

DOES SOCIAL CAPITAL REDUCE CRIME?[‡]

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June, 21, 2006

Abstract

We investigate the effects of civic norms and associational networks on crime rates. Through their impact on trust and economic development, civic norms may raise the expected returns to crime, but they may also increase its opportunity cost and the feelings of guilt and shame attached to it. Associational networks may increase returns to non-criminal activities and raise detection probabilities, but they may also provide communication channels for criminals. The empirical assessment of these effects poses serious problems of endogeneity, omitted variables and measurement error. Italy's great variance in social and economic characteristics, its homogeneity in policies and institutions, and the availability of historical data on social capital in its regions allow us to minimise the first two problems. To tackle the third one, we exploit high and stable report rates for some forms of property crime. Once we address these problems, we find that both civic norms and associational networks have a negative and significant impact on property crimes across Italian provinces.

JEL-Classification: A14, K42, Z13

Key-words: Civic norms, Associational networks, Property crime, Italy

[‡] We thank Robert Putnam for providing his data on social capital in Italy, and Federico Cingano and participants to a conference in Bologna for useful comments. Usual disclaimers apply.

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1. Introduction

Crime and the fear it generates are among the most important determinants of individual welfare and of the expected returns to many economic activities. It is both intuitive and confirmed by recent theoretical literature that individual choices of crime participation may be significantly affected by the presence of civic norms and associational networks. Yet it is not a priori clear whether their effect should be expected to be positive or negative. Indeed, while civic norms may attach guilt and shame to criminal behaviour, they may also stimulate trust in others, lower resources and effort devoted to self-defence and thus multiply opportunities for crime. Similarly, associational networks may increase returns to non-criminal activities and raise detection probabilities, but they may also work as communication channels for criminals. Further, whatever the empirical correlation, one may wonder whether it reflects a causal link, in what direction and with what implications for anti-crime policy. Yet such questions have received little attention, particularly by economists.¹ This is especially surprising in light of the recent economic literature on the micro-effects on crime of some forms of social interaction, like peer effects, neighbourhood effects, family background effects, and so on, and, more importantly, in light of the increasing relevance in the economic debate of the concept of social capital, often conceived in terms of social norms and networks that favour coordination and cooperation.

Starting from the seminal work by Putnam (1993) on the role of social capital for government well functioning, several contributions in this literature have focused on Italian data.² This is due to the fact that Italy displays large and persistent provincial disparities in social and economic characteristics in spite of having common policies, institutions, laws, justice system and school system, of having police forces organised at national level, and of being ethnically and religiously quite homogeneous. Thus, changes in these factors are not responsible for socio-economic differences across Italian provinces, and this in turn substantially reduces the omitted variable problems affecting many cross-country studies.³

In this paper we exploit provincial level variations in civic norms and associational networks in Italy to investigate their effects on crime rates. We focus on property crimes, because they are more likely to depend on economic motivations than violent crimes. Since social characteristics in Italy are often peculiar traits of single cities, provincial data are probably best suited to capture social capital in this country. We are not aware of any previous studies on the impact of social capital on crime in Italian provinces.⁴

Several studies, from Knack and Keefer (1997) to Bjørnskov (2006), find empirically that social capital is best described as a collection of three main dimensions, namely generalised trust, civic norms and associational networks, and that these dimensions have different impacts on economic outcomes. Since our aim is to study the latter two dimensions, we separately consider provincial level measures of cultural and

¹ In Section 2.3 we discuss more in depth these mechanisms, together with some recent empirical works by sociologists and criminologists, which start to address these questions.

² Among others, two recent examples are Guiso *et al.* (2004) and Peri's (2004) investigations of the role of social capital for financial and economic development.

³ For instance, in Lederman's (2002) cross-country investigation of the relationship between social capital and crime it is difficult to disentangle what is due to differences in social capital from what is due to different institutional settings.

⁴ Gatti, Tremblay and Larocque (2003) investigate the relationship between 'civicness' and juvenile crime in Italian regions, but their use of regional data imposes serious limitations. Moreover, they do not adequately tackle endogeneity.

recreational associations, voluntary associations, voter turnout at referenda and blood donations.⁵ To account for criminal networks, we also include a measure of criminal association. In our estimates we control for other major socioeconomic determinants of crime rate, such as income, unemployment rate, education, urbanisation rate, share of youth and clear-up rate. Furthermore, we control for time-invariant local determinants (geographical dummies) and for the length of judicial proceedings, which exhibits great variability across provinces.

Empirical work on crime and on social capital is typically affected by several methodological problems, the main of which are, besides omitted variables, measurement errors and endogeneity. Measured crime rates crucially depend on report rates, which vary significantly across crimes and space. If report rates are positively related to social capital, our estimates would be upwards biased. Endogeneity problems arise from the fact that certain forms of crime might affect social capital because they constrain social interaction, as shown, among others, by Liska and Warner (1991).⁶ Such a negative effect, due to reverse causation, would downwards bias our estimates.

As far as endogeneity is concerned, we consider blood donations and referenda turnout as safely exogenous variables with respect to crime rates. Indeed, blood donations seem to be as exogenous a variable as possible, and the referenda we consider have never concerned issues either related to crime or of direct interest to criminal groups. To control for the possible endogeneity of association density, we exploit the fact that associational networks in Italy are to a significant extent a historical heritage. We then use Putnam's (1993) historical data on associations in Italy as an instrument for current associations, arguing that it is unlikely that such instrument is correlated to current crime rates through other channels.

Measurement errors represent a relevant problem in the empirical analysis on crime determinants because of the underreporting that affects crime variables, which is likely to be determined not only by random errors but also by specific and persistent characteristics of each province, among which its level of social capital. To address this methodological issue we need a measure of crime that not only presents a low rate of underreporting, but, more importantly, a homogeneous report rate across space. In particular, thefts and robberies not only display a high degree of underreporting, but also a high heterogeneity in report rates across provinces. By contrast, car thefts do not suffer from underreporting (more than 94% of car thefts are reported) and the rate of report is almost identical across provinces. We present regressions for these three crimes, discuss the implications of high and heterogeneous underreporting and argue that regressions based on car thefts are the most reliable ones.

Our evidence, based on an original dataset, which merges existing sources with data collected by the authors, indicates that both civic norms and associational networks have a negative and significant impact on property crimes across Italian provinces.

