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Abstract: I examine the causal relation between social capital and corruption. A simple model illustrates potential mechanisms and yields testable implications, which I estimate in a sample of European countries. The estimated effect of social capital on corruption is found to be robust to the inclusion of a number of other variables and supplementing the sample with slightly older data from non-European countries. The evidence of the reverse causal direction is weak. I suggest that it is possible to build social capital through investing in education, interest in society and some level of income redistribution, which in turn reduces corruption.

Keywords: Corruption, illegal behavior, rent-seeking, social capital

JEL Codes: D72, K42, Z13

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1. Introduction

Corruption is often defined as the misuse of public office for private gains and as such, one would think that it could fit into most conceptions of political economy or public choice without complications. Yet, although it has appeared high on the research agenda in political science for a very long time, corruption has only entered economics in the last decade where the availability of cross-country data has spurred additional research activity and produced what appear to be very robust results. In the same period, the concept of social capital entered the economic vocabulary. Referring to elusive features such as "trust, norms and networks" (Putnam, 1993), it is thought to measure the ability to cooperate and the level of trust and honesty in society. Hence, it seems intuitively obvious to assume a strong link between the national levels of corruption and social capital: countries in which people appear to be more honest ought to experience less corruption.[1]

When surveying the existing literature on corruption, practically all studies document that economic development leads to less corruption in itself.[2] However, the policy implications are non-trivial, since a large empirical literature documents the adverse effects of corruption. For example, authors have found that corruption leads to lower growth (Mauro, 1995; Mo, 2001) and political instability (Le et al., 2003). The relation between economic development and corruption thereby becomes ambiguous, as the efficiency of policies directed towards increasing growth and thereby lowering corruption is hampered by corruption itself (Hall and Jones, 1999; Kaufman et al., 1999). Arguing for the inclusion of cultural variables, Treisman (2000) and Paldam (2001) moreover find that countries with relatively more people belonging to a reformed Christian denomination tend to have less corruption, as do those with common law systems (i.e. a history of British supremacy). Most of these factors remain stable over decades and hence cannot be changed, leaving very little room for policies directed towards fighting corruption. Nevertheless, delegating less discretionary power to public officials (Johnson et al., 1998) and decentralizing fiscal authority (Fisman and Gatti,

[1] Grootaert (1998) even proposes to use measures of corruption as indicators of social capital and Bjørnskov (2003) more recently measures social capital by performing a principal components analysis in which corruption enters very strongly.

[2] See e.g. surveys by Lambsdorff (1998) and Jain (2001).

2002) have also been found to lead to lower corruption while Treisman (2000) and Bonaglia et al. (2001) find that more open economies have less corruption. In addition, a free press may also inhibit corruption (Brunetti and Weder, 2003), as can proper civil service wages (van Rijckeghem and Weder, 1997). Finally, Alt and Lassen (2002) show that political competition leads to less corruption in a sample of 45 American states. These are all factors that can be changed within the span of years. It may be easier said than done but the more options are found, the easier it gets to use at least one of them in fighting corruption.

One of these could be investing in social capital; yet, the direction of causality between social capital and corruption is less clear than the immediate association. Corruption may be lower as a cause of higher levels of honesty and trust that others will conform to a given set of norms in society, but increasing corruption could also lead to less honesty and trust in fellow citizens by way of signaling that honesty often does not pay. Paldam and Svendsen (2002) and Uslaner (2001) are first attempts to look into this problem. The latter reports that social capital, measured as the extent to which people in a given society trusts fellow citizens, is a significant cause of less corruption. He nonetheless also finds weak evidence of the reverse causality. Bjørnskov and Paldam (2002) substantiate these findings by showing that changes in social capital is a cause of corruption trends. In the present paper, I continue this research by first illustrating a causal link between social capital and corruption in a very simple principal-agent-client model, which suggests that the level of corruption is decreasing in measures of generalized trust, monitoring effort and income. By utilizing new data on social capital and corruption, I corroborate a number of previous findings while I also find evidence of a strong causal effect from social capital. The latter prediction receives substantial support and seems relatively robust to the inclusion of other variables and different approaches to controlling for endogeneity. I find only weak indications of the reverse causality, thus confirming Uslaner's (2001) findings.

The rest of the paper is organized as follows. Section two develops a simple theoretical model, which illustrates an underlying causal mechanism. Section three describes the

data, while section four presents the empirical evidence. Section five summarizes the findings and concludes.

2. Theory

I exemplify a potential mechanism connecting corruption and social capital in a simple model, which has the principal-agent-client structure well known from a number of theoretical works in the corruption literature.[3] Imagine that the principal (e.g. a government minister) has an objective function that depends positively on the level of a number of activities some of which are prone for corruption, and negatively on the level of corruption κ. The principal is constrained by a budget (e.g. tax receipts) out of which he has to allocate resources to a number of purposes. Maximizing this function, the principal decides on a level of monitoring that implies a probability λ of detecting any corrupt activity, given the chances that the corrupt parties will actually be convicted. I will assume that the principal's objective function can be written as (1) and is maximized subject to the budget constraint in (2), where N_H and N_Z measure the level of two activities, the cost of monitoring is *a* while both types of activities cost the wage w per transaction. Maximizing U_p yields the optimum level of monitoring in (3), given the level of corruption obtained in the following and assuming that the two types of activity are equally important, hence α=β.

$$U_P = \left[\left(1-\kappa\right) N_H\right]^{\alpha} + N_Z^{\beta} \tag{1}$$

$$Y = a\lambda + w\left(N_H + N_Z\right) \tag{2}$$

$$\lambda^* = \frac{Y}{a} + \left[1-\kappa+\left(1-\kappa\right)^{\frac{1}{1-\alpha}}\right]\left(\frac{\delta\kappa^*}{\delta\lambda}\right)^{-1} \tag{3}$$

