NUPI

[743]
NUPIWorkingPaper

Department of International Economics

Police Corruption, Crime and Crime Reporting: A Simultaneous Equations Approach

Omar Azfar
Tugrul Gurgur

Norwegian Institute of International Affairs
Norsk Utenrikspolitisk Institutt

Utgiver: NUPI

ISSN: 82-7002-204-7
ISBN: 978-82-7002-204-5

Besøksadresse: C.J. Hambrosplass 2d
Addresse: Postboks 8159 Dep.
0033 Oslo
Internett: www.nupi.no
E-post: pub@nupi.no
Fax: [+ 47] 22 36 21 82
Tel: [+ 47] 22 99 40 00

Police Corruption, Crime and Crime Reporting: A Simultaneous Equations Approach*

Omar Azfar
John Jay College of Criminal Justice
City University of New York

Tugrul Gurgur
Department of Economics
University of Maryland

[Abstract] We study the causal relationship between police corruption, crime and crime reporting, using data from the International Crime Victimization Survey. Using a simultaneous equations approach we find a number of intuitive relationships, which are statistically significant. The clearest of these is that crime reporting reduces police corruption.

* We would like to thank the Norwegian Research Council for economic support as part of project no. 178683/S50, 'Violence, poverty and police corruption'. We thank Jens Andvig for very useful comments on an earlier draft.

1. Introduction

One of the central roles of government is the protection of the person and the property of its citizens. In addition to the large direct effect on welfare when citizens fear being victimized, there is also an impact on income if crime has a negative impact on social order, stability and commerce. Researchers have explained the variation of crime rates across countries by social, cultural, and economic factors. In this paper we aim to contribute to this line of research by investigating the causal links between police corruption, crime and crime reporting.

We find that crime rates, crime reporting, and police corruption jointly determine each other. There are several interactions: Crime reporting declines with police corruption and crime rates. The clearest of these is that police corruption decreases with crime reporting.

Most theoretical models of crime in the economics literature start from Becker's "crime and punishment" model (Becker, 1968; and Becker and Stigler, 1974). That model focuses on a typical individual who compares the expected utility of legal and illegal behavior. Crime is positively related to the potential gains from illegal activity and negatively related to the probability of conviction and the size of punishment.

From this starting point the theoretical and empirical literature on economics of crime has provided a number of different results, some contradictory. The most prominently discussed reasons of criminal behavior are income and income inequality (Entorf and Spengler, 1998; Fowles and Merva, 1996; Kelly, 2000; Chiu and Madden, 1998; Fanjzylber et al, 2000). Urbanization (Glaeser and Sacerdote, 1996), education and institutional development, such as the quantity of the police force and the judiciary have also been emphasized by some authors (Usher, 1997; Fanjzylber et al, 2000; Buonanno and MonTolio, 2006). Bourguignon (1999) fits the Becker model into a simple distributional framework. He models the crime rate so it will increase with the gains from crime and the extent of poverty and decreases with such crime-deterrent variables as the probability of detection, the size of the penalty and the extent of honesty within society.

Many studies argue that urban areas are more likely to have higher crime rates than rural areas and large cities more than small ones, perhaps due to higher pecuniary returns to crime in urban areas and the effect of population density on the probability of apprehension. Cities may create greater returns to crime because criminals may have greater access to the wealthy and face a greater density of victims. Also urban density makes it harder for the police to track criminals, which leads to lower probabilities of recognition and a lower probability of arrest. Van Kesteren

et al (2001) have analyzed individual risk factors of victimization in 17 industrialized countries using data from the International Crime Victim Survey (ICVS) in 2000. They have found that town size, income, juvenility, risky life-styles, and weak guardianship are significant risk factors but gender and educational level are not.

A major reason for the lack of conclusive results is the different ways crime data are generated. That is why we here pay much attention to the role of crime reporting. The link between development level (measured by poverty rate or income level) and crime rates appears inconclusive. Empirical studies within one particular country (such as the United States: Fowles and Merva, 1996; Kelly, 2000) suggest a negative effect of income on crime rates. Cross-country studies, on the other hand, report the opposite result. The usual conclusion in cross-national studies is that higher income inequality leads to a higher crime level (e.g. Fanjzylber et al, 2000). Some researchers, who use official crime data, even report that higher income increases the crime rates. Soares (2004a) shows that this is likely to be due to biases in official crime data, which tend to underreport crimes in poorer countries.

The link between crime rates and macro governance has been addressed recently (Lederman, et al. 2004). If, for example, aggregate corruption – where we have empirical indicators – is correlated with corruption levels in the police – we have a reasonable microeconomic mechanism where corruption may impact crime. Hunt (2006a) shows that corruption is disproportionately prevalent in the police and law enforcement sectors. Corruption in police may obviously hurt the effectiveness of law enforcement. If so, higher crime rates may result through a Becker mechanism. For example, criminals may bribe the police to avoid punishment, or corruption in hiring or budgeting process within law enforcement agencies may undermine the quality and effectiveness of the police force. Azfar (2004) has already shown that there is a strong correlation between homicide rates and the general level of corruption. This relationship remains strong and significant after controlling for income, inequality, presence of the death penalty, schooling and ethnic fractionalization. While that analysis was done without data specifically on police corruption, it seems that the most likely reason for a link between the general level of corruption and homicides is that police corruption increases homicides.

The empirical problems created by underreporting of crime in less developed countries, emphasized and corrected by Soares (2004a) apply as strongly to biasing the estimated relationship between governance and crime. The main reason is that police data have proved widely

misleading and crime is under-reported in countries with lower income and poorer governance. As explained in Soares (2004a) official crime statistics may underestimate actual crime rates, due to underreporting bias of police officers and/or unwillingness of crime victims to report crimes. Surveys, such as the International Crime Victim Surveys (ICVS), may provide more reliable results than the police-reported data. Andvig and Shrivasta (2008) document problems with the ICVS itself, and the results of Azfar and Murrell (2009) suggest we should treat survey data on sensitive subjects with some caution. However these problems pale in comparison to the problems of police reported data, which systematically underreports crime in the most corrupt and under-developed countries. Hence we use ICVS data for our econometric analysis, both in this paper and for our previous work described below.

