CPB Discussion Paper

No 136
December, 2009

The Impact of Social Capital on Crime

Evidence from the Netherlands

I. Semih Akçomak and Bas ter Weel

Abstract in Dutch

Waarom zijn er zulke grote verschillen in criminaliteit tussen Nederlandse gemeenten die op het eerste gezicht op elkaar lijken? Dit onderzoek laat zien dat verschillen in sociaal kapitaal tussen gemeenten belangrijk zijn voor de verklaring van deze heterogeniteit. Sociaal kapitaal is een diffuus begrip en wordt als een latente variabele behandeld in de analyses. Er wordt gebruik gemaakt van een aantal indicatoren zoals bloeddonaties, opkomst bij verkiezingen, giften aan goede doelen, inzet voor wijkactiviteiten en het vertrouwen dat mensen in elkaar hebben. Criminaliteit bestaat uit een aantal categorieën, van winkeldiefstal tot moord. De analyse laat zien dat sociaal kapitaal en criminaliteit niet alleen correleren, maar dat er een causaal verband bestaat. Om dit aan te tonen wordt sociaal kapitaal geïnstrumenteerd met drie historische variabelen: het aantal buitenlanders in een gemeente, het aantal scholen en het aantal protestanten per gemeente in 1859. De schattingsresultaten suggereren dat de exogene component van sociaal kapitaal significant en negatief gerelateerd is aan criminaliteit. Er wordt gecontroleerd voor een batterij aan waarneembare kenmerken van gemeenten. Daarnaast laat een robuustheidsanalyse zien welke sociaal-kapitaalindicatoren het meest geschikt zijn in toegepast economisch onderzoek.

CPB Netherlands Bureau for Economic Policy Analysis
Van Stolkweg 14
P.O. Box 80510
2508 GM The Hague, the Netherlands

Telephone +31 70 338 33 80
Telefax +31 70 338 33 50
Internet www.cpb.nl

ISBN: 978-90-5833-429-9

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

İ. Semih Akçomak
CPB Netherlands Bureau for Economic Policy Analysis and
Department of Economics and UNU-MERIT, Maastricht University,
Postal Address: P.O. Box 80510, 2508GM,
The Hague, the Netherlands
e-mail: s.akcomak@maastrichtuniversity.nl

Bas ter Weel
CPB Netherlands Bureau for Economic Policy Analysis
and UNU-MERIT, Maastricht University,
Postal Address: P.O. Box 80510, 2508GM,
The Hague, the Netherlands
e-mail: b.ter.weel@cpb.nl

20 November 2009

Abstract

This research shows that social capital is important in explaining why crime is so heterogeneous across space. Social capital is considered as a latent construct composed of a variety of indicators, such as blood donations, voter turnout, voluntary contributions to community well-being, and trust. To isolate exogenous variation in social capital, three historical variables are used as instruments: the fraction of foreigners, the number of schools and the fraction of Protestants in 1859. The historical information provides heterogeneity across municipalities in these three variables. In an application to Dutch municipalities the 2SLS estimates suggest that the exogenous component of social capital is significantly and negatively correlated with current crime rates, after controlling for a range of contemporaneous socio-economic indicators. Next, the robustness analysis shows why some social capital indicators are more useful than the others in applied economic research.

JEL classification: A13; A14; K42; Z13
Key words: Social capital; Crime; the Netherlands

* We benefited from discussions with Lex Borghans, Paolo Buonanno, Richard Freeman, Henri de Groot, Pierre Koning, Boris Lokshin, Bas Straathof, Ben Vollaard and Dinand Webbink. We acknowledge seminar participants at UNU-MERIT and the Department of Economics, Maastricht University; Netherlands Bureau for Economic Policy Analysis (CPB), the Department of Spatial Economics, Vrije Universiteit Amsterdam; ISER, University of Essex, the Utrecht School of Economics and the Regional Studies Association meetings in Prague in May 2008. Akçomak acknowledges financial support from the Maastricht Research School of Economics of Technology and Organizations (METEOR).

"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. Even after controlling for a range of conditions and population characteristics, there remains a high variance of crime across space.[1] How can we explain these differences in crime rates across space? The overall annual crime rate in our data varies between 1.6 and 14.6 incidents per capita, with observable factors, such as population density and size, the youth unemployment rate, the mean level of education and income inequality explaining only a small fraction of this difference. Next to that, consider the following example: The cities of Utrecht and Leiden are comparable on various socio-economic indicators, but Utrecht faces a crime rate of 14.3 per capita, relative to a rate of only 6.3 in Leiden.

We argue that differences in social capital account for a significant part of the observed differences in crime rates across cities and test this idea using a dataset of Dutch municipalities. To do so, we view history as a main determinant of present outcomes and show that we can isolate exogenous variation in social capital by using historical institutions as instruments, following a recent body of empirical studies (e.g., Tabellini, 2005; Guiso et al., 2008a; Akçomak and ter Weel, 2009). Our estimates suggest that differences in crime rates can for some part be traced back to historical differences in social capital between Dutch municipalities.

To what extent do these historical indicators shape current social capital? We employ a variety of social capital measures. Previous research treats social capital as a positive sum in the sense that social capital is an asset to the individual and the community.[2] Instead of measuring social capital as a positive sum, it might be easier to measure the absence of social capital through traditional measures of social dysfunction such as, family break down,

[1] Glaeser et al. (1996) and Sampson et al. (1997) find that observable local area characteristics explain only about 30 percent of the variance in crime rates across space in the United States. 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] 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 et al., 2004); more innovation (e.g., Akçomak and ter Weel, 2009); lower homicide rates (e.g., Rosenfeld et al., 2001) and lower car theft (e.g., Buonanno et al., 2009).

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 use different indicators such as voluntary contributions to charity, electoral turnout and blood donations as well as traditional measures of social capital such as trust.[3] We use divorce rates and population heterogeneity as indicators for the absence of social capital. These indicators are highly correlated to each other and a common denominator of all them, combining several multifaceted dimensions, may serve as a useful proxy for social capital (see Table 1 and Figure 1 which are further discussed in section 2). We treat social capital as a latent construct and build a number of social capital indices using principal component analysis (PCA).

What is the causal effect of social capital on crime? Sampson and Groves (1988) argue that communities are empowered through their trust in each other, which enables them to take action against crime and to cooperate with formal control, such as the police.[4] 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. Involvement in community activities 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. Consequently, given the probability of being caught and formal control, higher social capital reduces crime.

We use three historical "institutions" as instruments to social capital. First, we measure the opportunities for formal education by measuring the number of schools in 1859. Goldin and Katz (1999) show that historical differences in human capital investments help to explain differences in current levels of social capital.[5] Second, we measure population heterogeneity by the percentage of foreign inhabitants in 1859. If social capital is an asset paving the way to community governance (Bowles and Gintis, 2002), then any factor that leads to disorganization and disattachment in the community would eventually reduce social

[3] 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.

[4] See also Kornhauser (1978), Sampson and Groves (1989) and Bursik and Grasmick (1993). Here control also refers to individual control. For example, 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.).

[5] Recent papers by Tabellini (2005) and Akçomak and ter Weel (2009) support this finding. They show that for different samples of European regions literacy rates in the 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. Gradstein and Justman (2000, 2002) show that education affects social capital because education is an important socializing instrument. It builds common norms and facilitates interaction between community members who might be different along cultural, religious or ethnic lines.

capital. Population heterogeneity is such a factor that may trigger disattachment because higher levels of heterogeneity would break closure, reduce acquaintance among residents and may result in lower trust among members of the community (Rose and Clear, 1998; Rosenfeld et al., 2001).[6] Third, we use the number of Protestants in 1859 as an indicator for social capital. Beyerlein and Hipp (2005) differentiate between bonding and bridging social capital and argue that groups characterized by bonding social capital are less effective in creating an environment of informal social control, whereas groups with bridging social capital are more effective in creating such foundations.[7] Protestants are more likely to be involved in community wide volunteering, which refers to higher levels of bridging social capital. This stresses the institutional aspect of Protestantism. In addition, Woessmann and Becker (2009) argue that Protestant instructions to read the Bible in ones own language and support for universal schooling boosted literacy levels early on and hence created more human capital.[8] Recent studies show the validity of such an approach by consistently highlighting the role of history in explaining current social capital and culture (e.g., Tabellini, 2005; Guiso et al., 2008a; Akçomak and ter Weel, 2009). This could be due to formal institutions (Zucker, 1986; Acemoglu et al., 2001) or due to intergenerational transmission of values and attitudes (Dohmen et al., 2006; Tabellini, 2008b).[9]

Our estimates show that social capital, proxied by individual indicators and as a latent construct, is negatively associated with crime rates across Dutch municipalities. On average a one standard deviation increase in social capital would reduce crime rates by 0.32 of a standard deviation. This implies that the inclusion of social capital explains about 10 percent of the total variation in crime rates. Given that standard determinants explain only about half of the variation in crime rates, our estimates are of a substantial magnitude. The findings reveal that non-survey indicators such as voluntary contributions and voter turnout are more robust when compared to survey indicators such as generalized trust. The empirical results

[6] The effects of racial or ethnic heterogeneity on outcomes are well documented. 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). Easterly and Levine (1997) and Alesina et al. (1999) argue that ethnic fragmentation may increase polarization in a community and cause difficulty in the provision of public goods such as public education, libraries, and sewer systems. Alesina and La Ferrara (2000) argue that racial composition affects the degree of participation in social activities. Zak and Knack (2001) and Rupasingha et al. (2002) show that higher levels of ethnic diversity may result in less trusting societies.

[7] 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 interaction among groups. Beyerlein and Hipp (2005) use the percentage of mainline Protestants as a proxy for bridging social capital as they involve in community wide volunteering.

[8] A third mechanism may be 'guilt'. 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 have emphasized how religion plays a role in individual or firm decision making.

[9] Tabellini (2008a) and Guiso et al. (2008b) present an excellent discussion of the power of such an approach.

are robust to the inclusion of other variables, to the exclusion of influential observations, to alternative specifications, to the use of different subsamples and regional definitions, and across different types of crime.