A client (e.g. a firm or interest group) needs access to a service that is provided by an agency supervised by the principal with the expected value H to the client. However, the possibility exists that the client can pay to get special illegal treatment by for example being fast-tracked through an otherwise bureaucratic system, or have projects approved

[3] For contributions to this literature, see e.g. Groenendijk (1997) and Pechlivanos (2002). For a classic example of the second strand of the theoretical literature, see Shleifer and Vishny (1993).

that do not conform to legal regulations. The client then decides whether to attempt to offer the bribe B to an agent, based on his knowledge of the level of monitoring effort and social capital in order to get the special treatment. The treatment has the value s, making the client's total payoff H+s-B.[4]

The agent (e.g. a bureaucrat in charge of service provision) decides whether to accept a bribe or not. In contrast to the client, who is always economically rational in the standard sense, I assume that the agent can be one of two types. The first type is honest and never accepts bribes; hence he can be trusted to follow a given set of norms.[5] In the light of experimental evidence presented by Glaeser et al. (2000) and Carpenter (2002), this type would be expected to cooperate in a Prisoner's Dilemma game and answer yes to the generalized trust question used to measure social capital. If the honest type is offered a bribe, the client is punished by not being provided with the service. In both cases, the honest type receives his wage w. The second type is closer to a standard *homo economicus* as he can be bribed if the 'price is right' in which case he extents the service H and a special treatment with value s. In return, he receives a bribe, which increases his payoff to w+B. In the case that an agent does not accept or is not offered a bribe, he receives the payoff w, i.e. his normal salary. However, if the principal detects the corrupt transaction (with probability λ), the agent only receives his alternative payoff w_{out}, which could be any outside option between alternative employment with the principal and imprisonment. The question is therefore whether the agent accepts the bribe or not. The honest type never accepts a bribe and hence always receives the payoff w while the dishonest type accepts if the expected utility of taking the bribe plus a risk premium, π, exceeds that of being honest. This is fulfilled if:

$$\pi > \lambda w - \lambda w_{out} - (1-\lambda) B \qquad (4)$$

[4] Note that this is a one-shot game. I hence do not account for the possibility of repeat interactions between the agent and the client, which build trust on which to safeguard the corrupt relationship. The trust built in repeat interactions would be particularized trust, i.e. trust informed by historical outcomes of interaction between specific agents and clients, which is a quite different form of trust than generalized trust that extends to strangers and is thus individually non-informed (Uslaner, 2002). Although the paper deals only with generalized trust, my main points nevertheless do not depend on this simplification, which could be bypassed by e.g. assuming job rotation.

[5] The assumption that there are two types is not crucial. An alternative could be to let the bribe depend on some social capital parameter. This nonetheless produces similar qualitative results, i.e. applying Ockham's razor I opt for the simpler solution.

The risk premium depends on the agent's risk aversion, which is stochastic in the sense that it is private information not being revealed to the client.[6] I thus denote the probability that (4) is fulfilled as $\nu_\pi = 1 - \Theta\left(\lambda w - \lambda w_{out} - (1-\lambda)B\right)$. The result is that a risk-neutral client offers a bribe if inequality (5) is satisfied, which simply states that a client should offer a bribe whenever the expected payoff is higher than behaving 'honestly'. When the probability of meeting the honest type is p – the measure of social capital in the model - this boils down to the condition in (6).

$$H < p0 + (1-p)\nu_\pi \left[H + s - B\right] + (1-p)(1-\nu_\pi)H \tag{5}$$

$$H < \left(\frac{1}{p} - 1\right)(s - B)\nu_\pi \tag{6}$$

Assuming that H is stochastic, the probability of (6) being fulfilled is denoted $\nu_H = \Phi\left(\left(1/p - 1\right)(s-B)\nu_\pi\right)$. Remembering that only the dishonest type is likely to accept a bribe, the share κ of corrupt transactions to the total number of transactions in the model is expressed in equation (7), which is the level of corruption that enters the objective function of the principal upon which he chooses the optimal level of monitoring leading to λ.

$$\kappa = (1-p)\nu_H\nu_\pi \tag{7}$$

As such, the model has testable implications outlined in the derivatives in equations (8)-(10) where φ and θ are the density functions corresponding to Φ and Θ. First of all, even when social capital only derives from having trustworthy agents, corruption clearly comes to depend negatively on the share p of agents that are honest through two channels outlined in equation (8): the first term captures that only the share (1-p) of all agents will consider accepting a bribe, i.e. fewer bribes are accepted in countries with high levels of social capital while the second term shows that increasing the share of

[6] The parameter π thus measures the curvature of the individual's utility function.

honest agents results in fewer attempts at bribing. The derivative in equation (9) shows that corruption should be expected to depend negatively on the level of monitoring λ. Lastly, due to the principal having multiple objectives and a hard budget constraint, the level of monitoring and hence the level of corruption comes to depend on the resources allocated to the principal in equation (10).[7] Note that I for simplicity assume that the level of monitoring is irresponsive to the level of social capital.

$$\frac{\delta\kappa}{\delta p} = -\nu_\pi \nu_H - \frac{(1-p)}{p^2}\nu_\pi^2 \varphi(s-B) \leq 0 \tag{8}$$

$$\frac{\delta\kappa}{\delta\lambda} = -(1-p)\left[\nu_H + \left(\frac{1}{p}-1\right)(s-B)\varphi\nu_\pi\right]\theta(w-w_{out}+B) \leq 0 \tag{9}$$

$$\frac{\delta\kappa}{\delta Y} = \frac{\delta\kappa}{\delta\lambda}\frac{\delta\lambda}{\delta Y} = \frac{\delta\kappa}{\delta\lambda}\frac{1}{a} \leq 0 \tag{10}$$

The total effect of monitoring is depicted in Figure 1 where the continuum of equilibria given p is represented by the gray line as equations (3) and (7) form a system to be solved. To see that an equilibrium exists under reasonable assumptions about parameter values, simply note that the slopes of these two reaction functions are of opposite signs: a surge in corruption will induce more resources allocated to monitoring, which in turn brings down corruption.

