construct the indices.

The next step is to replicate the analysis above for an extended model:

$$\begin{aligned} crime &= \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp \\ &\quad + \beta_4 young + \beta_5 SC + \beta_6 X + \upsilon, \end{aligned} \tag{3}$$

where X consists of a set of control variables which are; (i) income inequality, (i) controls for the percentage of area devoted to shopping and recreation activities, and (iii) number of coffeeshops per 10,000 inhabitants. We expect these variables to be positively correlated with crime rates.

[18] Recently, a similar strategy was used by Fryer, Heaton, Levitt, and Murphy (2005) to measure the impact of crack cocaine on crime in U.S. cities.

Endogeneity and the possibility of reverse causality could bias the estimates of the above models when using OLS. Putnam (2000) has argued that low social capital may result in higher crime, which in turn may result in even lower levels of social capital. For example, a third unobserved variable could affect both crime and social capital. Certain policies implemented by the local government could reduce crime but at the same time have an impact on social capital. Or, it could be the case that crime reporting rates are correlated with social capital levels, so inhabitants living in high social capital areas may be more likely to report crime (e.g., Soares, 2004). To deal with such problems we use a 2SLS strategy in which we instrument social capital with the historical proxies discussed and constructed in Section 3. We use the percentage of foreigners, protestants and the number of schools in 1859 as instruments for social capital. This yields the following model for estimation:

$$\begin{aligned} crime &= \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp \\ &\quad + \beta_4 young + \beta_5 SC + \beta_6 X + \nu, \\ SC &= \delta_0 + \delta_1 foreign1859 + \delta_2 protestant1859 \\ &\quad + \delta_3 \#school1859 + \delta_4 Z + \eta, \end{aligned} \tag{4}$$

where *foreign1859* stands for the percentage of foreigners and *protestant1859* denotes the percentage of Protestants living in a municipality in 1859. $\#school1859$ is the number of schools per 100 inhabitants in 1859. The matrix Z includes all other exogenous variables. We expect $foreign1859$ to be negatively, and $protestant1859$ and $\#school1859$ to be positively correlated with social capital. Since almost all our variables have different measurement levels we standardized all the variables so that the mean and variance equals 0 and 1, respectively. Therefore the estimated coefficients are also standardized coefficients measuring how the dependent variable responds when an independent variable changes by one standard deviation.

5 Results

5.1 OLS Estimates

We start by estimating the base model (equation 2) using OLS. Table 3 presents the estimates. The dependent variable is defined as the overall crime rates. The mean of this crime

measure has been standardized to zero. We observe from the base model that individual indicators of social capital have significant impact on overall crime rates. *Charity*, *blood*, *vote*, *trust* and *trustplc* are negatively associated with crime, whereas $foreign$, *divorce* and *movers* are positively correlated with crime rates. With the exception of *trust* all coefficients are significant at the 5 percent level.[19] Our findings are in line with the previous research that reports negative effects for trust, civicness and electoral turnout (e.g., Sampson and Groves, 1989; Rosenfeld, Messner, and Baumer, 2001; Lederman, Loayza, and Menendez, 2002; Messner, Baumer, and Rosenfeld, 2004) and research that finds a positive link between crime and population heterogeneity (e.g., Jobes, 1999) and single parenthood (e.g., Sampson, Morenoff, and Earls, 1999) and crime. Moreover, all three social capital indices have significant negative effects on crime as can be observed from the last three columns in Table 3. These indices imply that a one standard deviation increase in the social capital index reduces crime by between 0.29 and 0.35 of a standard deviation. This effect is economically meaningful, since it means that a one standard deviation increase in social capital would reduce crime rates by about 2 percent on average.

Our findings on ordinary determinants of crime also support prior evidence. Population density generally has a positive and significant effect on crime suggesting that densely populated areas are more likely to be vulnerable to crime than relatively rural areas (e.g., Wolpin, 1978; Macmillan, 1995). This is because heterogeneity and residential instability reduce the effectiveness of community sanctions. In addition, urban areas attract criminal activity as there are more opportunities for such activities in cities where they can act rather anonymously (e.g., Glaeser and Sacerdote, 1999). We find a negative coefficient for education suggesting that the higher the level of education the lower the crime rate, which is also consistent with the literature (Lochner and Moretti, 2004; Wolpin, 1978). This is first because higher education is associated with better labor-market outcomes hence increasing the opportunity cost of crime and possibly because school attendance keeps young people away from the street conditional on the fact that young people commit more crimes (Lochner and Moretti, 2004). However, only in a few specifications the coefficient is statistically significant. The results also show that crime rates are increasing with the percentage of young people, which is consistent with earlier work (Wolpin, 1978; Freeman, 1996; Grogger, 1998). The only contradicting result of our estimates is the negative coefficient for the youth unem-

[19] As we have mentioned before *trust* scores are available at the NUTS 3 level and are merged to data at the municipality level. This adjustment likely partly explains why the coefficient is statistically insignificant. Similar analysis at the NUTS 3 level (with $n = 40$) returns a significant coefficient for *trust*.

ployment rate, although the coefficient is statistically insignificant. Oster and Agell (2007) and Gould, Weinberg, and Mustard (2002) show for a panel of Swedish municipalities and American cities that a fall in unemployment led to a drastic decrease in drug possession, auto theft and burglary. However, these results also reveal that changes in youth unemployment have no particular effect on crime.

After the inclusion of a number of additional control variables the results are qualitatively similar as the estimates in Table 4 show. All social capital indicators have a statistically significant impact on crime rates. In the extended model, income inequality has no significant effect on crime and the sign alternates depending on the specification. Previous research on the effect of income inequality on crime also shows contradicting results (e.g., Soares, 2004). However, recent research shows that changes in the distribution of income inequality rather than income inequality itself affect property crime (Bourguignon, Nuñez, and Sanchez, 2003; Chiu and Madden, 1998). Another point is that the cross-section analysis we employ throughout the paper may not be such a suitable approach to assess the importance of inequality and unemployment on crime rates. Unfortunately, in our setting it is not possible to pursue panel analysis. This is because we do not have the adequate data to do so and more importantly because social capital is a stock that does not change from year to year, whereas inequality and unemployment figures do.

As expected the percentage of recreational and shopping area has a positive and significant effect on crime (e.g., Jobes, 1999). This is because there are more opportunities for criminals in such areas and the returns are higher (e.g., Glaeser and Sacerdote, 1999). We also found quite a strong effect for the percentage of coffeeshops in a municipality on crime rates. This could be due to several reasons. First, the probability of committing crime may increase under the influence of soft drugs. Second, coffeeshops attract disadvantaged persons, gang activity and drug dealers which sets up an environment that supports criminal activity. Finally, to buy drugs, addicted people often have to commit crime. Inclusion of the four control variables increases the explanatory power by one third suggesting that about 65 percent of the variation in crime is explained by the extended model. The added-variable plots are presented in Figure 2, which reveal the strong conditional correlations except for trust.

Table 5 is a summary table presenting the coefficients of all social capital indicators we consider for different subsamples. It is apparent that all six (*charity*, *blood*, *vote*, $foreign$, *divorce* and *movers*) non-survey social capital indicators have a significant effect on crime.

The survey indicators, *trust*, *ppltrust*, *help*, *fair* and *trustplc*, do not return a significant coefficient all the time. Another potentially interesting result is the impact of emigration as well as immigration on crime rates. Immigration has a negative effect because it reduces closure in a community (e.g., Jobes, 1999). Considering the fact that social capital originates from social interactions within a network, any factor breaking links between actors is harmful for social capital. In this respect emigration may also increase crime rates. It could also be the case that individuals who are less integrated in a society are more likely to commit crime, which is why both immigration and emigration are positively associated with crime rates. Our indicator *movers* (capturing both effects) reflects residential instability in a community and it is positively related to crime suggesting that the higher instability the higher crime rates, which is consistent wih earlier work (e.g., Rose and Clear, 1998). The social capital indices are always significant at the one percent level regardless of the specification and the sample considered.

5.2 2SLS Estimates

The OLS estimates above could be biased because of causality problems. We next explore a 2SLS strategy instrumenting social capital with the percentage of foreigners, percentage of Protestants and the number of schools in 1859. Table 6 presents the 2SLS estimates. Columns (1), (3) and (5) present the first stages of the 2SLS estimations for the three social capital indices, respectively. The instruments in the first stage have the expected effect on social capital. The quality of the instruments is important as they should be correlated with social capital but not with the error term in a way that the instruments should be on the 'knife's edge'. If the correlations of the instruments and social capital are not strong enough in the first stage we run into weak instrument problems. On the other hand, if they are too strong we cannot safely assume that they are not correlated with the error term. The joint F-tests in the first stage show that our instruments are valid as they pass the F-test threshold of 10 suggested by Staiger and Stock (1997). Moreover the over-identification tests show that the effect of the instruments on crime are operationalized only through their effect on social capital, not by any other mechanism.

The second stage results reveal that the coefficients of the social capital indices are somewhat larger than their OLS counterparts and significant at the 1 percent level. These estimates imply that a one standard deviation increase in social capital reduces crime by between 0.30 and 0.34 of a standard deviation. This effect is economically meaningful and

not far from the estimates from the OLS exercise above (Table 4). The estimates suggest that the causality runs from social capital to crime and the historical state of a community shape current social capital.

Complementary to the OLS results above we present summary information on how individual indicators of social capital behave in 2SLS specification. Table 7 is comparable to Table 5 and for each subsample and model the first column shows the 2SLS coefficient derived from the estimation of equation (4) (for the base and the extended model). The second column shows the associated joint significance test of the instruments in the first stage. In all specifications the estimations return a significant coefficient in the second stage. However, the F-tests illustrate an interesting pattern. As can be seen from Table 7, F-tests for $foreign$, *divorce*, *vote* and *charity* are larger than (or within the proximity of) 10. Given this result, we can assert that these indicators cannot only be labeled as good indicators of social capital, since they are also the ones that display consistent and quite robust estimates in their relationship with crime. Blood donations do not perform as good as the ones above.

The estimates presented in Tables 4-7 use different measures of social capital and our social capital indices, which come from treating the concept as a latent construct. In the theoretical literature on social control, support and networks have been put forward or could be applied as measures of social capital in relation to crime. In our empirical analysis we have constructed measures that are by and large consistent with these theoretical concepts. All measures of social capital turn out to have a significant relationship with crime.

The methodology we employ in this paper allows us to discuss which indicators of social capital perform best. This is potentially interesting for future research as we can identify social capital indicators and also their relation to crime. Throughout the paper we have summarized the results for 14 potential social capital indicators and three indices constructed from these indicators. Indicators related to social support, solidarity and civicness perform quite well as indicators of social capital. However, electoral turnout and donations to charity stand out from the rest. Although their relation to crime is mostly significant, blood donations and trust are found to be rather inferior when compared to *charity* and *vote*. This can be seen from Table A1.2 in Appendix 1. When constructing the indices, the principal component analysis yields more or less the same weight for *charity* and *vote*, but *blood* and *trust* receive only about one third of the weight attached to *charity* and *vote*. This discrepancy becomes visible and significant as the sample moves from NUTS3 regions to smaller municipalities. Our results also show that indicators of social control (divorce rates) and pop-

ulation heterogeneity (percentage of foreigners, immigration, emigration and movers) can be labeled as good social capital indicators. When the principal component loadings of the most inclusive index ($SC1$) is inspected carefully one can easily see that *charity*, *vote*, $foreign$ and *divorce* receive similar weights in magnitude. In almost all specifications *charity*, *vote* and most of the measures of social control and heterogeneity are important determinants of crime. Blood donations and trust indicators from the ESS database are found to be not as important as the others.

5.3 Robustness

5.3.1 Subsamples

We perform several robustness checks to validate our results. First, we replicate the analysis using different subsamples. The detailed results of these exercises are presented in Appendix 2 for 95 municipalities with more than 40,000 inhabitants, Appendix 3 for 63 municipalities over 50,000 inhabitants, Appendix 4 for 40 NUTS 3 regions and finally Appendix 5 for the 22 largest agglomerations in the Netherlands. This exercise reveals that there are no crucial differences affecting the results discussed above and that our findings do not seem to be bound to a specific subsample.

5.3.2 Different Types of Crime

Besides analysis on the overall crime rates we also estimate the extended model (equation 3) for 9 different crime categories. The rationale behind this is the argument that overall crime rates are biased due to under reporting of certain crime types. Therefore, we have to show that our results also hold for crime that is supposed to have minimum reporting inconsistencies such as auto theft, robbery, serious assaults and homicide. Table 9 presents the expected sign and the significance levels of the impact of different social capital indicators on crime subcategories and Figure 3 depicts the added-variable plots. The results highlight several interesting points. With the exception of the social capital indices, the individual social capital indicators seem to have a weak effect on homicide only. Four indicators yield significant coefficients. The only subcategory of crime that is found to be affected by all social capital indicators is serious assaults. The difference in the effect of social capital on property and violent crimes is also not that important. The only exception to this is that *trust* and *divorce* seem to have more effect on violent crimes when compared to property crimes. Another interesting result is that *charity*, *vote* and $foreign$ have a significant impact

on almost all of the crime categories besides their effect on overall crime rates. The other indicators are sometimes loosely related to crime rates. This point could also be taken as a point for caution for researchers who employ a single (or few) social capital indicator, as the results would highly depend on the selection of that particular indicator.

5.3.3 Social Capital Indicators

One of our main arguments in this paper is that the indicators seemingly unrelated are in fact correlated with each other and represent different dimensions of social capital. Previous research argues that blood donations and electoral turnout can safely be considered to be exogenous (e.g., Guiso, Sapienza, and Zingales, 2004). By the same token, one could argue that divorce rates are exogenous too. However, it could be the case that because of higher crime, municipalities become more transient and heterogeneous as opportunities attract outsiders or it could be the case that because of high crime residents are afraid to leave their homes which affects their civic participation and reduces interpersonal trust (e.g., Liska and Warner, 1991). As a further robustness check we show what happens if one employs indicators of social capital as instruments for each other. Figure 4 summarizes the results. The upper and the lower panel represent the 2SLS coefficients and the t-ratios respectively. To make our point clear we can explain the methodology as following. We instrument each social capital indicator by the remaining five social capital indicators and estimate 2SLS models. For instance, for the first box-plot in the upper panel, we use all possible combinations of *blood*, *vote*, *trust*, $foreign$ and *divorce* − individually, and in groups of 2, 3, 4 and 5 − as instruments to *charity* and replicate the 2SLS estimation over and over again until we consume all possible combinations. This produces a set of 2SLS coefficients and t-ratios for *charity* and the distribution of these coefficients and t-ratios are depicted as the first box-plot in the upper and lower panel respectively. This is done for all six indicators and for each case there are 31 observations (i.e., 31 2SLS coefficients and t-ratios for each social capital indicator). The (*) indicates the coefficients and the t-ratios of the social capital indicators from the OLS estimation of equation 3 (see Table 4). The three vertical lines in the lower panel indicate the significance levels at the 1, 5 and 10 percent level.

From Figure 4, the following observations stand out. First, as can be seen from the lower panel, all the 2SLS coefficients are significant at least at the 5 percent level. This supports our argument that all these indicators are related to each other and could be used as instruments for each other. Including them in the same regression would render serious multicollinearity

problems. It was specifically for this reason that we formed social capital indices. Second, the 2SLS coefficients and t-ratios are somewhat higher than their OLS counterparts. Third, the 2SLS coefficient of *trust* varies to a large extent but this is expected as *trust* figures are adjusted to be used at the municipality level as explained in Section 3.1. As a further robustness check we estimate the 2SLS model by instrumenting social capital with the three instruments including them individually rather than as a group to see their individual effect on social capital in the first stage. The summary results are provided in Table 8. One can easily see that the percentage of Protestants in 1859 is a powerful instrument for social capital. Population heterogeneity and number of schools in 1859 do not perform as well as religiosity when used as instruments individually.

5.3.4 Differences in Income

Fourth, we consider including income measures to the extended model. It might be the case that income levels rather than income inequality explain variation in crime. Five different indicators of income are included separately in the regression to assess the responsiveness of the coefficients of three social capital indices. These are, (*i*) *income_p*: income per person (no distinction between full time and part-time employment), (*ii*) *income_t*: income per person (of those who work 52 weeks a year), (*iii*) *income_w*: income per person of western origin (of those who work 52 weeks a year), (*iv*) *income_nw*: income per person of non-western origin (of those who work 52 weeks a year), and (*v*) *income_gap*: income_w / income_nw. Figure 5 displays summary results of this exercise. Original standardized coefficients are compared to coefficients resulting from five different estimations for three SC indices. The inclusion of income indicators does not change the previous findings. Including income per person of full-time employees and income of non-western foreigners tends to reduce the SC coefficients slightly.

5.3.5 Population Heterogeneity

Next, crime rates could display variance across ethnic communities. For instance, keeping all other factors constant assume that there are two communities with similar level of foreigners residence but one has higher crime. The mix of foreigners might explain this difference. There might be less crime in municipalities where the majority of foreigners are from European countries. To test this, we differentiate between foreigners of western and non-western origin and re-estimate the extended model. When comparing different groups standardized

coefficients could be misleading, so we calculated the actual impact on crime. Presence of one percent of non-western foreigners is associated with 0.18 percent higher crime, whereas this is only 0.13 for western foreigners. The results are meaningful as on average the foreign population is about 15 percent of total population. So for instance, presence of 10 percent non-western foreigners in a municipality accounts for 1.8 percent crime on average.[20] One possibly expects this trend to persist for different crime categories. Figure 6 depicts the effect of the presence of non-western and western foreigners, with the original effect for different crime types.[21] As can be seen from the graph this is not exactly true. Only in the case of theft and robbery presence of non-western foreigners is associated with higher crime. There are negligible differences between non-western and western foreigners for other categories of crime.

Our strategy incorporates heterogeneity and divorce rates in a social capital index, so in a way we argue that these indicators affect outcomes through social capital. However, most empirical crime models assess the effect of these variables individually. For this reason, we estimated the extended model by OLS and 2SLS by including *divorce*, $foreign$ and $SC3$ index in the same equation. The results are summarized in Table 10, rows (3) and (4). The first two rows present the coefficients from the original estimations. The presence of social capital still seems to be an important indicator even after including *divorce* and $foreign$ as independent variables. The effect of $SC3$ reduces considerably but this does not change our conclusions. Rows (5) to (7) display summary results for the estimations when three instruments are included as independent variables. Our empirical strategy rests on the assumption that the exogenous variation in social capital depends on historical instruments. The 2SLS estimations only take this exogenous variation into account, which in a way assumes that historical instruments are the only indicators that matters. This is of course not true. One way to deal with this problem is to run OLS estimations controlling for historical instruments (e.g., Bloom, Sadun, and Van Reenen, 2007). Comparing rows (5) to (7) with the first two rows it can be observed that the results change slightly. Moreover, the findings also reinforce the quality of the instruments as it is clear that the instruments do not have impact on current crime levels.

Finally, as a further robustness check, we omitted the most influential observations using two criteria: Cook's D and Df Betas. For each criterion we first omitted the most influ-

[20] On average the overall crime rate is about 5 percent, so 10 percent of non-western foreign population accounts for about 30 percent of overall crime

[21] Murder and rape are omitted from the graph as the effects are very small and the differences between western and non-western foreigners are minor.

ential observation and then the first five most influential observations and re-estimated the extended model. Figure 10, rows (8) to (15) summarize the results of these estimations. The coefficients of the three social capital indices remain significant at the 1 percent level.

6 Conclusion

From a community governance perspective, communities play an important role in crime prevention by providing informal social control, support and networks. As Dilulio (1996) puts it, the presence of social capital provides community-oriented solutions to the crime problem and these solutions are more important than increasing expenditure on police or incarceration.

Our estimates suggest that communities/cities with higher levels of social capital have lower crime rates. We have shown that these estimates are robust and have examined carefully the causality of this relationship. Generally, a one standard deviation increase in social capital reduces crime by roughly around 0.30 of a standard deviation. These estimates contribute to finding an explanation for why crime is heterogeneous across space.

We have used institutional development in the past to proxy for current social capital. Hence, we treat social capital as a long-term phenomenon, which stock has been build during a long period of time. From a policy perspective, this makes our study difficult to apply because our measures of social capital cannot be changed rapidly but need long-term investment. On the positive side, we show that crime is higher in municipalities where more youth is present. Informal education in the early stages of the life cycle provided by the family and community control and support could act as an important mechanism to reduce youth crime and later on build networks.