We find that, contrary to expectations, the presence of associational networks and of civic and altruistic norms are positively associated with thefts and robberies, with an effect that in some specifications is significant. Yet, we argue that a possible interpretation is that this result is driven by a positive impact of social capital on rates of report. Indeed, when we study car thefts and thus eliminate any bias due to

⁵ While several perspectives on trust are possible, the fact that we do not include measures of trust corresponds to the view that it is rather a (long run) equilibrium outcome than a structural variable. We refer to Glaeser *et al.* (2000) for the meaning of most commonly used measures of trust.

⁶ They analyse 26 big U.S. cities in the mid Seventies and show that some forms of crime (e.g., robberies) generate fear and constrain social interaction, which, in turn, reduces opportunities for other forms of crime.

heterogeneous report rates, we find a negative and significant effect of social capital on crime, which is very robust across all specifications. In our baseline specification, a standard deviation increase in association density and in blood donations are associated with a reduction in car thefts by 13 and 9 percentage points, respectively. When we use instrumental variables these effects are even stronger, confirming that they are not due to reverse causation.

The remainder of the paper is organised as follows. In Section 2 we review the main literature on the effects of social environment on crime. In Section 3 we present our data and empirical strategy. Section 4 contains the results and Section 5 concludes.

2. Literature on social determinants of crime

There are at least four strands of literature that are related to our investigation: first, theoretical economic models of the social determinants of crime, many of which are based on multiple equilibria; second, empirical studies on such determinants; third, the few specific analyses of the effects of social capital on crime; and finally, works that measure social capital in Italy and evaluate its effects, although possibly not on crime but on different variables.

2.1 Economic models based on multiple equilibria

Following Becker (1968), most economists consider individual decisions of crime participation as rational choices, taken by comparison of expected costs and benefits. At the core of several theoretical models, which extend the basic paradigm to include the social component of such costs and benefits, lies some form of strategic complementarity: my returns to becoming criminal, relative to not doing so, are higher, the more other individuals choose criminal behaviours. This gives rise to multiple equilibria, which help explain variation of crime rates across regions with similar fundamentals. Several specific mechanisms that yield such result are explored in the literature. For instance, Sah (1991) focuses on punishment probability, which is perceived to be lower, the higher the expected number of criminals; Murphy *et al.* (1993) emphasise that criminal behaviour may crowd out legal productive activities, thus becoming relatively more rewarding, the more it expands (see also Burdett *et al.* 2003 and Rasmusen 1996). Calvó-Armengol and Zenou (2004) show that denser social networks may increase aggregate crime levels, by facilitating know-how sharing among criminals; and Weibull and Villa (2005) argue that the effectiveness of social norms against crime, due to both guilt and shame, is decreasing in crime rates, thus being yet another possible source of multiple equilibria.⁷

Several extensions of these frameworks have been considered, especially with the aim of studying determination and effects of anti-crime policies, as well as their interaction with various aspects of the social structure (Kugler *et al.*, 2004; Silverman, 2004 and Calvó-Armengol *et al.*, 2004).

2.2 Empirical evidence on social determinants of crime

⁷ Most economists in the tradition of methodological individualism would consider exogenous social norms as an *ad hoc* explanation. Weibull and Villa's (2005) model yields a unique equilibrium if social norms' effectiveness (the degree to which they generate guilt and shame) is exogenous, whereas multiple equilibria are possible when it is endogenous. In such case, social norms' effectiveness and crime rates are jointly determined in equilibrium.

Since the early Nineties, economists have collected more and more empirical evidence on social determinants of criminal behaviour. Rather than from multiple equilibria models, most of the theoretically driven empirical studies start from models with a unique equilibrium, on which comparative statics exercises may be conducted. Among other factors, attention has been devoted to criminal records in residence neighbourhood and in the family, as in Case and Katz (1991), to imitation of peers' behaviour and the degree of social interaction characteristic of each crime, as in Glaeser *et al.* (1996) and Patacchini and Zenou (2005), and to structural properties of relational networks, or of an individual's position therein, as in Haynie (2001) and Calvó-Armengol *et al.* (2005). Just to mention few results, which are of direct relevance for our study, Glaeser *et al.* (1996) find that the degree of social interaction is particularly high for auto theft, for crimes committed by younger criminals and in cities with more female-headed households (which is interpreted 'to mean that the average social interactions among criminals are higher when there are not intact family units', p. 543). Different and convincing evidence of the relevance of social and non-pecuniary factors for crime decisions is also provided by Levitt and Venkatesh's (2000) analysis of a drug-selling gang. Rubio (1997) points out that in Colombia, where incentives for crime are high, social capital may have the perverse effects of reinforcing crime choices.

One major problem of most empirical studies of neighbourhood effects on crime is that it is hard to control for self-selection and endogeneity, so that it is often hard to draw causal inferences. Ludwig *et al.* (2001) and Kling *et al.* (2005) are able to overcome this problem, thanks to the natural experiment constituted by the Moving to Opportunity (MTO) randomised housing mobility program of the U.S. Department of Housing and Urban Development, which since 1994 has relocated families from high to low poverty neighbourhoods. It is found that relocating sharply reduces juvenile arrests for violent crimes, but that after several years it has the effect of actually raising male arrests for property crimes, possibly because it offers, especially to males, new opportunities for property offences.

While this literature is more concerned with the micro-effects of local interaction patterns on crime rates than with the impact of more aggregate aspects of the social structure, like widespread civic norms and associational networks, as we are in the present study, it confirms three aspects which are important for us: the general relevance of social determinants of crime, the endogeneity problems that arise when one tries to evaluate such determinants, and the possibility that apparently desirable aspects of the social structure turn out to be conducive to crime.

2.3 Effects of social capital on crime: positive or negative?

It is intuitive to think of a positive link between social capital and crime, at least in the short run: if areas with higher social capital display higher trust, citizens in those areas may feel less threatened and put less resources and effort to defend themselves and their properties, thus remaining potentially more exposed to criminals. Crime opportunities would then be higher and this would both stimulate local criminality and attract criminals from other regions. Such attraction effect would be reinforced by the positive correlation between trust and economic development (Knack and Keefer 1997).⁸ Yet

⁸ If higher crime rates, in turn, induce a fast reduction in trust, because individuals become more careful, this crime-attraction effect of trust would not last long enough to be detected in cross-sectional data; but if, by contrast, trust is not so much responsive to crime, then we could expect a positive correlation between crime and social capital.