INSERT FIGURE 1 ABOUT HERE

In the following, I estimate the linear approximation in (11) to examine whether the implications from the model can be found in the data. This is done controlling for a caveat.

$$\tilde{\kappa} = \kappa_a + (p-p_a)\frac{\delta\kappa}{\delta p} + (\lambda-\lambda_a)\frac{\delta\kappa}{\delta\lambda} + (Y-Y_a)\frac{\delta\kappa}{\delta\lambda}\frac{\delta\lambda}{\delta Y} + \varepsilon \tag{11}$$

[7] It should also be noted that the model implies that corruption depends negatively on agents' wages w and positively on the outside option w_{out}, i.e. it is congruent with empirical evidence in Rijckeghem and Weder (1997).

Svendsen (2003) views corruption as a determinant of social capital, thus implying the reverse causal direction. If people see corruption as an effective means to an end, they may tend to lose trust that others conform to the norms and hence lose social capital. This can without problems be built into a repeated version of the model above, as p only has to depend negatively on the realized level of corruption in the previous round. As the model is only meant as an illustration of the underlying mechanism, I keep it as simple as possible. However, in the following, I set up a framework for testing these predictions in equation (11) where I control and test for the potential reverse causality.

3. Data and empirical strategy

The data used to test these implications are drawn from various sources. Firstly, I use the κ-index from Transparency International (2002). The index is constructed as a 'poll of polls' by drawing on information and ratings from various sources. It measures perceived corruption rated on a scale from zero (all-pervasive corruption) to ten (no corruption), i.e. a higher rating implies less corruption. It has the advantage of being posted consecutively since 1995 for most countries in the sample.

Secondly, the risk of detection implied by the level of monitoring, λ, is proxied by two different indices. The first is an index measuring the protection of property rights posted by the Heritage Foundation (2002). The second is the civil liberties index posted by Freedom House International (2002), a liberal think tank. This index measures such 'freedoms' as the ease with which citizens can develop views and personal autonomy from the state; i.e., following Scully (1988), I include it as it captures effects of e.g. property rights protection, freedom of press and organization. Both indices have been published annually for a prolonged period. Note that the indices are formed such that lower values imply better protection and hence higher risks of detection.

Thirdly, I enter a number of variables known from previous research to be powerful predictors of national corruption. Economic development is measured by the gross national income (GNI) corrected for purchasing power parity; the level of openness is measured by the total volume of trade divided by the gross domestic product, and the level of education by the percentage of the population entering secondary schooling.

These data are drawn from World Development Indicators (2002). Openness is alternatively measured as the number of years that the economy can be considered 'open' (denoted Sachs/Warner), which is drawn from Sachs and Warner (1995). The percentage of a population that belongs to a Protestant church (predominantly Lutherans, Anglicans and Calvinists) is drawn from Treisman (2000). Two measures of political competition are included: the number of parties in parliament needed to gain a two-thirds majority is constructed using data from CIA (2002) and the percentage of people placing themselves on the political middle is taken from Inglehart et al. (1998). Finally, political stability is measured by the corresponding index in Kaufman et al. (1999). Combinations of these variables enter the X-vector in equation (12) below.

Finally, I measure social capital by the national score on generalized trust, taken from the latest wave of the European Values Survey in van Schaik (2002). This score is the percentage of a population that answers yes to the question "in general, do you think most people can be trusted, or can't you be too careful?" As such, it measures social capital as the national average propensity to act according to a given set of norms and values, i.e. it measures national honesty. The generalized trust score thus proxies for the probability parameter p in the model. These data include 29 European countries only. They are supplemented by data from the World Values Survey performed in 1993-1995 in Inglehart et al. (1998).

The data measure a variety of related and unrelated features that may influence the national level of corruption. I estimate the influence of them in the simple linear model in equation (11) where income is denoted Y, social capital , the risk of detection is λ, and additional variables enter the X-vector. The baseline specification to be estimated thus becomes:

$$\kappa = \gamma_0 + \gamma_1 X + \gamma_2 p + \gamma_3 \lambda + \gamma_4 Y + u \qquad (12)$$

The X-vector is kept simple throughout, both due to the small sample size and problems of collinearity between explanatory variables. As such, it restricts the aim of this paper to only secondarily to providing an estimate of the size of the effects. It should also be

stressed that the results and conclusions presented below do not necessarily apply to all countries, as the sample used in most regressions only includes European countries. The data are summarized in the appendix.

To control for the potential endogeneity bias mentioned above, I estimate equation (12) using a two-stage least squares (2SLS) procedure with different instruments. My first choice of instrument for social capital is the percentage of the population that is Protestant. The correlation with the social capital proxy is 0.68 and highly significant; a Hausman test cannot reject that the instrument is exogenous. The underlying intuition behind using this instrument is the following. Ekelund et al. (2002) document that the Catholic Church acted as a price-discriminating monopolist in extracting rents from the populace. The Reformation in Northern Europe led to a decentralization of the power of the church and a subsequent individualization of religion and responsibility, as the discrimination could not be upheld in a social environment with an unstable income distribution. These two factors thus destroyed the patron-client relations between the priesthood / nobility and people that had evolved over the centuries. As Putnam (1993) describes in an Italian setting, this emancipation from the Catholic Church and traditional landed aristocracy facilitated the development of informal institutions in the form of horizontal relations of reciprocal dependency that could serve some of the same purposes as the patron had done before. These informal institutions are central to virtually any definition of the social capital concept; hence the percentage of a population that is Protestant thus measures the strength of the truly exogenous roots of social capital.