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Table 1: Summary statistics for municipalities with more than 30,000 inhabitants (n=142)

Variable	Mean	Std. Dev.	Min	Max
density	1369.31	1231.36	95.00	5511.00
charity	6.38	3.18	0.73	19.06
blood	2.69	1.67	0.21	14.41
vote	80.49	4.59	67.70	91.20
divorce	5.31	1.68	0.55	9.96
trust	5.77	0.25	5.30	6.20
ppltrust	5.76	0.31	5.13	6.32
help	5.32	0.29	4.79	5.91
fair	6.22	0.27	5.75	6.76
trustplc	5.89	0.19	5.23	6.41
foreign	16.30	7.30	4.61	45.39
immig	0.72	0.38	0.17	2.59
emmig	0.37	0.21	0.12	1.31
movers	1.09	0.55	0.31	3.78
SC1	0.00	1.80	-5.27	3.92
SC2	0.00	1.40	-3.50	3.70
SC3	0.00	1.32	-2.98	3.43
protestant1859	54.95	33.19	0.02	99.77
foreign1859	2.07	2.16	0.00	12.94
#school1859	0.05	0.04	0.00	0.18
crime	4.99	2.49	1.60	14.53
homicide	0.00	0.00	0.00	0.02
assault	0.58	0.30	0.13	2.01
rape	0.01	0.01	0.00	0.04
robbery	0.06	0.08	0.00	0.55
theft	1.23	0.74	0.23	5.31
autotheft	1.47	1.03	0.20	7.64
burglary	0.55	0.24	0.13	1.29
domestic burglary	0.47	0.21	0.05	1.09
drug	0.01	0.03	0.00	0.18
young	18.81	3.23	9.96	32.47
inequality	0.90	0.45	0.23	2.56
unemp	1.60	2.66	0.00	16.84
education	51.72	7.55	34.76	71.34
cofshop	0.35	0.45	0.00	3.67
shop	21.61	7.69	7.34	49.53
recrat	27.08	8.72	13.45	66.53

Table 2: Correlations among social capital indicators for municipalities with more than 30,000 inhabitants

(n=142)	charity	blood	vote	trust	ppltrust	help	fair	trustplc	foreign	divorce	immig	emmig	movers
charity	1.00												
blood	0.11	1.00											
vote	0.70	0.12	1.00										
trust	0.24	0.24	0.36	1.00									
ppltrust	0.12	0.23	0.28	0.90	1.00								
help	0.26	0.18	0.35	0.84	0.61	1.00							
fair	0.24	0.19	0.30	0.88	0.72	0.61	1.00						
trustplc	0.26	0.23	0.24	0.58	0.56	0.48	0.49	1.00					
foreign	-0.74	-0.10	-0.73	-0.23	-0.15	-0.19	-0.25	-0.13	1.00				
divorce	-0.68	-0.01	-0.66	-0.11	-0.04	-0.11	-0.14	-0.19	0.74	1.00			
immig	-0.41	0.01	-0.28	-0.04	-0.04	-0.03	-0.03	-0.01	0.53	0.47	1.00		
emmig	-0.49	-0.05	-0.42	-0.16	-0.11	-0.17	-0.14	0.01	0.59	0.37	0.69	1.00	
movers	-0.47	-0.01	-0.36	-0.09	-0.07	-0.09	-0.08	-0.00	0.59	0.47	0.96	0.87	1.00

Table 3: OLS results for crime and alternative indicators for social capital for municipalities with more than 30,000 inhabitants (base)

	(1) charity	(2) blood	(3) vote	(4) trust	(5) trustplc	(6) foreign	(7) divorce	(8) movers	(9) SC1	(10) SC2	(11) SC3
density	0.211	0.442	0.325	0.448	0.443	0.072	0.253	0.393	0.139	0.286	0.233
	(0.068)***	(0.061)***	(0.060)***	(0.063)***	(0.062)***	(0.078)	(0.084)***	(0.056)***	(0.072)*	(0.062)***	(0.064)***
education	-0.076	-0.207	-0.065	-0.166	-0.177	-0.051	-0.145	-0.165	-0.027	-0.055	-0.052
	(0.085)	(0.098)**	(0.085)	(0.098)*	(0.097)*	(0.070)	(0.086)*	(0.092)*	(0.072)	(0.084)	(0.080)
unemp	-0.053	-0.051	-0.060	-0.059	-0.087	-0.043	-0.049	-0.029	-0.070	-0.082	-0.064
	(0.037)	(0.041)	(0.034)*	(0.041)	(0.044)**	(0.035)	(0.035)	(0.038)	(0.034)**	(0.037)**	(0.034)*
young	0.246	0.292	0.230	0.249	0.252	0.222	0.136	0.130	0.232	0.299	0.271
	(0.069)***	(0.094)***	(0.082)***	(0.080)***	(0.075)***	(0.080)***	(0.099)	(0.089)	(0.083)***	(0.080)***	(0.080)***
SC	-0.449	-0.165	-0.371	-0.203	-0.478	0.618	0.417	0.370	-0.319	-0.290	-0.352
	(0.094)***	(0.077)**	(0.071)***	(0.129)	(0.202)**	(0.096)***	(0.112)***	(0.106)***	(0.051)***	(0.053)***	(0.058)***
Constant	0.014	0.014	0.014	0.029	0.051	0.014	0.014	0.014	0.014	0.014	0.014
	(0.055)	(0.061)	(0.057)	(0.065)	(0.067)	(0.051)	(0.056)	(0.055)	(0.051)	(0.056)	(0.054)
n	142	142	142	142	142	142	142	142	142	142	142
R-squared	0.57	0.47	0.55	0.46	0.48	0.64	0.56	0.57	0.63	0.57	0.59
Adj R sqr	0.55	0.46	0.53	0.44	0.46	0.62	0.54	0.56	0.62	0.55	0.58

Dependent variable is the overall crime rate. Coefficients are standardized coefficients.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: OLS results for crime and alternative indicators for social capital for municipalities with more than 30,000 inhabitants (extended)

	(1) charity	(2) blood	(3) vote	(4) trust	(5) trustplc	(6) foreign	(7) divorce	(8) movers	(9) SC1	(10) SC2	(11) SC3
density	0.203	0.370	0.263	0.363	0.366	0.063	0.280	0.340	0.124	0.225	0.197
	(0.067)***	(0.059)***	(0.062)***	(0.063)***	(0.059)***	(0.071)	(0.075)***	(0.058)***	(0.069)*	(0.063)***	(0.063)***
education	-0.047	-0.127	-0.051	-0.086	-0.096	-0.036	-0.107	-0.112	-0.025	-0.028	-0.039
	(0.064)	(0.069)*	(0.061)	(0.071)	(0.068)	(0.053)	(0.066)	(0.073)	(0.056)	(0.062)	(0.059)
unemp	-0.025	-0.021	-0.029	-0.030	-0.061	-0.021	-0.020	-0.013	-0.043	-0.050	-0.035
	(0.033)	(0.035)	(0.032)	(0.033)	(0.036)*	(0.034)	(0.033)	(0.034)	(0.033)	(0.033)	(0.033)
young	0.098	0.114	0.095	0.072	0.073	0.106	0.029	0.031	0.118	0.145	0.132
	(0.080)	(0.095)	(0.088)	(0.086)	(0.079)	(0.085)	(0.097)	(0.092)	(0.091)	(0.088)	(0.088)
inequality	-0.030	-0.099	0.068	-0.065	-0.081	0.016	-0.058	-0.044	0.045	0.028	0.038
	(0.055)	(0.057)*	(0.060)	(0.056)	(0.057)	(0.052)	(0.058)	(0.055)	(0.054)	(0.054)	(0.055)
shop	0.117	0.146	0.148	0.147	0.133	0.178	0.092	0.146	0.145	0.165	0.143
	(0.056)**	(0.058)**	(0.054)***	(0.062)**	(0.058)**	(0.052)***	(0.057)	(0.060)**	(0.053)***	(0.057)***	(0.054)***
recrat	0.136	0.178	0.177	0.163	0.176	0.139	0.155	0.112	0.135	0.146	0.154
	(0.062)**	(0.067)***	(0.065)***	(0.071)**	(0.065)***	(0.056)**	(0.059)***	(0.058)*	(0.056)**	(0.063)**	(0.062)**
cofshop	0.244	0.248	0.241	0.282	0.280	0.147	0.216	0.201	0.190	0.245	0.226
	(0.069)***	(0.063)***	(0.068)***	(0.070)***	(0.066)***	(0.055)***	(0.068)***	(0.081)**	(0.060)***	(0.064)***	(0.065)***
SC	-0.331	-0.170	-0.317	-0.206	-0.518	0.514	0.252	0.236	-0.260	-0.240	-0.286
	(0.090)***	(0.073)**	(0.070)***	(0.121)*	(0.181)***	(0.089)***	(0.097)**	(0.090)***	(0.047)***	(0.049)***	(0.055)***
Constant	0.014	0.014	0.014	0.029	0.054	0.014	0.014	0.014	0.014	0.014	0.014
	(0.050)	(0.052)	(0.050)	(0.055)	(0.056)	(0.046)	(0.051)	(0.051)	(0.047)	(0.049)	(0.048)
n	142	142	142	142	142	142	142	142	142	142	142
R-squared	0.67	0.63	0.66	0.62	0.64	0.71	0.64	0.65	0.7	0.67	0.68
Adj R sqr	0.64	0.61	0.63	0.59	0.62	0.69	0.62	0.62	0.68	0.65	0.66

Dependent variable is the overall crime rate. Coefficients are standardized coefficients.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Summary results for alternative indicators for social capital (OLS)

	pop>30,000 base	NUTS3 base	pop>50,000 base	pop>40,000 base	pop>30,000 extended	NUTS3 extended	pop>50,000 extended	pop>40,000 extended
charity	-0.449	-0.455	-0.373	-0.460	-0.331	-0.398	-0.400	-0.421
	(0.094)***	(0.125)***	(0.082)***	(0.080)***	(0.090)***	(0.078)***	(0.078)***	(0.079)***
blood	-0.165	-0.361	-0.162	-0.175	-0.170	-0.390	-0.208	-0.190
	(0.077)**	(0.150)**	(0.077)**	(0.077)**	(0.073)**	(0.116)***	(0.075)***	(0.076)**
vote	-0.371	-0.533	-0.288	-0.308	-0.317	-0.463	-0.339	-0.316
	(0.071)***	(0.118)***	(0.081)***	(0.075)***	(0.070)***	(0.117)***	(0.102)***	(0.079)***
trust	-0.203	-0.315	-0.363	-0.343	-0.206	-0.241	-0.575	-0.420
	(0.129)	(0.111)***	(0.265)	(0.182)*	(0.121)*	(0.102)**	(0.266)**	(0.171)**
ppltrust	-0.148	-0.385	-0.238	-0.260	-0.105	-0.291	-0.389	-0.297
	(0.124)	(0.153)**	(0.255)	(0.182)	(0.112)	(0.136)**	(0.257)	(0.167)*
help	-0.130	-0.162	-0.185	-0.233	-0.172	-0.135	-0.360	-0.301
	(0.105)	(0.098)	(0.176)	(0.129)*	(0.101)*	(0.093)	(0.200)*	(0.128)**
fair	-0.196	-0.248	-0.391	-0.296	-0.194	-0.173	-0.479	-0.365
	(0.134)	(0.093)**	(0.255)	(0.171)*	(0.118)	(0.081)**	(0.253)*	(0.164)**
trustplc	-0.478	-0.230	-0.363	-0.446	-0.518	-0.215	-0.652	-0.677
	(0.202)**	(0.100)**	(0.360)	(0.269)	(0.181)***	(0.093)**	(0.419)	(0.272)**
foreign	0.618	0.569	0.386	0.523	0.514	0.431	0.388	0.471
	(0.096)***	(0.166)***	(0.095)***	(0.095)***	(0.089)***	(0.139)***	(0.094)***	(0.093)***
divorce	0.417	0.570	0.167	0.296	0.252	0.497	0.132	0.210
	(0.112)***	(0.146)***	(0.134)	(0.114)**	(0.097)**	(0.151)***	(0.123)	(0.111)*
immig	0.362	0.341	0.215	0.288	0.217	0.160	0.137	0.179
	(0.099)***	(0.134)**	(0.076)***	(0.086)***	(0.083)**	(0.133)	(0.082)	(0.077)**
emmig	0.310	0.464	0.204	0.246	0.207	0.335	0.150	0.169
	(0.093)***	(0.141)***	(0.068)***	(0.082)***	(0.076)***	(0.133)**	(0.074)**	(0.076)**
movers	0.370	0.535	0.223	0.299	0.236	0.409	0.153	0.195
	(0.106)***	(0.154)***	(0.071)***	(0.090)***	(0.090)***	(0.125)***	(0.073)**	(0.081)**
SC1	-0.319	-0.376	-0.237	-0.270	-0.260	-0.339	-0.255	-0.255
	(0.051)***	(0.072)***	(0.050)***	(0.050)***	(0.047)***	(0.083)***	(0.050)***	(0.047)***
SC2	-0.290	-0.427	-0.240	-0.257	-0.240	-0.365	-0.285	-0.257
	(0.053)***	(0.086)***	(0.050)***	(0.052)***	(0.049)***	(0.075)***	(0.054)***	(0.049)***
SC3	-0.352	-0.473	-0.266	-0.317	-0.286	-0.402	-0.289	-0.305
	(0.058)***	(0.094)***	(0.056)***	(0.058)***	(0.055)***	(0.080)***	(0.058)***	(0.055)***
n	142	40	63	95	142	40	63	95

The coefficients in the first four columns derive from the estimation of the base model for each social capital indicator and the coefficients in the last four column derive from the estimation of the extended model for each social capital indicator. Coefficients are standardized coefficients.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: 2SLS results for crime and social capital for municipalities with more than 30,000 inhabitants

	(1) 1st stage SC1	(2) 2SLS crime	(3) 1st stage SC2	(4) 2SLS crime	(5) 1st stage SC3	(6) 2SLS crime
density	-0.841	0.089	-0.511	0.167	-0.524	0.162
	(0.133)***	(0.086)	(0.111)***	(0.072)**	(0.098)***	(0.074)**
education	0.294	-0.013	0.314	0.003	0.230	-0.025
	(0.091)***	(0.048)	(0.077)***	(0.057)	(0.073)***	(0.053)
unemp	-0.085	-0.048	-0.129	-0.065	-0.059	-0.039
	(0.060)	(0.035)	(0.063)**	(0.036)*	(0.048)	(0.035)
young	0.134	0.128	0.279	0.182	0.167	0.149
	(0.127)	(0.089)	(0.099)***	(0.091)**	(0.093)*	(0.086)*
inequality	0.318	0.063	0.314	0.069	0.301	0.062
	(0.104)***	(0.061)	(0.099)***	(0.063)	(0.080)***	(0.062)
shop	0.024	0.148	0.121	0.180	0.030	0.146
	(0.095)	(0.051)***	(0.097)	(0.056)***	(0.076)	(0.053)***
recrat	-0.026	0.129	-0.001	0.135	0.045	0.149
	(0.111)	(0.056)**	(0.081)	(0.063)**	(0.072)	(0.061)**
cofshop	-0.330	0.179	-0.130	0.235	-0.188	0.217
	(0.097)***	(0.062)***	(0.077)*	(0.062)***	(0.064)***	(0.064)***
foreign1859	-0.366		-0.309		-0.237	
	(0.090)***		(0.085)***		(0.066)***	
protestant1859	0.315		0.321		0.396	
	(0.086)***		(0.087)***		(0.067)***	
#school1859	0.185		0.172		0.106	
	(0.093)**		(0.082)**		(0.079)	
SC1		-0.295				
		(0.076)***				
SC2				-0.328		
				(0.081)***		
SC3						-0.341
						(0.081)***
Constant	0.000	0.014	0.000	0.014	0.000	0.014
	(0.088)	(0.046)	(0.080)	(0.048)	(0.069)	(0.047)
n	142	142	142	142	142	142
Adj R sqr	0.66	0.68	0.53	0.64	0.61	0.66
R-squared	0.69		0.57		0.64	
F-test instrm.	16.18***		17.43***		25.16***	
overid		4.41 (0.11)		3.28 (0.19)		2.11 (0.34)

Dependent variable is the overall crime rate. All variables are standardized. Columns 1, 3 and 5 are the first stage results.
Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
F-test is a test of joint significance of the instruments.
overid is a test of over identification. Null hypothesis: Over-identifying restrictions are valid.

Table 7: Different social capital indicators in the 2SLS specification

	pop>40,000 (base)		pop>30,000 (base)		pop>40,000 (extended)		pop>30,000 (extended)	
	2SLS	F-test	2SLS	F-test	2SLS	F-test	2SLS	F-test
SC1	-0.323	20.75***	-0.321	28.92***	-0.288	17.73***	-0.295	16.18***
	(0.084)***		(0.074)***		(0.073)***		(0.076)***	
SC2	-0.409	19.11***	-0.375	27.61***	-0.340	17.55***	-0.328	17.43***
	(0.098)***		(0.083)***		(0.081)***		(0.081)***	
SC3	-0.453	22.32***	-0.393	32.54***	-0.383	20.88***	-0.341	25.16***
	(0.099)***		(0.081)***		(0.085)***		(0.081)***	
charity	-0.900	7.65***	-0.776	10.27***	-0.744	6.71***	-0.684	8.23***
	(0.224)***		(0.182)***		(0.197)***		(0.191)***	
blood	-1.166	4.25***	-1.375	3.52**	-0.878	3.42**	-0.821	3.03**
	(0.354)***		(0.451)***		(0.274)***		(0.263)***	
vote	-0.487	32.15***	-0.432	44.86***	-0.456	31.37***	-0.387	38.80***
	(0.133)***		(0.101)***		(0.122)***		(0.101)***	
foreign	0.591	12.50***	0.632	16.64***	0.524	7.89***	0.543	7.84***
	(0.216)***		(0.188)***		(0.204)**		(0.190)***	
divorce	0.576	9.35***	0.878	6.91***	0.486	6.07***	0.777	2.61*
	(0.208)***		(0.271)***		(0.214)**		(0.367)**	

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

All coefficients are obtained from the 2SLS model (equation 4) when it is estimated with different social capital indicators. For each subsample and model the first column presents the 2SLS coefficients for different social capital indicators. The second column presents the F-test.

More detailed results are available from the authors upon request.

Table 8: Different 2SLS specifications for crime and social capital

	SC1		SC2		SC3	
	(1) 1st stage SC	(2) 2SLS crime	(3) 1st stage SC	(4) 2SLS crime	(5) 1st stage SC	(6) 2SLS crime
foreign1859	-0.472	-0.145	-0.418	-0.164	-0.378	-0.182
	(0.098)***	(0.102)	(0.088)***	(0.115)	(0.075)***	(0.128)
F-test instrm.	23.01***		22.59***		25.26***	
protestant1859	0.450	-0.407	0.436	-0.419	0.481	-0.380
	(0.084)***	(0.102)***	(0.081)***	(0.112)***	(0.062)***	(0.093)***
F-test instrm.	28.63***		28.74***		60.40***	
#school1859	0.216	-0.467	0.207	-0.486	0.156	-0.646
	(0.099)**	(0.262)*	(0.089)**	(0.283)*	(0.086)*	(0.420)
F-test instrm.	4.76**		5.37**		3.30*	

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
All coefficients are obtained from the 2SLS model (equation 4) when it is estimated by including the instruments individually rather than as a group of three.
More detailed results are available from the authors upon request.

Table 9: Summary results for crime categories and indicators of social capital for municipalities with more than 30,000 inhabitants

n=142	charity	blood	vote	trust	trustplc	foreign	divorce	movers	SC	SC1	SC2
expected sign	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(-)	(-)
crime	***	**	***	*	***	***	**	***	***	***	***
homicide	*	**	*		*		**		**	*	**
assault	***	***	***	***	***	***	***	**	***	***	***
rape	***		***	***		***	***	**	***	***	***
robbery	***		***	**	**	***	**	*	***	***	***
theft	***	***	***		**	***			***	***	***
autotheft		***	***		*	***	*	**	***	***	***
burglary	***		**		**	***			***	***	***
drug	**	***	***		**	***	*	**	***	***	***

The significance levels derive from estimation of the extended model (equation 3) for each crime category and each social capital indicator.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 10: Alternative specifications to explain crime differentials

		SC1	SC2	SC3	foreign_1859	prot_1859	educ_1859	foreign	divorce
Original coefficients of	(1) OLS	-0.260	-0.240	-0.286					
OLS and 2SLS		(0.047)***	(0.049)***	(0.055)***					
estimations	(2) 2SLS	-0.295	-0.328	-0.341					
		(0.076)***	(0.081)***	(0.081)***					
When divorce and	(3) OLS			-0.144				0.400	-0.029
foreign are included				(0.064)**				(0.105)***	(0.095)
as independent	(4) 2SLS			-0.227				0.345	-0.066
variables				(0.121)*				(0.134)***	(0.096)
When historical	(5) OLS	-0.249			-0.081	-0.092	-0.029		
variables are		(0.055)***			(0.058)	(0.051)*	(0.054)		
included as	(6) OLS		-0.213		-0.056	-0.102	-0.039		
independent variables			(0.057)***		(0.057)	(0.052)*	(0.056)		
	(7) OLS			-0.263	-0.053	-0.067	-0.047		
				(0.067)***	(0.056)	(0.055)	(0.056)		
When the most influential	(8) OLS	-0.239	-0.229	-0.269					
observation is removed		(0.045)***	(0.047)***	(0.053)***					
(according to Cook's D)	(9) 2SLS	-0.299	-0.336	-0.349					
		(0.076)***	(0.080)***	(0.080)***					
When the first five most	(10) OLS	-0.240	-0.223	-0.263					
influential observations		(0.043)***	(0.045)***	(0.050)***					
are removed	(11) 2SLS	-0.288	-0.329	-0.339					
(according to Cook's D)		(0.072)***	(0.078)***	(0.078)***					
When the most influential	(12) OLS	-0.240	-0.220	-0.268					
observation is removed		(0.044)***	(0.045)***	(0.053)***					
(according to DFBetas)	(13) 2SLS	-0.300	-0.333	-0.348					
		(0.075)***	(0.079)***	(0.079)***					
When the first five most	(14) OLS	-0.236	-0.220	-0.275					
influential observations		(0.043)***	(0.043)***	(0.047)***					
are removed	(15) 2SLS	-0.324	-0.358	-0.377					
(according to DFBetas)		(0.081)***	(0.085)***	(0.082)***					

The significance levels derive from the estimations of different specifications of the extended model (equation 3). Dependent variable is the overall crime rate.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