Azfar and Gurgur (2004) report that governance is strongly linked with both crime incidence and crime reporting rates even after controlling for possible endogeneity of the governance variable. Moreover, governance and income inequality do not have the same effect on every household: it is conditional on personal, social and economic characteristics. Urban, female, or poor citizens are more likely to experience a crime and less likely to report it if they live in countries with high-income inequality and poor governance.

Here we seek to understand the relationships between police corruption, crime and crime reporting. Since crime rates, crime reporting, and police corruption are likely to be affected by each other (for some mechanisms see Hunt 2006b), it is crucial to come up with some instruments that isolate this interaction. We provide some novel instruments to address the reverse causality problem, combining data from the International Crime Victim Survey, the World Values Survey (WVS) and other sources.

In Section 2 we present our hypotheses about to the nexus of crime-crime reporting-police corruption. In Section 3 we describe our variables of interest in more detail. In Section 4 we provide some preliminary analysis. The estimation results are presented and discussed in Section 5. In Section 6 we discuss the kinds of case study evidence needed to address the reverse causality questions. Section 7 concludes.

2. The Model

The variables we are mainly interested in explaining are crime rates, crime reporting, and police corruption. We test several hypotheses related to interactions between them:

H1: Police corruption is likely to lead to higher crime rates: plausible mechanisms are criminals being able to buy their way out of punishment; the fraying of meritocracy in the police which may reduce the probability of apprehension; the police may even become involved with criminal gangs and commit crimes themselves.

H2: Crime increases police corruption because the general level of criminality may infect the police force For example, an increased share of criminals among the public increases the share of population who may have incentives to, and fewer scruples about bribing the police. Also victims could be doubly victimized by the police (Hunt)

H3: Reporting crimes should reduce police corruption, since it becomes more difficult for corrupt police officials to cooperate with criminals to leave them off the hook when crimes are reported. Moreover police corruption itself is a crime that is more likely to get punished if they are reported. The Becker mechanism follows.

H4: Police corruption weakens the trust in law enforcement agencies and therefore discourages crime reporting.

H5: Crime reporting is likely to reduce crimes since criminals, thinking they are more likely to be caught, would be deterred from committing crimes.

H6: Crime may reduce crime reporting because the public may become demoralized about the likelihood that reporting would lead to redress or recovery of property. Also, the police may discourage the reporting of minor crimes if they have to deal with lots of more serious crimes.

Combining these hypotheses we may construct a system of equations:

$$\begin{aligned} \text{Crime} &= f(\text{Police Corruption, Crime Reporting, } X, Z_1) \\ \text{Crime Reporting} &= g(\text{Police Corruption, Crime, } X, Z_2) \\ \text{Police Corruption} &= h(\text{Crime, Crime Reporting, } X, Z_3) \end{aligned} \qquad (1)$$

Each equation in (1) involves a set of exogenous variables *X* that are common to all equations, as well as a set of exogenous variables *Z* that are specific to that equation. The *Z* variables are all instruments that help us to identify the system parameters.

We begin with the common exogenous variables *X*. These are Income Inequality, Education, Urbanization, and Ethnic Differences. They are usually considered as potential determinants of crime rates (see Glaeser and Sacerdote, 1996; Chiu and Madden, 1998; Fanjzylber et al, 2000; Soares, 2004a). Common results are that crime rates increase with income inequality, urbanization, and ethnic differences, and decrease with education. Crime reporting, on the other hand, is found to be positively correlated with education, and negatively correlated with income inequality (Soares, 2004b). We expect urbanization to have a positive influence on crime reporting, since crime victims would have easier access to law enforcement agencies. Ethnic differences may reduce reporting rates if it nourishes distrust and discrimination within the society, but might also increase crime reporting if ethnic groups are inclined to report each other. Finally, police corruption is likely to decrease with education, and increase with income inequality and ethnic differences (Van Rijckeghem and Weder, 1997; Fisman and Gatti, 1999; Treisman, 2000).

We measure income inequality by the Gini coefficient. For education we use the literacy rate. Although the number of years in schooling is also an alternative, we will use the former since it covers more countries. For ethnic differences we apply the ethno-linguistic fractionalization index used by Easterly and Levine (1997). The fractionalization index measures the probability that two randomly selected persons from a given country will not belong to the same ethnolinguistic group. The higher the index, the more heterogeneous and fragmented society tends to be and the lower the probability that economic agents are treated equally and fairly.

As noted, because each of the endogenous variables is likely to affect the others, it is imperative to address the endogeneity of police corruption, crime incidence, and crime reporting variables in equations where they are used as regressors. To find appropriate instruments for these variables has proved to be a challenging task. A variable has to satisfy three conditions to be a good instrument: It has to be exogenous; it has to be correlated with the endogenous variable; and finally it has to influence the dependent variable not directly but only through the endogenous variable it is the instrument for.

In each equation we use equation-specific exogenous variables that serve as instruments to identify the model parameters:

Z_1 (Crime) = Severity of punishment, Young population, Legality of abortion, Trust, Attitudes to theft
Z_2 (Crime reporting) = Social activism, Membership in voluntary organizations
Z_3 (Police Corruption) = Parking tickets of diplomats, Attitudes towards bribery.

Instruments for Crime

We use four instruments for crime incidence: variables that we assume have a direct impact on the probability of committing a crime, but only indirect effects on the other two endogenous variables (via the crime rate). The workings of the instrument 'severity of punishment' are straightforward. According to Becker's "crime and punishment" model (Becker 1968, and Becker and Stigler 1974), an individual compares the expected utilities of legal and illegal behavior. The severity of punishment increases the cost of illegal behavior and reduces the crime rate. We indicate the severity of punishment by whether there is death penalty in the legal system or not. This is clearly an imperfect measure, but it is the only widely available and objective criterion we are aware of.

It is a well-known stylized fact that young people are more likely to commit crimes (Patterson, 1991; Fowles and Merva, 1996; Grogger, 1998). Therefore, we expect to see a positive link between crime rates and the ratio of young people in the population.