several theories, developed by sociologists and criminologists, imply a negative effect of social capital on crime. For instance, Rosenfeld *et al.* (2001) argue that theories of social disorganisation, anomie and strain all predict that civic engagement and social trust (which they refer to as social capital) should reduce crime, because they increase formal and informal social control, strengthen the effectiveness of social norms and provide resources for individual goal attainment. Very few empirical studies relate social capital to crime. Among them, most attention has been devoted to violent rather than property crime. Using U.S. data for the Nineties, and controlling for a number of covariates, Rosenfeld *et al.* (2001) find a negative and significant impact of social capital on homicide rate, but they also find some evidence of reverse causation.⁹ One difficulty in interpreting their results is that their measure of social capital merges together different variables, so that it is not entirely clear what it indicates. Again with U.S. data, but with a different dataset, Messner *et al.* (2004) disentangle different dimensions of social capital and find that homicide rates decrease in social trust, as they expected, but, surprisingly, increase in community and political activism, a result which they find puzzling. In two other interesting studies, both conducted with a 2SLS approach, Chamlin and Cochran (1997) find that social altruism, proxied by charitable donations, has a negative and significant impact on both property and violent crime in a sample of U.S. cities, and Heaton (2006) finds that most of the negative correlation between crime and religious participation is indeed due to an effect of the former on the latter, so that, when historical data on religious adherence are used to control for endogeneity, religion is found to have no significant effect on either property or violent crime.

These results convey two messages: at the methodological level, they confirm both the opportunity to disentangle the different dimensions of social capital and the relevance of reverse causation problems; at the substantive level, they offer mixed evidence on the impact of different forms of social capital on crime and they make clear that more and careful empirical analysis is needed.

2.4 On the effects of social capital in Italy

While the literature considered so far explicitly focuses on crime and looks for its determinants, among which there are the various social effects of family, peers, neighbourhood and social capital, a different strand of literature takes social capital as its point of departure and studies its various effects, among which there are those on crime.¹⁰ We have already discussed some of this literature in the previous section. Here we limit our attention to three studies of the effects of social capital in Italy, which are more directly related to our work: Putnam's (1993) seminal book and recent work by Peri (2004) and Guiso *et al.* (2004). In a nutshell, Putnam shows that local governments are more efficient where civic engagement is stronger. Empirically, he relates civic engagement to measures of horizontal association networks, voter turnout at referenda, newspaper readership and the diffusion of preference vote at political elections.¹¹ Moreover, he relates the geographic distribution of social capital to historical origins

⁹ Previous studies, like Kennedy *et al.* (1998), moved in the same direction, but did not control for covariates.

¹⁰ Coleman (1988, 1990) and Putnam (1993, 1995) may be credited with the main responsibility for the academic diffusion of the concept of social capital. Sabatini's (2006) Social Capital Gateway is an excellent resource to find out about all aspects of social capital research. Rather than discussing the extensive literature on the topic, we refer the interested reader to his website.

¹¹ Several decades before Putnam, Banfield (1958) had looked at the strength of family ties and at what he termed 'amoral familism' to find the roots of backwardness and criminality in Southern Italy.

and uses it to explain the wide and persistent differences between Southern and Northern Italian regions.¹² Investigating the determinants of post-war development in Italian provinces, Peri (2004) uses as proxy of social capital the first principal component of the first three variables used by Putnam. Interestingly, he finds that this measure of civic involvement has no significant impact on economic development, but that murder rates, interpreted as a proxy of the presence of organised criminal groups, significantly reduce economic success. In an empirical investigation of the effects of social capital on financial development in Italy, Guiso *et al.* (2004) focus on two proxies of social capital, voter turnout at referenda and blood donations, and argue, as we do here, that they can both be safely considered exogenous, because they are not determined by economic or legal incentive, but rather by civic and altruistic norms. In particular, they find higher financial development where social capital is higher.

3. Data and empirical strategy

As mentioned above, in our analysis we disentangle various aspects of social capital, so that we are able to separately discuss the positive and negative effects of associational networks, the importance of both civic and altruistic norms and the relevance of historical heritage. This last aspect, besides being of interest in itself, also allows us to appropriately tackle endogeneity. Moreover, we control for a number of other variables, which are usually considered determinants of crime, thus minimising the risk that our results are driven by omitted variables.¹³

We consider the cross-section of the 103 Italian provinces. Summary statistics and extreme values for all the variables used are reported in Table 1, while data sources and the exact definition of each variable are presented in Table A1.

3.1 Measures of Social Capital

The most complex and debatable issue is how to measure social capital, given its multidimensional and multifaceted nature. Putnam (2000) argues that the more general forms of social capital are trust and social participation. In particular, he subdivides social participation in political participation, civic participation, religious participation, altruism and volunteering. In order to account for this multidimensionality we consider four different measures of social capital: recreational associations, voluntary associations, referenda turnout and blood donation. Table 2 reports the correlations between these four measure of social capital. Despite the different nature of these variables their correlations are high, except for the one between blood donation and associations. As Figure 1 shows, voluntary associations are mainly concentrated in northern and central regions, although they present a heterogeneous distribution.

Recreational associations (*Association*) measure the number of recreational, cultural, artistic, sport, environmental and any kind of non-profit associations per

¹² Putnam emphasizes that the process of social capital accumulation takes centuries. Paldam and Svendsen (2000) contend that, if this is the case, the term ‘capital’ is not appropriate: one should better speak of an exogenous background variable.

¹³ Among others, Raphael and Winter-Ebmer (2001) and Gould *et al.* (2002) find a positive and significant effect of unemployment and wages on crime. Buonanno (2006) finds that labour market conditions are a more important determinant of crime in Southern Italy than in the Centre-North of the country. Rather than unemployment, Imrohoroglu *et al.* (2004) emphasise the importance of apprehension probability, age and inequality. Bourguignon *et al.* (2003) is an example of the complexity of establishing clear links between inequality and crime.

100,000 inhabitants in 2001. To narrow the focus, voluntary associations (*Voluntary Assoc.*) capture in an analogous way the propensity of citizens to volunteering. Referenda turnout (*Turnout*) is the average of electoral turnout in the referenda held in Italy between 1974 and 1999 (notice that voting at referenda is not mandatory in Italy).

Finally, blood donation (*Blood*) is the number of donations per 100,000 inhabitants. Differently from Guiso *et al.* (2004), our measure of blood donation includes all provincial and regional associations of blood donors and it is not only restricted to AVIS, the major Italian association of blood donors. Indeed, although AVIS blood donations represent 90% of all donations at national level, they account for only 0% in Friuli Venezia Giulia, 40% in Puglia, 60% in Tuscany and Calabria and 80% in Veneto, Emilia Romagna and Sicily. Thus, restricting to AVIS would underestimate social capital in these regions.

3.2 Crime Variables

We use three measure of property crime rate: thefts, robberies and car thefts. Crime rates are expressed per 1,000 inhabitants and are in logarithms.