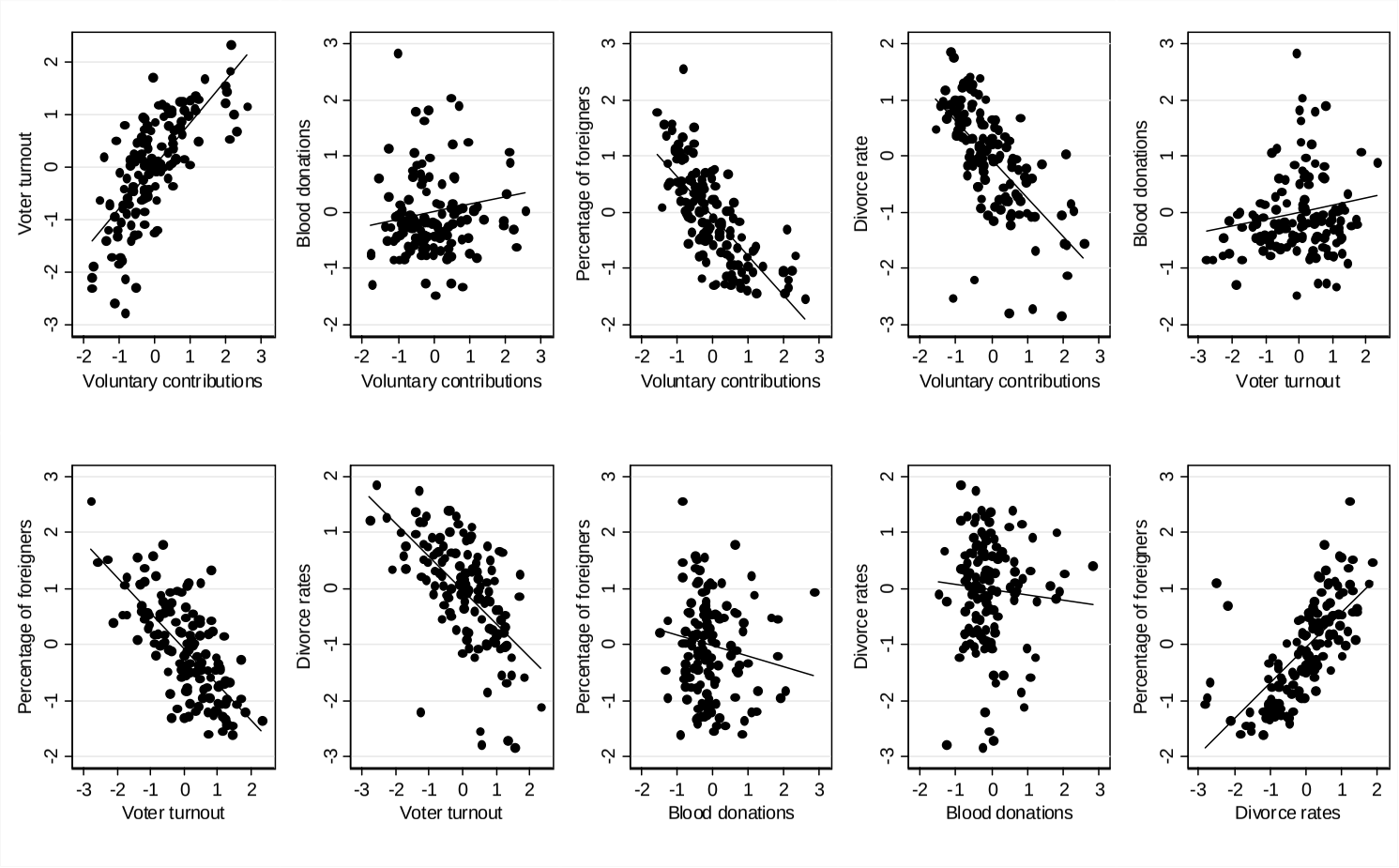


Figure 1: Scatterplots of social capital indicators for 142 municipalities with more than 30,000 inhabitants

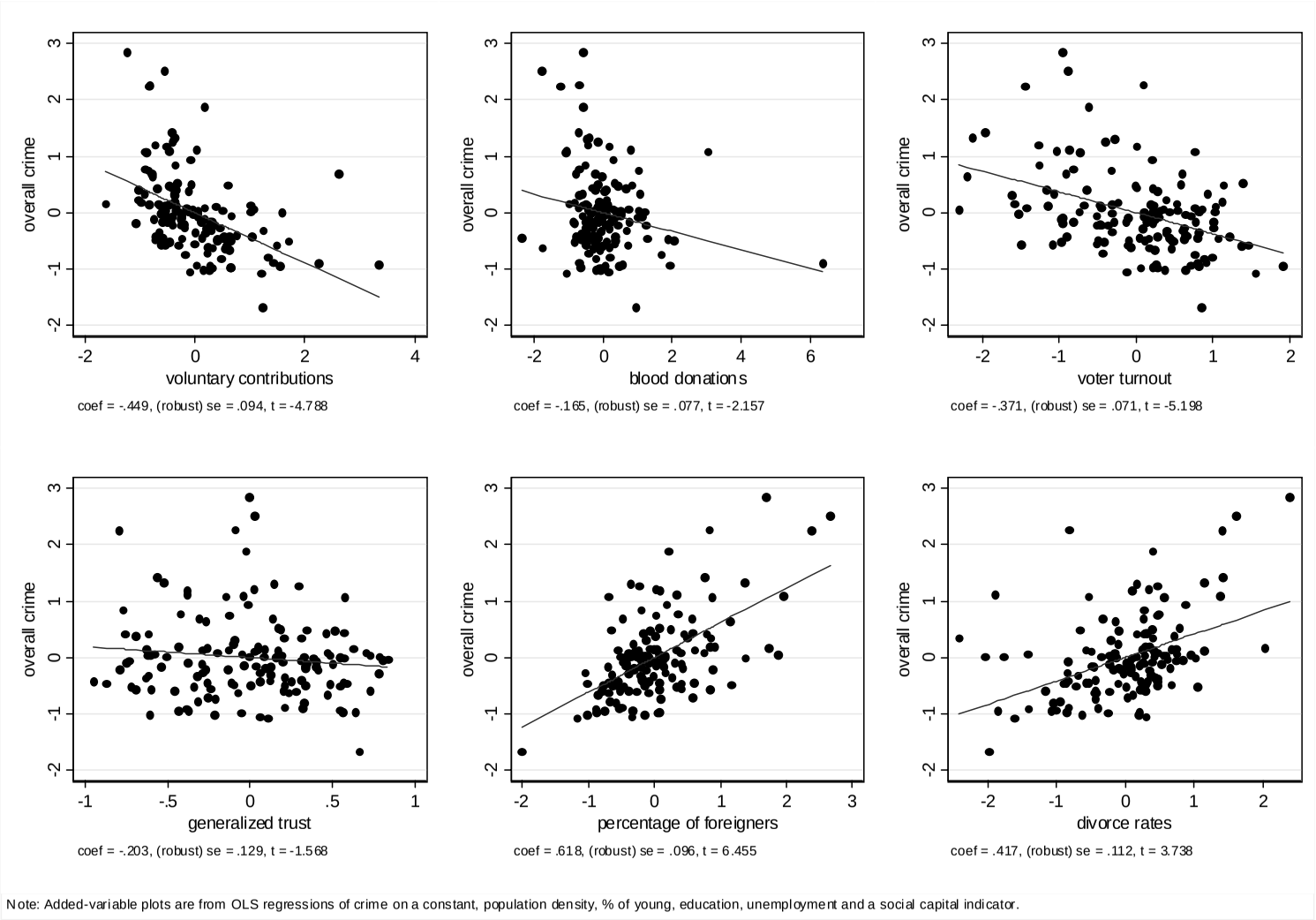


Figure 2: Overall crime and social capital indicators for 142 municipalities with more than 30,000 inhabitants

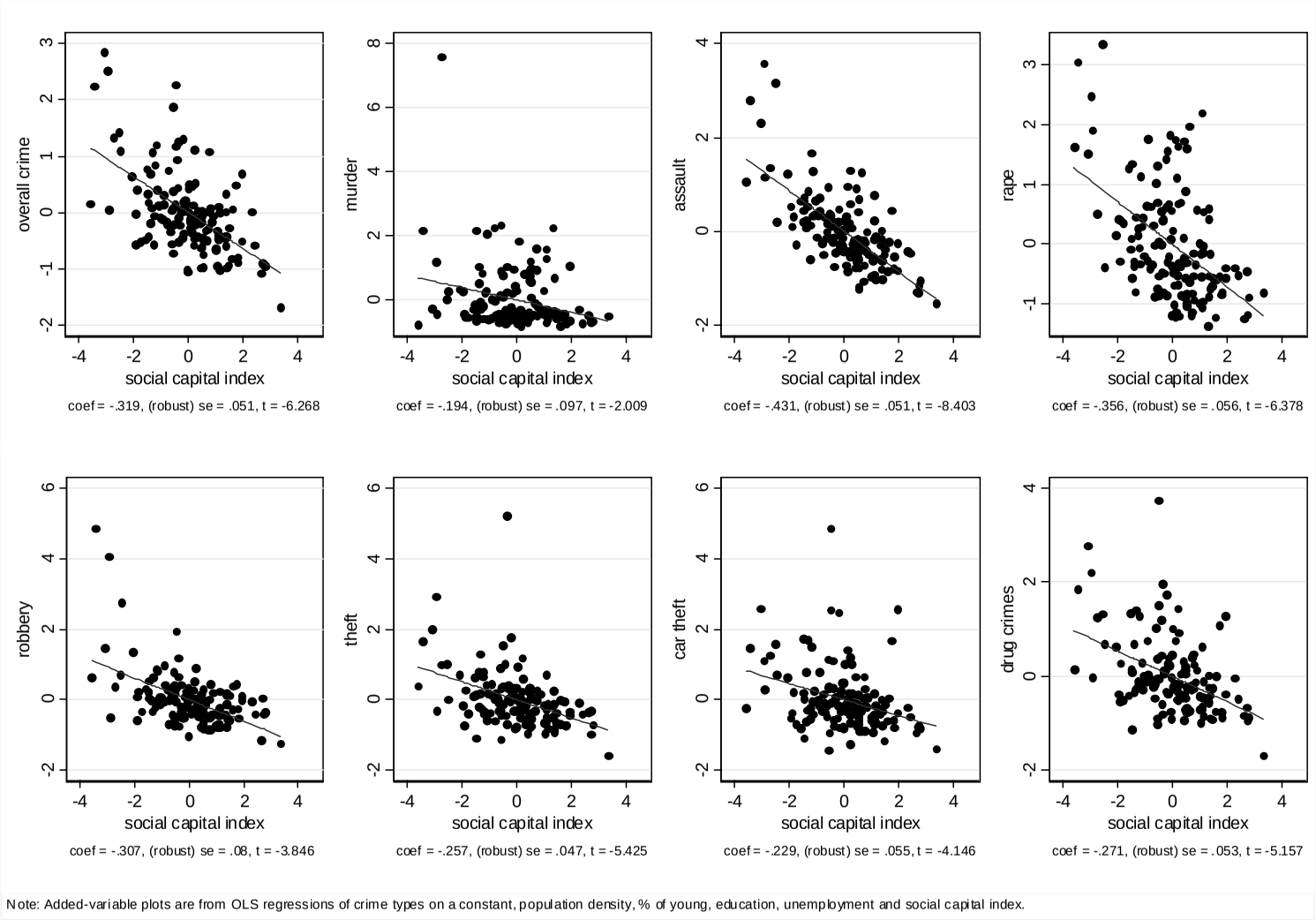


Figure 3: Crime categories and social capital for 142 municipalities with more than 30,000 inhabitants

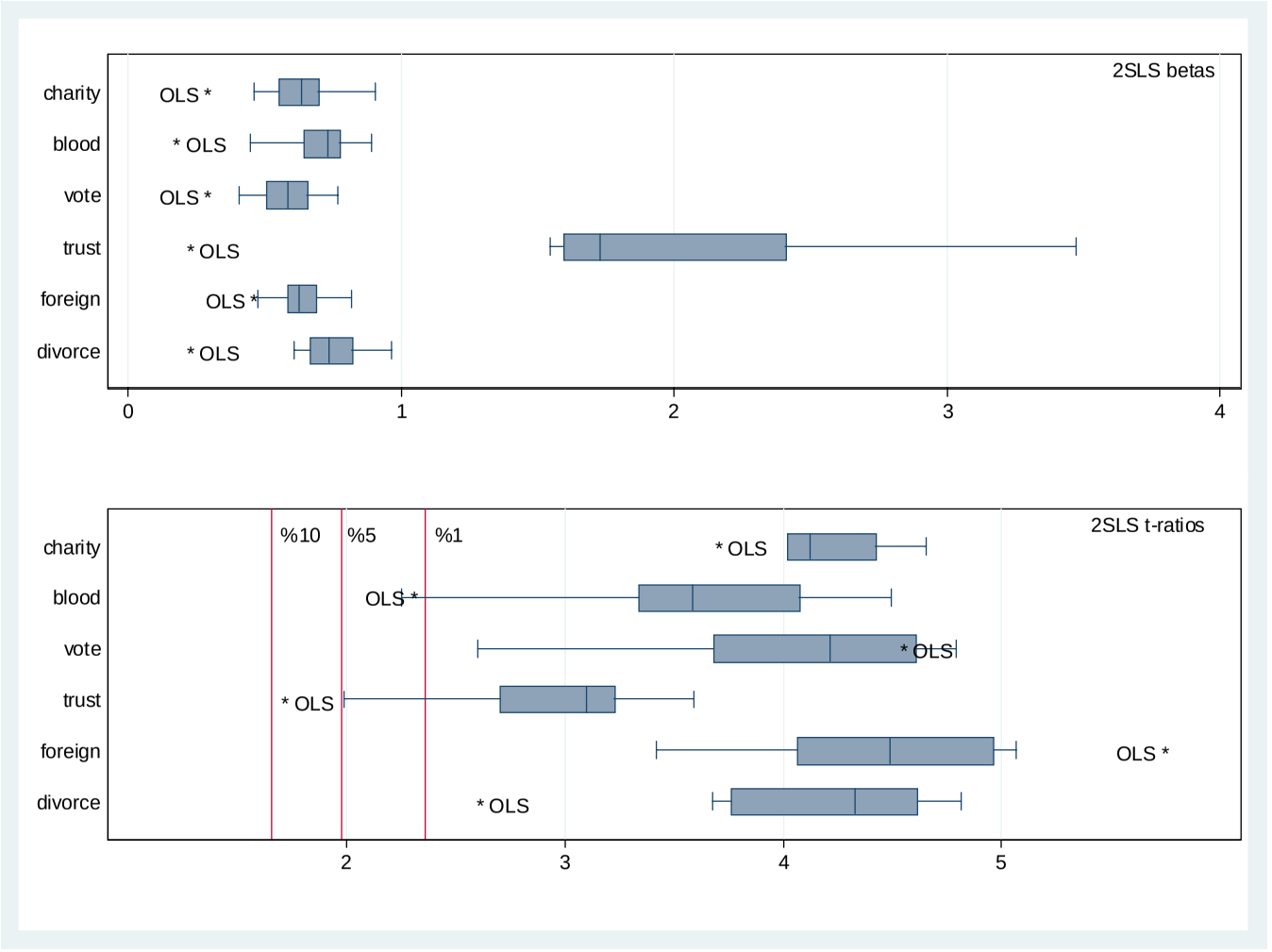


Figure 4: Distribution of 2SLS coefficients and t-ratios extracted from the robustness check

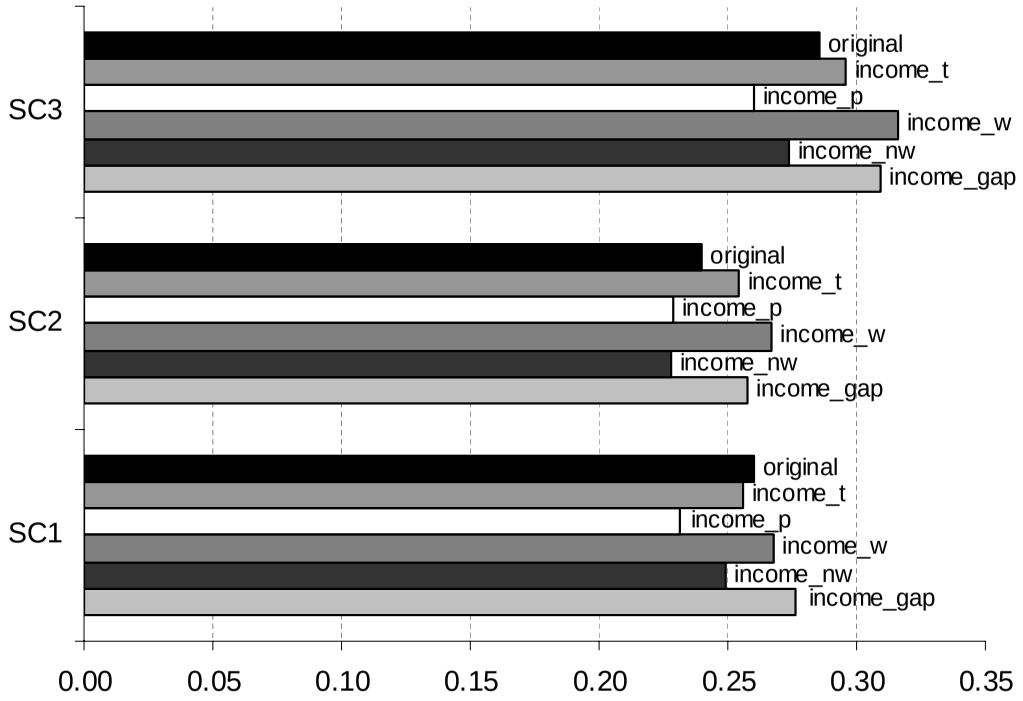


Figure 5: Standardized coefficients of SC when controlled for different indicators of income

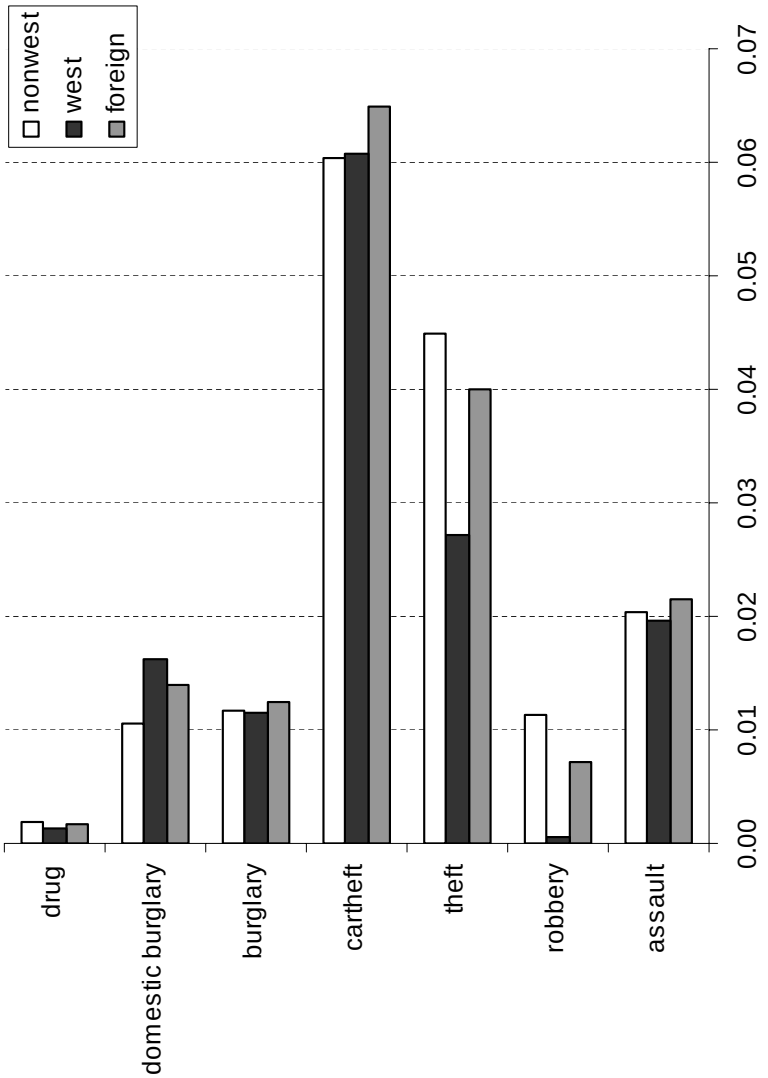


Figure 6: Origin of foreigners and differences in crime rates

A Details on Variable Definitions and Data Sources

A.1 Variable definitions

Table A1.1: Variable definitions and sources

Variable	Definition
young	Percentage of people aged 15-24 in 2001. Source: Centraal Bureau voor de Statistiek (CBS).
density	Log of population density in 2001. Source: CBS.
unemp	Youth unemployment defined as a percentage of people who are under age 30 and unemployed in 2001. Source: CBS
education	Percentage of people with medium and high levels of education in 2001. Source: CBS.
inequality	Income inequality defined as the difference between the 80th and 20th percentile of the income distribution in 2001. Source: CBS.
recrat	Percentage of total area devoted to recreation in 2001. Source: CBS.
shop	Percentage of total area devoted to shopping in 2001. Source: CBS.
cofshop	Number of coffeeshops per 10,000 inhabitants in 2002. Source for the absolute figures: (Bieleman and Nayer, 2005).
charity	Voluntary contributions per household in Euros. Average of six years from 2000-2005. Source: Centraal Bureau Fondsenwerving. See Appendix 1.2 for details.
blood	Blood donations per 100 inhabitants in 2005. Source: See Appendix 1.2 for details.
vote	Voter turnout in the election of the lower house (Tweede Kamer) in 2003. Source: CBS.
trust	Trust indicator calculated as the average of three indicators: *ppltrst*, *help* and *fair*. See Appendix 1.1 for details. Source: European Social Survey (ESS) 2002 and 2004 rounds.
ppltrust	Generalized trust indicator constructed from the answers to the question "Most people can be trusted or you cannot be too careful". See Appendix 1.2 for details. Source: ESS 2002 and 2004 rounds.
help	Social capital indicator obtained from the question "Most of the time people are helpful or mostly looking out for themselves". See Appendix 1.2 for details. Source: ESS 2002 and 2004 rounds.
fair	Social capital indicator obtained form the question "Most people try to take advantage of you, or try to be fair". See Appendix 1.2 for details. Source: ESS 2002 and 2004 round
trustplc	Confidence in police. See Appendix 1.2 for details. Source: ESS 2002 and 2004 rounds.
SC1	First principal component of six social capital indicators: *charity*, *blood*, *vote*, *trust*, $foreign$ and *divorce*. See Appendix 1.2 for details.

Note: If otherwise indicated all variables are averages of years 2000, 2001 and 2002.