This paper contributes to the literature in several aspects. First, we treat social capital as a latent construct. There are only a number of recent studies that follow a similar approach (e.g., Svendsen and Bjørnskov, 2007; Owen and Videras, 2009; Sabatini, 2008) with most of them using survey data at the individual level to measure the presence of social capital. We measure and compare both the presence (e.g., blood donations and voluntary givings) and absence of social capital (e.g., family breakdown and population heterogeneity) using survey and non-survey data, which differentiates our study from the existing literature. This allows us to assess the quality of the different indicators in more detail. Simple correlations between various survey and non-survey indicators of social capital display quite high coefficients (which are shown in Table 1 and discussed below). For instance, the average of the correlation coefficients between survey based *trust* and non-survey based social capital indicators 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 (e.g., Tabellini, 2008a). We argue that the history of a municipality a century ago shapes current social capital. Third, though crime is a global phenomenon most of the literature is based on the evidence from the United States, the United Kingdom and Canada.[10] The Netherlands is an interesting case with homogeneous economic conditions, a high concentration of foreigners and a liberal attitude towards soft drugs. Finally, our units (municipalities) are much smaller in scale and much more homogeneous when compared to other studies using regional information for country analysis. Thus, the results are less likely to be affected by 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. We present information on the data and define our measures of social capital in Section 2. The empirical strategy is presented in Section 3. Section 4 presents the estimates and a number of robustness checks. Section 5 concludes.

[10] For the United States see for instance, Glaeser et al. (1996), Freeman (1996), Grogger (1998), Glaeser and Sacerdote (1999), Gould et al. (2002), Levitt (2004) and Lochner and Moretti (2004). For the United Kingdom see, Wolpin (1978) and Sampson and Groves (1989) and for Canada see, Macmillan (1995) and McCarthy and Hagan (2001).

2 Definitions, data and descriptives

The cross-section data span 142 municipalities with more than 30,000 inhabitants in the Netherlands. We employ the 2002 geographical definition of Dutch municipalities and each municipality is matched to a NUTS regional definition.[11] Most of the socio-economic variables come from Statistics Netherlands (CBS). We discuss the most salient details below, and other variable definitions, sources and details in Appendix A.1.[12]

2.1 Defining social capital

Before turning to the data, we first define what we mean by social capital by reviewing its use in the literature, thereby putting our indicators into perspective.

First, social capital is an increasing function of participation in civic life. In a study concerning violent crime in Chicago, Sampson et al. (1997) report significantly lower crime levels and self-reports of victimization in neighbourhoods characterized by collective efficacy. Similarly, Bursik and Grasmick (1993) argue that the effectiveness of law enforcement and public control is higher in communities with extensive civic engagement.[13] In practice, higher voter turnout and more voluntary donations to charity are assumed to contribute to a community's social capital. Voter turnout is hypothesized to capture civic involvement and participation in community decision making (e.g., Putnam, 1993; Rosenfeld et al., 2001; Gatti et al., 2003). Voluntary contributions in money terms are supposed to capture the strength of intermediate social structures such as charities and clubs, and could be employed as another indicator that measures the presence of social capital. We use a city's voter turnout 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 et al. (2004) suggest to use voluntary blood donations as an indicator for social capital. Although charity and blood seem 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

[11] The 2002 geographical definition of Dutch municipalities is available from Statistics Netherlands (CBS) at http://www.cbs.nl. The NUTS definition is available from Eurostat at http://ec.europa.eu/eurostat. The Netherlands are divided into 4 NUTS 1, 12 NUTS 2 and 40 NUTS 3 regions. See Table A5.1 for details.

[12] For smaller municipalities data are sometimes missing. Moreover, municipality definitions change every year, which affects smaller municipalities more than the larger ones. By restricting the analysis to municipalities with more than 30,000 inhabitants we avoid complications that may arise from such situations. Table A1.1 defines all variables and Table A2.1 presents summary statistics for all variables applied in the empirical analysis.

[13] See also Taylor et al. (1984), Sampson and Groves (1989), Land et al. (1990), Rosenfeld et al. (2001), Lederman et al. (2002) for empirical evidence.

reciprocity at the same time. For instance, most charity organizations 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 crowd out blood donations (Titmuss, 1970; Mellstrom and Johannesson, 2008). In the Netherlands there is no monetary compensation for donating blood, so we suggest that blood donations capture a 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. In sociology trust has been identified as a source of social capital (e.g., Portes, 1998). Economists define the concept in a rather lax way, as an optimistic expectation regarding other agents behaviour (Fafchamps, 2004). In practice, both sociologists and economists have benefited from the survey-based 'generalized trust' indicator as a proxy for social capital and as an alternative measure to social relations in general, which measures the degree of opportunistic behaviour (e.g., Putnam, 1995; Knack and Keefer, 1997; Messner et al., 2004). The trust indicator is found to be highly correlated with other measures of social capital such as memberships to associations, extent of friendship networks and voting (Putnam, 1995).[14] We also use a generalized trust index to represent social capital.

Finally, informal controls and the extent of informal contacts 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. Population heterogeneity is an important factor that affects social capital and trust as it breaks closure. Communities are stronger when there is lower population turnover and density because these factors negatively affect the ability to observe and intervene in trouble making activities. Glaeser and Sacerdote (1999) explain why there is more crime in larger cities, by arguing 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 thus results in more crime.

In disadvantaged families and disadvantaged neighbourhoods 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; Evans et al., 1992; Manski, 2000). Individuals who belong to such an environment are more likely to live in dense areas with a heterogeneous population, more likely to be unemployed, have low incomes

[14] Research has shown that the survey-based trust question may measure trustworthiness (e.g., Glaeser et al., 2000) or well-functioning institutions (e.g., Beugelsdijk, 2005) rather than trust itself.

and education, and more likely to be growing up in a single-parent family headed by women. 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. Therefore, disadvantaged families and persons invest and participate less in the social community they belong to. 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). As a proxy for the absence of social capital, we use divorce rates and the percentage of foreigners as indicators for (lack of) informal control.

2.2 Measuring 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). The data are available in Euros and defined as voluntary contributions per household averaged over the period 2000-2005.[15] For the electoral turnout we use the voter turnout for the elections of the Lower House (Tweede Kamer) in 2003. Following Guiso et al. (2004) we collected data on blood donations. We define *blood* as the blood donations per 100 inhabitants in 2005. Higher values of *charity*, *vote* and *blood* are associated with higher levels of social capital.

To support our data and for robustness purposes we also gathered data from the 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 social capital literature. To increase the sample size we merged the first and the second round of the 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 deal with over-sampling. We constructed an equal weight trust indicator from the answers to the following three questions and labelled it *trust*, (*i*) most people can be trusted or you can't be too careful (*ppltrust*), (*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")

[15] 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. This calculation introduces some bias because the municipality definitions change every year and in cases that we have missing population or household information we had to interpolate the data. As expected there is no effect on the results.

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 the analysis by creating variables that have the same value for municipalities in the same NUTS 3 regional definition.[16]

The absence of social capital is measured using traditional indicators of heterogeneity and family structure. We first collected information on the percentage of foreigners in each municipality as a proxy for population heterogeneity.[17] Related to this measure we form *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 of family induced social capital, divorce rates are used.[18]

The correlations among all social capital indicators are displayed in Table 1 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.[19] As shown in Section 4.3 these early findings are not restricted to a specific group of municipalities and hold for different subsamples.

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 differentiate between regions with high and low social capital. When 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. When the cluster groups are increased to four, 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 the mean for *foreign* and *divorce*. In the southern part this pattern is the other way around. In the west and the east we obtain mixed groups. This simple analysis gives another hint that the social capital indicators tend to move together supporting the simple correlations in Table 1.

Our premise in this paper is that these indicators capture different dimensions of social capital and although they may not be good proxies for social capital individually, a common

[16] 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.

[17] 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.

[18] We also experimented by using the percentage of single parent families, which yields similar results.

[19] The average is 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.

denominator of them may stand out 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 perform PCA including *charity*, *blood*, *vote*, *trust*, *foreign* and *divorce* and save 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 into one measure. Then, we form another index in a similar way, *SC2*, only capturing the presence of social capital hence including the first four indicators above. Due to the limited availability of *trust* at the municipality level, we form a final index, *SC3*, including only *charity*, *blood* and *vote*. The first component explains more than 60 percent of the variation in these three indicators. Further details on the social capital indicators, the principal component loadings and the explained variance for all included indicators are presented in Appendix A.3.

2.3 Measuring crime rates

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

We use an overall crime indicator per 100 inhabitants covering all recorded crimes (*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, which is so common in the Netherlands that many people do not report it. Crime numbers on 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 specify 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 A.4 defines each of these categories and presents descriptive statistics. The most common reported crimes are robberies, theft and drug related crimes. Whereas the least common are homicide 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 crimes and roughly 11 percent consists of assaults; whereas serious crimes such as rape and homicide represents only 1 percent of overall crime rate. Second, in the Netherlands most criminal activities take place in larger agglomerations. 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. For robbery and drug related crime, 3 out of 4 are observed in the 22 largest Dutch cities. Overall, 53 percent of all recorded crime is observed in the 22 largest agglomerations. Table A4.2 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 sample of 142 municipalities represents only about 35 percent of all the municipalities in the Netherlands but covers about 90 percent of overall crime.

2.4 Instrumental variables

In line with Tabellini (2005), Guiso et al. (2008b) and Akçomak and ter Weel (2009), we suggest that historical factors do have an impact on the formation of social capital. Three indicators are used as instruments for social capital all of which are observed at the municipality level in 1859: (*i*) population heterogeneity, (*ii*) percentage of Protestants, and (*iii*) the number of schools. All three variables are taken from the population archive (*Volkstellingen*), which provides historical household data. We select the year 1859 because this is the earliest date for which consistent data at the municipality level are available. More information about the three instruments can be found in Appendix A.5. Table A5.1 lists the data for the 142 municipalities.

The percentage of foreigners in 1859 is used as an instrument for current social capital because 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 affects current social capital but has no direct impact on current crime levels. We define *foreign1859* as the percentage of foreigners in a municipality in 1859 and *protestant1859* as the percentage of inhabitants belonging to any of the Protestant denominations in 1859. We also employ a direct proxy for human capital investment: *#school1859* is defined as the number of schools per 1,000 inhabitants.

3 Empirical strategy

Empirically we want to explore the effect of social capital on crime rates across space. Social capital is different from other forms of capital in the sense that it is not directly observable. We know that social capital is hard to measure and is best treated as a latent construct. Therefore, our first strategy is to measure social capital as a single index composed of different indicators that could represent 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 A3.1 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 total variation in social capital. A similar strategy was used by Fryer et al. (2005) to measure the impact of crack cocaine on crime in U.S. cities.[20]

After constructing the indices, we estimate the following model with OLS:

$$\begin{aligned} crime \;\; = \;\; & \beta_0 + \; \beta_1 density + \; \beta_2 education + \; \beta_3 unemp \\ & + \beta_4 young + \; \beta_5 SC + \; \beta_6 X + \; \upsilon, \end{aligned} \tag{2}$$

where subscript m for municipalities is suppressed for notational convenience, and the error term complies with the usual assumptions. *Crime* represents crime rates depending on the type 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 also include 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 young population and youth unemployment to be positively associated with crime. SC represents not only the three indices but also the six individual social capital indicators. X consists of a set of control variables which are; (i) income inequality, (ii) controls for the percentage of

[20] One of the most important aspect of crime is variation across space. If this variation is due to social capital one may suggest an indicator that is dispersed across cross-section units. By employing a PCA we somehow reduce dispersion and normalize the SC indicator. The other approach is to use a multiplicative index that pulls out the distribution and exaggerate extreme values to make the variance bigger (e.g., Rasch model). In the empirical part we also experimented with such an approach which did not yield better results in explaining the variability in crime-rates.