As briefly described in the introduction, a major problem when dealing with official data on crime rates is that they crucially depend on report rates, which in the Italian context vary significantly across crimes and space. For instance, thefts and robberies not only show a high degree of underreporting, but also display a high heterogeneity in report rates across provinces. The rate of report of thefts is 30.8% in the North and 21.3% in the South, and robbery report rate is 46.6% in the North and 32.2% in the South. By contrast, car thefts do not suffer from underreporting (more than 94% of car thefts are reported) and, more importantly, the rate of report is very similar (almost identical) across provinces.¹⁴ The geographical distribution of reported common thefts, robberies and car thefts is presented in Figure 2.

3.3 Socioeconomic and Demographic Controls

Our dataset comprises a set of socioeconomic and demographic variables that are likely to be correlated with crime rates. The explanatory variables are separated into three groups: deterrence variables, demographic variables and socio-economic variables. Deterrence variables (i.e. clear-up rate, probability of apprehension and severity of punishment) determine the expected returns from crime. The deterrence variables used are the clear-up rate (*Clear-up*) and the length of the entire judicial process (*Length*).

We include two standard demographic variables: the percentage of men aged 15-29 (*Youth*) and the share of population living in cities with more than 100,000 inhabitants (*Urbanisation*). Young men are said to be more prone to engage in criminal activities than the rest of the population (Freeman, 1991; Grogger, 1998). It is well documented that there is more crime in big cities than in small cities or rural areas (Glaeser and Sacerdote, 1999). In particular, returns from crime may be higher and the probability of arrest may be lower in urban areas.

We complete our dataset by including a set of socio-economic variables: GDP per capita, the unemployment rate (*Unemployment*) and the share of population with high school (*High School*).

GDP per capita is a proxy for the general level of prosperity in each province and thus an indicator of illegal income opportunities (Ehrlich, 1973). Another economic

¹⁴ “La sicurezza dei cittadini. Reati, vittime, percezione della sicurezza e sistemi di protezione”, ISTAT.

factor that may affect crime is unemployment. There is a general belief that unemployment and crime are positively correlated. The existence of a casual link between unemployment and crime has been widely investigated in the past, although the strength of this relationship remains ambiguous both in its nature and in its robustness. Education may affect the decision to engage in criminal activities in several ways. First, higher levels of educational attainment are associated with higher returns in the labour market, thus increasing the opportunity cost of criminal behaviour. Secondly, education may alter personal preferences in a way that affects decisions to engage in crime. In particular, education may have a sort of “civilisation” effect. Fajnzylber *et al.* (2002) suggest that education, which has a civic component, may alter an individual’s moral stance, and thus affect individual perception of crime.

In order to address the possibility that certain associational networks increase crime rates we control for the presence of criminal association at provincial level. We proxy the extent of criminal networks with the number of incriminations for criminal association per 100,000 inhabitants (*Crim. Networks*). This latter variable may be particularly relevant in the Italian context, which presents a strong and pervasive presence of organized crime in Southern provinces.

Finally, we account for the structural and relevant differences between the North, the Centre and the South of Italy by including corresponding macro regional dummies.

4. Results

Table 3 reports the basic estimates of the effect of the various measures of social capital (cultural and recreational associations, voluntary associations, blood donations and referenda turnout) on crime rates (thefts, robberies and car thefts). Our results show that social capital is not correlated with robberies, is positively and significantly correlated with thefts and is negatively and significantly correlated with car thefts.

To mitigate possible omitted-variables biases we control extensively for the demographic and socioeconomic variables presented in the previous section: young men aged 15-29, urbanisation rate, GDP per capita, unemployment rate, percentage of population with high school diploma, clearance rate, length of judicial process, extent of organized crime and macro regional dummies. Our main results, presented in Tables 4-6, confirm that, even after controlling for deterrence, demographic and socioeconomic variables, social capital measures do not exert any significant effects on common thefts and robberies, whereas they are negatively and significantly correlated to car thefts.

The clear-up rate, the degree of urbanisation, the presence of criminal networks, per capita income and education are the most significant explanatory variables of crime rates. For instance, an increase of 1% in the clearance rate leads to a reduction in crime rate between 3% for robberies and 9% for thefts. The average length of judicial process is significant for robberies and car thefts, but not for common thefts, and the unemployment rate is significant for car thefts, but not for the other two crimes. All of these variables have the expected sign.

Our findings do not suggest a clear and unambiguous effect of social capital on crime. Yet, as discussed in the previous sections, report rates are low and vary substantially across crimes and provinces for common thefts and robberies, whereas they are extremely high and geographically homogeneous for car thefts. This implies that data on reported thefts and robberies are neither reliable nor comparable across provinces. Our main concern is the possible correlation between report rates and social

capital.¹⁵ Suppose that report rates were higher in provinces with higher social capital (which is indeed plausible, for instance if social capital is associated with higher trust in the police and in public institutions). In this case, crime rates might seem higher in provinces with higher social capital only because reporting rates are higher in those provinces. This idea would provide a parsimonious explanation of the above described results. While we do not have provincial level data on report rates, and therefore cannot directly test this hypothesis, we do conclude from this discussion that, in order to minimise measurement error problems, it is advisable to restrict attention to data on car thefts.

Our estimates for car thefts (Table 6) show that the different measures used for social capital exert a negative and significant effect on crime rate (with only referenda turnout being not significant), even after controlling for all the above listed variables. A standard deviation increase in association density and in blood donations are associated with a reduction in car thefts by 13 and 9 percentage points, respectively.

We have performed a number of robustness check exercises, to control for the effects of business cycle, big cities and family ties. More precisely, we have included the growth rate of unemployment between 1995 and 2001, a dummy for the presence of a city with more of 250,000 inhabitants in the province, the percentage of marriages celebrated in church, the frequency of divorces and separations, and the percentage of non married couples. None of them is significant and their inclusion does not significantly alter the effects of either social capital or of the other controls. Therefore, we do not present such robustness checks. Due to data unavailability, we were not able to include two additional controls we would have liked, namely income inequality within each province and inter-province migration of criminals. As discussed in section 2.3, criminals could migrate to provinces with higher social capital in order to exploit citizens' higher level of trust in those areas. Not controlling for this upwards biases the coefficient of social capital, thus strengthening our results. It is also worth mentioning that, notwithstanding the positive correlation between our social capital variables, when we simultaneously include in the car theft regression blood donations, referenda turnout and voluntary associations, all of them maintain the negative sign and the latter one remains significant at 5% level.¹⁶

One reason for caution with these results, especially as far as associations are concerned, is that they may be due to reverse causation. As we argued in the previous sections, other studies find evidence that higher crime rates constrain social interaction, and theoretical models warn us that reverse causation may be present in a number of settings. The negative relationship we find could then reflect the impact of crime on associations, rather than the other way around. To control for this, we instrument voluntary associations with historical data on mutual aid societies, cooperatives, electoral turnout, and cultural and recreational associations founded before 1860, one decade before Italy's unification. Historical data come from the seminal work by Putnam (1993) on the role of social capital on government functioning in Italy.