Variable	Definition
SC2	First principal component of four social capital indicators: *charity*, *blood*, *vote* and *trust*. See Appendix 1.2 for details.
SC3	First principal component of three social capital indicators: *charity*, *blood* and *vote*. See Appendix 1.2 for details.
divorce	Percentage of divorces in the total population. Source: CBS.
immig	Immigration as a percentage of the total population. Source: CBS.
emmig	Emigration as a percentage of the total population. Source: CBS.
movers	Sum of immigration and emigration as a percentage of the total population. Source: CBS.
foreign	Percentage of foreigners in the total population. Source: CBS.
foreign1859	Percentage of foreigners in the total population in 1859. See Appendix 1.3 for details. Source: Volkstellingen Archief.
protestant1859	Percentage of Protestants in the total population in 1859. See Appendix 1.3 for details. Source: Volkstellingen Archief.
#school1859	Number of schools per 100 inhabitants in 1859. See Appendix 1.3 for details. Source: Volkstellingen Archief.
crime	Crime rates including all recorded crimes in 2002. See Appendix 1.4 for detailed information on crime data and how crime categories are formed.
homicide	Homicide per 100 inhabitants in 2002.
assault	Assault per 100 inhabitants in 2002.
rape	Rape per 100 inhabitants in 2002.
robbery	Robbery per 100 inhabitants in 2002.
theft	Theft per 100 inhabitants in 2002.
autotheft	Motor vehicle theft per 100 inhabitants in 2002.
burglary	Burglary per 100 inhabitants in 2002.
domestic burglary	Domestic burglary per 100 inhabitants in 2002.
drug	Crime related to hard drugs per 100 inhabitants in 2002.

Note: If otherwise indicated all variables are averages of years 2000, 2001 and 2002.

A.2 Social capital indicators

We have benefited from four social capital indicators. First, we used voluntary contributions per household as an indicator of altruism. The data is available from Centraal Bureau Fondsenwerving via [http://www.cbf.nl//Database_goede_doelen/2_Collectegegevens_Gemeenten.php] at the municipality level from 2000 to 2005. However in order to minimize the risk of high variability from year to year and because of missing values for some municipalities for different years we took the average of the available data for each municipality.

Second, as a measure of civic participation we used the voter turnout of the elections for the Lower House (Tweede Kamer) in 2003. This data is available at the municipality level via Centraal Bureau voor de Statistiek (CBS) website at [http://www.cbs.nl/nl-NL/menu/cijfers/statline/toegang/default.htm] and is calculated as the number of votes divided by the number of inhabitants eligible to vote multiplied by 100.

Our next indicator, blood donations, could also be viewed as an indicator of altruism. We collected data number of blood donations at the municipality level. The data is recorded under two different headings: blood donations to blood centers and hospitals, and blood donations to the mobile centers. Not every municipality in the Netherlands has a blood bank and/or a hospital and some of these municipalities are frequently visited by mobile services. However there are some municipalities that do not have blood centers and have not been visited by mobile blood centers. Therefore, we have made the following correction. If there is no record for a municipality we assume that the inhabitants of the municipality donate blood in the closest municipality in the neighborhood. However, in all cases there is more than one neighbor municipality in which the inhabitants can possibly donate blood. In such cases we divided the population of that municipality by the number of neighbors and recorded the inhabitants of that municipality to other neighbor municipalities as if they reside there. Once we have replicated this for all the municipalities that we do not have a record for, we end up with a base population for all the municipalities in our data set. Then we divide the number of blood donations by the base population to calculate the blood donations per 100 inhabitants for each municipality. Finally, for all the municipalities that we do not have a record for, we took the average of the neighbor municipalities. Among 63 municipalities with a population over 50,000 only 5 are subject to such a correction and among 142 municipalities that has a population over 30,000, 31 are subject to this correction. For NUTS 3 aggregation there is no significant difference between the corrected and non-corrected blood donation data suggested by the simple correlation coefficient of 0.89 (significant at the 1 percent level). However for reasons of symmetry with our analysis at the municipality level we have aggregated the corrected blood donations data at the municipality level to 40 NUTS3 regions and proceed employing this measure.

Fourth, we used a set of indicators from the European Social Surveys (ESS), carried out in 2002 and 2004. In order to maximize the number of individual data we merged the first and the second rounds of the data set for Netherlands. The data is available for 40 NUTS 3 regions. We aggregated the data on individuals (2,364 individuals in the first round and 1,881 individuals in the second round, a total of 4,245 data points) to 40 regions. The raw data is adjusted by population weights to reduce the problems that may arise due to oversampling. The questions that we base our indicators on and the answer categories to these questions are exactly the same in both rounds. We used an equal weighted average to construct a trust index *(trust)* from three questions. First, people trust *(ppltrst)* is a generalized trust indicator obtained from the answers to the question "Most people can be trusted or you cannot be too careful". The answer category ranges from (0) "you can't be too careful" to (10) "most people can be trusted", with nine levels in between. The mean (s.e.) for this indicator is 5.75 (2.09) for n=4,243. Second, people help *(help)* is constructed from the question "Most of the time people are helpful or mostly looking out for themselves". The answer category ranges from (0)

"people mostly look out for themselves" to (10) "people mostly try to be helpful", with nine levels in between. The mean (s.e.) for this indicator is 5.30 (1.97) for n=4,242. Third, people fair *(fair)* is an indicator obtained from the question "Most people try to take advantage of you, or try to be fair". The answer category ranges from (0) "most people would try to take advantage of me" to (10) "most people would try to be fair", with nine levels in between. The mean (s.e.) for this indicator is 6.20 (1.85) for n=4,233. The mean (s.e.) for the trust index is 5.75 (1.58) for n=4,229. We also used the question on confidence to police *(trustplc)* for robustness reasons. The question is "How much you personally trust in police". The answer category ranges from (0) "no trust at all" to (10) "complete trust". The mean (s.e.) for this indicator is 5.89 (1.94) for n=4,213. One particular weakness of these measures is that they are observed at the regional level and when conducting the analysis at the municipality level these indicators have the same number for all the municipalities belonging to the same NUTS3 definition.

In addition to these four indicators, we also used two other indicators − the percentage of divorces and the percentage of foreigners in the total population − as they display high and significant correlations with the above four indicators. Out of these seemingly unrelated indicators we have constructed several social capital indices by using principal component analysis (PCA). We first included 6 indicators, *charity*, *blood*, *vote*, *trust*, $foreign$ and *divorce*, to form an all inclusive measure and labeled it as $SC1$. Then we included only four social capital indicators, excluding *divorce* and $foreign$ and form $SC2$ defined as the first principal component of *charity*, *blood*, *vote* and *trust*. Finally we constructed a third index out of three indicators, *charity*, *blood* and *vote*, and labeled it $SC3$. The reason for this is that *trust* is measured at the regional level as discussed above and especially in the analysis at the municipality level this might result in measurement error.

To check the robustness of our indices we constructed all possible combinations of these indices by interchanging between indicators. For instance, we can use *ppltrust*, *help*, $fair$ separately instead of *trust* or we can use *immig* instead of $foreign$. All constructed indices behave in a similar way. We also did not include similar indicators in content (for instance, including *ppltrust*, *help* or *trustplc* at the same time) because PCA tends to give similar weights to these indicators and the resulting index becomes very powerful (i.e., the probability of obtaining a significant coefficient for the social capital index in regressions increases considerably).

Table A1.2 below displays information on the principal component loadings of the first principal component and the explained variance for each social capital index for different samples. As visible from the table the indicators have positive loadings. On the contrary indicators that are associated with the absence of social capital have negative loadings as expected. The PCA tends to put more (and similar in terms of quantity) weight on *charity*, *vote*, $foreign$ and *divorce* and less weight one *blood* and *trust*. One reason for this is that *blood* and *trust* involve data corrections and interpolations. This can be easily seen from the table. For instance loadings to *blood* decrease considerably in all three social capital indices as we move to the right of the table (i.e., the number of corrected/interpolated data points increase as the sample size increases from 40 NUTS3 regions with no data corrections to 142 municipalities with some data corrections, which seems to reduce the robustness of the indicator). After all this can be viewed as a positive outcome and it helps to produce a social capital indicator by specifically placing less weight on some indicators. All indices are expected to display a negative relationship with crime.

Table A1.2: Principal component loadings for the first component and the explained variance

	NUTS3 regions			muncp. pop>50,000			muncp. pop>40,000			muncp. pop>30,000		
	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
charity	0.42	0.49	0.58	0.48	0.55	0.63	0.47	0.55	0.66	0.49	0.59	0.69
blood	0.32	0.46	0.50	0.25	0.40	0.46	0.17	0.34	0.36	0.10	0.25	0.22
vote	0.47	0.58	0.65	0.47	0.57	0.63	0.48	0.58	0.66	0.49	0.63	0.69
trust	0.28	0.46		0.30	0.47		0.31	0.50		0.21	0.44	
foreign	-0.48			-0.47			-0.48			-0.50		
divorce	-0.44			-0.41			-0.43			-0.47		
explained variance	0.56	0.57	0.65	0.55	0.56	0.63	0.55	0.55	0.60	0.54	0.49	0.58
n	40	40	40	63	63	63	95	95	95	142	142	142

A.3 Crime data

Crime data is available at the municipality level at http://www.ad.nl/misdaadmeter/. We collected data on 27 different types of crime. However, due to well-known problems with the data for certain crime types (under-reporting and reliability), we construct different subgroups according to he 2006 European Sourcebook of Crime and Criminal Justice. All crime numbers are calculated as per 100 inhabitants. Throughout our investigation we employ the following subcategories.

Table A1.3.1: Definitions of subgroups of crime

Indicator	Definition
crime	Crime rates including all 27 categories.
homicide	Homicide.
rape	Rape.
assault	It is defined as the activity of intentionally causing bodily injury to another person. We include sexual assault, threatening, armed-attack, mis-treat and act on person, and mugging.
theft	Includes auto theft, motor/scooter theft, theft from any kind of business (office, shop, school, sport complex), and pickpocketing.
autotheft	Theft of a motor vehicle excluding handling/receiving stolen vehicles. We include auto theft, motor/scooter theft, theft of motor vehicles.
robbery	The general definition is stealing from a person with force or threat. This includes robbery and mugging.
burglary	Includes theft from any kind of business.
domestic burglary	Domestic burglary is defined as gaining access to private premises with the intent to steal goods. This subcategory excludes theft from a business.
drug	Hard-drug trading. We did not include soft-drug trading as soft-drugs use (not trading) is legal in the Netherlands. This may affect the figures for soft-drugs related crime and its reporting.

Table A1.3.2: Distribution of criminal activity for different samples

	large city	pop>50,000	pop>40,000	pop>30,000
crime	52.57	70.41	77.04	83.19
homicide	50.84	66.48	74.30	84.36
rape	49.44	67.89	75.09	81.35
assault	51.91	70.86	77.50	83.49
robbery	76.82	90.13	93.26	94.97
theft	54.30	71.37	77.93	83.98
autotheft	55.99	71.30	77.82	83.85
burglary	43.58	64.21	72.16	79.17
domestic burglary	45.13	64.13	71.49	78.49
drug	75.98	84.69	87.26	90.19
n	22	63	95	142

A.4 Historical data

The major source of the historical data we used is the Volkstellingen Archief (Dutch census), which is an invaluable data source comprising basic population and household data starting from 1795 onwards. We collected information for 1859 which was the first round presenting data at the municipality level. This year has a particular municipality definition presenting data on about 1,200 local area units. Therefore, we had to come up with a correspondence table matching the local area names in 1859 to current municipality definitions. In doing this we benefited from (*i*) information on the historical evolution of the municipality definitions, (*ii*) correspondence tables linking each current local area unit (about 6,000 places regardless of size that are smaller than a municipality) in the Netherlands to a municipality definition in 2002, and (*iii*) historical maps as we encountered problems in matching about 10 local area units to a municipality. The main reason for this is that the statistics were recorded in historical names that do not necessarily exist anymore in the current correspondence tables. For these local area units we use historical maps and match the historical local area name to a current local area name and then to a corresponding municipality. Information on the first two is available from Statistics Netherlands (CBS).

First, we have collected data on the percentage of foreigners in a local area unit in 1859. We define *foreign1859* as the number of foreigners per inhabitant multiplied by 100. Then we gathered information on the percentage of Protestants in a municipality in 1859. The names and the data availability for different Churches and Protestant groups (most of which are smaller denominations and most of the time constitute less than 0.01 percent of the total population) differ in great extent from the current classifications. Therefore, we summed up all inhabitants belonging to a Protestant denomination, divided by the total number of inhabitants living in the municipality and multiplied by 100 to arrive at our indicator *protestant1859*. Finally, we gathered data on the number of houses and schools per local area unit in 1859. We define *#school1859* as the number of schools per 100 inhabitants and view it as a proxy to education in 1859. One particular problem with the historical data is that some current municipalities were gained from the North Sea: Noordoostpolder in 1944, Oostelijk Flevoland in 1957 and Zuidelijk Flevoland in 1966. Obviously, we do not have information for these regions before these dates, and we used figures from the 1971 census as a substitute for earlier years. Only four municipalities are subject to this correction are, Almere (code 476), Dronten (381), Lelystad (439), and Noordoostpolder (411).

Table A1.4: Social capital and historical data for municipalities with more than 30,000 inhabitants

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
14	113	Groningen	1.82	10.74	81.40	5.90	2.24	80.79	0.0371
18	113	Hoogezand-Sappemeer	4.05	1.68	77.20	5.90	1.66	84.12	0.0960
34	230	Almere	2.76	1.83	76.20	5.66	3.76	43.79	0.0555
37	111	Stadskanaal	7.98	2.98	78.80	5.83	7.62	82.67	0.0222
74	123	Heerenveen	9.45	4.80	80.70	6.03	0.62	94.25	0.0650
80	121	Leeuwarden	5.87	5.74	80.50	5.93	1.56	76.81	0.0355
90	123	Smallingerland	8.58	5.89	84.00	6.03	0.08	99.77	0.0484
91	122	Sneek	7.89	6.11	80.80	5.83	0.79	81.99	0.0707
106	131	Assen	5.58	2.55	82.50	5.46	2.24	88.74	0.0374
109	132	Coevorden	8.12	2.63	83.70	5.51	7.37	83.07	0.1799
114	132	Emmen	5.81	2.41	78.60	5.51	5.97	88.11	0.1572
118	133	Hoogeveen	8.92	2.83	81.20	6.09	0.99	96.06	0.0333
119	133	Meppel	8.20	3.73	83.80	6.09	0.74	92.18	0.0877
141	213	Almelo	6.53	2.35	77.60	5.64	2.85	78.53	0.0401
150	212	Deventer	5.43	5.43	80.60	6.11	1.32	71.71	0.0302
153	213	Enschede	4.62	4.50	76.60	5.64	3.73	67.78	0.0850
160	211	Hardenberg	10.24	2.86	86.40	5.98	6.03	85.75	0.1354
163	213	Hellendoorn	12.77	3.24	87.10	5.64	0.88	69.14	0.1473
164	213	Hengelo (Overijssel)	4.74	5.70	82.60	5.64	2.20	52.51	0.1024
166	211	Kampen	12.62	2.46	86.10	5.98	1.75	80.46	0.0739
171	230	Noordoostpolder	13.43	2.18	85.10	5.66	3.76	43.79	0.0667
173	213	Oldenzaal	7.11	2.66	84.90	5.64	4.64	14.17	0.0619
177	212	Raalte	14.60	2.74	85.80	6.11	0.47	32.01	0.0404
178	213	Rijssen	13.12	4.18	91.20	5.64	0.36	85.65	0.0325
181	211	Steenwijk	8.70	2.40	84.50	5.98	0.37	89.00	0.1057
186	213	Vriezenveen	19.06	4.08	83.80	5.64	1.41	93.27	0.0162
193	211	Zwolle	12.98	14.41	82.90	5.98	1.54	72.34	0.0501
200	221	Apeldoorn	4.47	3.95	80.90	5.94	0.85	85.60	0.0707
202	223	Arnhem	2.21	1.87	75.00	6.09	4.53	54.32	0.0281
203	221	Barneveld	13.09	4.51	88.90	5.94	0.50	88.47	0.1825

Table A1.4: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
206	223	Bemmel	8.00	2.35	82.50	6.09	2.18	9.99	0.0720
222	222	Doetinchem	6.90	2.92	80.80	6.20	2.13	60.15	0.0945
228	221	Ede	7.87	1.79	85.50	5.94	0.31	98.12	0.0416
232	221	Epe	13.70	1.66	83.60	5.94	0.26	84.94	0.0567
240	222	Groenlo	10.19	1.33	82.70	6.20	3.19	16.90	0.0788
243	221	Harderwijk	8.75	2.44	83.40	5.94	5.50	85.49	0.0611
262	222	Lochem	9.52	1.46	86.40	6.20	0.62	96.94	0.1674
267	221	Nijkerk	9.90	2.71	85.60	5.94	0.29	85.06	0.0364
268	223	Nijmegen	2.32	4.61	77.30	6.09	4.60	27.76	0.0139
274	223	Renkum	5.25	1.41	84.80	6.09	1.55	77.45	0.0726
275	223	Rheden	5.98	3.78	83.70	6.09	1.57	80.16	0.0730
281	224	Tiel	5.36	1.59	77.80	5.64	1.56	67.65	0.0481
289	221	Wageningen	5.63	0.57	84.20	5.94	1.93	77.14	0.0756
296	223	Wijchen	5.14	1.95	83.10	6.09	0.90	5.31	0.0706
299	223	Zevenaar	8.17	3.78	81.10	6.09	4.44	9.49	0.0823
301	222	Zutphen	5.21	3.52	81.70	6.20	2.36	78.10	0.0511
303	230	Dronten	7.60	1.62	84.10	5.66	3.76	43.79	0.0625
307	310	Amersfoort	4.47	3.78	81.70	5.84	1.32	47.05	0.0200
310	310	De Bilt	6.17	2.35	88.30	5.84	0.44	82.81	0.0000
321	310	Houten	7.03	2.10	86.00	5.84	0.45	26.09	0.0000
333	310	Maarssen	7.55	1.29	81.80	5.84	1.07	65.35	0.0748
342	310	Soest	6.37	1.42	84.40	5.84	0.77	35.74	0.0000
344	310	Utrecht	1.41	3.73	77.60	5.84	1.92	59.05	0.0108
345	310	Veenendaal	7.87	1.38	85.20	5.84	0.56	91.92	0.0000
353	310	IJsselstein	8.24	2.71	81.30	5.84	0.83	42.38	0.0615
355	310	Zeist	5.55	2.38	82.50	5.84	5.34	74.74	0.0646
356	310	Nieuwegein	5.32	1.82	79.40	5.84	0.68	52.21	0.0295
361	322	Alkmaar	5.36	3.69	78.60	6.01	1.24	57.07	0.0506
362	326	Amstelveen	3.66	2.06	84.20	5.75	1.66	54.80	0.0325
363	326	Amsterdam	0.88	0.54	71.80	5.75	3.14	67.20	0.0089

Table A1.4: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
373	322	Bergen (Noord-Holland)	8.90	0.47	85.50	6.01	0.22	40.58	0.0394
375	323	Beverwijk	3.91	2.25	77.80	5.94	1.15	37.80	0.1119
381	327	Bussum	5.38	1.92	83.80	6.18	0.48	10.85	0.0000
383	323	Castricum	10.82	2.50	88.20	5.94	0.41	33.40	0.1366
392	324	Haarlem	4.48	2.23	78.40	5.79	1.89	59.88	0.0361
394	326	Haarlemmermeer	5.58	1.88	82.60	5.75	1.82	66.95	0.0276
396	323	Heemskerk	7.89	2.84	80.80	5.94	0.00	18.24	0.0861
398	322	Heerhugowaard	7.07	3.54	80.40	6.01	0.11	54.19	0.0000
400	321	Den Helder	4.25	2.64	74.00	5.85	2.96	73.07	0.0065
402	327	Hilversum	4.64	2.39	81.60	6.18	0.64	35.06	0.0172
405	321	Hoorn	4.83	4.13	79.80	5.85	1.25	55.54	0.0399
406	327	Huizen	6.68	2.23	85.90	6.18	0.04	99.02	0.0000
439	326	Purmerend	3.50	2.79	77.20	5.75	1.50	72.41	0.0924
453	323	Velsen	6.92	1.94	80.10	5.94	1.98	38.69	0.0000
479	325	Zaanstad	6.36	1.66	78.80	6.04	0.47	82.03	0.0358
484	334	Alphen aan den Rijn	6.50	0.21	80.10	5.91	0.63	74.32	0.0440
489	335	Barendrecht	7.59	1.40	85.20	5.30	0.18	98.61	0.0449
502	335	Capelle aan den IJssel	3.61	2.21	78.60	5.30	0.00	94.67	0.0627
503	333	Delft	4.10	3.09	81.10	5.70	3.10	58.10	0.0000
505	336	Dordrecht	3.01	2.00	75.00	5.70	1.31	86.81	0.0038
512	336	Gorinchem	5.70	3.32	78.00	5.70	1.79	71.99	0.0439
513	334	Gouda	5.27	4.15	82.60	5.91	1.06	65.48	0.0269
518	332	The Hague	0.73	1.46	70.80	5.68	3.06	65.20	0.0099
530	335	Hellevoetsluis	3.85	1.40	76.40	5.30	3.85	90.78	0.0150
537	331	Katwijk	8.03	4.72	82.10	6.15	0.40	90.61	0.0569
546	331	Leiden	3.17	7.44	80.00	6.15	1.33	73.03	0.0218
548	332	Leidschendam-Voorburg	2.94	2.59	82.80	5.68	1.35	34.43	0.0338
556	335	Maassluis	7.66	2.29	80.60	5.30	0.33	87.97	0.0552
590	336	Papendrecht	5.71	2.00	82.90	5.70	0.38	99.01	0.0000
594	332	Pijnacker-Nootdorp	9.98	2.76	86.70	5.68	1.24	55.31	0.0000