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.[21]

Endogeneity and the possibility of reverse causality could bias the estimates of the above models when using OLS. Putnam (2000) argue that low social capital may result in higher crime, which in turn may result in even lower levels of social capital. A third unobserved variable could affect both crime and social capital. For example, certain policies implemented by the local government could reduce crime but at the same time have an impact on social capital. If property-based crime rates affect price of residential property and neighbourhood safety people may move to other low-crime neighboorhoods hence reducing the social capital of the high-crime neighboorhoods (e.g., Gibbons, 2007). 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 percentage of foreigners and Protestants and the number of schools in 1859. This yields the following model:

$$\begin{aligned} crime &= \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp \\ &\quad + \beta_4 young + \beta_5 SC + \beta_6 X + \nu, \\ SC &= \delta_0 + \delta_1 foreign1859 + \delta_2 protestant1859 \\ &\quad + \delta_3 \#school1859 + \delta_4 Z + \eta, \end{aligned} \tag{3}$$

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 equals 0 and the variance is 1. So, the estimated coefficients show how the dependent variable responds when an independent variable changes by one standard deviation.

[21] A recent study by Vollaard and Koning (2009) reports that police expenditures have a significant negative impact on crime rates in the Netherlands. However, data on police expenditures are available for 25 police regions only, which is why it is not possible to apply these data.

4 Results

4.1 OLS estimates

We start by estimating equation (2) using OLS. Table 2 and 3 present the estimates. The dependent variable is defined as the overall crime rate. We observe that individual indicators of social capital correlate with overall crime rates. *Charity*, *blood*, *vote* and *trust* are negatively correlated with crime, whereas $foreign$ and *divorce* are positively correlated with crime rates. With the exception of *trust* all social capital coefficients are significant at the 5 percent level.[22] Our findings are in line with previous research that reports negative effects for trust, civicness and electoral turnout (e.g., Sampson and Groves, 1989; Rosenfeld et al., 2001; Lederman et al., 2002; Saegert et al., 2002; Messner et al., 2004; Buonanno et al., 2009); a positive correlation between crime and population heterogeneity (e.g., Jobes, 1999) and single parenthood and crime (e.g., Sampson et al., 1999).[23] Moreover, all three social capital indices have a significant negative correlation with crime as can be observed from Table 3, columns (1), (4) and (7). In a causal interpretation 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 implies that a one standard deviation increase in social capital would reduce crime rates by about 2 points on average, given an average crime rate of about 5 percent.

Our estimates on the ordinary determinants of crime also support prior evidence. Population density has a positive and significant correlation with crime suggesting that densely populated areas face more crime than relatively rural areas (e.g., Wolpin, 1978; Macmillan, 1995). We find a negative coefficient for education suggesting that higher levels of education go together with lower crime rates, 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 positively

[22] As we have mentioned before *trust* scores are available at the NUTS 3 level and are merged with the 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*.

[23] There are also studies that do not report significant effects for participation in (voluntary) associations. For instance, Buonanno et al. (2009) found no significant effect of associational activity on theft and robbery. However, voter turnout is found to be negatively related to property crimes. See also Perkins et al. (1996). Note that our measure *charity* is different from the ones used in this literature and measures actual contributions in money terms rather than participation or membership.

correlated 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 unemployment rate, although the coefficient is statistically insignificant. Öster and Agell (2007) and Gould et al. (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.

As for the other explanatory variables, income inequality has no significant correlation with 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 et al., 2003; Chiu and Madden, 1998). In Section 4.4 we replicate the analysis by including the level of income as an additional control and show that this has very little impact on the coefficient of social capital.

As expected the percentage of recreational and shopping area has a positive and significant impact on crime (e.g., Jobes, 1999). This might be because there are more opportunities for criminals in such areas (e.g., Glaeser and Sacerdote, 1999). We also find a strong correlation between the percentage of coffeeshops in a municipality and crime rates. This could be due to several reasons. First, the probability of committing crime may increase under the influence of soft drugs. Soft drugs such as cannabis may act as a gateway to hard drugs such as cocaine and heroine and through this channel may affect criminality (e.g., Pudney, 2003). Second, coffeeshops attract disadvantaged persons, gang activity and drug dealers, which sets up an environment that supports criminal activity.

All in all, 65 percent of the variation in crime is explained by estimating equation (2) and about 10 percent of this variation is due to social capital. As Table A2.2 in Appendix 2 shows, the results are not bound to a specific choice of sample (see also Section 4.4.1). The added-variable plots, which reveal strong conditional correlations, are presented in Figure 2.

4.2 2SLS estimates

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 3 presents the 2SLS estimates. Columns (2), (5) and (8) present the first stages of the 2SLS estimations for the three social capital indices, respectively. The instruments in the first stage display 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 instruments are highly correlated with the instrumented variable, 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 close to the OLS estimates. The estimates also suggest that the causality runs from social capital to crime and that the historical state of a community shapes current social capital.

Complementary to the OLS results above, we present summary information on how individual indicators of social capital behave in 2SLS specifications. In Table 4, for each subsamples (population>30,000 and population>40,000) the first column shows the 2SLS coefficient derived from the estimation of equation (3). 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 4, F-tests for $foreign$, *divorce*, *vote* and *charity* are larger than (or within the proximity of) 10. Given this result, we can say that these indicators display better results compared to other social capital indicators because they show consistent and quite robust estimates in their relationship to crime. Blood donations do not perform as good as the ones above.

4.3 Different types of social capital

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 good social capital indicators.

Table A2.2 presents the coefficients of the alternative social capital indicators we consider for different subsamples. The survey indicators, *ppltrust*, *help*, $fair$ and *trustplc*, do not return a significant coefficient all the time. Another potentially interesting result is the cor-

relation between emigration and immigration and 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. Our indicator *movers* (capturing both effects) reflects residential instability in a community and it is positively correlated with crime, which is consistent with earlier works (e.g., Rose and Clear, 1998). In Akçomak and ter Weel (2008) we present detailed estimates for a variety of samples with different municipality size. All results are similar to the ones presented here.

Throughout the analysis we summarize 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. This can be seen from Table A3.1 in Appendix A.3. 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 larger NUTS3 regions to municipalities smaller in size. Our results also show that indicators of social control (divorce rates) and population 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, we can 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. The latter have been often used in cross-country studies explaining differences in outcomes, such as income, by differences in social capital.

4.4 Robustness

4.4.1 Subsamples

Several robustness checks are performed to validate the results. First, we replicate the analysis using different subsamples: 95 municipalities over 40,000 inhabitants; 63 municipalities over 50,000 inhabitants; 40 NUTS 3 regions and finally the 22 largest agglomerations in the Netherlands. This exercise reveals that there are no important differences affecting the results

discussed above and that our findings do not seem to be bound to a specific subsample. The results are summarized in Akçomak and ter Weel (2008) or available upon request from us.

4.4.2 Different types of crime

Besides analysis on the overall crime rates we also estimate equation (2) 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 5 presents the 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, only in the case of homicide the individual social capital indicators seem to have a weak effect. The only subcategory of crime that is found to be affected by all social capital indicators is serious assaults. Social capital does not have different effects on property and violent crimes. 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. The other indicators are sometimes loosely related to crime rates. This point should be taken as a point for caution for researchers who employ a single social capital indicator to explain differences in outcomes, as the results could depend on the selection of that particular indicator.

4.4.3 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 et al., 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 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. In Figure 4 the upper and the lower panel represent the 2SLS coefficients and the t-ratios respectively. We instrument each social capital indicator by

the remaining five social capital indicators to 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 for *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*, with the distributions of these coefficients and their t-ratios depicted as the first box-plot in the upper and lower panel of the figure, 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 (2) (see Table 2). The three vertical lines in the lower panel indicate the significance levels at the 1, 5 and 10 percent level.

From this exercise the following observations stand out. First, all the 2SLS coefficients are significant at the 5 percent level, as can be seen from the lower panel. This supports our argument that all 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 is specifically for this reason that we form 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 2.2.

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 6. One can see that the percentage of Protestants in 1859 is a powerful instrument for social capital. Population heterogeneity and number of schools in 1859 perform less well.

4.4.4 Differences in income

We also consider including income measures into the extended model. It might be the case that income levels rather than income inequality explains the variation in crime. Five different indicators of income are included separately in the regression analysis to assess the responsiveness of the coefficients of the three social capital indices. Figure 5 displays the summary results. Original standardized coefficients are compared to coefficients resulting from five estimations with an income indicator for the three SC indices. The inclusion of income indicators does not change the findings. Including income per person of full-time employees and income of non-western foreigners tends to reduce the SC coefficients slightly but not significantly.

4.4.5 Population heterogeneity

Crime rates could also display variance across ethnic communities. Keeping all other factors constant, assume that there are two communities with the same percentage of foreign residents 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 equation (2). When comparing different groups standardized coefficients could be misleading, so we calculate the actual impact on crime.

The results are as follows. The presence of one percent non-western foreigners is associated with 0.17 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 the total population. So, the presence of 10 percent non-western foreigners in a municipality accounts for 1.7 points of the average crime rate of about 5 points, i.e. about 30 percent of the overall crime rate. This trend may 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.[24] As can be seen from the graph, only in the case of theft and robbery the presence of non-western foreigners is associated with more crime. There are negligible differences between non-western and western foreigners for other crime categories.

Our strategy incorporates heterogeneity and divorce rates in a social capital index, which in a way means that these indicators affect outcomes through social capital. However, most empirical crime models assess the impact of these variables individually. For this reason, we reestimate equation (2) by OLS and 2SLS by including $divorce$, $foreign$ and the $SC3$ index in the same equation. The results are summarized in Table 7, rows (3) and (4). The first two rows in Table 7 present the coefficients from the original estimations. The presence of social capital is still 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.[25]

Our empirical strategy rests on the assumption that the exogenous variation in social capital depends on historical instruments. The 2SLS estimations take this exogenous variation into account, which assumes that historical instruments are the only indicators that matter. This is of course not entirely true. One way to deal with this problem is to run OLS estimations

[24] 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.