Association density today is indeed significantly correlated to our historical instruments, which offer different measures of civic participation between the mid XIX century and the advent of Fascism. We argue that these instruments are not likely to exert any direct effect on current crime rates, besides the indirect effect through current

¹⁵ A simple reason such as insurance coverage of cars could be the reason why car thefts are more reported to the police than other property crimes, but it cannot explain geographic variation in underreporting of thefts and robberies. This makes room for social capital to help explain such variation.

¹⁶ In the regressions for robberies and common thefts, in turn, they are not individually significant when simultaneously introduced.

association density, at least once we control for the other determinants of crime, such as income, criminal networks and the other covariates mentioned above. Although high persistence in both associational networks and crime rates might imply that our strategy does not entirely solve the endogeneity problem, on one side our use of four different historical instruments minimises the risk that persistence carries reverse causation through time, and on the other side this is probably the best one can do. Table 7 presents results of a 2SLS regression, in which voluntary associations are first regressed against our historical instruments and then the predicted value is used (with the other covariates) in the crime regression. When instrumented with historical data, voluntary associations maintain a negative and significant impact on crime. The same holds for cultural and recreational associations.¹⁷ Moreover, controlling for endogeneity raises the absolute value of the estimated coefficient (which passes from -1% to -4%), confirming that our previous results were not due to reverse causation. These qualitative results are robust to different specifications of the first stage regression.

5. Concluding remarks

We present robust evidence that, once we control for a variety of possible other determinants, as well as for potential endogeneity and measurement error problems, civic and altruistic norms and associational networks significantly reduce crime rates. To assess this result, we exploit the great variation in social characteristics across Italian provinces, the availability of historical data, which we use as instruments, the high and geographically stable report rates for certain forms of property crime, as well as a number of control variables, some of which directly collected by the authors. We proceed in several steps. We first argue that it is not a priori clear what the sign of the correlation between crime rates and these forms of social capital should be. Then we show that, at a general level, its sign and significance are crime-specific. Next, we argue that low and geographically heterogeneous report rates undermine these results and show that, when we restrict to reliable data, the correlation is negative and significant.¹⁸ We argue that a (plausible) positive correlation between social capital and report rates for certain forms of crime would provide a parsimonious explanation of all our findings, but unfortunately our data do not allow to assess this empirically. Independently of whether this is the right explanation or not, there remains the basic fact that we need to restrict to reliable data to draw meaningful inferences. Further, we show that the negative and significant correlation found for our best data is robust not only to inclusion of additional controls, but, more importantly, to endogeneity concerns: when we instrument current association rates with historical data, their effect increases, whereas it should decrease if our result were due to reverse causation.¹⁹

Our results imply that a policy of promotion of civic norms and associational life may have beneficial side effects in terms of crime-reduction. Thus socio-cultural interventions may usefully complement traditional anti-crime policies, based on punishment threat. Indeed, as argued by Kugler *et al.* (2004), in some cases higher

¹⁷ Results are identical and we do not show them.

¹⁸ We also find that certain associational networks, by providing criminals with more operating channels, significantly increase crime rates. While calling for a more detailed analysis of the effect of heterogeneous associations, this result confirms their general importance.

¹⁹ The same is true for some variables which are omitted in our analysis due to data unavailability: for instance, if provinces with higher social capital attract more criminals, and we do not control for this, our estimates are upwards biased and this strengthens the negative and significant correlation we find.

punishment threats induce higher corruption rather than lower criminality, as appears to be the case in some Italian provinces. Our empirical investigation supports the idea that in such cases it makes sense to fight the deep, social roots of crime, besides repressing its specific manifestations.

Since we have neither modelled nor empirically investigated the determinants of civic norms and associational networks, any more precise policy indications would be purely speculative. In any case, if the negative correlation we find reflects a stable relationship, then policy intervention might alter the underlying parameters, for instance those governing the flows of creation and destruction of new and old associations. If, by contrast, it reflects coordination of different provinces on different equilibria, some with high crime and low civic participation, and some with the opposite features, then the rationale for intervention would come from coordination failure. If there is a critical mass of individuals, which, once coordinated on a different equilibrium strategy, is sufficient to induce the rest of the population to form expectations accordingly and therefore shift behaviour, then the policy target should be the simultaneous coordination of this critical mass.²⁰ While the evidence we present does not allow to discriminate between these two views, it definitely speaks in favour of global strategies of tackling crime.

²⁰ Observe that social capital persistence over time is compatible with both views: on one side, stocks change slowly when entry and exit flows are approximately balanced; on the other side, they change seldom when substantial critical masses are needed to trigger a change.

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Table 1 – Summary Statistics

	Mean	Standard deviation	Minimum	Maximum
Ln Car Thefts	0,54	0,78	-0,98	2,39
Car Thefts per 1,000 inhabitants	2,35	2,09	0,38	10,91
Clear-up rate for car thefts	4,99	3,48	0,67	20,80
Ln Robberies	-1,23	0,68	-3,01	1,14
Robberies per 1,000 inhabitants	0,38	0,38	0,05	3,12
Clear-up rate for robberies	34,36	11,09	5,62	63,08
Ln Thefts	2,84	0,40	1,79	3,98
Thefts per 1,000 inhabitants	18,58	8,07	5,98	53,65
Clear-up rate for thefts	5,40	1,99	1,64	14,13
Urbanisation rate	13,79	19,83	0,00	86,37
Length of judicial proceeding (in years)	2,90	1,24	1,06	10,12
% of young males aged 15-29 years	9,08	0,89	6,86	11,32
% of population with high school	27,82	2,43	21,47	35,95
Unemployment rate	11,39	8,39	2,32	30,90
Per capita GDP (in thousand euros)	14,68	2,86	9,31	20,42
Referenda turnout	67,74	9,21	47,98	81,08
Associations per 100,000 inhab.	37,13	16,10	14,53	84,59
Voluntary associations per 100,000 inhab.	35,69	15,67	12,90	82,40
Blood donations per 100,000 inhab.	36,25	22,09	1,33	114,78
Criminal Networks per 100,000 inhab.	0,02	0,03	0,00	0,23