Table A1.4: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
597	335	Ridderkerk	5.72	1.40	82.10	5.30	0.12	98.99	0.0000
599	335	Rotterdam	0.73	1.40	69.90	5.30	2.84	68.62	0.0101
603	332	Rijswijk (Zuid-Holland)	3.83	2.38	79.50	5.68	2.09	50.49	0.0000
606	335	Schiedam	2.01	2.29	74.00	5.30	1.74	55.62	0.0060
612	335	Spijkenisse	3.33	2.91	75.60	5.30	0.05	98.57	0.0000
622	335	Vlaardingen	2.30	3.17	77.10	5.30	0.44	83.15	0.0120
632	310	Woerden	8.55	2.78	86.20	5.84	0.73	61.90	0.0231
637	332	Zoetermeer	4.57	2.44	80.90	5.68	0.72	56.00	0.0000
642	336	Zwijndrecht	6.38	2.00	80.90	5.70	0.27	97.66	0.0209
664	342	Goes	6.44	1.55	80.10	5.41	1.03	83.37	0.0526
687	342	Middelburg	6.96	1.55	82.30	5.41	0.93	88.20	0.0215
715	341	Terneuzen	6.27	2.41	74.70	5.97	8.64	53.64	0.0207
718	342	Vlissingen	4.24	1.55	75.40	5.41	3.64	76.75	0.0246
736	310	De Ronde Venen	9.94	2.77	85.40	5.84	1.27	41.95	0.0000
737	121	Tytsjerksteradiel	17.91	1.17	87.10	5.93	0.11	99.70	0.0286
748	411	Bergen op Zoom	6.55	2.97	75.00	5.51	2.53	18.59	0.0000
758	411	Breda	3.34	2.00	75.70	5.51	5.06	11.82	0.0098
762	414	Deurne	6.48	1.95	80.40	5.74	0.25	1.65	0.0446
772	414	Eindhoven	4.49	2.53	74.50	5.74	2.04	1.41	0.0402
777	411	Etten-Leur	5.44	2.00	76.60	5.51	0.94	6.03	0.0355
779	411	Geertruidenberg-Drimmelen	6.63	2.32	81.00	5.51	0.70	25.52	0.0372
794	414	Helmond	2.52	2.26	72.60	5.74	2.64	2.88	0.0469
796	413	's-Hertogenbosch	3.49	2.36	76.90	5.82	2.50	13.71	0.0301
797	413	Heusden	5.43	1.94	80.90	5.82	0.56	16.95	0.0166
824	412	Oisterwijk-Hilvarenbeek	5.39	2.45	84.75	5.72	1.50	4.27	0.0147
826	411	Oosterhout	4.36	2.21	78.80	5.51	1.47	4.00	0.0000
828	413	Oss	4.20	2.25	78.40	5.82	0.66	1.53	0.0811
855	412	Tilburg-Goirle	3.67	2.45	70.70	5.72	1.37	1.06	0.0153
856	413	Uden	5.74	1.96	79.90	5.82	0.40	0.02	0.0543
858	414	Valkenswaard	5.15	3.85	81.20	5.74	2.29	1.41	0.0487
860	413	Veghel	6.02	4.34	81.30	5.82	0.44	2.53	0.0609
861	414	Veldhoven	4.15	2.53	80.60	5.74	1.04	2.15	0.0000

Table A1.4: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
867	412	Waalwijk	5.37	2.43	78.30	5.72	0.59	37.17	0.0083
882	423	Landgraaf	3.26	1.26	72.60	5.34	8.44	0.03	0.0531
902	422	Echt-Susteren	5.16	2.15	77.60	5.43	5.22	0.32	0.0133
917	423	Heerlen	2.75	1.26	68.60	5.34	4.47	1.06	0.0166
928	423	Kerkrade	3.73	1.26	67.70	5.34	12.94	0.11	0.0000
935	423	Maastricht	3.15	2.62	72.00	5.34	8.37	11.41	0.0153
957	422	Roermond	4.69	1.92	70.00	5.43	7.42	3.32	0.0379
983	421	Venlo	3.46	2.69	72.30	5.97	6.61	4.01	0.0318
984	421	Venray	5.68	1.65	77.90	5.97	2.59	0.06	0.1019
988	422	Weert	4.59	1.74	76.40	5.43	3.30	0.39	0.0502
995	230	Lelystad	3.02	1.92	74.40	5.66	3.76	43.79	0.0468
1674	411	Roosendaal	5.40	2.56	75.50	5.51	4.35	2.04	0.0000
1676	342	Schouwen-Duiveland	9.00	2.51	85.00	5.41	0.60	91.13	0.0427
1699	131	Noordenveld	7.30	2.16	85.70	5.46	1.37	83.83	0.1195
1709	411	Moerdijk	7.50	2.00	79.50	5.51	0.57	47.05	0.0283
1730	131	Tynaarlo	9.40	1.94	86.30	5.46	0.58	98.42	0.0751
1731	131	Midden-Drenthe	8.80	1.89	86.20	5.46	0.76	97.00	0.0588
1734	223	Overbetuwe	7.90	0.57	83.00	6.09	0.88	39.68	0.0851
1735	213	Hof van Twente	12.50	2.29	87.60	5.64	0.95	67.96	0.0899
1883	423	Sittard-Geleen	4.80	2.37	74.60	5.34	5.17	1.59	0.0608

The figures for municipalities of Flevoland- Almere (34), Noordoostpolder (171), Dronten (303) and Leystad (995) are for 1971 as these lands were gained from the land and did not exist in 1859. *charity*: voluntary contributions per household in euros. *blood*: blood donations per 100 inhabitants. *vote*: voter turnout in lower house (tweede kamer) elections 2003 in percentages. *trust*: trust index sourced from the individual level data ESS. *foreign1859*: percentage of foreigners in total population in 1859. *protestant1859*: percentage of protestants in total population in 1859. *#school1859*: number of school per 100 inhabitants in 1859.

B Results for municipalities larger than 40,000 inhabitants

The results below are replications of the analysis, tables and graphs for 95 municipalities with more than 40,000 inhabitants (except for Table 5). We provide these results and the results in the following appendices for robustness reasons to show that our findings prevail for different samples of municipalities and different regional definitions.

Table A2.1: Summary statistics (n=95)

Variable	Mean	Std. Dev.	Min	Max
density	1626.83	1278.82	96.00	5511.00
charity	5.39	2.57	0.73	13.43
blood	2.84	1.89	0.21	14.41
vote	79.31	4.56	67.70	88.90
divorce	5.75	1.64	0.64	9.96
trust	5.76	0.25	5.30	6.20
ppltrust	5.77	0.30	5.13	6.32
help	5.30	0.28	4.79	5.91
fair	6.22	0.27	5.75	6.76
trustplc	5.89	0.20	5.23	6.41
foreign	18.42	7.37	5.76	45.39
immig	0.76	0.36	0.17	1.96
emmig	0.40	0.22	0.14	1.31
movers	1.16	0.53	0.38	3.27
SC1	0.00	1.82	-4.97	4.32
SC2	0.00	1.47	-3.36	4.55
SC3	0.00	1.33	-2.83	4.65
protestant1859	54.77	32.07	0.02	99.77
foreign1859	2.27	2.20	0.00	12.94
#school1859	0.04	0.04	0.00	0.18
crime	5.66	2.64	1.65	14.53
homicide	0.00	0.00	0.00	0.02
assault	0.66	0.32	0.21	2.01
rape	0.01	0.01	0.00	0.04
robbery	0.08	0.09	0.00	0.55
theft	1.41	0.67	0.39	4.30
autotheft	1.66	1.12	0.20	7.64
burglary	0.62	0.24	0.18	1.29
domestic burglary	0.52	0.22	0.05	1.09
drug	0.02	0.03	0.00	0.18
young	19.43	3.20	9.96	32.47
inequality	0.82	0.41	0.23	2.12
unemp	1.88	2.70	0.00	16.84
education	52.44	7.46	34.76	71.34
cofshop	0.44	0.49	0.00	3.67
shop	23.59	6.60	8.73	43.23
recrat	27.09	7.43	13.67	56.93

Table A2.2: Correlations among social capital indicators for municipalities with more than 40,000 inhabitants

(n=95)	charity	blood	vote	trust	ppltrust	help	fair	trustplc	foreign	divorce	immig	emmig	movers
charity	1.00												
blood	0.20	1.00											
vote	0.67	0.22	1.00										
trust	0.38	0.32	0.48	1.00									
ppltrust	0.32	0.31	0.48	0.90	1.00								
help	0.18	0.22	0.33	0.83	0.62	1.00							
fair	0.47	0.28	0.44	0.88	0.72	0.60	1.00						
trustplc	0.26	0.28	0.25	0.62	0.62	0.44	0.54	1.00					
foreign	-0.73	-0.17	-0.70	-0.34	-0.31	-0.15	-0.16	-0.41	1.00				
divorce	-0.62	-0.04	-0.61	-0.22	-0.22	-0.18	-0.07	-0.29	0.72	1.00			
immig	-0.47	0.07	-0.37	-0.08	-0.05	0.15	-0.04	-0.11	0.66	0.55	1.00		
emmig	-0.47	-0.04	-0.44	-0.25	-0.20	0.05	-0.19	-0.27	0.58	0.31	0.68	1.00	
movers	-0.51	0.04	-0.43	-0.16	-0.12	0.12	-0.10	-0.19	0.68	0.50	0.95	0.87	1.00

Table A2.3: OLS results for crime and alternative indicators for social capital for municipalities with more than 40,000 inhabitants (base)

	(1) charity	(2) blood	(3) vote	(4) trust	(5) trustplc	(6) foreign	(7) divorce	(8) movers	(9) SC1	(10) SC2	(11) SC3
density	0.172	0.403	0.349	0.398	0.406	0.145	0.287	0.346	0.187	0.286	0.251
	(0.075)**	(0.069)***	(0.067)***	(0.070)***	(0.071)***	(0.076)*	(0.080)***	(0.064)***	(0.075)**	(0.070)***	(0.072)***
education	-0.200	-0.347	-0.185	-0.316	-0.340	-0.134	-0.308	-0.265	-0.136	-0.179	-0.160
	(0.076)**	(0.082)***	(0.079)**	(0.084)***	(0.084)***	(0.074)*	(0.080)***	(0.080)***	(0.080)*	(0.081)**	(0.078)**
unemp	-0.026	0.006	-0.022	-0.022	-0.013	-0.002	-0.011	0.037	-0.058	-0.062	-0.039
	(0.040)	(0.065)	(0.044)	(0.064)	(0.064)	(0.040)	(0.047)	(0.049)	(0.044)	(0.047)	(0.041)
young	0.241	0.272	0.234	0.225	0.204	0.244	0.115	0.152	0.258	0.310	0.302
	(0.076)***	(0.107)**	(0.094)**	(0.089)**	(0.084)**	(0.092)***	(0.118)	(0.091)*	(0.100)**	(0.094)***	(0.095)***
SC	-0.460	-0.175	-0.308	-0.343	-0.446	0.523	0.296	0.299	-0.27	-0.257	-0.317
	(0.080)***	(0.077)**	(0.075)***	(0.182)*	(0.269)	(0.095)***	(0.114)**	(0.090)***	(0.050)***	(0.052)***	(0.058)***
constant	0.022	0.022	0.022	0.054	0.065	0.022	0.022	0.022	0.022	0.022	0.022
	(0.060)	(0.068)	(0.065)	(0.071)	(0.075)	(0.059)	(0.065)	(0.064)	(0.059)	(0.062)	(0.061)
n	95	95	95	95	95	95	95	95	95	95	95
R-squared	0.66	0.57	0.61	0.56	0.57	0.68	0.60	0.62	0.68	0.64	0.66
Adj R sqr	0.65	0.55	0.59	0.54	0.54	0.66	0.58	0.59	0.66	0.62	0.64

Dependent variable is the overall crime rate. All variables are standardized.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A2.4: OLS results for crime and alternative indicators for social capital for municipalities with more than 40,000 inhabitants (extended)

	(1) charity	(2) blood	(3) vote	(4) trust	(5) trustplc	(6) foreign	(7) divorce	(8) movers	(9) SC1	(10) SC2	(11) SC3
density	0.118	0.33	0.266	0.311	0.324	0.113	0.267	0.31	0.131	0.201	0.179
	(0.071)	(0.066)***	(0.070)***	(0.070)***	(0.070)***	(0.073)	(0.080)***	(0.068)***	(0.073)*	(0.070)***	(0.071)**
education	-0.154	-0.256	-0.161	-0.227	-0.235	-0.126	-0.266	-0.235	-0.127	-0.137	-0.135
	(0.064)**	(0.067)***	(0.065)**	(0.069)***	(0.067)***	(0.066)*	(0.068)***	(0.067)***	(0.069)*	(0.068)**	(0.065)**
unemp	-0.036	-0.016	-0.029	-0.048	-0.050	-0.014	-0.014	0.017	-0.064	-0.074	-0.047
	(0.038)	(0.033)	(0.040)	(0.039)	(0.038)	(0.046)	(0.034)	(0.034)	(0.050)	(0.044)*	(0.043)
young	0.124	0.143	0.133	0.101	0.066	0.139	0.023	0.059	0.155	0.193	0.19
	(0.085)	(0.112)	(0.108)	(0.099)	(0.088)	(0.102)	(0.118)	(0.101)	(0.112)	(0.105)*	(0.107)*
inequality	0.037	-0.033	0.138	0.022	-0.019	0.043	0.013	0.001	0.094	0.088	0.092
	(0.065)	(0.074)	(0.074)*	(0.068)	(0.068)	(0.066)	(0.072)	(0.073)	(0.067)	(0.066)	(0.068)
shop	0.136	0.143	0.139	0.147	0.126	0.141	0.098	0.115	0.141	0.164	0.151
	(0.059)**	(0.069)**	(0.061)**	(0.068)**	(0.072)*	(0.061)**	(0.068)	(0.071)	(0.055)**	(0.057)***	(0.057)***
recrat	0.129	0.159	0.142	0.149	0.184	0.149	0.155	0.121	0.149	0.146	0.142
	(0.060)**	(0.067)**	(0.062)**	(0.065)**	(0.060)***	(0.054)***	(0.061)**	(0.067)*	(0.052)***	(0.056)**	(0.055)**
cofshop	0.197	0.197	0.210	0.237	0.243	0.106	0.173	0.164	0.150	0.203	0.184
	(0.069)***	(0.077)**	(0.079)***	(0.082)***	(0.073)***	-0.064	(0.077)**	(0.090)*	(0.065)**	(0.070)***	(0.068)***
SC	-0.421	-0.190	-0.316	-0.420	-0.677	0.471	0.210	0.195	-0.255	-0.257	-0.305
	(0.079)***	(0.076)**	(0.079)***	(0.171)**	(0.272)**	(0.093)***	(0.111)*	(0.081)**	(0.047)***	(0.049)***	(0.055)***
Constant	0.022	0.022	0.022	0.061	0.088	0.022	0.022	0.022	0.022	0.022	0.022
	(0.054)	(0.061)	(0.059)	(0.064)	(0.067)	(0.055)	(0.061)	(0.061)	(0.054)	(0.055)	(0.055)
n	95	95	95	95	95	95	95	95	95	95	95
R-squared	0.74	0.67	0.69	0.66	0.68	0.73	0.67	0.67	0.74	0.73	0.73
Adj R sqr	0.71	0.64	0.66	0.63	0.65	0.70	0.63	0.63	0.71	0.70	0.71

Dependent variable is the overall crime rate. All variables are standardized

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A2.5: 2SLS results for crime and social capital for municipalities with more than 40,000 inhabitants

	(1) 1st stage SC1	(2) 2SLS crime	(3) 1st stage SC2	(4) 2SLS crime	(5) 1st stage SC3	(6) 2SLS crime
density	-0.690	0.104	-0.439	0.155	-0.447	0.138
	(0.146)***	(0.086)	(0.125)***	(0.078)**	(0.116)***	(0.084)*
education	0.493	-0.108	0.447	-0.093	0.372	-0.099
	(0.134)***	(0.075)	(0.128)***	(0.078)	(0.101)***	(0.072)
unemp	-0.210	-0.073	-0.260	-0.100	-0.132	-0.060
	(0.143)	(0.057)	(0.101)**	(0.055)*	(0.088)	(0.050)
young	0.180	0.168	0.328	0.238	0.244	0.225
	(0.163)	(0.110)	(0.117)***	(0.107)**	(0.118)**	(0.107)**
inequality	0.293	0.108	0.301	0.119	0.276	0.118
	(0.124)**	(0.066)	(0.100)***	(0.069)*	(0.090)***	(0.066)*
shop	0.057	0.144	0.163	0.177	0.108	0.159
	(0.120)	(0.052)***	(0.105)	(0.056)***	(0.090)	(0.055)***
recrat	0.166	0.150	0.149	0.146	0.128	0.141
	(0.139)	(0.048)***	(0.109)	(0.052)***	(0.090)	(0.052)***
cofshop	-0.219	0.140	-0.037	0.195	-0.098	0.173
	(0.146)	(0.062)**	(0.110)	(0.064)***	(0.096)	(0.061)***
foreign1859	-0.442		-0.320		-0.250	
	(0.105)***		(0.116)***		(0.085)***	
protestant1859	0.263		0.343		0.365	
	(0.114)**		(0.105)***		(0.082)***	
#school1859	0.432		0.350		0.289	
	(0.109)***		(0.103)***		(0.081)***	
SC1		-0.288				
		(0.073)***				
SC2				-0.340		
				(0.081)***		
SC3						-0.383
						(0.085)***
Constant	0.000	0.022	0.000	0.022	0.000	0.022
	(0.109)	(0.051)	(0.099)	(0.053)	(0.086)	(0.052)
n	95	95	95	95	95	95
Adj R sqr	0.66	0.71	0.57	0.69	0.60	0.70
R-squared	0.70		0.62		0.65	
F-test instrm.	17.73		17.55		20.88	
overid		5.20 (0.07)*		2.44 (0.30)		1.95 (0.38)

Dependent variable is the overall crime rate. All variables are standardized. Columns 1, 3 and 5 are the first stage results.
Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
F-test is a test of joint significance of the instruments.
overid is a test of over identification. Null hypothesis: Over-identifying restrictions are valid.

Table A2.6: Different 2SLS specifications for crime and social capital

	SC1		SC2		SC3	
	(1) 1st stage SC	(2) 2SLS crime	(3) 1st stage SC	(4) 2SLS crime	(5) 1st stage SC	(6) 2SLS crime
foreign1859	-0.547	-0.163	-0.450	-0.198	-0.385	-0.232
	(0.117)***	(0.086)*	(0.119)***	(0.105)*	(0.095)***	(0.116)**
F-test instrm.	21.69***		14.28***		16.28***	
protestant1859	0.505	-0.443	0.528	-0.423	0.513	-0.436
	(0.116)***	(0.108)***	(0.097)***	(0.105)***	(0.077)***	(0.102)***
F-test instrm.	18.96***		29.15***		43.58***	
#school1859	0.526	-0.317	0.465	-0.359	0.407	-0.410
	(0.104)***	(0.104)***	(0.098)***	(0.131)***	(0.079)***	(0.148)***
F-test instrm.	25.38***		22.48***		26.35***	

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
All coefficients are obtained from the 2SLS model (equation 4) when it is estimated by including instruments individually. rather than as a group of three. F-test stands for the significance of the instrument in the first stage.
Detailed results are available from the authors upon request.