In recent years, the legalization of abortion in the United States in 1973 has been suggested as one of the reasons that explain the drop in crime rates in late 80s and 90s (Donahue and Levitt, 2001). Donahue and Levitt argue that people tend to have unwanted children if abortion is illegal. Since these children grow up in an unhealthy environment, they are more likely to engage in criminal activities.

In addition to the aforementioned instruments, we use the "Trust" variable from the World Values Survey to measure the level of trust within the society. This measure of trust may proxy trustworthiness (Uslaner 2002) and trustworthiness is expected to reduce crime rates. (See Azfar and Subrick 2005 for an explanation of this variable and others from the World Values Survey).

We also use another variable that shows attitudes towards crime: the willingness to buy stolen goods. In societies where people have a strong anathema to crime, they may be unwilling to buy stolen goods on principle, even if there was no risk of being caught. We use a question from the World Values Survey which asks "Is it ever OK to buy a stolen good?" This unwilling-

ness may also reduce the pecuniary returns to crime (its less worthwhile stealing a bicycle or leather jacket if it will be difficult to resell). Indeed we find that crime levels are a lot lower in societies where people are unwilling to buy stolen goods.

There doesn't appear to be more than the usual amount of concern about the four instruments used in the crime regression. The instrumental variables are not likely to affect the two other dependent variables in a strong way. While there are possible mechanisms for such an influence (for example, banning abortion may lead to corruption because pregnant women have to pay off the police to get one), it seems unlikely that these mechanisms would have a strong enough effect to seriously bias the results.

Instruments for Crime Reporting

Our search for instruments for crime reporting was premised on the idea that crimes are more likely to be reported if the citizenry possesses more civic virtue and if crime reporting is less onerous. .We use measures of social activism from the World Values Survey as instruments..

We use two measures of social activism from the WVS. One is the proportion of households who are involved in signing a petition to government and the other is the proportion of households who are members of voluntary organizations. People who are more active in civic activities are also more likely to go to the police to report crimes. These instruments also seem broadly plausible.

Instruments for Police Corruption

Finally, we use two sets of instruments for corruption. Our first instrument is a novel one, first introduced by Fisman and Miguel (2006). It measures the number of parking violations committed by diplomats in New York City. Due to the location of the United Nations Headquarters, thousands of diplomats from more than 100 countries live in NYC. Their diplomatic immunity shields them from prosecution, including petty crimes like parking tickets (or at least did till the Clinton-Schumer Act of 2002). We use the number of tickets per diplomat issued between 1997 and 2002 as an instrument of corruption. This variable measures law obedience by government officials and so might be a good proxy for corruptibility of the police. In many countries like Pakistan where "ladders" allow bribes to be passed up the hierarchy and protection to be passed

down, the elite's attitudes to law obedience would affect the extent of police corruption rather directly.

Our second instrument is a question from the World Values Survey on the extent to which people think bribery is ever justifiable. Our reason for including this instrument is simply that the extent to which people justify bribery may affect their willingness to pay bribes.

3. Description of Endogenous Variables

Crime and Crime Reporting

The data for crime and crime reporting comes from the International Crime Victim Surveys (ICVS), which have been conducted starting from 1989 by a group of international research institutes under the coordination of the United Nations Interregional Crime and Justice Research Institute. Four rounds of the ICVS were conducted for selected countries, distributed irregularly over the years 1989, 1992, 1996/1997, and 2000. Unlike the official crime statistics, such as the United Nations Survey of Crime Trends and Operations of Criminal Justice Systems, the ICVS uses crime information collected from the households. The victimization surveys arguably better reflect the crime rates for at least two reasons: First crimes may be under-reported to the police, and underreported by the police to the UN (Soares, 2004a). Improvement in the police capacity or efficiency will tend to increase the reported crime rates. Second, crime statistics may not be comparable across countries. Official police figures vary because of differences in legal definitions, recording practices, and precise rules for classifying and counting incidents. But most importantly they appear to suffer from systematic under-reporting of crimes in the most misgoverned countries (Soares 2004a), which would seriously bias any attempt to estimate the link between corruption and crime using official figures.

The sample of countries in the ICVS covers 67 countries. In the ICVS research project the statisticians have made great efforts in making the definitions comparable. A problem with these statistics when comparing countries is, however, that they have been collected at different points of time. For example, global shifts in protection technology reducing some crime rates may make the cross-country statistics less comparable. In addition for several poor countries they are only representative for the populations in larger(st) cities[y]. While we have examined whether this causes a serious bias and found no evidence for it, it would be far more preferable to

have data on representative samples. All things considered, it is the best set of statistics available for our purposes (i.e., much better than official police reported data).
We construct five categories of crime:

(i) Vehicle-related Theft: Theft of cars, motorcycles and bicycles; theft from cars
(ii) Other theft: Theft of personal property, theft from garage/lockups
(iii) Burglary: Burglary and attempted burglary
(iv) Robbery: Theft with violence or threat of violence
(v) Assault: Violence without theft

We also create a composite crime index (and a corresponding crime reporting index), which is equal to the simple average of the above five crime categories.

As discussed in Soares (2004a) the primary distinction between theft and burglary is that thefts do not involve invasion of a house or a building. Unlike Soares, we take into account the distinction between thefts that involve vehicles (cars, motorcycles, bicycles) and other types of theft. The poor are less likely to be subject to the first simply because they may not be able to afford cars or motorcycles. The fourth category, robbery, is a special case of contact crimes, which involve some sort of violence. The fifth variable, assault also involves violence for the victim, but not necessarily any monetary gain for the criminal.

Police Corruption

Obtaining an accurate, direct measurement of corruption is in most cases impossible given the secretive nature of corrupt transactions and the lack of incentives for the involved parties to reveal information. Various methods have been used in the literature for finding signals that may reveal the size of the phenomenon. Crime records, surveys of households' reported experience, polls of experts, case studies, etc. have all been applied – each with its own weaknesses.

Crime records (number of police officers sentenced or prosecuted or reported for corruption) may appear at first to provide the most straightforward method of measurement. Their accuracy, however, depends on the honesty and effectiveness of law enforcement agencies. The honesty of law enforcement agencies is, however, related to the average corruption level in the bureaucracy itself. And the bureaucracy is often quite dishonest. The police's dishonesty is evi-

denced, among other things, by the reluctance of victims to report crimes to them. When asked, households often cite fear and dislike of the police as one reason for not reporting a crime. If corrupt, the police might not report the crimes they have profited from.