[25] In the estimations the effect of $foreign$ is found to be significant, whereas $divorce$ has no statistically significant effect. We also included other social capital indicators − *charity*, *vote* and *blood* − individually and together with $divorce$ and $foreign$. In this case only *charity* returned a significant coefficient.

controlling for historical instruments (e.g., Bloom et al., 2007). Rows (5) to (7) in Table 7 display summary results for the estimations when the three instruments are included as independent variables. Comparison of rows (5) to (7) with the first two rows shows that the results change slightly. Moreover, the findings also reinforce the quality of the instruments as the instruments do not have statistically significant effect on current crime levels.[26]

Finally, as a further robustness check, we omit the most influential observations using two criteria: Cook's D and Df Betas. For each criterion we first took out the most influential observation and then the first five most influential observations and re-estimated equation (2). Table 7, 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.

5 Conclusion

From a community governance perspective, social capital plays an important role in crime prevention by providing informal social control and support and due to network externalities. The presence of social capital provides community-oriented solutions to the crime problem and these solutions are important next to formal measures such as increasing expenditure on police or incarceration. Our findings are in line with Huck and Kosfeld (2007) who show that voluntary crime-watch programmes can act as an effective tool for community crime prevention complementing other formal tools. This research contributes to the literature by trying to isolate the effect of social capital on crime rates.

Our estimates for Dutch municipalities suggest that communities with higher levels of social capital have lower crime rates. We show that these estimates are robust and we have carefully examined 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 so heterogeneous across space.

We note that the empirical findings have limitations. Geography and spatial correlations may determine both social capital and crime. It might be easier to argue that crime levels in a municipality are affected by unemployment and income levels of neighbouring municipalities. However, it is not straightforward to assume that this holds for the relationship between social capital and crime as well. We consider municipalities as the unit of analysis, which still have geographical boundaries. We assume that crime is mostly a local phenomenon and criminals have better knowledge about the opportunities in cities that they live in, compared

[26] In the OLS specification, only the effect of $foreign1859$ is significant at the 10 percent level; $protestant1859$ and $\#school1859$ have no statistically significant impact on the current crime rate.

to crime opportunities in neighbouring cities. Moreover, ideally one should use panel data to infer causality from the data. Cross-sectional analysis has limitations in evaluating causality. Unfortunately, in our setting it is not possible to pursue panel analysis. This is because we do not have the data to do so and more importantly because social capital is a stock that does not change considerably from year to year, whereas variables such as inequality and unemployment do. Alternatively, we use an instrumental variable strategy to capture the exogenous variation in social capital. Our instruments pass overidentification tests, however this is not a bullet proof that the instruments are not correlated with unobserved factors that might affect crime as well. Having used many socio-economic indicators as right-handside variables, it is hard to find good instruments that is legitimate in both statistical and economic sense.

We use institutional development in the past to proxy for current levels of 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 to build social networks. This is an area in which policy makers do have impact by means of preventing people to drop out of schools and by setting up schemes to stimulate youth to stay out of unemployment.

References

Acemoglu, D., S. Johnson, and J. A. Robinson (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review 91*(5), 1369–1401.

Akçomak, I. S. and B. ter Weel (2008). The impact of social capital on crime: Evidence from the Netherlands. *IZA Discussion Paper No:3603 IZA Bonn*.

Akçomak, I. S. and B. ter Weel (2009). Social capital, innovation and growth: Evidence from Europe. *European Economic Review 53*(5), 544–567.

Alesina, A., R. Baqir, and W. Easterly (1999). Public goods and ethnic divisions. *Quarterly Journal of Economics 114*(4), 1243–1284.

Alesina, A. and E. La Ferrara (2000). Participation in heterogeneous communities. *Quarterly Journal of Economics 115*(3), 847–904.

Andreoni, J. (1995). Warm-glow versus cold-prickle: The effects of positive and negative framing on cooperation experiments. *Quarterly Journal of Economics 110*(1), 1–21.

Becker, G. (1968). Crime and punishment and economic approach. *Journal of Political Economy 76*(2), 169–217.

Beugelsdijk, S. (2005). A note on the theory and measurement of trust in explaining differences in economic growth. *Cambridge Journal of Economics 30*, 371–387.

Beyerlein, K. and J. R. Hipp (2005). Social capital, too much of a good thing? American religious traditions and community crime. *Social Forces 84*(2), 995–1013.

Bieleman, B. and H. Nayer (2005). Coffeeshops in Nederland 2005. *INTRAVAL, Report for the Dutch Ministry of Justice. Internet source accessed on 27.04.2007 available at http://www.intraval.nl/pdf/mcn05_b52.pdf*.

Bloom, N., R. Sadun, and J. Van Reenen (2007). Measuring and explaining decentralization across firms and countries. *Internet source accessed on 15.06.2008 available at http://www.stanford.edu/ nbloom/decent.pdf*.

Bourguignon, F., J. Nuñez, and F. Sanchez (2003). A structural model of crime and inequality in Colombia. *Journal of the European Economic Association 1*(2-3), 440–449.

Bowles, S. and H. Gintis (2002). Social capital and community governance. *Economic Journal 112*(483), F419–F436.

Buonanno, P., D. Montolio, and P. Vanin (2009). Does social capital reduce crime? *Journal of Law and Economics 52*(1), 145–170.

Bursik, R. J. and H. G. Grasmick (1993). *Neighborhoods and Crime: The Dimensions of Effective Community Control*. Lexington Books.

Case, A. C. and L. F. Katz (1991). The company you keep: The effect of family and neighborhood on disadvataged youth. *National Bureau of Economic Research Working Paper No. 3705*.

Chiu, W. H. and P. Madden (1998). Burglary and income inequality. *Journal of Public Economics 69*(1), 123–141.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, S95–S120.

Dohmen, T., A. Falk, D. Huffman, and U. Sunde (2006). The intergenerational transmission of risk and trust attitudes. *IZA Discussion Paper No:2380 IZA Bonn*.

Easterly, W. and R. Levine (1997). Africa's growth tragedy: Policies and ethnic divisions. *Quarterly Journal of Economics 112*(4), 1203–1250.

Ehrlich, I. (1973). Participation in illegitimate activities: A theoretical and empirical investigation. *Journal of Political Economy 81*(3), 521–565.

Evans, W. N., E. O. Wallace, and R. M. Schwab (1992). Measuring peer group effects: A study of teenage behavior. *Journal of Political Economy 100*(5), 966–991.

Fafchamps, M. (1996). The enforcement of commercial contracts in Ghana. *World Development 24*(3), 427–448.

Fafchamps, M. (2004). *Market Institutions in Sub-Saharan Africa*. Cambridge: MIT Press.

Falk, A. (2004). Charitable giving as a gift exchange: Evidence from a field experiment. *IZA Discussion Paper No: 1148*, IZA–Bonn.

Freeman, R. (1999). The economics of crime. In O. Ashenfelter and D. Card (Eds.), *Handbook of Labor Economics*, pp. 3529–3571. Amsterdam: Elsevier.

Freeman, R. B. (1996). Why do so many young American men commit crimes and what might we do about it? *Journal of Economic Perspectives 10*(1), 25–42.

Fryer, R. G., P. S. Heaton, S. D. Levitt, and K. M. Murphy (2005). Measuring the impact of crack cocaine. *NBER Working Paper, No: 11318*.

Fukuyama, F. (1996). *Trust. The Social Virtues and the Creation of Prosperity*. New York: Free Press Paperbacks.

Gatti, U., R. E. Tremblay, and D. Larocque (2003). Civic community and juvenile delinquency. a study of regions of italy. *British Journal of Criminology 43*(1), 22–40.

Gibbons, S. (2007). The cost of urban property crime. *Economic Journal 114*(November), F441–F463.

Glaeser, E. L., D. I. Laibson, J. A. Scheinkman, and C. L. Soutter (2000). Measuring trust. *Quarterly Journal of Economics 115*(3), 811–846.

Glaeser, E. L. and B. Sacerdote (1999). Why is there more crime in cities? *Journal of Political Economy 107*(6), S225–S258.

Glaeser, E. L., B. Sacerdote, and J. A. Scheinkman (1996). Crime and social interactions. *Quarterly Journal of Economics 111*(2), 507–548.

Goldin, C. and L. F. Katz (1999). Human capital and social capital: The rise of secondary schooling in America, 1910-1940. *Journal of Interdisciplinary History 29*(4), 683–723.

Gould, E. D., B. A. Weinberg, and D. B. Mustard (2002). Crime rates and local labor market opportunities in the United States: 1979-1997. *Review of Economics and Statistics 84*(1), 45–61.

Gradstein, M. and M. Justman (2000). Human capital, social capital, and public schooling. *European Economic Review 44*(4-6), 879–890.

Gradstein, M. and M. Justman (2002). Education, social cohesion, and economic growth. *American Economic Review 92*(4), 1192–1204.

Grogger, J. (1998). Market wages and youth crime. *Journal of Labor Economics 16*(4), 756–791.

Guiso, L., P. Sapienza, and L. Zingales (2004). The role of social capital in financial development. *American Economic Review 94*(3), 526–56.

Guiso, L., P. Sapienza, and L. Zingales (2008a). Long term persistence. *University of Chicago Graduate School of Business Research Paper No. 08-11*.

Guiso, L., P. Sapienza, and L. Zingales (2008b). Social capital as good culture. *Journal of the European Economic Association 6*(2-3), 295–320.

Hirschi, T. (1969). *Causes of Delinquency*. Berkley, CA: University of California Press.

Huck, S. and M. Kosfeld (2007). The dynamics of neighbourhood watch and norm enforcement. *Economic Journal 117*(January), 270–286.

Jobes, P. C. (1999). Residential stability and crime in small rural agricultural and recreational towns. *Sociological Perspectives 42*(3), 499–524.

Knack, S. and P. Keefer (1997). Does social capital have an economic payoff? A cross-country investigation. *Quarterly Journal of Economics 112*(4), 1251–1288.

Kornhauser, R. R. (1978). *Social Sources of Delinquency: An Appraisal of Analytic Model*. Chicago: University of Chicago Press.

Land, K. C., P. L. McCall, and L. E. Cohen (1990). Structural covariates of homicide rates: Are there any invariance across time and space. *American Journal of Sociology 95*(4), 922–963.

Lederman, D., N. Loayza, and A. M. Menendez (2002). Violent crime: Does social capital matter? *Economic Development and Cultural Change 50*(3), 509–539.