Table 2 - Correlations

	Ln Car Thefts	Ln Robberies	Ln Thefts	Association	Voluntary Assoc.	Blood	Turnout	Crim. Networks
Ln Car Thefts	1.0000							
Ln Robberies	0.7681 (0.0000)	1.0000						
Ln Thefts	0.5395 (0.0000)	0.7169 (0.0000)	1.0000					
Association	-0.1845 (0.0620)	0.1141 (0.2510)	0.3966 (0.0000)	1.0000				
Voluntary Assoc.	-0.1989 (0.0440)	0.1072 (0.2813)	0.3962 (0.0000)	0.9950 (0.0000)	1.0000			
Blood	-0.3286 (0.0007)	-0.0783 (0.4320)	0.1966 (0.0465)	0.2643 (0.0070)	0.2718 (0.0055)	1.0000		
Turnout	-0.2656 (0.0067)	0.1361 (0.1704)	0.4867 (0.0000)	0.5617 (0.0000)	0.5736 (0.0000)	0.6453 (0.0000)	1.0000	
Crim. Networks	0.5808 (0.0000)	0.6020 (0.0000)	0.3257 (0.0008)	-0.0871 (0.3816)	-0.0929 (0.3505)	-0.3067 (0.0016)	-0.2060 (0.0368)	1.0000

Notes: This table shows the correlation among social capital variables and crime variables. The number in parentheses is the significance level of each coefficient.

Table 3 – Simple regressions of crime rates on various indicators of social capital

Panel A: Thefts				
	(1)	(2)	(3)	(4)
Association	0.010 [0.002]***			
Voluntary Assoc.		0.010 [0.002]***		
Blood			0.004 [0.002]*	
Turnout				0.021 [0.004]***
R ²	0.16	0.16	0.04	0.24
Panel B: Robberies				
Association	0.005 [0.004]			
Voluntary Assoc.		0.005 [0.004]		
Blood			-0.002 [0.003]	
Turnout				0.010 [0.008]
R ²	0.01	0.01	0.01	0.02
Panel C: Car Thefts				
Association	-0.009 [0.004]**			
Voluntary Assoc.		-0.010 [0.004]**		
Blood			-0.012 [0.003]***	
Turnout				-0.022 [0.008]***
R ²	0.03	0.04	0.11	0.07

Notes: Dependent variables are logarithm of common thefts per 1,000 inhabitants (Panel A), robberies per 1,000 inhabitants (Panel B) and car thefts per 1,000 inhabitants (Panel C). Association is the number of recreational associations per 100,000 inhabitants; Voluntary Assoc. is the number of voluntary associations per 100,000 inhabitants; Blood is the number of blood donations per 100,000 inhabitants; Turnout is the average of electoral turnout of the referenda held in Italy between 1974 and 1999. Robust standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Determinants of Thefts

	(1)	(2)	(3)	(4)
Association	0.004 [0.002]*			
Voluntary Assoc.		0.003 [0.002]		
Blood			-0.001 [0.001]	
Turnout				0.014 [0.006]**
Crim. Networks	0.021 [0.011]**	0.022 [0.011]**	0.021 [0.010]**	0.021 [0.010]**
Length	0.021 [0.018]	0.022 [0.018]	0.024 [0.018]	0.020 [0.017]
Youth	-0.034 [0.058]	-0.039 [0.058]	-0.056 [0.054]	-0.065 [0.055]
High School	-0.013 [0.009]	-0.014 [0.010]	-0.018 [0.009]*	-0.011 [0.010]
Unemployment	-0.002 [0.009]	-0.002 [0.009]	-0.005 [0.009]	0.008 [0.010]
GDP per capita	0.025 [0.021]	0.026 [0.021]	0.028 [0.021]	0.032 [0.021]
Urbanisation	0.006 [0.002]***	0.006 [0.002]***	0.007 [0.002]***	0.006 [0.002]***
Clear-up	-0.088 [0.014]***	-0.088 [0.014]***	-0.088 [0.014]***	-0.078 [0.015]***
R ²	0.73	0.73	0.72	0.74

Notes: Dependent variables is logarithm of common thefts per 1,000 inhabitants. Association is the number of recreational associations per 100,000 inhabitants; Voluntary Assoc. is the number of voluntary associations per 100,000 inhabitants; Blood is the number of blood donations per 100,000 inhabitants; Turnout is the average of electoral turnout of the referenda held in Italy between 1974 and 1999. Crim. Networks is the number of organized crimes per 100,000 inhabitants; Length is length in years of the entire judicial process; Clear-up is the clearance rate for type of crimes; Youth is the percentage of men aged 15-29 years; Urbanisation is the share of population living in cities with more than 100,000 inhabitants; GDP per capita is expressed in thousand euros; Unemployment is the total unemployment rate; High School is the share of population with high school diploma. All estimates include macro regional dummies for the North, Center and South of Italy. Robust standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Determinants of Robbery

	(1)	(2)	(3)	(4)
Association	0.004 [0.003]			
Voluntary Assoc.		0.003 [0.003]		
Blood			-0.001 [0.003]	
Turnout				0.037 [0.011]***
Crim. Networks	0.070 [0.013]***	0.070 [0.013]***	0.070 [0.013]***	0.069 [0.012]***
Length	0.089 [0.049]*	0.091 [0.049]*	0.093 [0.049]*	0.076 [0.053]
Youth	0.006 [0.084]	-0.001 [0.085]	-0.014 [0.086]	-0.036 [0.082]
High School	-0.043 [0.016]***	-0.044 [0.016]***	-0.049 [0.016]***	-0.029 [0.016]*
Unemployment	-0.001 [0.016]	-0.001 [0.016]	-0.003 [0.016]	0.026 [0.016]
GDP per capita	0.057 [0.037]	0.058 [0.037]	0.059 [0.038]	0.068 [0.038]*
Urbanisation	0.009 [0.003]***	0.010 [0.003]***	0.011 [0.002]***	0.008 [0.002]***
Clear-up	-0.027 [0.005]***	-0.027 [0.005]***	-0.026 [0.004]***	-0.025 [0.004]***
R ²	0.70	0.70	0.70	0.74