This instrument may nonetheless be too strong, as it could also pick up the influence of features such as the Scandinavian welfare states and other institutional idiosyncrasies of rich Protestant countries. As my second choice, I therefore follow Uslaner (2001) by using generalized trust from the last World Values Survey, i.e. the same variable with an average seven-year lag. The correlation with contemporaneous trust is 0.90 and as the other instrument, I cannot reject that lagged trust is exogenous although it does not perform as well in the test as my first choice. As the very high correlation might indicate, lagged trust may simply perform too well. I therefore attempt to use it as a

proxy for current social capital in order to be able to supplement the European data with additional 16 countries.[8] At the end of the following section, I also present a short analysis to estimate the strength and robustness of the reverse causal relation.

4. Results

This section presents the results of entering the available data in a simple linear regression framework and thus testing the predictions of the model developed in section two. I also estimate the reverse causal direction. As a first indication, Figure 2 below plots the level of corruption on the x-axis against the level of social capital measured as generalized trust on the y-axis. There seems to be a quite strong association, supported by a highly significant correlation coefficient of 0.73, which is only marginally smaller when controlling for the level of economic development. However, as stressed in the introduction, the associations between income and corruption, income and social capital, and corruption and social capital need not be trivial. Hence, I apply a two-stage least squares (2SLS) procedure with the instruments outlined above.

INSERT FIGURE 2 ABOUT HERE

4.1 Does social capital cause corruption?

The results of using the percentage of the population that is Protestant in 2SLS are reported in Table 1. The first column reports results of the baseline using ordinary least squares (OLS), i.e. without controlling for potential endogeneity. Results using lagged trust are reported in Table 2.

Table 1 first of all document the well known result that economic development is a vital element in fighting corruption. The OLS estimate in column one is somewhat larger than the 2SLS estimates in columns two to nine, but GNI per capita remains significant with the exception of columns four and eight where particularly severe problems of multicollinearity confound the estimate. The same problems apply with respect to civil liberties that enter as a proxy for the risk of detecting corrupt transactions, λ. Civil

[8] It should be noted that the correlation between the percentage of Protestants and the supplemented social capital data falls to 0.60, i.e. the variable remains a valid instrument. This is also supported by the conclusions in Guiso et al. (2003).

liberties, measuring aspects of freedom of speech, press and property rights protection thus captures effects previously found by van Rijckeghem and Weder (1997) and Brunetti and Weder (2003). However, the estimate is basically the same whether I apply OLS or 2SLS. It moreover performs better than the index of property rights protection from the Heritage Foundation. Column four reports the larger estimate of this index, but also that including this variable makes GNI insignificant, as both proxy for economic development. Entering civil liberties and the Heritage index jointly suggests that the former is the better proxy for legal protection of property, freedom of speech and other features entering as λ. It should nonetheless be noted that it is not entirely stable, similar to the results presented in Fisman and Gatti (2002).[9]

Looking at Table 1, it becomes obvious that the main question of this paper – whether social capital is a cause of less corruption – can be answered with a resounding yes. The estimate on generalized trust remains strongly significant and robust to including almost any variable. The exceptions are column two, which does not include a measure of the λ in the model, and columns six, ten and eleven, which include measures of human capital and political competition. In all cases, the coefficient on generalized trust increases substantially. The reason for the former result is that social capital in this case proxies for civil liberties; the reason for the latter results is outlined below where I estimate the national determinants of social capital.

INSERT TABLE 1 ABOUT HERE

INSERT TABLE 2 ABOUT HERE

The variables entering the sensitivity analysis outlined in columns four to eleven also include two measures of openness. Treisman (2000) finds some evidence that open countries are less corrupt, but warns that corrupt officials may keep the country relatively closed in order to extract corrupt gains from tariff protection; hence the relation between openness and corruption may be endogenous. Entering the volume of

[9] In this respect, it is worth noting that corruption can be shown to be a cause of civil liberties, hence the estimate may be biased due to endogeneity. Fortunately, this does not significantly affect the remaining results.

trade divided by GDP per capita, I find no evidence of a causal relationship. Including this variable moreover does not affect the estimate on social capital. However, it should be stressed that I do not control for endogeneity. As the second measure of openness, I enter the Sachs and Warner (1995) measure. The coefficient on social capital remains unaltered, but this particular openness measure seems to pick up a lot of variation in economic freedom and development. As a result, the coefficients on civil liberties and GNI per capita lose their significance. I also enter inflation, which Paldam (2002) suggests is a measure of economic stability that could lead to less corruption. I nevertheless fail to find any relation between the two. Other variables not shown here include Fisman and Gatti's (2002) decentralization measure thought to decrease corruption, a result for which I fail to find supportive evidence.

Lastly, I enter two measures of political competition to examine whether social capital somehow proxies for political awareness or if political competition has an effect on its own. The number of parties needed to gain two-thirds majority in parliament is denoted 'parliament spread' in Table 1, the percentage of the population saying that they belong to the political middle is denoted 'political spread'. None of them become significant and both even appear with the wrong sign. They do, however, serve to increase the estimated effect of social capital, indicating a potential effect of interaction.

These results should be interpreted with some care. They nonetheless show the significant importance of social capital, which is replicated in Table 2 where I use a lagged measure of generalized trust as an alternative instrument for social capital. The results are qualitatively very similar to those reported in Table 1, although the estimate on social capital is approximately a fourth smaller. Table 2 thus lends additional credibility to the results in Table 1. I nevertheless supplement the European data on social capital with older data from the rest of the world as an additional check, which brings the sample size up to the 45 countries summarized in the appendix. As stated above, the remarkable stability of social capital may suggest that this procedure does not introduce unacceptable measurement errors. The results reported in Table 3 show a very similar picture as Table 1. The estimate on civil liberties seems to be less robust to the inclusion of additional control variables, yet the main results of the previous tables

are replicated. Furthermore, I cannot reject at conventional levels of significance that the estimates on GNI and social capital are the same in both tables using Protestants as the instrument, suggesting that the findings are not specific to Europe.