It has already been demonstrated that the accuracy problems of police reports are so severe that using data on crimes from the police leads to seriously biased and misleading results when regarded as accurate signals of actual crime levels (Soares 2004a, Azfar and Gurgur 2004). The problems in using data from the police on police corruption in any direct way would be even worse. Conducting interviews with experts may circumvent this measurement problem that causes endogeneity, but this also injects some subjectivity that may hinder cross-country comparisons.

Many surveys only ask about opinions not experiences. When citizens are asked to rate the corruption in police organizations (e.g. public opinion survey that was conducted by Gallup International in 1996 in 37 countries), it is not clear whether their answers to the questions are based on their personal experience or their general impression about the police (shaped by their social or economic background, political views, or reporting by the media).

However, the police corruption variable that we use in this study, based on ICVS data, asks citizens to report specific incidents where they have actually been asked to pay bribes by a police officer. Assuming that the sampling procedure in each country produces a reasonably representative sample they provide a fairly accurate way of measuring police corruption – though there are obviously still concerns about respondents misreporting police corruption to surveyors.[1]

The exact wording of the question is as follows:

> *In some countries, there is a problem of corruption among government or public officials. During [the year the survey was conducted], has any government official, for instance a customs officer, a police officer or inspector in your country asked you, or expected you to pay a bribe for his or her services?*

[1] This is a problem for all research on corruption [or more generally any sensitive subject] that uses survey data. Azfar and Murrell (2009) try to estimate the extent of this problem and suggest a mechanism for mitigating it by identifying reticent respondents and treating their responses differently from respondents who appear more reliable. The technique however needs the inclusion of a module in the survey to identify reticent respondents, which has not yet been included in a crime victimization survey. Including such a module in a crime survey is a promising avenue for future research.

What type of official was involved? Was it a government official, a customs officer, a police officer, or some sort of inspector?

Based on this question we construct a police corruption variable. We assign 1 to a household who reports an incidence of corruption involving police officers, and 0 to all other respondents. Then, we simply use the country averages to measure police corruption in each country.

To what extent is this variable compatible with other corruption measures? One of the most widely used corruption variables has been constructed by the World Bank Institute as a part of its Governance Indicators, labeled "Control of Corruption" (Kauffman, Kraay and Mastruzzi 2003). The simple correlation between our police corruption variable and the Bank's corruption measure is quite high: 0.58. The correlation with Transparency International's widely used Corruption Perceptions Index is 0.51 (the Transparency International Index is available on their website and the methodology described by Lambsdorf 2005).

4. Preliminary Analysis

The variables and data sources are described in Table 1 and descriptive statistics of variables are shown in Table 2. We present crime rates and crime reporting rates for each country in Table 3. Among the respondents (who own a car), 18 percent have suffered from a car theft in the last two years.The theft rate varies from 3 percent (Malta) to 34 percent (Mongolia) across countries. Small-scale theft has been experienced by 13 percent of the sampled households during the last two years; burglary incidence is lower at 11 percent, but varies more across countries.

Most crimes do not get reported. On the average, 52 percent of car thefts, 49 percent of burglaries, 28 percent of small thefts, 37 percent of robberies, and 27 percent of assaults are reported to the police.[2]

Table 4 presents simple cross-country correlations. A number of interesting patterns appear. For instance, the crime rates for the different types of crime tend to strongly covary. Even the correlation between other theft (theft of non-car items without violence) and assault (violence

[2] The low report rate corresponds to our own experience, the two co-authors together have been victimized over 10 times and have reported a crime to the police only once: Azfar used personal contacts in the police for the recovery of an important letter that accompanied a valued personal article – the article was not recovered, having been stolen during a customs inspection, but the letter was.

without theft) is strong, 0.68. Crime-reporting rates also covary except for assault. An interesting new variable based on "real" data, the non-payment of parking tickets by diplomats in New York (Fisman and Miguel), which is a proxy for corruption in the elite in an atmosphere of non-enforcement, correlates positively with crime and police corruption, and negatively with crime reporting.

5. Empirical Analysis

We begin with OLS to get an idea about the basic relationships among the variables. Although the results are likely to be affected by several potential endogeneity problems, it is nevertheless helpful to establish some basic links between variables. We start with the base model in which each of the three equations is estimated separately. We consider each crime category one by one. Then, we estimate each equation using the composite crime variable (and the corresponding composite crime-reporting variable). Next, we include or exclude various variables to understand the robustness of the model. For example, what happens if we exclude crime reporting from the crime equation? What happens if we add previously excluded variables to each model?

Then we use 2SLS (two-stage-least-squares) and 3SLS (three-stage-least-squares), where endogeneity in crime, crime reporting, and police corruption is addressed using the aforementioned instruments.[3]

OLS Results

Crime

Let us look at the OLS estimation of crime rates. As shown in Table 5, the predictive power of the model is at its highest in robbery (R^2=0.73) and weakest in other theft (R^2=0.63), and in general the fit is quite good. Police corruption is significant in every crime category, except for

[3] The difference between 2SLS and 3SLS is the variance-covariance matrix of the estimators. 2SLS ignores the potential correlation between the error terms across equations and assumes that the error term in one equation is independent of the error term in another equation. Since 3SLS does not have this restriction, it is more efficient than 2SLS. On the other hand, if there is an error in one equation (omitted variable, etc.), not only do the estimators of that equation become biased, but the estimators of other equations may become biased as well. Due to the interdependency in the variance-covariance matrix, problems in one equation propagate to other systems in 3SLS. In 2SLS, however, an error in one equation causes biased results in that equation only. In conclusion, if there are serious doubts about model specification, 2SLS is preferred to 3SLS. If the model is believed to be well-specified, 3SLS should be preferred.