Notes: Dependent variables is logarithm of robberies per 1,000 inhabitants. Association is the number of recreational associations per 100,000 inhabitants; Voluntary Assoc. is the number of voluntary associations per 100,000 inhabitants; Blood is the number of blood donations per 100,000 inhabitants; Turnout is the average of electoral turnout of the referenda held in Italy between 1974 and 1999. Crim. Networks is the number of organized crimes per 100,000 inhabitants; Length is length in years of the entire judicial process; Clear-up is the clearance rate for type of crimes; Youth is the percentage of men aged 15-29 years; Urbanisation is the share of population living in cities with more than 100,000 inhabitants; GDP per capita is expressed in thousand euros; Unemployment is the total unemployment rate; High School is the share of population with high school diploma. All estimates include macro regional dummies for the North, Center and South of Italy. Robust standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6. Determinants of Car Theft

	(1)	(2)	(3)	(4)
Association	-0.008 [0.004]*			
Voluntary Assoc.		-0.009 [0.004]**		
Blood			-0.005 [0.002]**	
Turnout				-0.011 [0.014]
Crim. Networks	0.064 [0.024]***	0.064 [0.024]***	0.059 [0.024]**	0.064 [0.024]***
Length	0.078 [0.036]**	0.077 [0.035]**	0.067 [0.034]*	0.074 [0.034]**
Youth	0.003 [0.114]	-0.002 [0.112]	0.081 [0.106]	0.056 [0.110]
High School	-0.035 [0.020]*	-0.037 [0.020]*	-0.032 [0.019]*	-0.031 [0.019]
Unemployment	0.023 [0.017]	0.021 [0.017]	0.022 [0.016]	0.019 [0.019]
GDP per capita	0.088 [0.042]**	0.088 [0.042]**	0.081 [0.041]*	0.078 [0.043]*
Urbanisation	0.010 [0.003]***	0.010 [0.003]***	0.007 [0.003]**	0.008 [0.004]**
Clear-up	-0.087 [0.015]***	-0.086 [0.014]***	-0.094 [0.016]***	-0.095 [0.017]***
R ²	0.70	0.70	0.70	0.69

Notes: Dependent variables is logarithm of car thefts per 1,000 inhabitants. Association is the number of recreational associations per 100,000 inhabitants; Voluntary Assoc. is the number of voluntary associations per 100,000 inhabitants; Blood is the number of blood donations per 100,000 inhabitants; Turnout is the average of electoral turnout of the referenda held in Italy between 1974 and 1999. Crim. Networks is the number of organized crimes per 100,000 inhabitants; Length is length in years of the entire judicial process; Clear-up is the clearance rate for type of crimes; Youth is the percentage of men aged 15-29 years; Urbanisation is the share of population living in cities with more than 100,000 inhabitants; GDP per capita is expressed in thousand euros; Unemployment is the total unemployment rate; High School is the share of population with high school diploma. All estimates include macro regional dummies for the North, Center and South of Italy. Robust standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7. IV results

Panel A: First Stage			
	(1)	(2)	(3)
	Thefts	Robberies	Car Thefts
Association 1860	5.078 [2.921]*	5.252 [2.878]*	4.766 [2.900]*
Cooperatives	19.778 [12.198]*	18.053 [11.992]	19.042 [12.128]*
Mutual Aid Societies	0.002 [0.001]*	0.002 [0.001]**	0.002 [0.001]*
Electoral Turnout	-6.168 [1.898]***	-5.775 [1.877]***	-6.194 [1.891]***
Panel B: Second Stage			
Voluntary Assoc.	0.001 [0.005]	-0.003 [0.010]	-0.038 [0.012]***
Crim. Networks	2.223 [0.965]**	7.179 [1.332]***	6.365 [2.475]**
Length	0.022 [0.016]	0.096 [0.052]*	0.114 [0.040]***
Youth	-0.061 [0.062]	-0.039 [0.099]	-0.194 [0.151]
High School	-0.018 [0.010]*	-0.052 [0.017]***	-0.061 [0.025]**
Unemployment	-0.008 [0.007]	-0.007 [0.013]	0.011 [0.016]
GDP per capita	0.038 [0.020]*	0.065 [0.039]*	0.062 [0.051]
Urbanisation	0.007 [0.003]**	0.012 [0.004]***	0.021 [0.006]***
Clear-up	-0.092 [0.017]***	-0.026 [0.005]***	-0.069 [0.020]***
R ²	0.72	0.69	0.54

Notes: In the IV first stage Voluntary Assoc. is instrumented with four historical variables, kindly provided by Robert Putnam. Association 1860 is the fraction of cultural and recreational associations still existing in 1982, which were founded before 1860; Cooperatives is the density of cooperatives in the population, averaged across 1889, 1901, 1910 and 1915; Mutual Aid Societies measures participation to mutual aid societies, standardised by the population and averaged across 1873, 1878, 1885, 1895 and 1904; Electoral Turnout averages turnout in national elections in 1919 and 1921 and in local and provincial elections in 1920 (the only elections with universal male suffrage before Fascism). First stage regressions include all covariates used in the second stage. Dependent variables are logarithm of common thefts per 1,000 inhabitants (Column 1), robberies per 1,000 inhabitants (Column 2) and car thefts per 1,000 inhabitants (Column 3). Voluntary Assoc. is the number of voluntary associations per 100,000 inhabitants; Blood is the number of blood donations per 100,000 inhabitants. Crim. Networks is the number of organized crimes per 100,000 inhabitants; Length is length in years of the entire judicial process; Clear-up is the clearance rate for type of crimes; Youth is the percentage of men aged 15-29 years; Urbanisation is the share of population living in cities with more than 100,000 inhabitants; GDP per capita is expressed in thousand euros; Unemployment is the total unemployment rate; High School is the share of population with high school diploma. All estimates include macro regional dummies for the North, Center and South of Italy. Robust standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 1. Geographical distribution of voluntary associations per 100,000 inhabitants, blood donation per 100,000 inhabitants and referenda turnout