Table A2.7: Summary results for crime categories and indicators of social capital for municipalities with more than 40,000 inhabitants

n=**95**	charity	blood	vote	trust	trustplc	foreign	divorce	movers	SC	SC1	SC2
expected sign	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(-)	(-)
crime	***	**	***	**	**	***	*	**	***	***	***
homicide							**				
assault	***	***	***	***	***	***	***	*	***	***	***
rape	**		**	***		***	***	**	***	***	**
robbery	**		**	**	**	***	**	**	***	***	**
theft	***	**	***		*	***			***	***	***
autotheft	***	***	***		*	***			***	***	***
burglary	***				*	*			**	*	**
domestic burglary	***			**		***		***	***	***	***
drug	***	***	***	*	**	***		*	***	***	***

The significance levels derive from estimation of the extended model for each crime category and varying social capital indicators. See Table 8.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

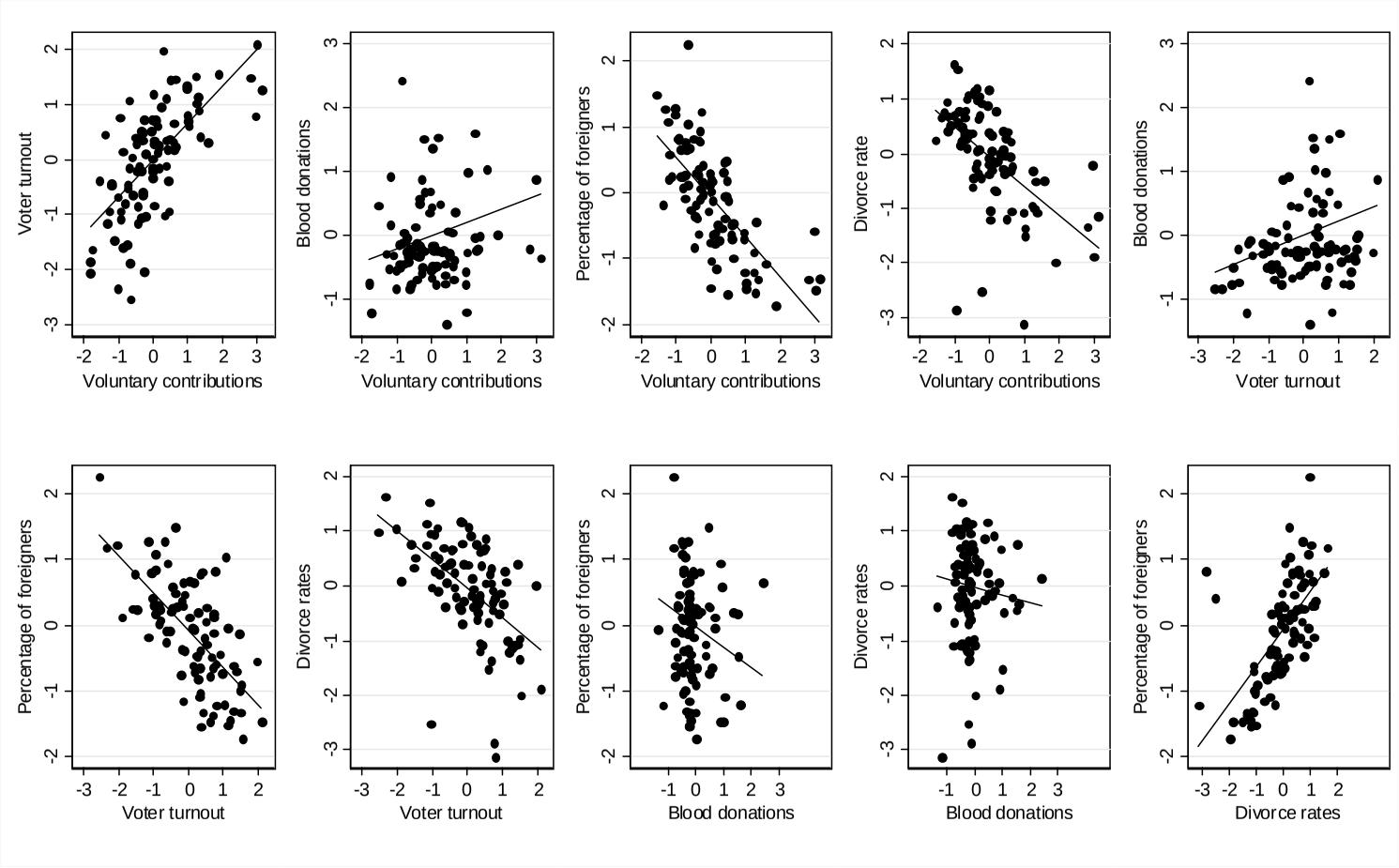


Figure 7: Scatterplots of social capital indicators for 95 municipalities with more than 40,000 inhabitants

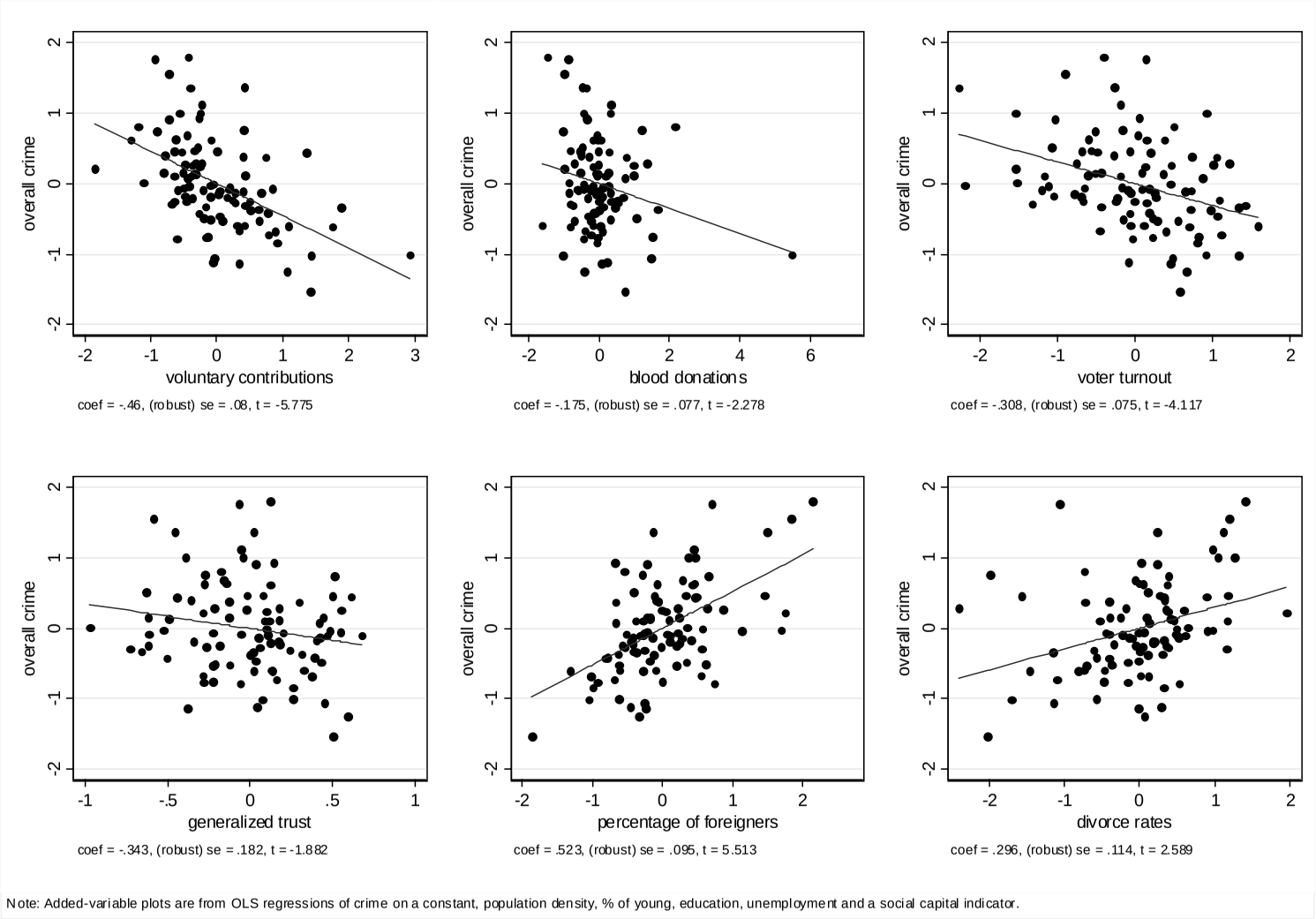


Figure 8: Overall crime and social capital indicators for 95 municipalities with more than 40,000 inhabitants

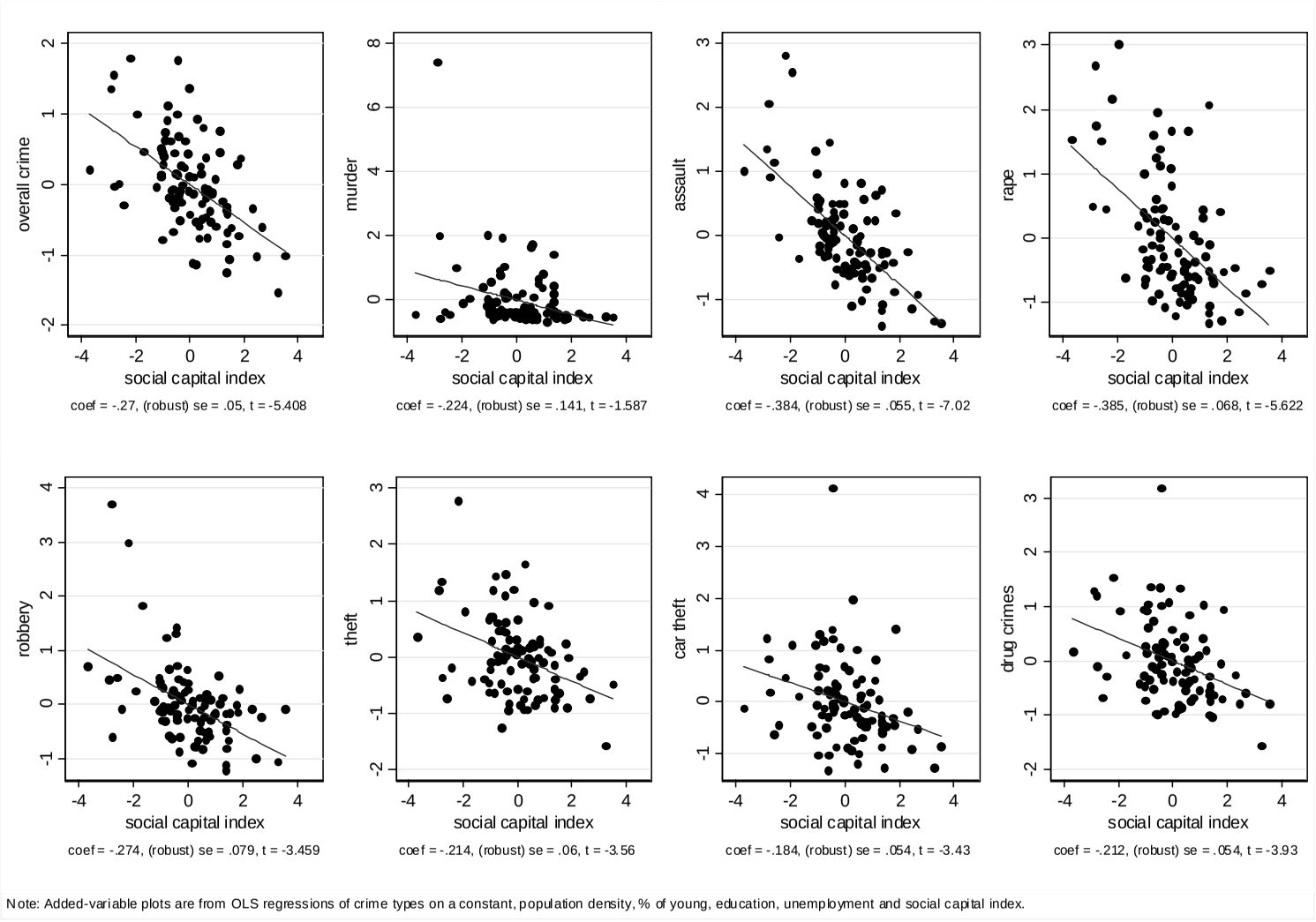


Figure 9: Crime categories and social capital for 95 municipalities with more than 40,000 inhabitants

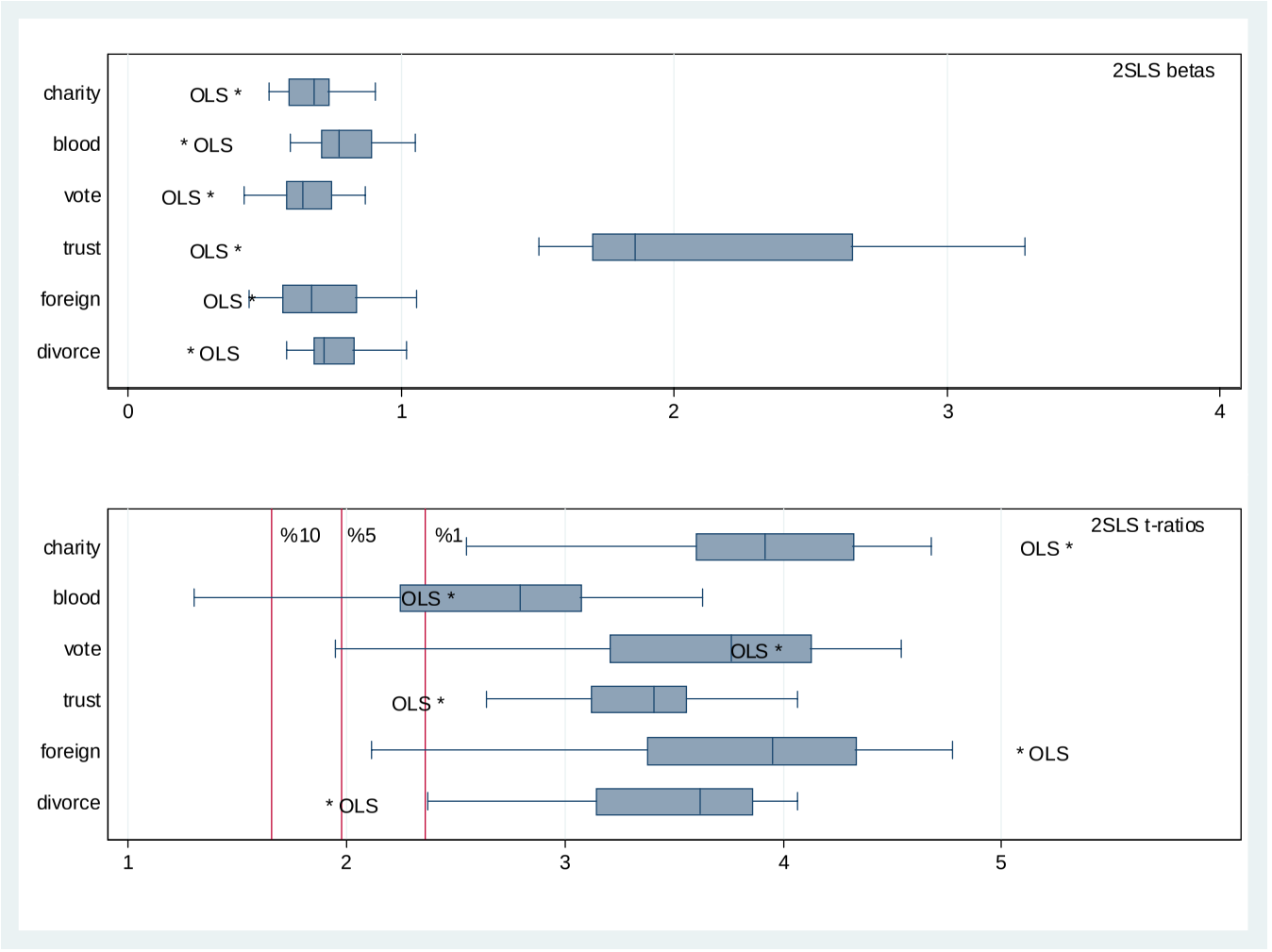


Figure 10: Distribution of 2SLS coefficients and t-ratios extracted from the robustness check

C Results for municipalities larger than 50,000 inhabitants

The results below are replications in a similar manner for 63 municipalities with more than 50,000 inhabitants. Since we have only 63 observations, we did not replicate the results for the extended model and the 2SLS results. The coefficients for different social capital indicators deriving from the extended model are summarized in Table 5.

Table A3.1: Summary statistics (n=63)

Variable	Mean	Std. Dev.	Min	Max
density	1901.88	1373.94	183.00	5511.00
charity	4.76	2.49	0.73	13.09
blood	3.11	2.19	0.21	14.41
vote	78.35	4.32	68.60	88.90
divorce	6.08	1.61	1.06	9.96
trust	5.76	0.25	5.30	6.20
ppltrust	5.76	0.30	5.13	6.32
help	5.31	0.28	4.79	5.91
fair	6.21	0.27	5.75	6.76
trustplc	5.89	0.20	5.23	6.41
foreign	20.44	7.14	5.76	45.39
immig	0.86	0.37	0.34	1.96
emmig	0.44	0.22	0.18	1.31
movers	1.30	0.55	0.54	3.27
SC1	0.00	1.81	-4.65	4.87
SC2	0.00	1.49	-3.19	4.88
SC3	0.00	1.37	-2.60	5.09
protestant1859	55.42	30.36	1.06	99.77
foreign1859	2.43	1.96	0.00	8.64
#school1859	0.04	0.04	0.00	0.18
crime	6.36	2.82	1.65	14.53
homicide	0.00	0.00	0.00	0.01
assault	0.75	0.33	0.21	2.01
rape	0.01	0.01	0.00	0.04
robbery	0.11	0.10	0.01	0.55
theft	1.61	0.69	0.39	4.30
autotheft	1.88	1.26	0.20	7.64
burglary	0.67	0.24	0.22	1.29
domestic burglary	0.56	0.23	0.05	1.09
drug	0.02	0.04	0.00	0.18
young	20.10	3.40	9.96	32.47
inequality	0.72	0.36	0.23	1.92
unemp	1.86	2.18	0.00	8.53
education	53.78	7.32	37.72	71.34
cofshop	0.52	0.54	0.00	3.67
shop	25.30	5.81	14.94	43.23
recrat	26.73	6.65	13.67	41.58

Table A3.2: Correlations among social capital indicators

(n=63)	charity	blood	vote	trust	ppltrust	help	fair	trustplc	foreign	divorce	immig	emmig	movers
charity	1.00												
blood	0.32	1.00											
vote	0.66	0.33	1.00										
trust	0.38	0.30	0.45	1.00									
ppltrust	0.29	0.32	0.40	0.88	1.00								
help	0.22	0.15	0.34	0.82	0.56	1.00							
fair	0.47	0.28	0.42	0.88	0.70	0.58	1.00						
trustplc	0.25	0.25	0.21	0.56	0.57	0.41	0.46	1.00					
foreign	-0.74	-0.28	-0.63	-0.31	-0.22	-0.17	-0.42	-0.06	1.00				
divorce	-0.59	-0.12	-0.61	-0.15	-0.10	-0.05	-0.24	-0.11	0.65	1.00			
immig	-0.47	-0.01	-0.31	-0.04	0.03	-0.03	-0.10	0.22	0.66	0.47	1.00		
emmig	-0.39	-0.05	-0.29	-0.20	-0.10	-0.17	-0.23	0.16	0.45	0.17	0.77	1.00	
movers	-0.47	-0.03	-0.32	-0.11	-0.02	-0.09	-0.16	0.20	0.61	0.38	0.97	0.91	1.00

Table A3.3: OLS results for crime and alternative indicators for social capital (base model)

	(1) charity	(2) blood	(3) vote	(4) trust	(5) trustplc	(6) foreign	(7) divorce	(8) movers	(9) SC1	(10) SC2	(11) SC3
density	0.220	0.389	0.350	0.378	0.394	0.208	0.337	0.355	0.208	0.278	0.278
	(0.076)***	(0.074)***	(0.069)***	(0.081)***	(0.081)***	(0.079)**	(0.092)***	(0.069)***	(0.083)**	(0.077)***	(0.072)***
education	-0.288	-0.416	-0.256	-0.412	-0.434	-0.252	-0.396	-0.394	-0.201	-0.245	-0.239
	(0.098)***	(0.095)***	(0.100)**	(0.099)***	(0.097)***	(0.093)***	(0.099)***	(0.093)***	(0.096)**	(0.094)**	(0.094)**
unemp	-0.040	0.004	-0.071	-0.027	-0.004	-0.049	-0.029	0.024	-0.116	-0.098	-0.071
	(0.068)	(0.075)	(0.070)	(0.086)	(0.081)	(0.066)	(0.075)	(0.072)	(0.064)*	(0.071)	(0.064)
young	0.242	0.292	0.271	0.250	0.226	0.256	0.168	0.169	0.294	0.344	0.326
	(0.085)***	(0.122)**	(0.104)**	(0.098)**	(0.094)**	(0.098)**	(0.118)	(0.096)*	(0.111)**	(0.102)***	(0.106)***
SC	-0.373	-0.162	-0.288	-0.363	-0.363	0.386	0.167	0.223	-0.237	-0.24	-0.266
	(0.082)***	(0.077)**	(0.081)***	(0.265)	(0.360)	(0.095)***	(0.134)	(0.071)***	(0.050)***	(0.050)***	(0.056)***
Constant	0.034	0.034	0.034	0.077	0.078	0.034	0.034	0.034	0.034	0.034	0.034
	(0.069)	(0.076)	(0.073)	(0.079)	(0.088)	(0.070)	(0.076)	(0.073)	(0.068)	(0.070)	(0.069)
Observations	63	63	63	63	63	63	63	63	63	63	63
R-squared	0.70	0.65	0.67	0.64	0.64	0.70	0.64	0.67	0.71	0.70	0.71
Adj R sqr	0.68	0.62	0.65	0.60	0.60	0.67	0.61	0.64	0.69	0.67	0.68

Dependent variable is the overall crime rate. All variables are standardized.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

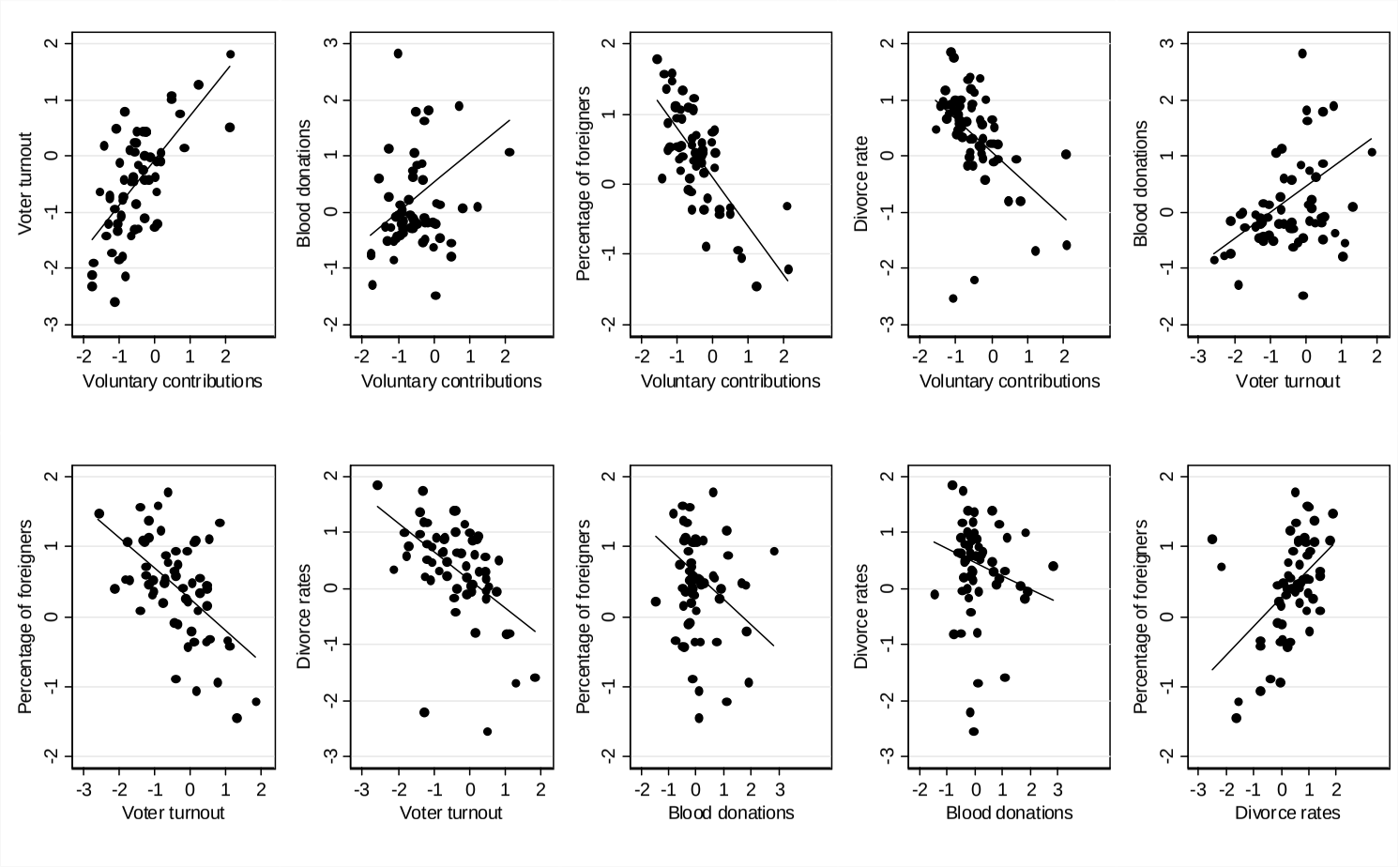


Figure 11: Overall crime and social capital indicators for 63 municipalities with more than 50,000 inhabitants