INSERT TABLE 3 ABOUT HERE

Across all specifications of the model, social capital thus emerges as a key cause of corruption, and although the size of the estimates should be interpreted with care, the quantitative importance of social capital can be illustrated by a simple example. Latvia is a country that is ridden with corruption, as indicated by its score of 3.4 on the κ - index. Imagine that Latvia could raise its level of generalized trust by one standard deviation, i.e. to about the sample average. The results above suggest that this alone would cause Latvian corruption to decrease to about 5, i.e. to the level of Greece or Hungary, which in turn could result in more rapid development.[10] The last exercise of this paper therefore is to examine what contributes to national-level social capital in order to give some indication of what can be done to invest in national social capital. In addition, this addresses the question of reverse causality.

4.2 Does corruption cause social capital?

To examine the reverse causal direction, i.e. the question whether corruption causes social capital, I instrument corruption and GNI per capita with their five-year lagged values. The results are reported in Table 4, which gives at best qualified support for the importance of the reverse causal direction while also showing the severity of the multicollinearity problems. The combination of the level of economic development and the percentage of the population that is Protestant in column one explains half of the variation in the data, consistent with previous findings in Curtis et al. (2001), Uslaner (2002) and Guiso et al. (2003). Protestants, used as an instrument in Table 4, is unfortunately the only variable that remains significant throughout.

[10] Estimates from introducing social capital in the literature on economic growth show that this shock to the level of social capital could in turn result in an increase in the annual per capita growth rate of at least one half percentage point (Whiteley, 2000; Zak and Knack, 2001; Beugelsdijk et al., 2002).

Corruption only becomes significant when GNI is left out of the equation as in columns three and seven; hence it is difficult to answer, which of the two (or both) is the more important. Still, what can be learned from the table is that human capital, measured as the percentage of the population that enters secondary schooling, is an important source of social capital in Europe. This result is found in a number of recent studies using individual-level data (Uslaner, 1997; Alesina and la Ferrara, 2000) and translates to the macro level with the implication that investments in education entails a positive social capital externality as found by Knack and Keefer (1997). However, the effect of human capital becomes insignificant when corruption replaces GNI in the equation. I also find some support for Fisman and Gatti's (2002) notion that decentralization leads to less corruption, which here works through increasing the level of social capital. This result is nevertheless not robust to the inclusion of human capital, which alongside the political variables in the model in columns 10 and 11 on the other hand gives the best fit. The political spread – the number of people saying that they belong to the political middle – receives a significant, negative coefficient and moreover makes human capital significant. The reason is probably that the variable captures how interested citizens are in society, as they otherwise would take more of a stance. In other words, it measures the strength of civic society.

INSERT TABLE 4 ABOUT HERE

This is consistent with Claibourn and Martin's (2000) finding that Americans who are regular newspaper-readers and participate in political activities have substantially more social capital than those who do not. As such, interest in society unsurprisingly contributes to both individual and national social capital although it should be stressed that the choice of proxy is not without importance. I entered another proxy for interest in society, newspaper circulation obtained from UNESCO (1998), without results. Using the first proxy, the finding is nonetheless robust to the inclusion of a number of variables of which Table 4 shows the result of including the Gini variable, a measure of inequality that Uslaner (2002, Ch. 8) forcefully argues is a cause of social capital. The European results reported here reject that notion.

As a last exercise, I enter generalized trust supplemented with older data from the rest of the world as in Table 3. Given the assumption that these data proxy sufficiently well for current social capital, this provides a test of the results to check if they are sample-specific. The results are shown in Table 5 where I follow Uslaner (2002) in excluding the post-communist countries.[11] The table suggests that sample-specificity is not a problem for most of the findings. First of all, the Protestant share of the population remains robustly associated with social capital although it performs slightly better in the all-European sample. This is probably due to the fact that some of the countries in the supplemented sample have large proportions of their population belonging to non-Christian, non-hierarchical religions such as Buddhism. Such religions may have produced similar cultural effects as those pertaining to Protestant European countries.

INSERT TABLE 5 ABOUT HERE

Secondly, decentralization is not significant while the proxy for interest in society remains significant in some specifications. However, removing either the top or bottom income quintile from the sample shows that the significance of the latter variable derives from having relatively poor countries in the sample. Conversely, the significance of education in Table 3 can be shown to be an effect deriving from the top quintiles. In other words, the sources of social capital appear to be substantially different in less developed societies. Thirdly, inequality comes to be significantly associated with social capital, i.e. the result is now in line with Uslaner's (2002) conclusion that inequality leads to less trust. The result reported in Table 5, columns 9-11, is moreover robust to the inclusion of a range of other variables and thus provides additional support for Uslaner's (2002) conclusions.

Fourthly, one of the most central results in Table 5 is nevertheless that I can reject that corruption is a cause of social capital. There is no specification in which corruption comes to be significantly causally associated with social capital. The closest is column

[11] The reason for excluding these countries is due to two outcomes of having a communist regime: 1) countries achieved an artificially egalitarian income distribution due to the communist ideology, and 2) the regimes systematically destroyed social capital (Paldam and Svendsen, 2002). The joint effect is that these countries have relatively little income inequality and low levels of social capital, which suggests that they in some sense are far from 'equilibrium' given their present status as regular market economies.