Levitt, S. D. (2004). Understanding why crime fell in the 1990s: Four factors that explain the decline and six that do not. *Journal of Economic Perspectives 18*(1), 163–190.

Liska, A. E. and B. Warner (1991). Functions of crime: A paradoxical process. *American Journal of Sociology 96*(6), 1441–63.

Lochner, L. and E. Moretti (2004). The effect of education on crime: Evidence from prison inmates, arrests, and self-reports. *American Economic Review 94*(1), 155–189.

Macmillan, R. (1995). Changes in the structure of life courses and the decline of social capital in Canadian society: A time analysis of property crime rates. *Canadian Journal of Sociology 20*(1), 51–79.

Manski, C. F. (2000). Economic analysis of social interactions. *Journal of Economic Perspectives 14*(3), 115–136.

Mauro, P. (1995). Corruption and growth. *Quarterly Journal of Economics 110*(3), 681–712.

McCarthy, B. and J. Hagan (2001). When crime pays: Capital, competence and criminal success. *Social Forces 79*(3), 1035–1060.

McLanahan, S. and G. Sandefur (1994). *Growing Up with a Single Parent: What Hurts, What Helps*. Cambridge MA: Harvard University Press.

Mellstrom, C. and M. Johannesson (2008). Crowding out in blood donation: Was Titmuss right? *Journal of the European Economic Association 6*(4), 845–863.

Messner, S. F., E. P. Baumer, and R. Rosenfeld (2004). Dimensions of social capital and rates of criminal homicide. *American Sociological Review 69*(December), 882–903.

Öster, A. and J. Agell (2007). Crime and unemployment in turbulent times. *Journal of the European Economic Association 5*(4), 752–775.

Owen, A. L. and J. Videras (2009). Reconsidering social capital: A latent class approach. *Empirical Economics 37*(3), 555–582.

Parcel, T. L. and E. G. Menaghan (1994). Early parental work, family social capital, and early-childhood outcomes. *American Journal of Sociology 99*(4), 972–1009.

Perkins, D. D., B. B. Brown, and R. B. Taylor (1996). The ecology of empowerment: Predicting participation in community organizations. *Journal of Social Issues 52*(1), 85–110.

Platteau, J. P. (1994). Behind the market stage where real societies exist: Part I - the role of public and private order institutions. *Journal of Development Studies 30*(3), 533–577.

Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology 24*, 1–24.

Pudney, S. (2003). The road to ruin? sequences of initiation to drugs and crime in britain. *Economic Journal 113*(March), C182–C198.

Putnam, R. D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton NJ: Princeton University Press.

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy 6*, 65–78.

Putnam, R. D. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster.

Rose, D. R. and T. R. Clear (1998). Incarceration, social capital, and crime: Implications for social disorganization theory. *Criminology 36*(1), 441–479.

Rosenfeld, R., S. F. Messner, and E. P. Baumer (2001). Social capital and homicide. *Social Forces 80*(1), 283–310.

Rupasingha, A., S. J. Goetz, and D. Freshwater (2002). Social and institutional factors as determinants of economic growth: Evidence from the United States counties. *Papers in Regional Science 81*(2), 139–155.

Sabatini, F. (2008). Social capital as social networks: A framework for measurement and an empirical analysis of its determinants and consequences. *forthcoming in the Journal of Socio-Economics*.

Saegert, S., G. H. Winkel, and C. Swartz (2002). Social capital and crime in New York city's low-income housing. *Housing Policy Debate 13*(1), 189–226.

Sampson, R. J. and W. B. Groves (1988). Local friendship ties and community attachment in mass society: A multilevel systemic model. *American Sociological Review 53*(5), 766–779.

Sampson, R. J. and W. B. Groves (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology 94*(4), 774–802.

Sampson, R. J., J. D. Morenoff, and F. Earls (1999). Beyond social capital: Spatial dynamics of collective efficacy for children. *American Sociological Review 64*(5), 633–660.

Sampson, R. J., S. W. Raudenbush, and F. Earls (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science 277*, 918–924.

Soares, R. R. (2004). Development, crime and punishment: Accounting for international differences in crime rates. *Journal of Development Economics 73*(1), 155–184.

Staiger, D. and J. H. Stock (1997). Instrumental variables regression with weak instruments. *Econometrica 65*(3), 557–86.

Svendsen, G. T. and C. Bjørnskov (2007). How to construct a robust measure of social capital: Two

contributions. *Journal of Comparative Policy Analysis 9*(3), 275–292.

Tabellini, G. (2005). Culture and institutions: Economic development in the regions of Europe. *Working Paper Bocconi University and IGIER*.

Tabellini, G. (2008a). Institutions and culture. *Journal of the European Economic Association 6*(2-3), 255–294.

Tabellini, G. (2008b). The scope of cooperation: Values and incentives. *Quarterly Journal of Economics 123*(3), 905–950.

Taylor, R. B., S. D. Gottfredson, and S. Brower (1984). Block crime and fear: Defensible space, local social ties, and territorial functioning. *Journal of Research in Crime and Delinquency 21*(2), 303–331.

Titmuss, R. M. (1970). *The Gift Relationship: From Human Blood to Social Policy*. Berkley: George Allen and Unwin.

Vollaard, B. and P. Koning (2009). The effect of police on crime, disorder and victim precaution. Evidence from a Dutch victimization survey. *International Review of Law and Economics 29*(4), 336–348.

Williams, J. and R. C. Sickles (2002). An analysis of the crime as work model: Evidence from the 1958 Philadelphia birth cohort study. *Journal of Human Resources 37*(3), 479–509.

Woessmann, L. and O. S. Becker (2009). Was Weber wrong: A human capital theory of Protestant economic history. *Quarterly Journal of Economics 124*(2), 531–596.

Wolpin, K. I. (1978). An economic analysis of crime and punishment in England and Wales, 1894-1967. *Journal of Political Economy 86*(5), 815–840.

Zak, P. J. and S. Knack (2001). Trust and growth. *Economic Journal 111*(470), 295–321.

Zucker, L. G. (1986). Production of trust: Institutional sources of economic structure, 1840-1920. *Research in Organizational Behavior 8*, 53–111.

Table 1: Correlations among social capital indicators for 142 municipalities

	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 2: OLS results for crime and alternative indicators of social capital

	(1)	(2)	(3)	(4)	(5)	(6)
charity	-0.331					
	(0.090)***					
blood		-0.170				
		(0.073)**				
vote			-0.317			
			(0.070)***			
trust				-0.206		
				(0.121)*		
foreign					0.514	
					(0.089)***	
divorce						0.252
						(0.097)**
density	0.203	0.370	0.263	0.363	0.063	0.280
	(0.067)***	(0.059)***	(0.062)***	(0.063)***	(0.071)	(0.075)***
education	-0.047	-0.127	-0.051	-0.086	-0.036	-0.107
	(0.064)	(0.069)*	(0.061)	(0.071)	(0.053)	(0.066)
unemp	-0.025	-0.021	-0.029	-0.030	-0.021	-0.020
	(0.033)	(0.035)	(0.032)	(0.033)	(0.034)	(0.033)
young	0.098	0.114	0.095	0.072	0.106	0.029
	(0.080)	(0.095)	(0.088)	(0.086)	(0.085)	(0.097)
inequality	-0.030	-0.099	0.068	-0.065	0.016	-0.058
	(0.055)	(0.057)*	(0.060)	(0.056)	(0.052)	(0.058)
shop	0.117	0.146	0.148	0.147	0.178	0.092
	(0.056)**	(0.058)**	(0.054)***	(0.062)**	(0.052)**	(0.057)
recrat	0.136	0.178	0.177	0.163	0.139	0.155
	(0.062)**	(0.067)***	(0.065)***	(0.071)**	(0.056)**	(0.059)***
cofshop	0.244	0.248	0.241	0.282	0.147	0.216
	(0.069)***	(0.063)***	(0.068)***	(0.070)***	(0.055)***	(0.068)***
Constant	0.014	0.014	0.014	0.029	0.014	0.014
	(0.050)	(0.052)	(0.050)	(0.055)	(0.046)	(0.051)
n	142	142	142	142	142	142
R-squared	0.67	0.63	0.66	0.62	0.71	0.64
Adj R sqr	0.64	0.61	0.63	0.59	0.69	0.62

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Dependent variable is the overall crime rate. Coefficients are standardized coefficients.

Table 3: OLS and 2SLS results for crime and social capital

	(1) OLS	(2) 1st stage SC1	(3) 2SLS crime	(4) OLS	(5) 1st stage SC2	(6) 2SLS crime	(7) OLS	(8) 1st stage SC3	(9) 2SLS crime
SC1	-0.260		-0.295						
	(0.047)***		(0.076)***						
SC2				-0.240		-0.328			
				(0.049)***		(0.081)***			
SC3							-0.286		-0.341
							(0.055)***		(0.081)***
density	0.124	-0.841	0.089	0.225	-0.511	0.167	0.197	-0.524	0.162
	(0.069)*	(0.133)***	(0.086)	(0.063)***	(0.111)***	(0.072)**	(0.063)***	(0.098)***	(0.074)**
education	-0.025	0.294	-0.013	-0.028	0.314	0.003	-0.039	0.230	-0.025
	(0.056)	(0.091)***	(0.048)	(0.062)	(0.077)***	(0.057)	(0.059)	(0.073)***	(0.053)
unemp	-0.043	-0.085	-0.048	-0.050	-0.129	-0.065	-0.035	-0.059	-0.039
	(0.033)	(0.060)	(0.035)	(0.033)	(0.063)**	(0.036)*	(0.033)	(0.048)	(0.035)
young	0.118	0.134	0.128	0.145	0.279	0.182	(0.132)	0.167	0.149
	(0.091)	(0.127)	(0.089)	(0.088)	(0.099)***	(0.091)**	(0.088)	(0.093)*	(0.086)*
inequality	0.045	0.318	0.063	0.028	0.314	0.069	0.038	0.301	0.062
	(0.054)	(0.104)***	(0.061)	(0.054)	(0.099)***	(0.063)	(0.055)	(0.080)***	(0.062)
shop	0.145	0.024	0.148	0.165	0.121	0.180	0.143	0.030	0.146
	(0.053)***	(0.095)	(0.051)***	(0.057)***	(0.097)	(0.056)***	(0.054)***	(0.076)	(0.053)***
recrat	0.135	-0.026	0.129	0.146	-0.001	0.135	0.154	0.045	0.149
	(0.056)**	(0.111)	(0.056)**	(0.063)**	(0.081)	(0.063)**	(0.062)**	(0.072)	(0.061)**
cofshop	0.190	-0.330	0.179	0.245	-0.130	0.235	0.226	-0.188	0.217
	(0.060)***	(0.097)***	(0.062)***	(0.064)***	(0.077)*	(0.062)***	(0.065)***	(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)	
Constant	0.014	0.000	0.014	0.014	0.000	0.014	0.014	0.000	0.014
	(0.047)	(0.088)	(0.046)	(0.049)	(0.080)	(0.048)	(0.048)	(0.069)	(0.047)
n	142	142	142	142	142	142	142	142	142
Adj R sqr	0.68	0.66	0.68	0.67	0.53	0.64	0.68	0.61	0.66
R-squared	0.70	0.69		0.65	0.57		0.66	0.64	
F-test instrm.		16.18***			17.43***			25.16***	
overid			4.41 (0.11)			3.28 (0.19)			2.11 (0.34)