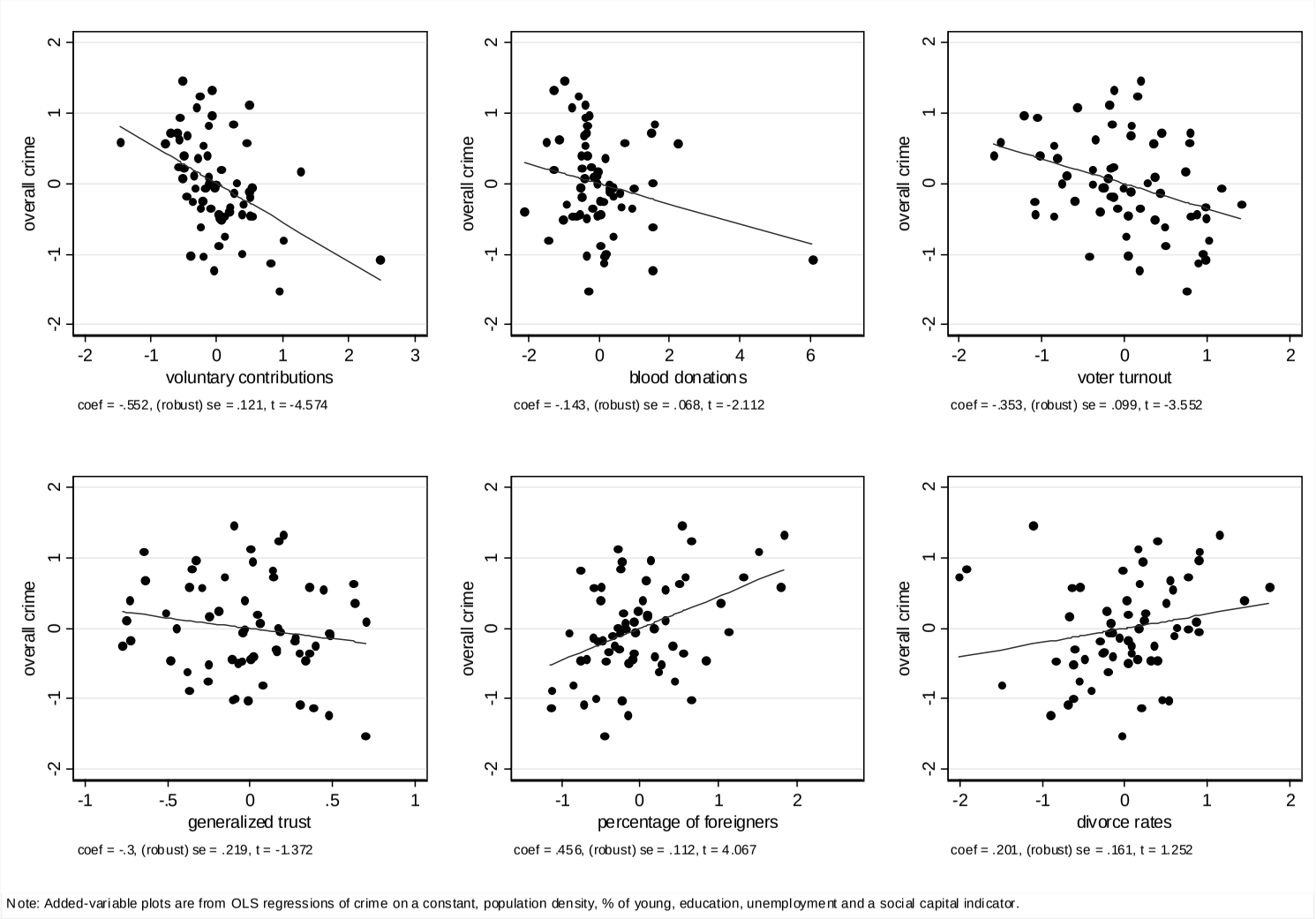


Figure 12: Overall crime and social capital indicators for 63 municipalities with more than 50,000 inhabitants

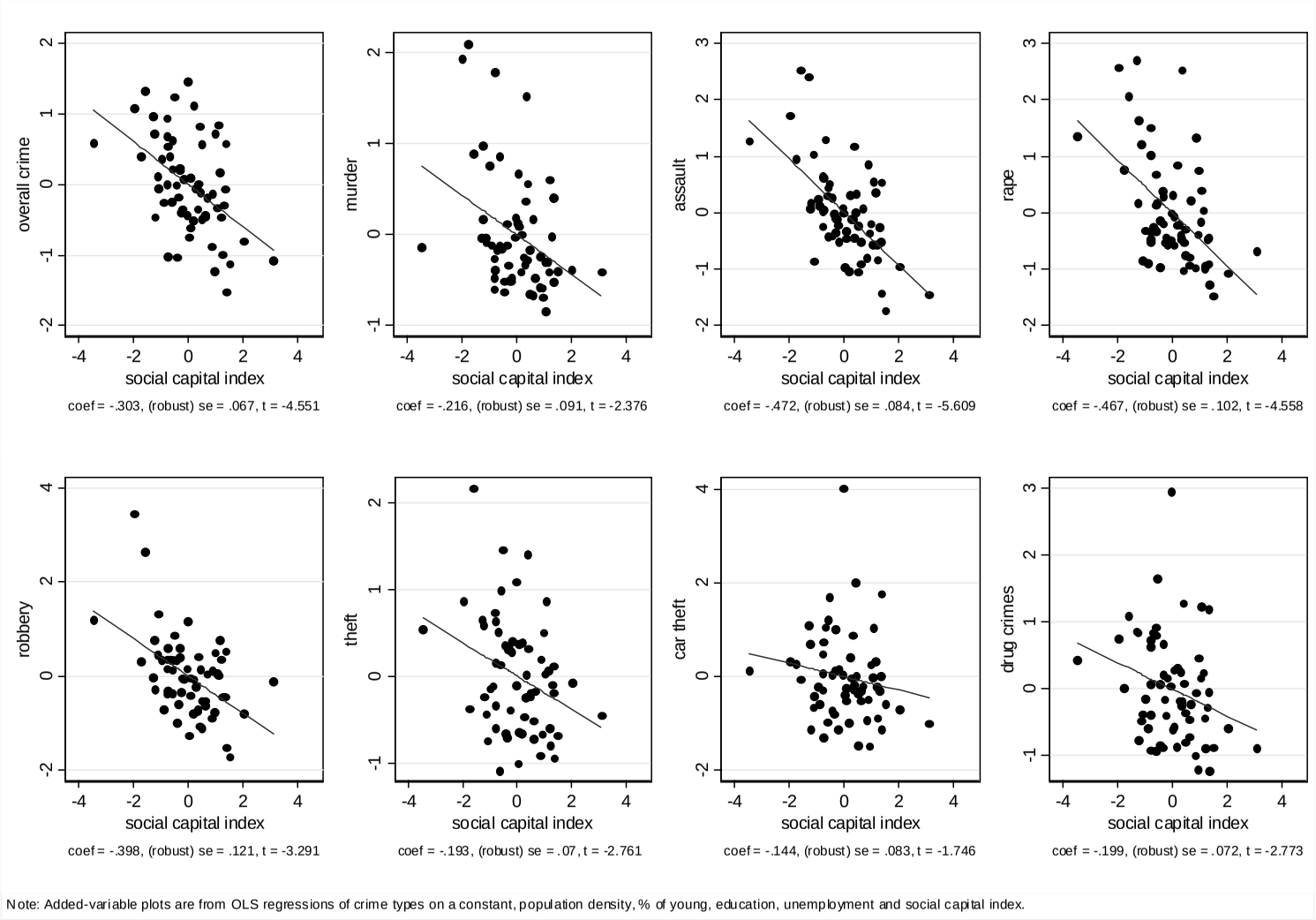


Figure 13: Crime categories and social capital for 63 municipalities with more than 50,000 inhabitants

D Results for 40 NUTS 3 regions

To check whether we obtain similar results for a different regional definition rather than municipalities, we constructed another data set comprising the same indicators for 40 NUTS 3 regions. Detailed information on the NUTS definition for the Netherlands is available from the Eurostat webpage [http://ec.europa.eu/eurostat/ramon/nuts/home_regions_en.html]. The table below summarizes the NUTS 1, NUTS 2 and NUTS 3 definitions. Due to the limited number of observations (n=40) we only provide summary statistics, correlations of social capital indicators and figures that plot the added value of social capital on crime. The coefficients for different social capital indicators deriving from the extended model are summarized in Table 5.

NUTS1	NUTS2	NUTS3	NUTS 1 region	NUTS 2 region	NUTS 3 region
1	11	111	Noord-Nederland	Groningen	Oost-Groningen
1	11	112	Noord-Nederland	Groningen	Delfzijl en omgeving
1	11	113	Noord-Nederland	Groningen	Overig Groningen
1	12	121	Noord-Nederland	Friesland	Noord-Friesland
1	12	122	Noord-Nederland	Friesland	Zuidwest-Friesland
1	12	123	Noord-Nederland	Friesland	Zuidoost-Friesland
1	13	131	Noord-Nederland	Drenthe	Noord-Drenthe
1	13	132	Noord-Nederland	Drenthe	Zuidoost-Drenthe
1	13	133	Noord-Nederland	Drenthe	Zuidwest-Drenthe
2	21	211	Oost-Nederland	Overijssel	Noord-Overijssel
2	21	212	Oost-Nederland	Overijssel	Zuidwest-Overijssel
2	21	213	Oost-Nederland	Overijssel	Twente
2	22	221	Oost-Nederland	Gelderland	Veluwe
2	22	222	Oost-Nederland	Gelderland	Achterhoek
2	22	223	Oost-Nederland	Gelderland	Arnhem/Nijmegen
2	22	224	Oost-Nederland	Gelderland	Zuidwest-Gelderland
2	23	230	Oost-Nederland	Flevoland	Flevoland
3	31	310	West-Nederland	Utrecht	Utrecht
3	32	321	West-Nederland	Noord-Holland	Kop van Noord-Holland
3	32	322	West-Nederland	Noord-Holland	Alkmaar en omgeving
3	32	323	West-Nederland	Noord-Holland	IJmond
3	32	324	West-Nederland	Noord-Holland	Agglomeratie Haarlem
3	32	325	West-Nederland	Noord-Holland	Zaanstreek
3	32	326	West-Nederland	Noord-Holland	Groot-Amsterdam
3	32	327	West-Nederland	Noord-Holland	Het Gooi en Vechtstreek
3	33	331	West-Nederland	Zuid-Holland	Agglomeratie Leiden en Bollenstreek
3	33	332	West-Nederland	Zuid-Holland	Agglomeratie 's-Gravenhage
3	33	333	West-Nederland	Zuid-Holland	Delft en Westland
3	33	334	West-Nederland	Zuid-Holland	Oost-Zuid-Holland
3	33	335	West-Nederland	Zuid-Holland	Groot-Rijnmond
3	33	332	West-Nederland	Zuid-Holland	Agglomeratie 's-Gravenhage
3	33	333	West-Nederland	Zuid-Holland	Delft en Westland
3	33	334	West-Nederland	Zuid-Holland	Oost-Zuid-Holland
3	33	335	West-Nederland	Zuid-Holland	Groot-Rijnmond
3	33	336	West-Nederland	Zuid-Holland	Zuidoost-Zuid-Holland
3	34	341	West-Nederland	Zeeland	Zeeuwsch-Vlaanderen
3	34	342	West-Nederland	Zeeland	Overig Zeeland
4	41	411	Zuid-Nederland	Noord-Brabant	West-Noord-Brabant
4	41	412	Zuid-Nederland	Noord-Brabant	Midden-Noord-Brabant
4	41	413	Zuid-Nederland	Noord-Brabant	Noordoost-Noord-Brabant
4	41	414	Zuid-Nederland	Noord-Brabant	Zuidoost-Noord-Brabant
4	42	421	Zuid-Nederland	Limburg	Noord-Limburg
4	42	422	Zuid-Nederland	Limburg	Midden-Limburg
4	42	423	Zuid-Nederland	Limburg	Zuid-Limburg

Table A4.1: Summary statistics (n=40)

Variable	Mean	Std. Dev.	Min	Max
density	654.73	618.01	146.00	3196.00
charity	2.43	0.76	0.98	4.85
blood	2.37	1.28	0.89	6.68
vote	80.88	3.19	74.35	85.55
divorce	5.21	1.14	3.74	8.63
trust	5.81	0.24	5.30	6.20
ppltrust	5.79	0.31	5.13	6.32
help	5.35	0.32	4.79	5.91
fair	6.26	0.25	5.75	6.76
trustplc	5.88	0.25	5.12	6.41
foreign	15.25	6.50	7.45	35.36
immig	0.76	0.24	0.42	1.49
emmig	0.47	0.19	0.25	0.95
movers	1.08	0.56	0.45	3.37
SC1	0.00	1.84	-4.77	2.90
SC2	0.00	1.51	-3.04	2.69
SC3	0.00	1.39	-2.56	2.82
protestant1859	61.92	30.19	0.89	99.93
foreign1859	1.92	1.90	0.00	8.83
#school1859	0.05	0.03	0.01	0.15
crime	4.56	1.90	2.35	10.75
homicide	0.00	0.00	0.00	0.00
assault	0.54	0.22	0.30	1.43
rape	0.01	0.01	0.00	0.03
robbery	0.06	0.07	0.01	0.34
theft	1.13	0.49	0.52	3.14
autotheft	1.29	0.67	0.30	3.00
burglary	0.50	0.16	0.20	1.04
domestic burglary	0.43	0.17	0.20	0.82
drug	0.02	0.02	0.00	0.11
young	18.85	1.80	15.76	24.38
inequality	0.78	0.27	0.34	1.39
unemp	1.2	0.90	0.00	3.2
education	50.55	5.60	39.09	61.15
cofshop	0.36	0.35	0.03	2.33
shop	20.02	3.10	12.81	28.91
recrat	28.24	5.24	17.22	38.60

Table A4.2: Correlations among social capital indicators

(n=40)	charity	blood	vote	trust	ppltrust	help	fair	trustplc	foreign	divorce	immig	emmig	movers
charity	1.00												
blood	0.26	1.00											
vote	0.64	0.49	1.00										
trust	0.32	0.39	0.45	1.00									
ppltrust	0.20	0.40	0.42	0.84	1.00								
help	0.41	0.22	0.36	0.80	0.50	1.00							
fair	0.22	0.30	0.31	0.81	0.56	0.47	1.00						
trustplc	0.28	0.20	0.20	0.49	0.57	0.38	0.38	1.00					
foreign	-0.62	-0.39	-0.66	-0.22	-0.08	-0.17	-0.26	0.08	1.00				
divorce	-0.55	-0.32	-0.55	-0.19	-0.04	-0.10	-0.33	-0.01	0.86	1.00			
immig	-0.46	-0.01	-0.38	-0.13	-0.06	-0.11	-0.17	0.10	0.69	0.73	1.00		
emmig	-0.64	-0.29	-0.64	-0.24	-0.07	-0.26	-0.20	0.18	0.80	0.68	0.70	1.00	
movers	-0.56	-0.30	-0.56	-0.23	-0.10	-0.11	-0.31	0.12	0.90	0.81	0.77	0.80	1.00

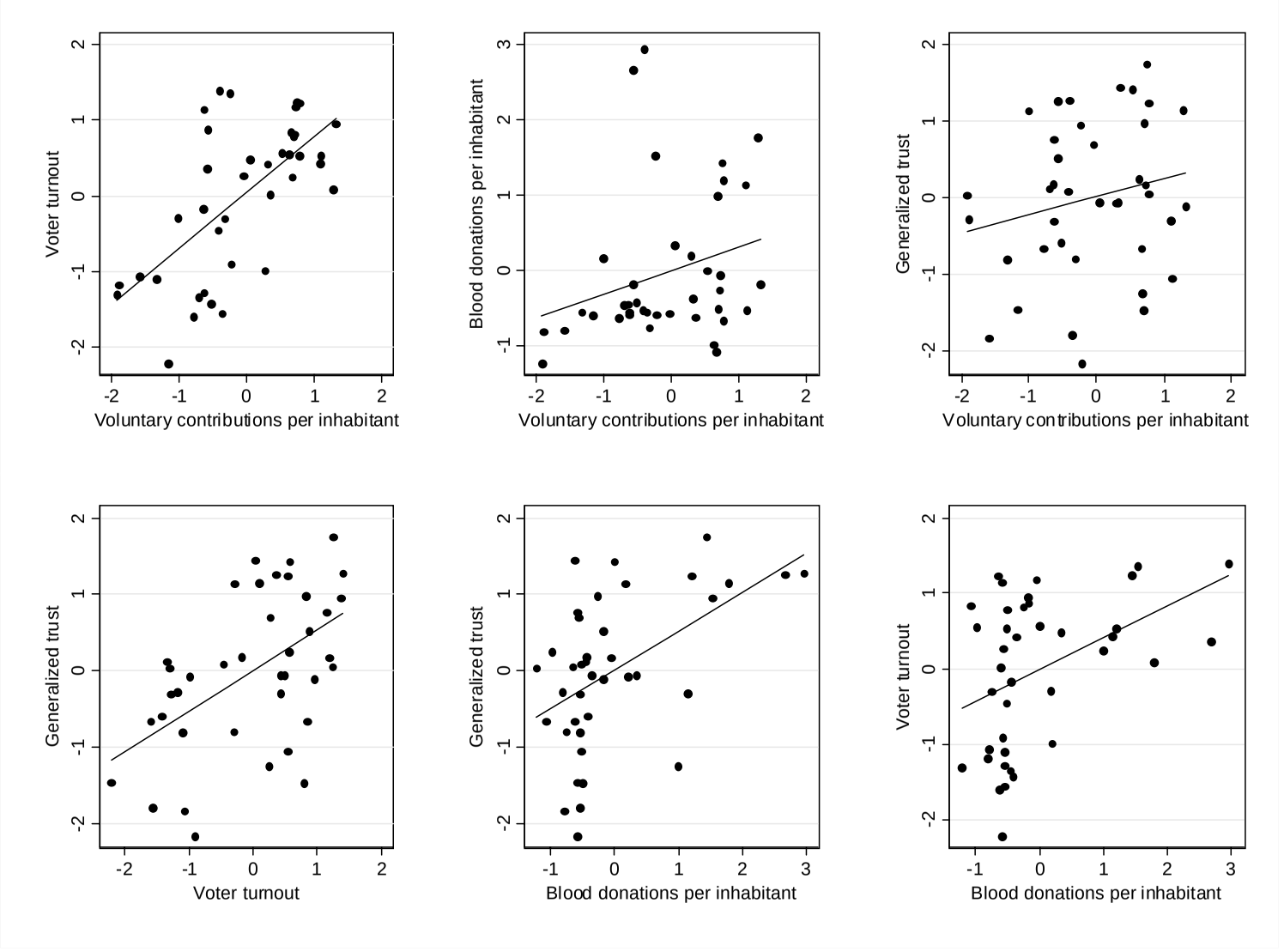
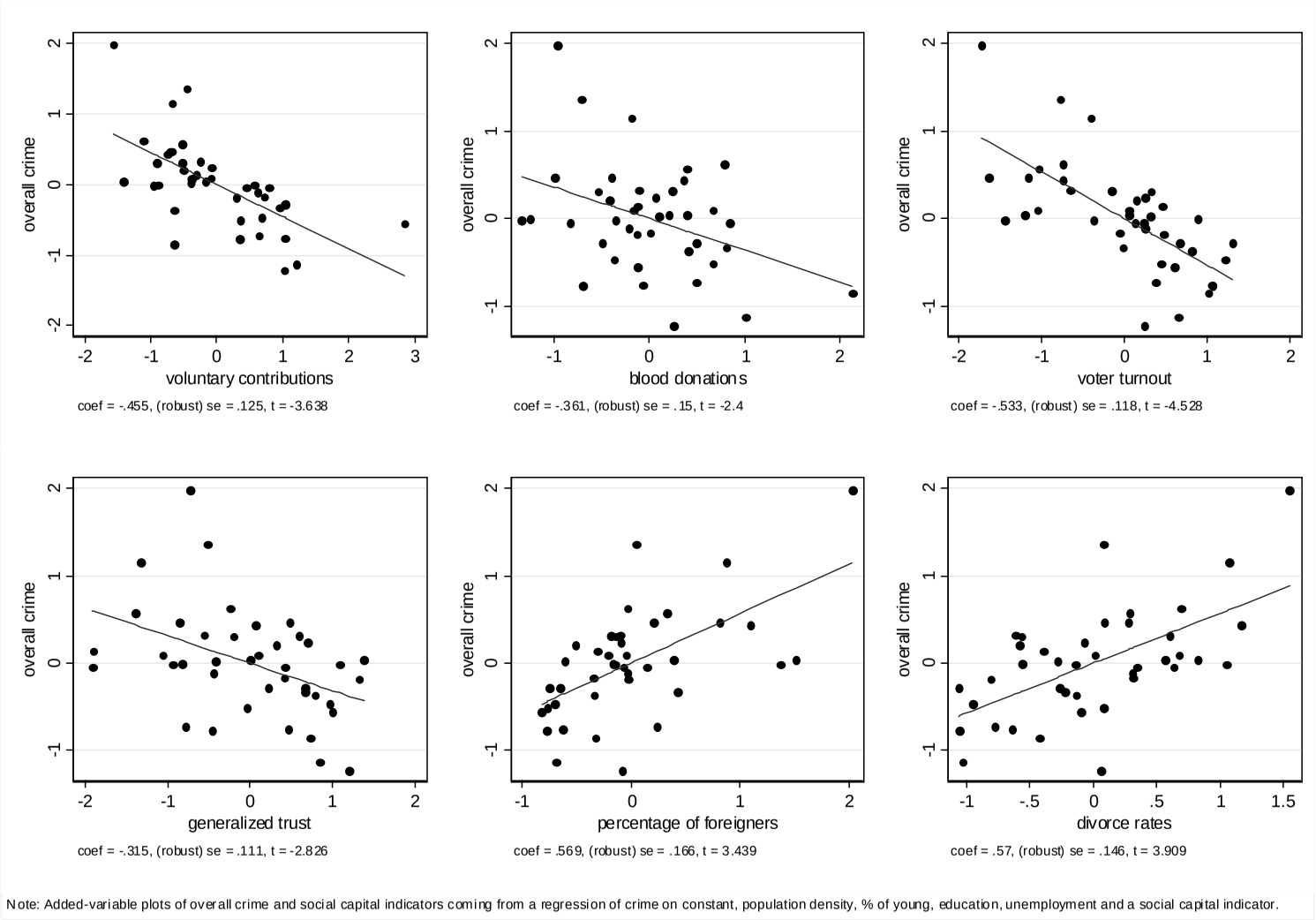


Figure 14: Scatterplots of social capital indicators for 40 NUTS3 regions



Note: Added-variable plots of overall crime and social capital indicators coming from a regression of crime on constant, population density, % of young, education, unemployment and a social capital indicator.