"other theft" and "robbery". The effect of crime reporting on crime, while substantial in magnitude is statistically insignificant for most crimes. Note that in each column the coefficient of crime reporting has a negative sign, suggesting that there might be a negative link between crime and crime reporting (eg. more reporting reduces crime or vice versa). The effect of crime reporting on robbery is large and significant. We report Beta coefficients, so the coefficient of 0.36, like most other coefficients represents an elasticity: taken literally this means a doubling of the crime reporting rate would lead to a 36% decline in robbery. The coefficients of discrete variables like "Death Penalty" or "Abortion Legal" mean that the presence of these laws has an effect as large in percentage terms as the coefficient (for example, a coefficient of -0.10 means that the presence of Death Penalty reduces the likelihood of crimes by 10%).

The coefficient of income inequality, measured by the Gini coefficient, has the expected positive sign and is significant in all crime categories, except for "other theft". Among the other three conceptually important variables, education (measured by literacy rate) is significant with the expected negative coefficient in all crime categories (except for other theft), urbanization is significant in only two crime categories (car related theft and robbery) with the expected positive coefficient; and the ethnic differences variable is significant with the expected positive coefficient in assault.

The three variables that we use as instruments later in our analysis have the predicted signs. Death penalty has a negative coefficient, albeit significant in only one category: robbery (the death penalty may be a better measure for the severity with which robbery is punished than the severity of punishing petty theft). The legalization of abortion is not significant. One factor that may lower the significance of abortion may be that it works with a long lag, (according to Donahue and Levitt's conjecture about how abortion reduces crime, one has to wait for unwanted fetuses to not be born, not grow up and not commit crimes, before legalizing abortion has an effect on reducing crime) and we don't have the data to construct the correct lagged variable. Finally, the proportion of young people in the population has positive coefficients across the board, statistically significant in car related theft, other theft, and burglary.

The composite crime variable is presented in column 6. The fit of the regression is good (R^2=0.69). Police corruption appears to increase crime. Crime reporting has the expected negative sign but it is not significant. The coefficient of the crime-reporting variable is smaller than for each individual crime. This makes sense since the reporting of a crime should really only re-

duce the frequency of that crime. The literacy rate appears to reduce crime, whereas urbanization, and the proportion of the young in the population appear to increase it. All in all, the model results are mostly in line with the literature.

Crime Reporting

Next, we repeat the same exercise for crime reporting in Table 6. The predictive power of the model is less strong than that of the crime model. The R^2 varies from 0.27 (assault) to 0.53 (other theft). Police corruption has a negative coefficient for reporting in all crime categories, but significant only in car theft and burglary. Crime incidence has negative and significant coefficients in 4 of 5 crime categories. Income inequality is significant only for the reporting of 'other theft', though it has the predicted sign (negative) in all five categories. Urbanization is significant in all crime categories, whereas ethnolinguistic fractionalization is not significant at all. The literacy rate has the wrong (negative) sign, and the coefficient is significant in the car theft and robbery regressions.

In column 6 we present the results of the composite crime reporting equation. The fit of the regression is good (R^2=0.55). Police corruption reduces crime reporting, as does crime. The literacy rate surprisingly reduces crime reporting. As expected, the urbanization rate appears to increase it.

Police Corruption

Finally, we estimate the police corruption equation using OLS. The results are presented in Table 7. The model in column (6) that involves aggregate crime statistics explains about 48 percent of the variation in police corruption. Crime incidence is not significant, whereas crime reporting is significant with the predicted negative coefficient, suggesting an inverse link between police corruption and the crime-reporting rate. Literacy rate has statistically significant coefficient with negative sign, i.e. police corruption decreases with education. The link between police corruption and urbanization, seems to be positive. Ethnic fractionalization is marginally significant with positive coefficient, which means that police corruption tends to be higher in countries with ethnic differences. The coefficient of income inequality has the expected negative sign, but is not statistically significant.

System of Equations: 2SLS and 3SLS results

Our system consists of three equations – one for each endogenous variable. First, we used 2SLS to estimate system coefficients. Then, we repeat the same exercise using 3SLS. Note that since 3SLS yields more efficient results than 2SLS, we expect that the number of variables with statistically significant coefficients under 3SLS would be higher than those under 2SLS. However, 3SLS results are more vulnerable to model specification errors than 2SLS.

As explained above, we used a set of instruments in our paper. Severity of punishment, Young population, Legality of abortion, Trust and Attitudes towards theft for crime rates; Social activism for crime reporting; Parking tickets of diplomats, and Social norms about bribery for police corruption. To test whether the over-identifying restrictions are justified, we use the Hausman test.[4] The test results show no indication that the equation is mis-specified. Endogeneity of these instruments is tested by Durbin-Wu-Hausman test.[5] The Durbin-Wu-Hausman test results also did not indicate any problem with the instruments.

The results for the model are presented in Table 8 and 9, using 2SLS and 3SLS, respectively. We discuss 2SLS first:.

The impact of crime reporting on crime is large but not quite significant. The coefficient of 0.45 suggests that a doubling of crime reporting would lead to a 45% reduction in the crime rate, but the t stat of 1.42 is not quite significant. Two variables are significant at 5 percent: urbanization rate (positive sign) and the death penalty (negative sign). Two other variables are marginally significant: Legality of abortion (unexpected positive sign) and Justification of buying stolen goods (expected positive sign).

In the crime reporting regression, both endogenous variable crime rates and police corruption have the correct negative sign, and t-stats above 1.5 but neither coefficient is statistically

[4] The Hausman test is based on regressing the residuals from the main equation on the entire set of exogenous variables. Under the null hypothesis of over-identifying restrictions, the test statistic, NR2 (N is the sample size and R2 is the uncentred goodness of fit from the regression of residuals on all the instruments) has a chi-square distribution with K-T degrees of freedom, where K is the number of exogenous variables and T is the number of endogenous variables. If the instruments are excluded from the structural equation correctly, the set of instruments should have no explaining power over the residuals and consequently the R2 should be low.

[5] We conduct the Durbin-Wu-Hausman test for each of the instruments as well as the control variables. The test is based on the existence of two alternative estimators: one is consistent and asymptotically efficient under the null hypothesis and the other is consistent under the null and alternative hypothesis, but not efficient under the null hypothesis. The null hypothesis states that the variables, which are assumed to be exogenous, are indeed so. In the alternative hypothesis a variable that previously enters the system exogenously is treated as endogenous and estimated using other exogenous variables (without specifying a structural equation). If the difference between estimates is "large enough" we reject the null hypothesis that the variable in question is exogenous.

significant. Literacy has a counterintuitive negative sign and urbanization has a positive sign. These are the only significant variables.