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Dependent variable is the overall crime rate. All variables are standardized. Columns 1, 4 and 7 present the results from the OLS estimation and columns 2, 5 and 8 are the first stage results. 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 4: Different social capital indicators in the 2SLS specification

	pop>40,000		pop>30,000	
	2SLS	F-test	2SLS	F-test
SC1	-0.288	17.73***	-0.295	16.18***
	(0.073)***		(0.076)***	
SC2	-0.340	17.55***	-0.328	17.43***
	(0.081)***		(0.081)***	
SC3	-0.383	20.88***	-0.341	25.16***
	(0.085)***		(0.081)***	
charity	-0.744	6.71***	-0.684	8.23***
	(0.197)***		(0.191)***	
blood	-0.878	3.42**	-0.821	3.03**
	(0.274)***		(0.263)***	
vote	-0.456	31.37***	-0.387	38.80***
	(0.122)***		(0.101)***	
foreign	0.524	7.89***	0.543	7.84***
	(0.204)**		(0.190)***	
divorce	0.486	6.07***	0.777	2.61*
	(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 3) 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 joint significance test of the instruments in the first stage. For instance the coefficient of SC1 (third column, first row) and the. corresponding F-test comes from the estimation in Table 3 column 3. All other coefficients are estimated in a similar manner: estimating the 2SLS model by replacing the social capital indicator, obtaining the coefficient of the social capital indicator and the corresponding F-test. More detailed results are available from the authors upon request.

Table 5: Summary results for crime categories and indicators of social capital

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

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

The significance levels derive from the estimation of equation (2) for each crime category and each social capital indicator.

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

	SC1		SC2		SC3	
	(1) 1st stage SC1	(2) 2SLS crime	(3) 1st stage SC2	(4) 2SLS crime	(5) 1st stage SC3	(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 3) when it is estimated by including the instruments individually rather than as a group of three. For instance, the coefficients and the F-test in first row and columns 1 and 2 comes from the estimation of the 2SLS specification instrumenting SC1 by only foreing1859. The remaining numbers are obtained in a similar manner. More detailed results are available from the authors upon request.

Table 7: Alternative specifications to explain differences in crime rates

		SC1	SC2	SC3
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
foreign are included				(0.064)**
as independent	(4) 2SLS			-0.227
variables				(0.121)*
When historical	(5) OLS	-0.249		
variables are		(0.055)***		
included as	(6) OLS		-0.213	
independent variables			(0.057)***	
	(7) OLS			-0.263
				(0.067)***
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)***

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Dependent variable is the overall crime rate. The coefficients derive from the estimations of different specifications of equations 2 and 3.