3, where corruption seems to proxy for the income level and thus comes close to being significant at the 10 % level. Finally, civil liberties also seem to influence the level of social capital. This is an important finding as it points to the possibility that policy choices can influence the level of social capital. It is moreover emphasized by the finding (not shown) that the only variables that seem to be relatively robust causal factors in post-communist countries are civil liberties and political stability, which is insignificant in Table 5.

The evidence thus shows that social capital has historically very deep roots by depending on the dominant religion in the country. The quality of legal institutions, measured by the civil liberties index, also contributes to social capital, as does human capital, although only in relatively rich societies, corresponding to findings at the individual level, as does the average interest in society, which nonetheless appears more robust when less developed societies are included in the sample. Finally, in countries without a communist past, income inequality contributes to corruption through its effect on the level of social capital. These findings point to some tentative policy implications outlined in the conclusions.

5. Conclusions

This paper examines the link between corruption and social capital. A simple theoretical model illustrated a mechanism where higher levels of social capital lead to less corruption by both implying more agents that are unlikely to accept a bribe and fewer attempts at bribing agents. This served as the background for the subsequent empirical analysis.

Using a sample of 29 European countries for which I have recent social capital data, I first corroborate two findings from previous studies: economic development is a strong cause of less corruption, as is a proper regulatory environment, measured by an index of civil liberties. In answering the main question of this paper, I find a strong causal link from higher levels of social capital to less corruption. The estimate is robust to the inclusion of a series of potentially confounding variables and to supplementing the sample with 16 non-European countries. It is also worth noting that I fail to find

evidence of a number of other variables such as inflation and openness that previous studies have found to be significant determinants of corruption. This could nonetheless be caused by the relatively small sample size or be due to the specific instrument applied. I also address the issue of reverse causality by asking whether corruption is a determinant of social capital. This direction is more complicated to unravel, as severe problems of multicollinearity make it difficult to separate effects. The strongest determinant is nonetheless the percentage of the population that is Protestant. There is also some indication that investments in human capital could entail a positive social capital externality in relatively wealthy societies, a result known from studies on individual data. Conversely, an indicator of people's interest in society seems relatively robustly associated with social capital in less wealthy countries. Common for all societies without a communist past is that higher income inequality is associated with lower levels of social capital.

The policy implications of this research are limited. Social capital is often found to be remarkably stable across time, having roots that are centuries deep, which suggests why it has proved so difficult to fight corruption in many countries. Yet, evidence presented in this paper also suggests that something can be done to invest in social capital and that such investments in turn will reduce corruption. Investments and encouraging interest in society by for example ensuring that newspapers and other media are independent and easily accessible seem to lead to more social capital. In addition, some degree of income redistribution could also lead to a strengthening of national social capital. These implications should, however, be read tentatively as this paper asks more questions than it answers, which I leave to future research. They include whether alternative measures of social capital perform better than the one used in this paper and whether the inclusion of more developing and middle-income countries substantially alters the conclusions. Finally, as social capital reduces corruption, the most important question is how countries can invest in it. This would not only reduce corruption, but also facilitate economic growth and thus other desirable features of society.

Appendix

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Table A.1. Data on economic development, social capital and corruption

Country	GNI per capita	Trust, 1999-2000	Trust, 1993-1995	Civil liberties	Corruption
Austria	26,310	33.9	31.9	1	7.7
Belarus	7,550	41.9	-	6	4.1
Belgium	27,500	29.3	31.6	2	6.1
Bulgaria	5,530	26.9	30.0	3	3.5
Croatia	7,780	20.5	-	2	3.7
Czech Republic	13,610	23.9	28.0	2	4.3
Denmark	27,120	66.5	57.0	1	9.8
Estonia	9,050	22.9	28.0	2	5.7
Finland	24,610	58.0	60.1	1	10.0
France	24,470	22.2	23.9	2	6.7
Germany	25,010	34.8	33.9	2	7.6
Greece	16,940	19.1	-	3	4.9
Hungary	12,060	21.8	28.0	2	5.2
Iceland	28,770	41.1	42.8	1	9.1
Ireland	25,470	35.2	43.6	1	7.2
Italy	23,370	32.6	30.2	2	4.6
Latvia	6,960	17.1	19.0	2	3.4
Lithuania	6,960	24.9	31.0	2	4.1
Luxemburg	45,410	25.9	-	1	8.6
Netherlands	26,170	59.7	51.1	1	8.9
Poland	9,030	18.9	35.0	2	4.1
Romania	6,380	10,1	16.0	2	2.9
Russia	8,030	23.7	38.0	5	2.1
Slovakia	11,000	15,7	28.0	2	3.5
Slovenia	17,390	21,7	17.0	2	5.5
Spain	19,180	38.5	33.3	2	7.0
Sweden	23,770	66.3	61.6	1	9.4
Ukraine	3,710	27.2	-	4	1.5
United Kingdom	23,550	29.8	44.7	2	8.7
Argentina	12,090	-	25.0	3	3.5
Australia	25,370	-	43.9	1	8.3
Brazil	7,320	-	6.9	3	3.9
Canada	27,330	-	50.8	1	9.2
Chile	9,110	-	22.9	2	7.4
India	2,390	-	34.7	3	2.8
Japan	26,460	-	41.4	2	6.4
Mexico	8,810	-	25.9	3	3.3
Nigeria	790	-	23.0	5	1.2
Norway	29,760	-	63.1	1	9.1
Portugal	16,880	-	21.2	1	6.4
South Africa	9,180	-	29.3	2	5.0
South Korea	17,340	-	36.0	2	4.0
Switzerland	30,350	-	43.1	1	8.6
Turkey	7,030	-	10.0	5	3.8
United States	34,260	-	44.4	1	7.8
Uruguay	8,880	-	52.0	1	4.7
Observations	46	29	41	46	46