The police corruption equation has two variables that are statistically significant. Crime reporting tends to reduce police corruption. The impact of crime reporting on police corruption is the only clearly significant effect of one endogenous variable on another. Note that it is present in OLS (Table 7), as well. The literacy rate leads to lower corruption rate

Looking at 3SLS results in Table 15, we observe that four of the six endogenous variables have significant coefficients of the expected sign. The effect of crime reporting on police corruption is highly significant ($t=3.31$ $P<0.01$). Crime reporting also has a significant negative effect on crime. Both police corruption and crime have a significant negative effect on crime reporting.

7. Conclusion

The literature on governance has recently expanded, connecting governance to a host of dependent and independent variables using various econometric techniques. In this paper we aim to contribute to research on governance and social outcomes by investigating the causal links between crime, crime reporting, and police corruption. In particular, we examine how a variable related to the probability of being caught (police corruption) is related to crime rates and crime reporting.

All in all, we found that crime rates, crime reporting, and police corruption jointly determine each other and there are significant interactions among those variables. In the most plausible specification (Model 8), which uses 2SLS to estimate the six possible causal relationships between the three independent variables, we find that crime reporting has a significant negative effect on police corruption. Note that the crime reporting variable is constructed from the reporting on crimes like theft, and not reporting on police corruption itself, so this is a reliable result and not due to some statistical artifact.

This important result indicates that elements of social structure which make it more likely that citizens will report crimes – either because they believe it's the right thing to do, of because they hope to gain some redress – will reduce police corruption because the police will be deterred by the possibility they themselves may be reported.

A number of other relationships are of substantial magnitudes but not quite significant in 2SLS. In 3SLS, which is more sensitive to mis-specification bias, but likely to give more precise

estimates if the model is correctly specified, we find 4 significant relationships: crime reporting reduces both crime and police corruption; and both crime and police corruption reduce crime reporting.

References

Azfar, O., "The Rule of Law, Corruption and Homicides", mimeo IRIS, submitted to the World Bank, MD, 2004.

Azfar, O. and T. Gurgur, "Crime, Crime Reporting and Governance", mimeo, IRIS University of Maryland, College Park, MD, 2004.

Azfar, O. and S. F. Azfar, Corruption in health and education, background paper for the Asian Human Development Report, 2008.

Azfar, O. and Y. Lee, "Corruption and Human Trafficking", mimeo, IRIS University of Maryland, College Park, MD, 2003.

Azfar, O. and P. Murrell, Identifying reticent respondents: Assessing the quality of survey data on corruption and values, [University of Maryland Working Paper, 2006], *forthcoming Economic Development and Cultural Change, 2009.*

Azfar, O. and R. Subrick, 2005 Social capital, governance and growth: Results from a Cross-Country Panel Dataset on Six Dimensions of Social Capital, http://www.dgroups.org/groups/worldbank/KS-workshop/index.cfm?op=dsp_resource_details&resource_id=8630&cat_id=6706

Becker, G. S. and G. J. Stigler, "Law Enforcement, Malfeasance, and Compensation of Enforcers", *Journal of Legal Studies* 3, pp.1-18, 1974.

Becker, G. S., "Crime and Punishment: An Economic Approach," *Journal of Political Economy* 76(2), pp.169-217, 1968.

Buonanno, P. and D. Montolio, "Identifying the Socioeconomic Determinants of Crime across Spanish Provinces", mimeo, Universitat de Barcelona, 2006.

Bourguignon, F. "Crime, Violence and Inequitable Development," mimeo., Delta, Paris. 1999

Chiu, W. and P. Madden, "Burglary and Income Inequality," *Journal of Public Economics* 69, pp. 123-141, 1998.

Djankov, S.; R. La Porta; F. Lopez-de-Silanes, and A. Shleifer, "Courts: The Lex Mundi Project", Working Paper 8890, NBER, Cambridge, MA, 2002.

Donohue, J. and S. Levitt, "The Impact of Legalized Abortion on Crime", Quarterly Journal of Economics, 116(2), pp. 379-420. 2001

Easterly, W. and R. Levine, "Africa's Growth Tragedy: Policies and Ethnic Divisions", The Quarterly Journal of Economics, MIT Press, vol. 112(4), pages 1203-50, 1997.

Entorf H. and H. Spenger "Socio-economic and Demographic Factors of Crime in Germany: Evidence from Panel Data of the German States", mimeo., ZEV, Germany, 1998.

Fanjzylber, P., D. Lederman, and N. Loayza," Crime and Victimization: An Economic Perspective", *Economia* 1 (1),pp. 219- 278, 2000.

Fisman R. and Gatti R.,"Decentralization and Corruption:Evidence Across Countries", Working Paper, World Bank, Washington, DC, 1999.

Fisman, E. and E. Miguel, "Cultures of Corruption: Evidence from Diplomatic Parking Tickets", Working Paper 12312, NBER, Cambridge, MA.2006

Fowles, R. and M. Merva, "Wage Inequality and Criminal Activity", *Criminology* 34 (2),pp. 163-182, 1996.

Gallup, J.L., J.D. Sachs, and A.D. Mellinger, "Geography and Economic Development", Working Paper 6849, NBER, Cambridge, MA. 1998.

Glaeser, E. and B. Sacerdote, "Why is There More Crimes in Cities?" NBER Working Paper 5430. NBER, Cambridge, 1996.

Grogger, J., "Market Wages and Youth Crime", *Journal of Labor Economics* 16, pp.343-350, 1998.

Hunt, Jennifer. 2006a. Why are some public officials more corrupt than others? Chapter 11 in Susan Rose Ackerman.2006. *International Handbook on the Economics of Corruption, Cheltenham, UK: Edward Elgar, 323 – 351.*

Hunt, Jennifer. 2006b. How Corruption Hits People When They Are Down. *NBER Working Paper No. 12490, Cambridge, Massachusetts: National Bureau of Economic Research. August.*

Kauffman, D., A. Kraay and M. Mastruzzi, Governance Matters III, *World Bank 2003.*

Kelly, M., "Inequality and crime", *Review of Economics and Statistics* 82 (4), 540– 554, 2000

Klitgaard, Robert. 1988. Controlling Corruption. Berkeley: University of California Press.