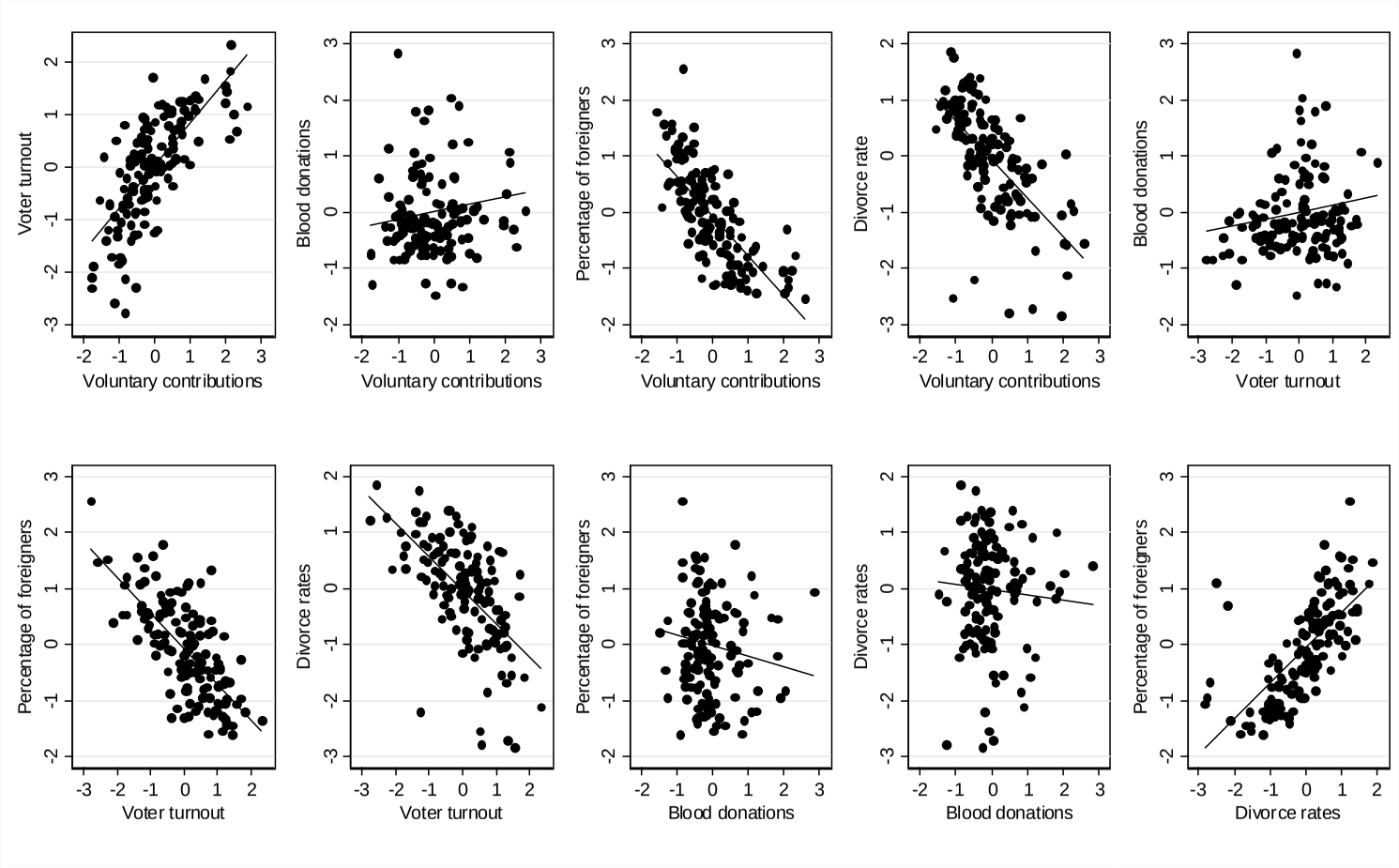

Figure 1: Scatterplots of social capital indicators for 142 municipalities

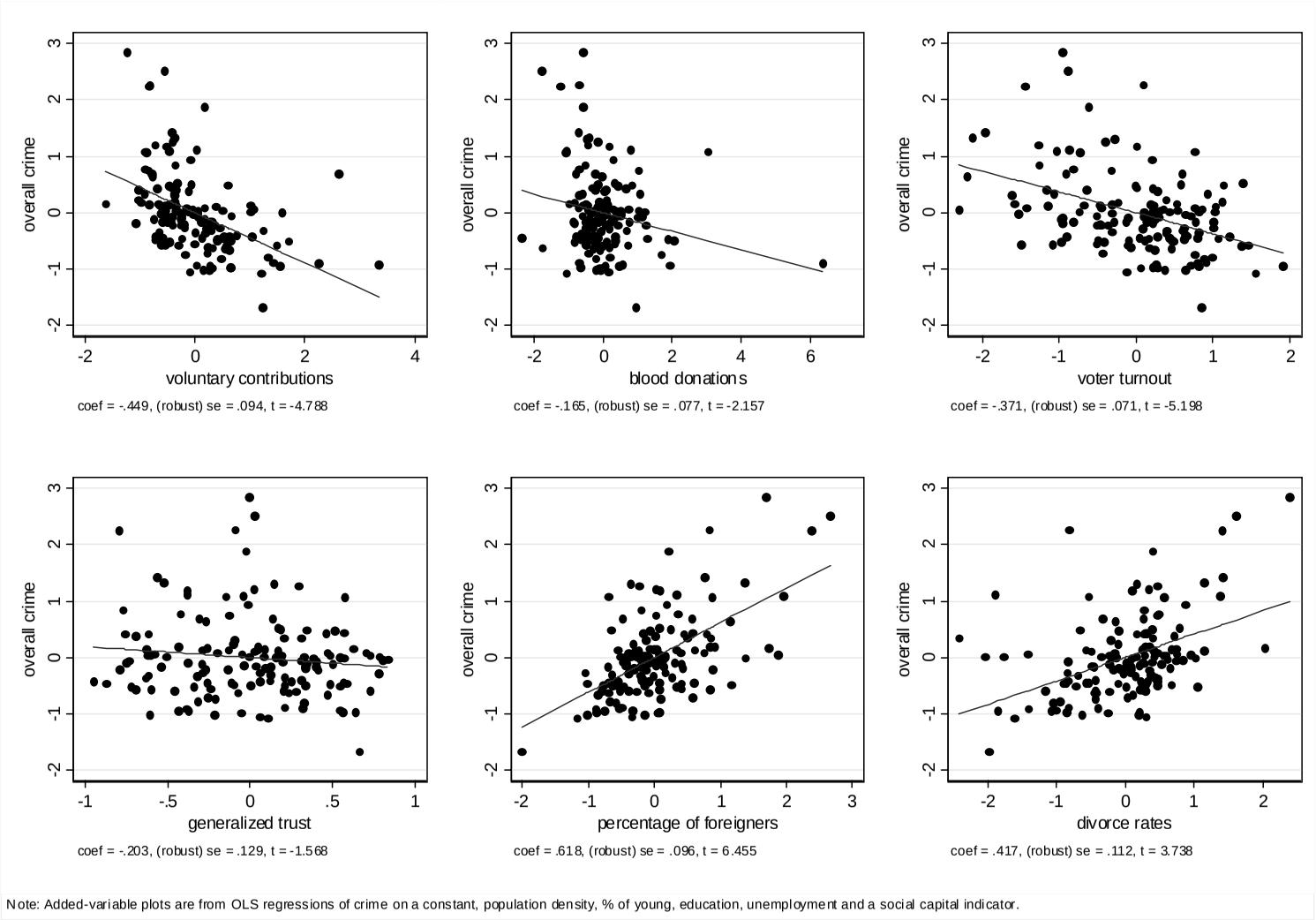

Figure 2: Overall crime and social capital indicators for 142 municipalities

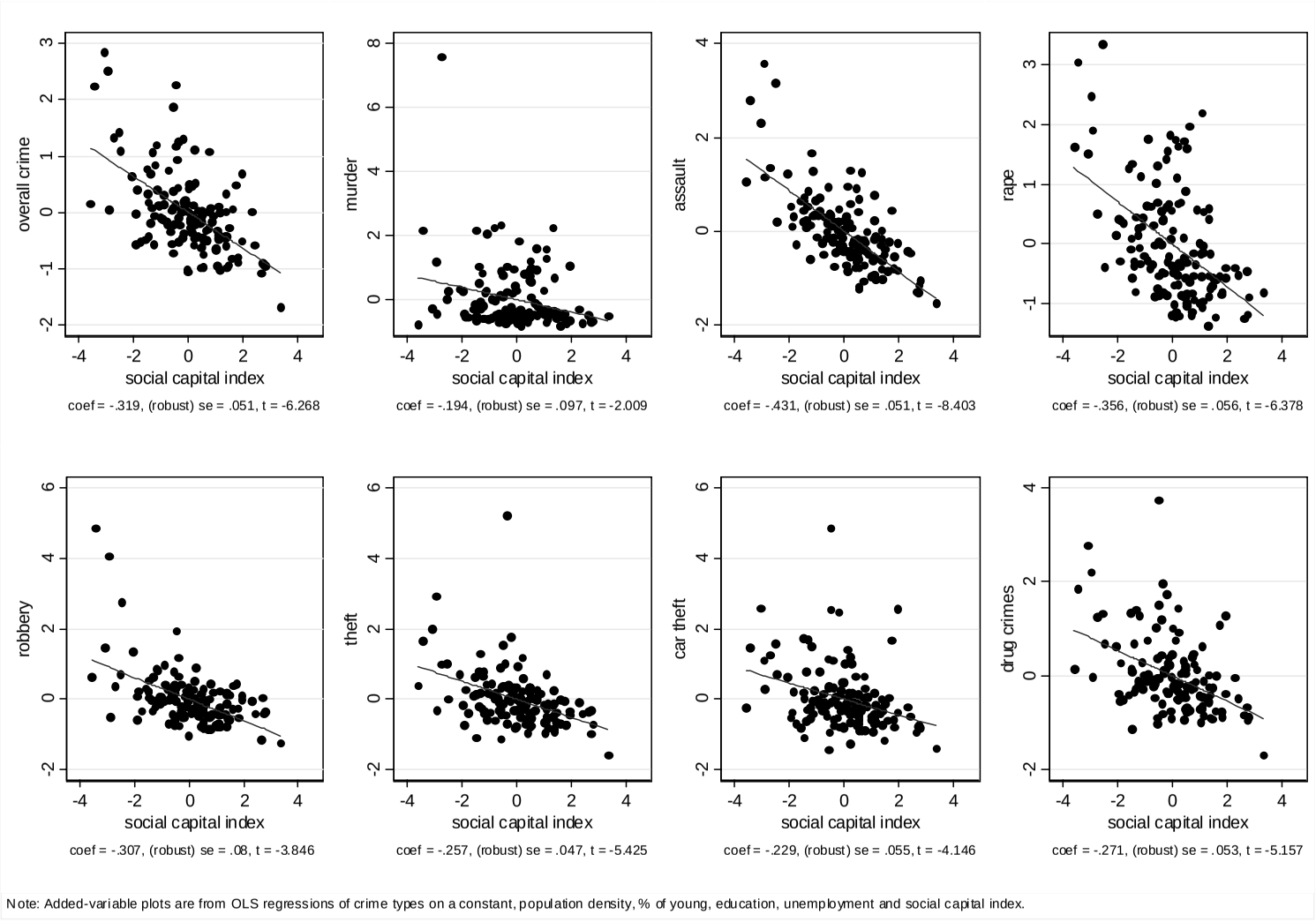

Figure 3: Crime categories and social capital for 142 municipalities

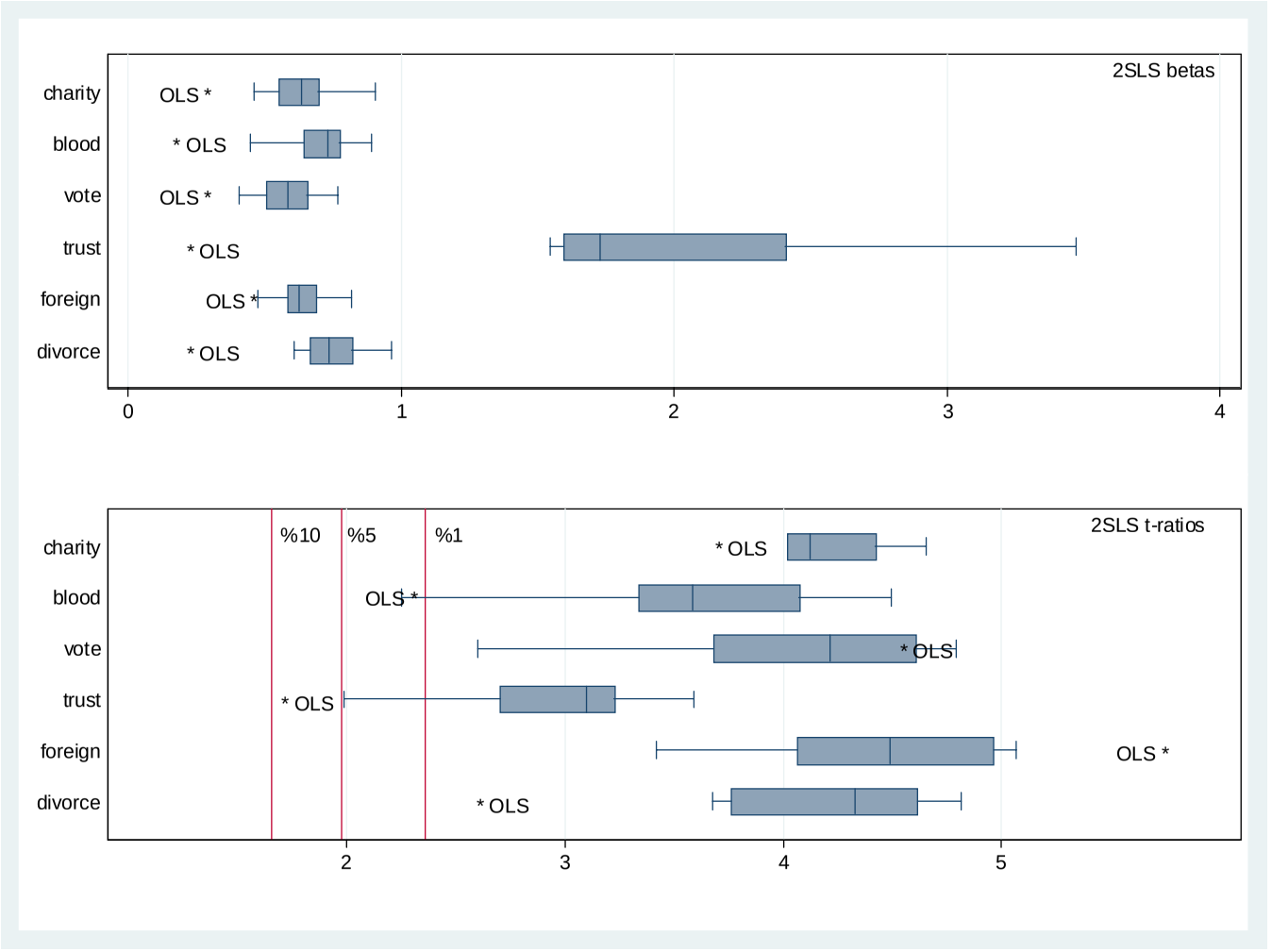

Figure 4: Distribution of 2SLS coefficients and t-ratios extracted from the robustness check

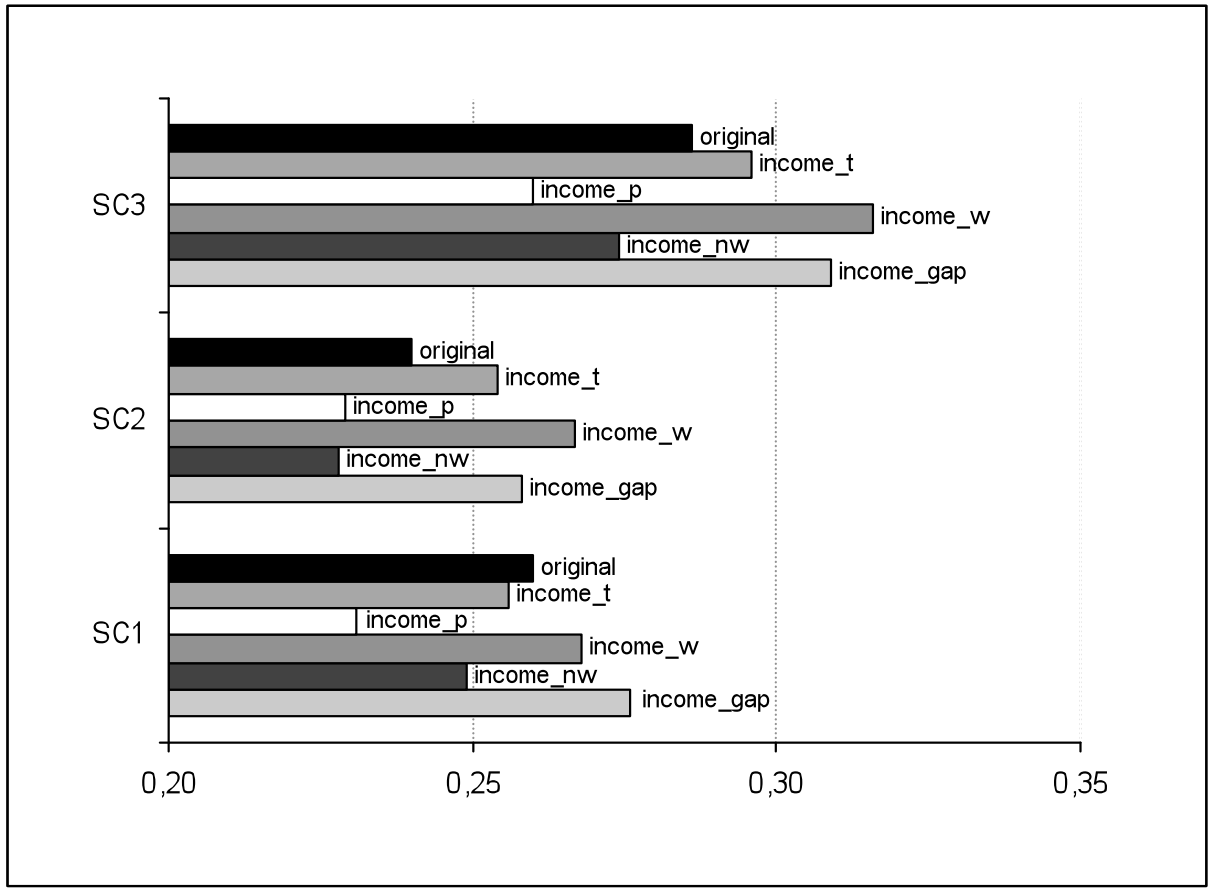

Figure 5: Standardized coefficients of SC when controlled for different indicators of income