Figure 15: Overall crime and social capital indicators for 40 NUTS3 regions

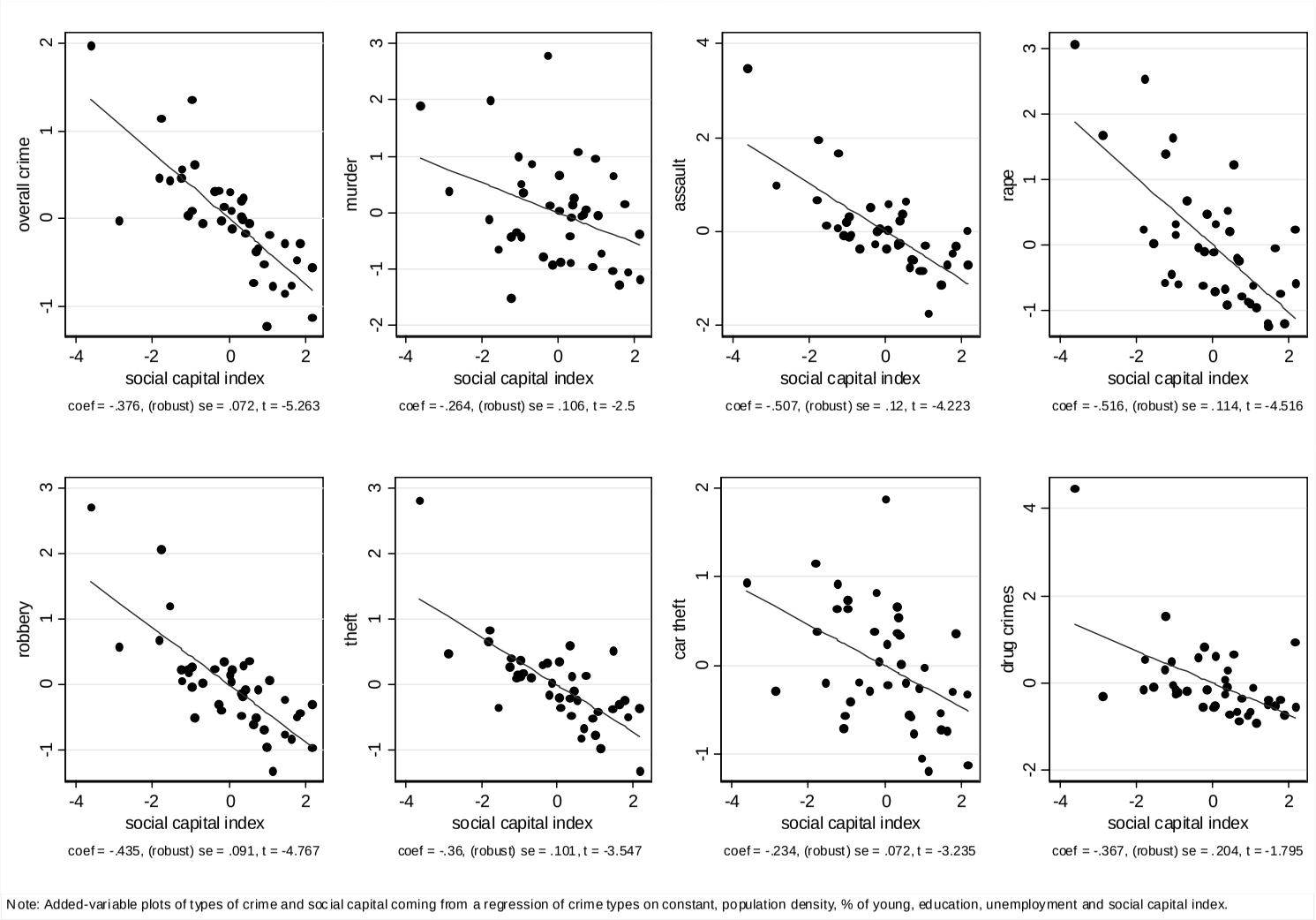


Figure 16: Crime categories and social capital for 40 NUTS3 regions

E Results for 22 large agglomerations

Finally, we also performed analysis at the city level. In the Netherlands there are 22 large agglomerations as stated by the CBS. These are Groningen (GRN), Leeuwarden (LEUW), Zwolle (ZWL), Enschede (ENS), Apeldoorn (APD), Arnhem (ARN), Nijmegen (NIJM), Amersfoort (AMERSF), Utrecht (UTR), Amsterdam (AMST), Haarlem (HRLM), Leiden (LEID), 's-Gravenhage (DHG), Rotterdam (ROTD), Dordrecht (DRDR), Breda (BRD), Tilburg (TLB), 's-Hertogenbosch (SHRT), Eindhoven (EIND), Geleen/Sittard (SITT), Heerlen (HERL) and Maastricht (MAST). We provide the summary statistics, correlation table between social capital indicators, and added-variable plots. Since we have only 22 observations we can not provide detailed analysis and the added-variable plots are based on OLS regressions of crime on a constant, population density and social capital.

Table A5.1: Summary statistics (n=22)

Variable	Mean	Std. Dev.	Min	Max
density	2311.56	1498.66	455.00	5511.00
charity	3.59	2.54	0.73	12.98
blood	3.82	3.30	0.54	14.41
vote	76.04	4.18	68.60	82.90
divorce	6.76	1.73	1.62	9.96
trust	5.75	0.25	5.30	6.15
ppltrust	5.80	0.31	5.23	6.32
help	5.24	0.26	4.81	5.66
fair	6.20	0.26	5.75	6.56
trustplc	5.94	0.20	5.57	6.41
foreign	24.08	8.64	13.71	45.39
immig	1.07	0.38	0.51	1.82
emmig	0.56	0.23	0.24	1.26
movers	1.62	0.54	0.75	2.74
SC1	-1.79	1.81	-5.27	2.25
SC2	-0.99	1.63	-3.50	3.70
SC3	-1.13	1.40	-2.98	3.30
protestant1859	47.01	31.45	1.06	86.81
foreign1859	2.95	1.82	0.85	8.37
#school1859	0.03	0.02	0.00	0.08
crime	8.81	2.96	4.02	14.53
homicide	0.00	0.00	0.00	0.01
assault	0.99	0.40	0.34	2.01
rape	0.02	0.01	0.01	0.04
robbery	0.18	0.14	0.05	0.55
theft	2.23	0.72	1.20	4.30
autotheft	2.96	1.39	1.10	7.64
burglary	0.81	0.22	0.52	1.29
domestic burglary	0.72	0.25	0.05	1.09
drug	0.05	0.05	0.01	0.18
young	22.03	4.29	10.47	32.47
inequality	0.52	0.23	0.23	1.11
unemp	2.45	2.35	0.00	7.93
education	57.05	6.36	44.27	70.21
cofshop	0.94	0.68	0.32	3.67
shop	27.88	5.61	17.73	39.76
recrat	30.91	6.53	19.37	41.58

Table A5.2: Correlations among social capital indicators

	charity	blood	vote	trust	ppltrust	help	fair	trustplc	foreign	divorce	immig	emmig	movers
charity	1.00												
blood	0.65	1.00											
vote	0.54	0.72	1.00										
trust	0.20	0.49	0.68	1.00									
ppltrust	0.21	0.55	0.68	0.94	1.00								
help	-0.04	0.19	0.46	0.84	0.65	1.00							
fair	0.34	0.54	0.70	0.93	0.88	0.65	1.00						
trustplc	0.35	0.22	0.34	0.60	0.51	0.58	0.54	1.00					
foreign	-0.62	-0.51	-0.65	-0.30	-0.32	-0.03	-0.45	-0.20	1.00				
divorce	-0.49	-0.31	-0.45	-0.05	-0.04	0.15	-0.22	-0.10	0.67	1.00			
immig	-0.57	-0.24	-0.41	-0.05	-0.08	0.24	-0.28	0.08	0.74	0.65	1.00		
emmig	-0.31	-0.25	-0.44	-0.46	-0.43	-0.30	-0.50	0.01	0.27	0.04	0.58	1.00	
movers	-0.53	-0.27	-0.47	-0.23	-0.23	0.04	-0.40	0.06	0.63	0.47	0.94	0.82	1.00

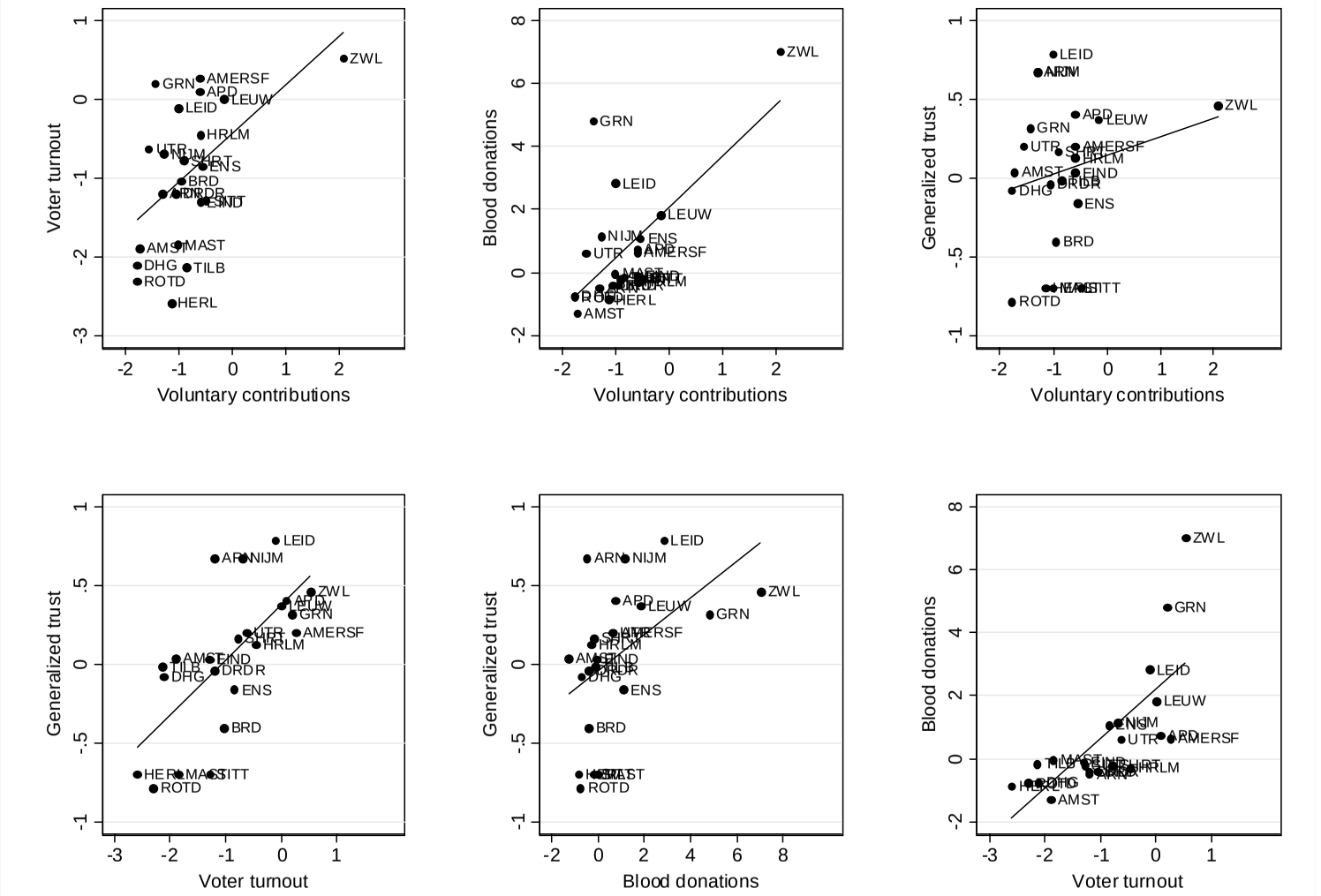
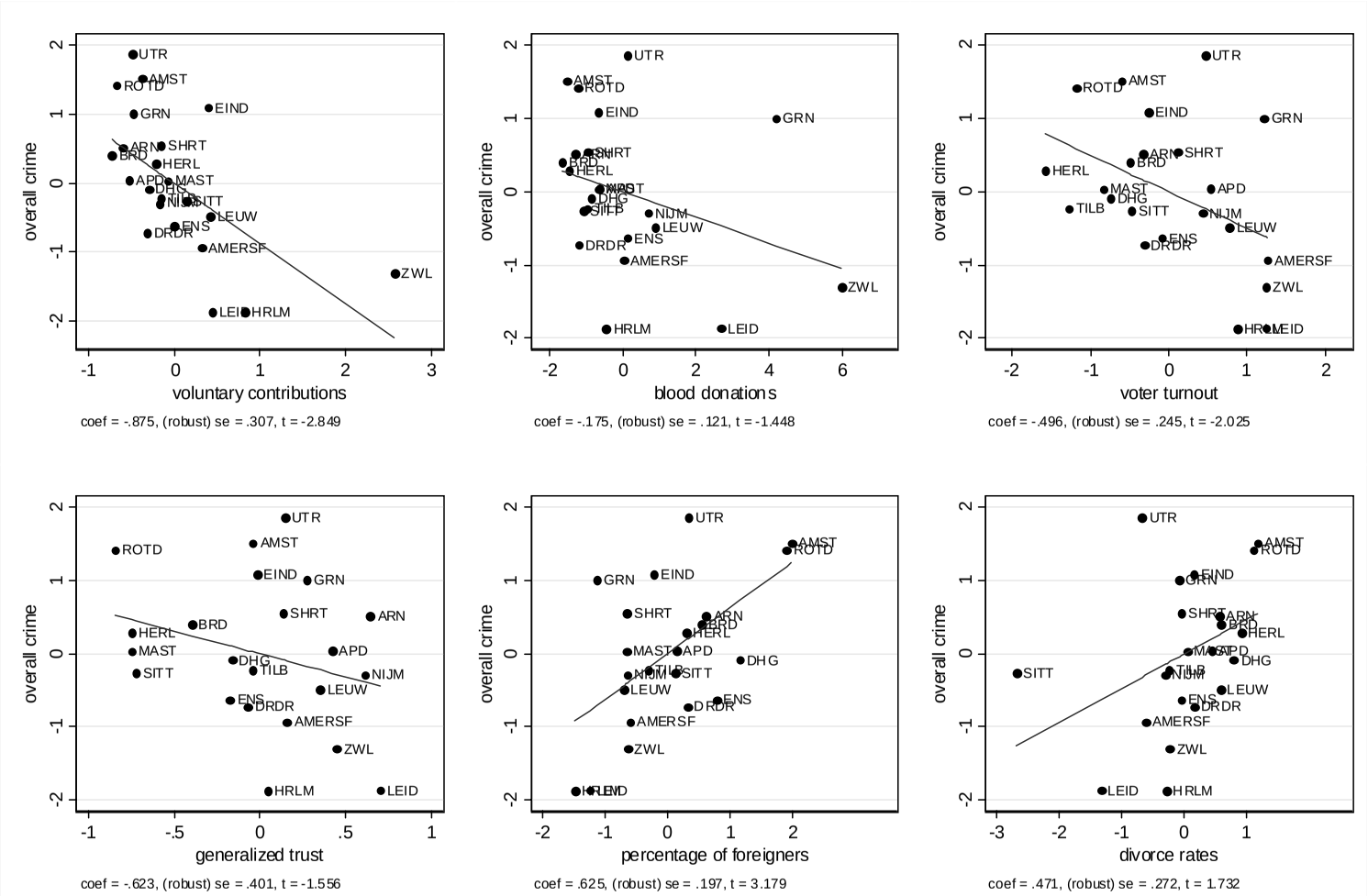
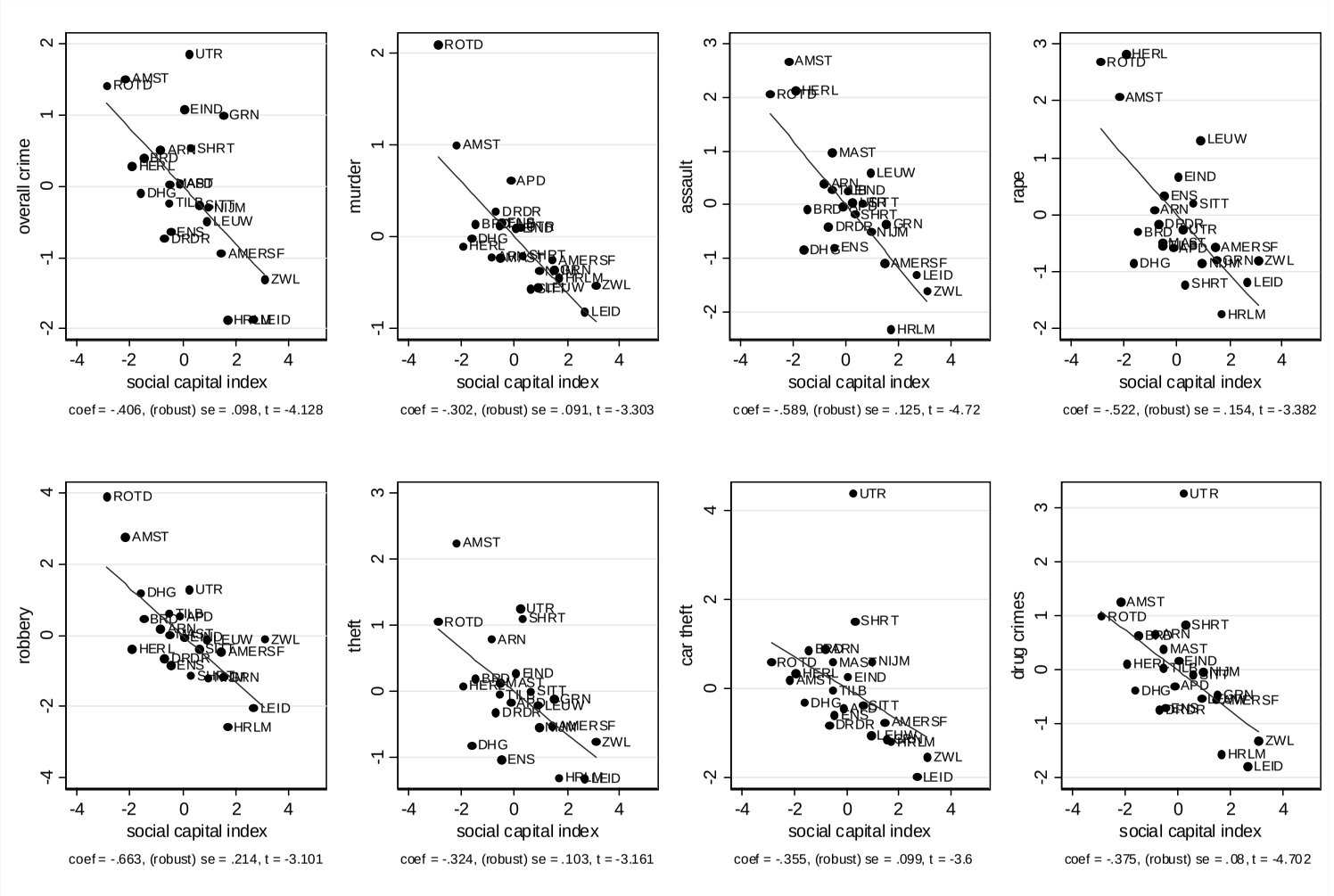


Figure 17: Scatterplots of social capital indicators for 22 largest agglomerations



Note: Added-variable plots of overall crime and social capital indicators coming from a regression of crime on constant, population density and a social capital indicator.

Figure 18: Overall crime and social capital indicators for 22 largest agglomerations



Note: Added-variable plots of types of crime and social capital coming from a regression of crime types on constant, population density and social capital index.

Figure 19: Crime categories and social capital for 22 largest agglomerations