Lambsdorff, J., Transparency International's Corruption Perception Index, *mimeo, University of Passau 2005.*

Lederman, D., N. Loayza and R. Soares, "Accountability and Corruption, Political Institutions Matter", mimeo., World Bank, Washington, DC, 2004.

Mauro, P. "Corruption and Growth", *Quarterly Journal of Economics* 110, pp. 681–712. 1995.

Patterson, E., “Poverty, Income Inequality, and Community Crime Rates”, *Criminology* 29 (4), pp. 755-776, 1991.

Soares, R.R., “Crime Reporting As A Measure of Institutional Development”, *Economic Development and Cultural Change* 52(4), p851-871. 2004b.

Soares, R.R., “Development, Crime and Punishment: Accounting For the International Differences In Crime Rates”, *Journal of Development Economics* 73, 2004a.

Treisman D., “The Causes of Corruption: A Cross National Study,” *Journal of Public Economics* 76, pp. 399-457, 2000.

Van Kesteren J., Mayhew P., Nieuwbeerta P. “Criminal Victimization in Seventeen Industrialized Countries: Key findings from the 2000 International Crime Victims Survey”, UNICRI, 2001.

Van Rijckeghem C. and Beatrice W., “Corruption and Rate of Temptation: Do Low Wages in the Civil Service Cause Corruption?”, IMF Working Paper 97/73, Washington, DC, 1997.

Usher, D., “Education as Deterrent to Crime”, *Canadian Journal of Economics* 30, pp. 123-135, 1997.

Uslaner, E., The Moral Foundations of Trust, Cambridge University Press, 2002

Table 1: Description of Variables

Variable	Description	Source
Car Theft	Proportion of people who have experienced a vehicle-related theft in the last two years (theft of cars, theft from cars, theft of motorcycles and bicycles)	ICVS
Other Theft	Proportion of people who have experienced other theft in the last two years	ICVS
Burglary	Proportion of people who have experienced burglary in the last two years (burglary and attempt at burglary)	ICVS
Robbery	Proportion of people who have experienced robbery in the last two years	ICVS
Assault	Proportion of people who have experienced assault in the last two years	ICVS
Reporting Car Theft	Proportion of crime victims who report a vehicle related theft	ICVS
Reporting Other Theft	Proportion of crime victims who report other theft	ICVS
Reporting Burglary	Proportion of crime victims who report a burglary	ICVS
Reporting Robbery	Proportion of crime victims who report a robbery	ICVS
Reporting Assault	Proportion of crime victims who report an assault to the police that they have experienced in the last two years	ICVS
Police Corruption	Proportion of households who have faced police corruption in the last two years	ICVS
Control of Corruption	Control of corruption – Governance Indicator	World Bank
Income Inequality	Gini coefficient	World Bank
Education	Literacy rate among adult households	World Bank
Urbanization	Percentage of population living in urban areas	World Bank
Ethnic Differences	The probability that two randomly selected people in a country will not belong to the same ethnolinguistic group	La Porta et al. (1998)
Death Penalty	Whether death penalty exists in the judicial system and is enforced in the last 10 years	Amnesty International
Young Population	Proportion of households between the ages 15-24	World Bank
Abortion Laws	Whether abortion is permitted without any restriction or permitted on socio-economic grounds	http://www.reproductiverights.org
Democracy	Democracy score, average of the 1970-1994 period	La Porta et al. (1998)
Red Tape	Number of procedures to start up a new business	Djankov et al.(2002)
Judicial Formalism	Duration of enforcement in days (from notification to actual enforcement)	Djankov et al.(2002)
Access to sea	The ratio of population living within 60 miles to open sea or ocean is related to geography.	Fisman and Miguel (2006)
Parking Tickets	The number of parking violations committed by diplomats in New York City (per diplomat)	Fisman and Miguel (2006)
Trust	Level of trust within the society to other people	World Values Survey
Membership	Proportion of people who are members of organizations (environment, education, arts)	World Values Survey
Social Activism	The proportion of people who have signed a petition to government	World Values Survey
Justify Bribery	The proportion of people who justify bribery	World Values Survey
Justify Stealing	The proportion of people who justify buying stolen goods	World Values Survey

Table 2: Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Crime rate (average)	66	0.10453	0.05645	0.02562	0.27328
Car Theft	67	0.18089	0.06984	0.05235	0.35171
Other Theft	67	0.13370	0.08228	0.00472	0.35253
Burglary	67	0.10996	0.08914	0.00846	0.40281
Robbery	66	0.03877	0.04019	0.00023	0.18587
Assault	67	0.06347	0.03972	0.01052	0.18492
Reporting crime (average)	66	0.38464	0.11250	0.15392	0.61327
Reporting Car Theft	67	0.51769	0.16518	0.18110	0.83636
Reporting Other Theft	67	0.27926	0.15099	0.03175	0.62694
Reporting Burglary	67	0.49024	0.14212	0.21237	0.80000
Reporting Robbery	66	0.37746	0.14475	0.00000	0.69565
Reporting Assault	67	0.27000	0.10834	0.08589	0.72000
Control of Corruption	67	0.40119	1.18004	-1.27000	2.58000
Police Corruption	53	0.02701	0.03491	0.00000	0.16906
Gini Coefficient	67	40.093	12.2206	22.0000	74.6100
Literacy Rate	67	87.4179	16.8416	33.0000	100.000
Urbanization	67	57.3881	21.5111	10.0000	96.0000
Ethnic Differences	67	0.35146	0.24230	0.00200	0.93020
Death Penalty	65	0.23077	0.42460	0.00000	1.00000
Young Population (log)	67	2.70100	1.05689	-0.85360	4.85280
Abortion Legal	67	3.70149	1.70574	0.00000	5.00000
Democracy	66	5.56402	3.96345	0.00000	10.0000
No of Procedures (log)	64	2.19376	0.49547	0.69315	2.94444
Duration of Enforcement (log)	64	3.64824	0.96519	0.69315	5.12396
Parking Tickets (log)	63	1.82721	1.42026	0.00000	4.94591
Population near Sea (log)	65	0.49389	0.36217	0.00000	1.00000
Trust others	55	0.29555	0.14750	0.04630	0.63734
Membership	47	0.07429	0.04524	0.02412	0.24355
Social Activism	54	0.55781	0.13649	0.24992	0.83470
Justify Stolen Goods	49	0.08734	0.03772	0.02180	0.20329
Justify Bribery	55	0.08760	0.05206	0.00990	0.26872