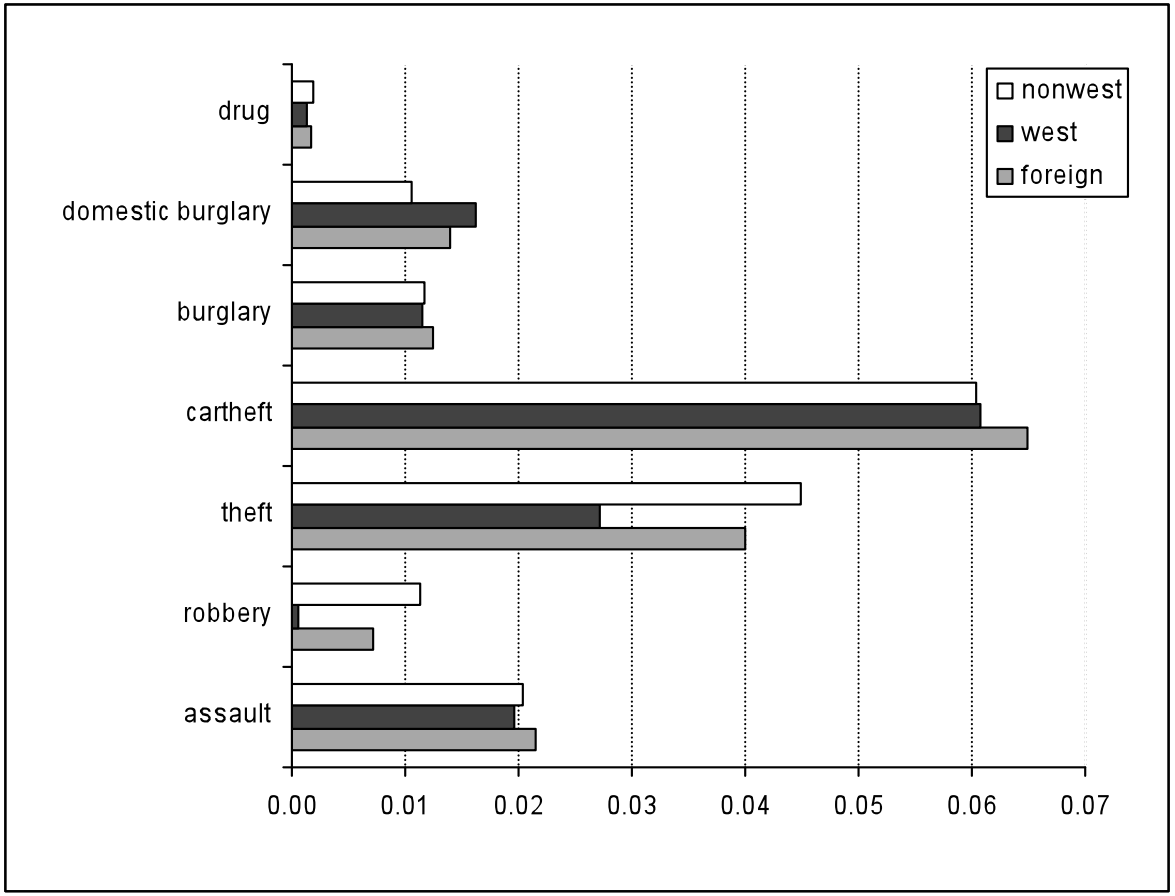

Figure 6: Origin of foreigners and differences in crime rates

Appendix

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 A.2 for details.
blood	Blood donations per 100 inhabitants in 2005. Source: See Appendix A.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 A.2 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 A.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 A.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 A.2 for details. Source: ESS 2002 and 2004 round
trustplc	Confidence in police. See Appendix A.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 A.2 for details.
SC2	First principal component of four social capital indicators: *charity*, *blood*, *vote* and *trust*. See Appendix A.2 for details.

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

Variable	Definition
SC3	First principal component of three social capital indicators: *charity*, *blood* and *vote*. See Appendix A.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 A.4 for details. Source: Volkstellingen Archief.
protestant1859	Percentage of Protestants in the total population in 1859. See Appendix A.4 for details. Source: Volkstellingen Archief.
#school1859	Number of schools per 100 inhabitants in 1859. See Appendix A.4 for details. Source: Volkstellingen Archief.
crime	Crime rates including all recorded crimes in 2002. See Appendix A.3 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.
income_p	income per person (no distinction between full time and part-time employment) in 2002. Source: CBS.
income_t	income per person (of those who work full year) in 2002. Source: CBS.
income_w	income per person of western origin (of those who work full year) in 2002. Source: CBS.
income_nw	income per person of non-western origin (of those who work full year) in 2002. Source: CBS.
income_gap	*income_w* / *income_nw*.

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

A.2 Detailed estimation results

Table A2.1: Summary statistics for 142 municipalities

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 A2.2: Summary results for alternative indicators of social capital (OLS)

	pop>30,000	NUTS3	pop>50,000	pop>40,000
charity	-0.331	-0.398	-0.400	-0.421
	(0.090)***	(0.078)***	(0.078)***	(0.079)***
blood	-0.170	-0.390	-0.208	-0.190
	(0.073)**	(0.116)***	(0.075)***	(0.076)**
vote	-0.317	-0.463	-0.339	-0.316
	(0.070)***	(0.117)***	(0.102)***	(0.079)***
trust	-0.206	-0.241	-0.575	-0.420
	(0.121)*	(0.102)**	(0.266)**	(0.171)**
foreign	0.514	0.431	0.388	0.471
	(0.089)***	(0.139)***	(0.094)***	(0.093)***
divorce	0.252	0.497	0.132	0.210
	(0.097)**	(0.151)***	(0.123)	(0.111)*
SC1	-0.260	-0.339	-0.255	-0.255
	(0.047)***	(0.083)***	(0.050)***	(0.047)***
SC2	-0.240	-0.365	-0.285	-0.257
	(0.049)***	(0.075)***	(0.054)***	(0.049)***
SC3	-0.286	-0.402	-0.289	-0.305
	(0.055)***	(0.080)***	(0.058)***	(0.055)***
ppltrust	-0.105	-0.291	-0.389	-0.297
	(0.112)	(0.136)**	(0.257)	(0.167)*
help	-0.172	-0.135	-0.360	-0.301
	(0.101)*	(0.093)	(0.200)*	(0.128)**
fair	-0.194	-0.173	-0.479	-0.365
	(0.118)	(0.081)**	(0.253)*	(0.164)**
trustplc	-0.518	-0.215	-0.652	-0.677
	(0.181)***	(0.093)**	(0.419)	(0.272)**
immig	0.217	0.160	0.137	0.179
	(0.083)**	(0.133)	(0.082)	(0.077)**
emmig	0.207	0.335	0.150	0.169
	(0.076)***	(0.133)**	(0.074)**	(0.076)**
movers	0.236	0.409	0.153	0.195
	(0.090)***	(0.125)***	(0.073)**	(0.081)**
n	142	40	63	95

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The coefficients are standardized coefficients deriving from the estimation of equation (2) for each social capital indicator. For instance, the coefficient of charity in first row, first column is obtained from the estimation of the OLS specification (equation 2) with charity as and indicator of social capital. All other coefficients are obtained in similar manner by estimating equation 2 by replacing SC with different social capital indicators in the table.

A.3 Social capital indicators

We benefit from four social capital indicators. The data on voluntary contributions per household is available from Centraal Bureau Fondsenwerving at the municipality level from 2000 to 2005 via [http://www.cbf.nl//Database_goede_doelen/2_Collectegegevens_Gemeenten.php]. 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.

Data on voter turnout of the elections for the Lower House (Tweede Kamer) in 2003 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]. It is calculated as the number of votes divided by the number of inhabitants eligible to vote multiplied by 100.

We collected data on 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 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 neighbourhood. However, in all cases there is more than one neighbour municipality in which the inhabitants can possibly donate blood. In such cases we divide the population of that municipality by the number of neighbours and recorded the inhabitants of that municipality to other neighbour municipalities as if they reside there. Once we replicate 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 neighbour 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 aggregate the corrected blood donations data at the municipality level to 40 NUTS3 regions and proceed employing this measure.

Fourth, we use a set of indicators from the European Social Surveys (ESS), 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 use an equal weighted average to construct a trust index *(trust)* from three questions. 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. 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. 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 use 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.

Including the indicators to measure the absence of social capital − the percentage of divorces and the percentage of foreigners in the total population − we end up with six indicators. Out of these seemingly unrelated indicators we construct several social capital indices by using principal component analysis (PCA). We first include 6 indicators, *charity*, *blood*, *vote*, *trust*, $foreign$ and *divorce*, to form an all inclusive measure and labeled it as $SC1$. Then we include 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 construct 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 construct 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 do 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 A3.1 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 A3.1: 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.4 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 the 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 A4.1: 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	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 do 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 A4.2: 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.5 Historical data

The major source of the historical data we use 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 used 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 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 use 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 A5.1: 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
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

Table A5.1: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
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
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

Table A5.1: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
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
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

Table A5.1: Social capital and historical data for municipalities with more than 30,000 inhabitants (continued)

code	nuts3	municipality	charity	blood	vote	trust	foreign1859	protestant1859	#school1859
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
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.