Table 1. Causes of corruption

	1[a]	2	3	4	5	6	7	8	9	10	11
GNI	0.468***	0.403***	0.354***	0.232	0.261*	0.389***	0.320**	0.201	0.350***	0.341***	0.322*
	(5.091)	(2.837)	(2.964)	(1.509)	(1.840)	(3.150)	(2.116)	(1.502)	(2.801)	(2.917)	(1.819)
Generalized trust	0.437***	0.830***	0.681***	0.648***	0.634***	0.849***	0.681***	0.673***	0.682***	0.720***	0.787***
	(5.683)	(4.346)	(4.923)	(3.683)	(3.944)	(5.019)	(4.265)	(4.410)	(4.786)	(5.175)	(3.319)
Civil liberties	-0.262***		-0.260**		-0.220*		-0.283**	-0.170	-0.248**	-0.248**	-0.203
	(-3.098)		(-2.593)		(-1.811)		(-2.654)	(-1.396)	(-2.170)	(-2.511)	(-1.447)
Property rights				-0.326*	-0.148						
				(-1.881)	(-0.740)						
Secondary schooling						-0.062					
						(-0.544)					
Trade openness							0.002				
							(0.022)				
Sachs/Warner								0.232*			
								(1.945)			
Inflation									-0.024		
									(-0.231)		
Parliament spread										-0.102	
										(-1.247)	
Political spread											0.159
											(1.012)
Constant	2.69***	-0.19	1.91**	3.01	3.08*	2.19	2.17*	2.21*	1.90*	2.62**	-0.75
	(3.721)	(-0.250)	(2.076)	(1.647)	(1.826)	(0.841)	(1.951)	(1.765)	(1.995)	(2.536)	(-0.243)
Observations	28	28	28	28	28	24	27	22	28	27	21
Adjusted R-square	0.872	0.736	0.829	0.819	0.839	0.797	0.817	0.842	0.823	0.832	0.805
F-value	64.48	40.08	46.37	43.30	37.59	32.31	31.07	30.30	33.56	34.37	22.69

Note: the instrument applied for social capital is the percentage of the population that is Protestant; [a] OLS regression. *** denotes significance at p<0.01, ** at p<0.05, and * at p<0.10; t-statistics in parentheses.

Table 2. Causes of corruption – alternative instrument

	1	2	3	4	5	6
GNI	0.489***	0.490***	0.371***	0.243	0.392**	0.358**
	(3.887)	(4.272)	(3.094)	(1.622)	(2.831)	(2.700)
Generalized trust	0.536***	0.280*	0.509***	0.400***	0.614***	0.513***
	(3.932)	(1.747)	(4.031)	(3.115)	(3.467)	(3.890)
Protestants		0.329***				
		(3.026)				
Civil liberties			-0.225**		-0.061	-0.219*
			(-2.216)		(-0.391)	(-2.053)
Property rights				-0.396**		
				(-2.580)		
Secondary schooling					-0.004	
					(-0.039)	
Inflation						-0.029
						(-0.307)
Constant	0.97*	1.61***	2.90***	4.77***	2.05	2.94**
	(1.845)	(3.477)	(2.846)	(3.117)	(0.647)	(2.812)
Observations	23	23	23	23	21	23
Adjusted R-square	0.828	0.884	0.861	0.866	0.818	0.854
F-value	56.39	59.46	48.57	50.50	24.66	34.69

Note: the instrument applied for social capital is five-year lagged generalized trust. *** denotes significance at p<0.01, ** at p<0.05, and * at p<0.10; t-statistics in parentheses.

Table 3. Causes of corruption – supplemented sample

	1[a]	2	3	4	5	6
GNI	0.520***	0.371***	0.333**	0.372**	0.345**	0.353**
	(5.560)	(2.891)	(2.319)	(2.306)	(2.228)	(2.265)
Generalized trust [b]	0.290***	0.635***	0.631***	0.753***	0.648***	0.638***
	(3.654)	(3.702)	(2.920)	(2.869)	(3.347)	(2.983)
Civil liberties	-0.251***	-0.193*		-0.144	-0.197*	-0.145
	(-2.857)	(-1.775)		(-0.815)	(-1.716)	(-0.949)
Property rights			-0.286*			
			(-1.706)			
Secondary schooling				0.072		
				(0.538)		
Trade openness					0.042	
					(0.387)	
Sachs/Warner						0.144
						(1.046)
Constant	3.17***	1.70	2.38	0.59	1.50	1.41
	(4.174)	(1.550)	(1.238)	(0.194)	(1.123)	(0.846)
Observations	45	45	45	39	41	39
Adjusted R-square	0.805	0.745	0.728	0.638	0.741	0.689
F-value	62.77	44.78	41.08	18.21	30.32	22.61

Note: the instrument applied for social capital is the percentage of the population that is Protestant; [a] OLS regression; [b] data from sample supplemented by Inglehart et al. (1998). *** denotes significance at p<0.01, ** at p<0.05, and * at p<0.10; t-statistics in parentheses.