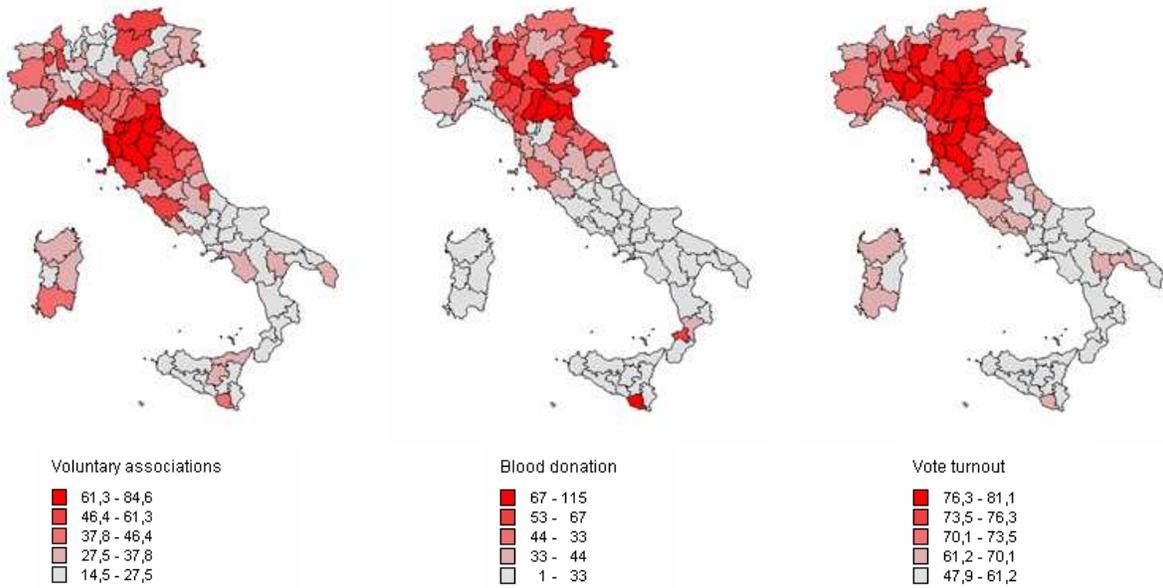


Figure 2. Geographical distribution of common thefts, robberies and car thefts (per 1,000 inhabitants)

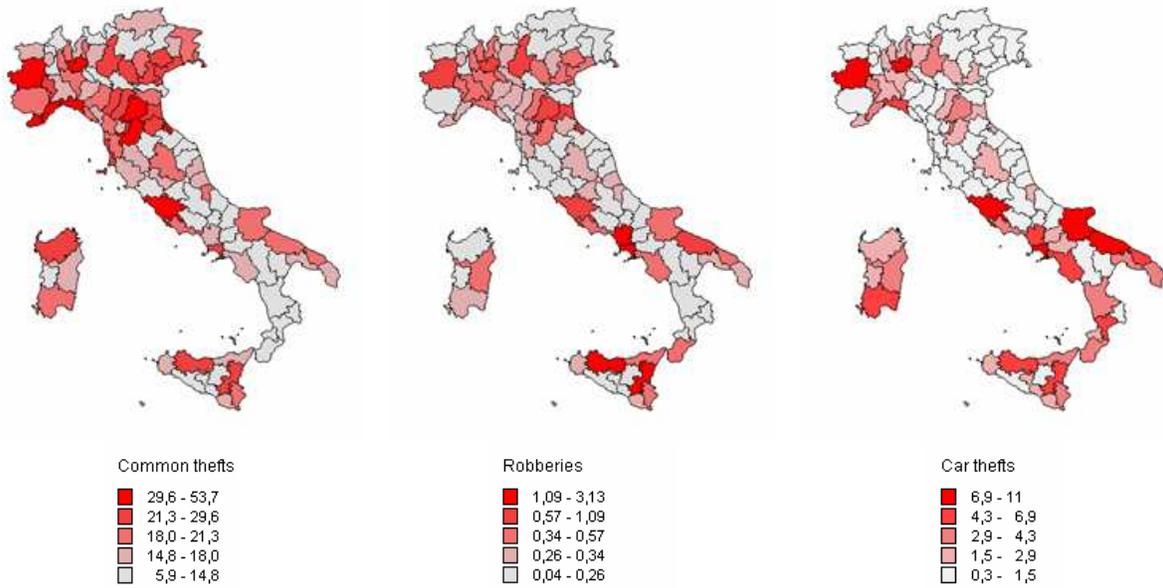


Table A1. Variable description and data sources

Variable	Description	Source
Association	Number of cultural, recreational, artistic, sport, environmental and any other kind of non-profit associations per 100,000 inhabitants at the province level. Year 2000.	ISTAT
Voluntary Assoc.	Number of associations whose members work for them voluntarily per 100,000 inhabitants at the province level, according to the law n. 291/91. Year 1999.	ISTAT
Blood	Number of blood donations per 100,000 inhabitants collected by AVIS, the Italian association of blood donors, and other blood donors associations that collect blood at provincial level (FIDAS, FRATRES, AFDS). Year 2000.	AVIS, FRATRES, FIDAS, AFDS
Turnout	Voter turnout at the province level for all the referenda held between 1974 and 1999. For each province turnout data were averaged across time.	Ministry of Interior
Thefts	Logarithm of common thefts per 1,000 inhabitants at the province level. Average across years 2000-2001-2002.	ISTAT
Robberies	Logarithm of robberies per 1,000 inhabitants at the province level. Average across years 2000-2001-2002.	ISTAT
Car thefts	Logarithm of car thefts per 1,000 inhabitants at the province level. Average across years 2000-2001-2002.	ISTAT
Per capita GDP	GDP in the province in thousands of euros divided by population in the province. Year 2001.	ISTAT
Unemployment	Total rate of unemployment at the province level. Year 2001.	ISTAT
High School	Percentage of population over 6 years who completed at least the high school at the province level. Year 2001.	ISTAT
Youth	Percentage of young males aged 15-29 in the population at the province level. Year 2001.	ISTAT
Urbanisation	Percentage of population living in cities with more than 100,000 inhabitants at the province level. Year 2001.	ISTAT
Length	Average number of years it takes to complete the first and the second degree of trial by the courts located in a province. Data have been computed using courts-level data on the length of trials and then averaging across courts located in the same province. Year 2001.	Ministry of Justice
Clear-up	Ratio of the number of crimes cleared by the police to the total number of crimes reported, for each province and crime category. The clear-up rate is equal to 1 minus the ratio of crime committed by unknown offenders to the total number of crimes recorded in each category for each province. Year 2001.	ISTAT
Crim. Networks.	Number of incriminations for criminal association per 100,000 inhabitants at the province level. Average across years 2000-2001-2002.	ISTAT
Association 1860	Fraction of cultural and recreational associations still existing in 1982, which were founded before 1860.	Putnam (1993)
Cooperatives	Density of cooperatives in the population, averaged across 1889, 1901, 1910 and 1915.	Putnam (1993)
Mutual Aid Societies	Participation to mutual aid societies, standardised by the population and averaged across 1873, 1878, 1885, 1895 and 1904.	Putnam (1993)
Electoral Turnout	Average turnout in national elections in 1919 and 1921 and in local and provincial elections in 1920 (the only elections with universal male suffrage before Fascism).	Putnam (1993)