Table 4. Causes of social capital

	1	2	3	4	5	6	7	8	9	10	11
GNI 2000	0.301**	0.138		0.408**		0.310**					
	(2.058)	(0.270)		(2.390)		(2.322)					
Protestants	0.578***	0.448	0.372*	0.648***	0.511*	0.590***	0.407**	0.343	0.345	0.625***	0.666***
	(4.031)	(1.198)	(1.915)	(4.360)	(1.861)	(4.579)	(2.171)	(1.519)	(1.522)	(4.342)	(4.868)
Civil liberties				0.240							
				(1.367)							
Transition country					-0.332						
					(-0.926)						
Corruption		0.257	0.432**		0.063		0.378*	0.316	0.340		
		(0.354)	(2.102)		(0.125)		(1.741)	(1.388)	(1.351)		
Secondary schooling						0.278**	0.231			0.306**	0.227*
						(2.179)	(1.641)			(2.326)	(1.828)
Decentralization								0.317*			
								(1.970)			
Political spread									-0.322**	-0.274*	-0.314**
									(-2.211)	(-1.875)	(-2.439)
Inequality											-0.003
											(-0.021)
Constant	17.68***	14.28	12.60*	7.81	28.74	-31.78	-28.27	2.79	43.51**	-1.31	15.85
	(4.304)	(1.436)	(2.001)	(0.913)	(1.425)	(-1.486)	(-1.335)	(0.267)	(2.518)	(-0.048)	(0.527)
Observations	28	26	26	28	26	24	22	18	20	18	18
Adjusted R-square	0.499	0.495	0.525	0.510	0.524	0.639	0.647	0.686	0.656	0.699	0.764
F-value	14.94	6.50	15.37	10.71	10.53	15.16	14.42	10.49	13.72	14.94	14.74

Note: the instruments applied for GNI and corruption are five-year lags. *** denotes significance at p<0.01, ** at p<0.05, and * at p<0.10; t-statistics in parentheses.

Table 5. Causes of social capital – supplemented sample without post-communist countries

	1	2	3	4	5	6	7	8	9	10	11
GNI 2000	0.228	0.144		-0.061	-0.034		0.411**	-0.157	-0.014		
	(1.624)	(0.558)		(-0.350)	(-0.179)		(2.740)	(-0.720)	(0.089)		
Protestants	0.623***	0.567***	0.521***	0.517***	0.664***	0.718***	0.529***	0.519***	0.624***	0.541***	0.534***
	(4.577)	(2.956)	(3.115)	(4.336)	(4.738)	(3.302)	(3.465)	(4.104)	(5.161)	(4.580)	(4.737)
Civil liberties				-0.473**				-0.339		-0.257*	-0.369
				(-2.436)				(-1.098)		(-2.014)	(-1.204)
Corruption		0.135	0.287			-0.104					
		(0.408)	(1.641)			(-0.362)					
Secondary schooling					0.262	0.288					
					(1.472)	(1.538)					
Political spread							-0.057				
							(-0.424)				
Political stability								0.226			-0.135
								(0.654)			(-0.414)
Inequality									-0.361**	-0.256**	-0.302*
									(-2.376)	(-2.243)	(1.998)
Constant	21.19***	18.84**	17.44**	45.04***	8.78	9.66	20.38*	40.88***	48.46***	51.02***	58.61***
	(4.701)	(2.598)	(2.662)	(4.223)	(0.754)	(0.866)	(1.732)	(3.055)	(3.958)	(7.715)	(2.958)
Observations	31	31	31	31	31	31	27	31	30	30	30
Adjusted R-square	0.509	0.504	0.522	0.613	0.514	0.510	0.612	0.612	0.625	0.702	0.703
F-value	17.11	11.50	17.94	17.39	11.24	11.06	15.17	13.24	17.65	24.58	18.79

Note: the instruments applied for GNI, corruption and civil liberties are five-year lags. *** denotes significance at p<0.01, ** at p<0.05, and * at p<0.10; t-statistics in parentheses.

Figure 1. Equilibria in the model

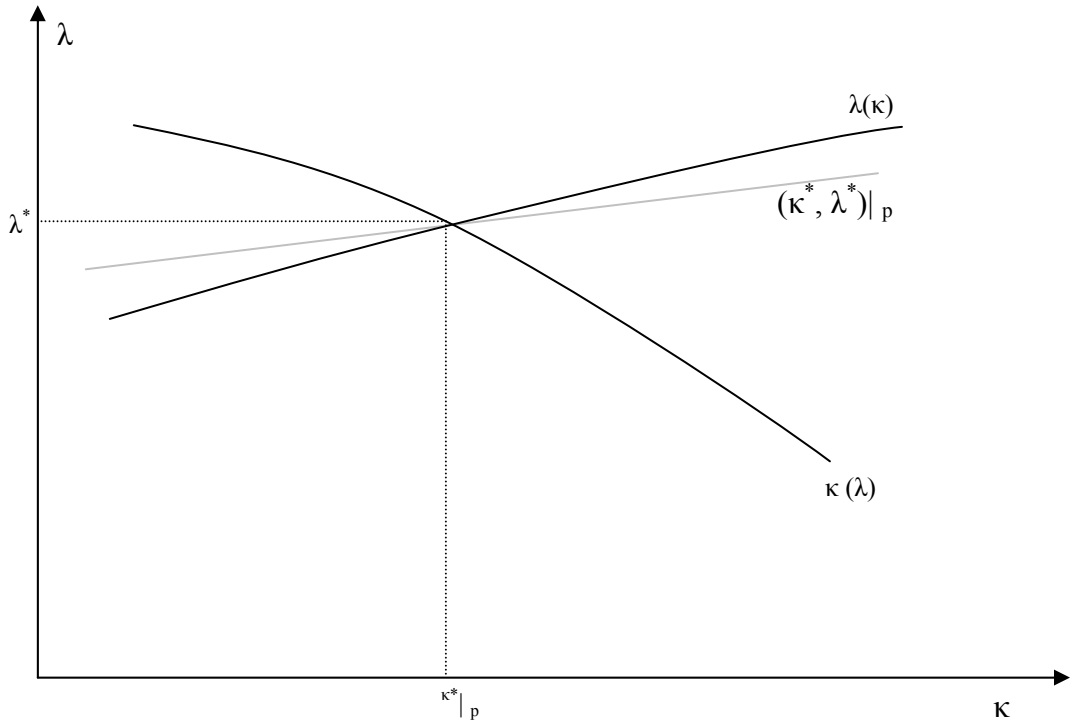

Figure 2. Corruption and social capital