Table 3: Crime Data (presented in percentages)

Country	Crime rate	Car Theft	Other Theft	Burglary	Robbery	Reporting Car Theft	Reporting Other Theft	Reporting Burglary	Reporting Robbery	Reporting Assault	Police Cor-ruption
ALBANIA	25.69	18.90	9..33	4.46	5.04	27.71	9.53	37.86	21.65	27.83	0.54
ARGENTINA	26.81	10.71	10.53	12.83	5.51	42.06	24.52	34.72	36.92	30.85	5.49
AUSTRALIA	11.83	8.20	8.41	1.17	7.18	65.04	37.12	67.62	50.00	39.05	0.11
AUSTRIA	5.24	5.45	1.49	0.21	2.41	76.81	48.05	52.38	33.33	11.76	0.14
AZERBAIJAN	9.35	4.60	1.95	1.95	2.41	38.89	5.00	31.25	47.06	38.10	3.29
BELARUS	12.80	10.20	11.02	1.99	4.15	41.86	15.58	46.00	26.67	16.49	0.87
BELGIUM	9.38	5.29	5.06	1.40	3.48	76.92	54.88	68.90	51.28	31.28	0.09
BOLIVIA	17.21	27.18	23.34	8.90	10.08	22.09	3.17	25.23	13.41	13.04	10.62
BOTSWANA	24.69	14.96	20.51	3.84	11.96	60.11	33.60	63.27	42.19	23.59	0.35
BRAZIL	15.62	16.87	5.92	14.88	8.93	34.60	6.01	30.63	15.00	8.59	7.78
BULGARIA	27.49	15.95	12.56	2.85	5.27	39.26	16.40	53.82	42.03	21.14	3.88
CAMBODIA	18.55	12.20	23.55	1.69	7.22	32.61	10.08	21.59	54.17	30.14	7.21
CANADA	12.47	7.44	6.02	1.35	5.82	61.08	35.15	65.48	49.53	35.89	0.15
CHINA	18.64	8.53	2.72	0.75	2.35	44.41	19.38	35.29	35.71	40.91	..
COLOMBIA	31.59	26.92	20.12	16.40	14.69	33.40	16.63	32.69	20.00	16.09	8.19
COSTA RICA	18.58	15.95	18.72	6.28	6.32	29.08	17.52	34.51	23.89	29.82	2.35
CROATIA	8.79	4.27	3.34	1.31	3.22	55.56	50.50	47.37	51.61	23.29	2.60
CZECH REP.	25.14	15.95	11.46	1.80	5.32	65.63	39.38	65.89	46.48	27.75	1.31
DENMARK	11.84	4.88	3.65	0.67	3.06	67.95	51.82	70.59	63.16	32.94	0.04
EGYPT	20.58	24.55	10.67	3.42	4.21	56.07	26.96	42.86	29.03	15.79	..
ESTONIA	19.70	11.24	9.10	3.60	7.02	46.81	27.68	35.38	33.59	20.08	0.30
FINLAND	9.34	4.63	1.34	0.77	5.24	61.43	36.41	39.60	40.00	21.13	0.00
FRANCE	12.86	4.46	4.60	1.10	4.43	67.99	48.28	60.68	58.33	34.72	0.21
GEORGIA	23.05	14.57	9.91	3.53	3.36	25.72	10.73	46.38	24.24	15.94	5.32
GERMANY	9.91	5.00	2.99	0.99	3.94	79.09	38.43	75.71	55.32	16.39	..
HUNGARY	20.18	9.76	7.71	2.16	4.05	64.24	33.82	60.00	35.56	10.47	0.38
INDIA	10.32	16.41	5.48	1.24	3.60	81.71	20.42	51.85	45.83	20.83	4.38
INDONESIA	12.82	11.20	9.95	1.84	3.89	38.77	38.30	42.66	33.33	24.57	16.91
ITALY	15.12	6.01	4.43	2.00	1.21	54.51	37.72	51.19	39.47	30.43	..
JAPAN	9.25	0.47	2.02	0.02	1.05	49.18	50.00	54.76	0.00	31.82	0.00
KOREA, SOUTH	16.69	3.45	10.14	0.47	2.14	18.11	18.18	34.54	22.22	24.39	1.27
KYRGYZ REP.	15.14	19.18	12.00	2.93	10.03	30.22	10.13	42.64	20.83	16.67	4.80
LATVIA	17.85	16.85	7.84	3.93	4.93	43.73	13.85	34.78	34.78	23.93	3.15
LESOTHO	19.17	16.51	17.74	4.55	10.98	38.33	16.78	57.06	29.73	25.24	..
LITHUANIA	23.21	12.77	12.12	3.75	5.57	45.00	17.48	46.46	45.65	25.74	1.72
MACEDONIA	18.12	10.40	5.79	1.68	4.73	44.55	35.29	39.47	36.36	38.71	0.76
MALTA	13.21	3.30	2.35	0.43	4.37	62.04	38.71	50.00	50.00	34.15	0.32
MONGOLIA	30.42	34.20	20.15	5.28	10.16	31.69	12.63	56.93	34.29	20.20	2.58
MOZAMBIQUE	35.17	25.99	40.28	18.59	16.61	29.23	10.78	21.24	15.13	19.72	..
NAMIBIA	28.84	18.98	27.49	8.57	11.51	59.04	11.67	58.46	27.38	24.11	..
NETHERLANDS	15.56	6.05	5.00	1.05	4.83	67.69	53.67	72.39	56.96	37.60	0.05

Country	Crime rate	Car Theft	Other Theft	Burglary	Robbery	Reporting Car Theft	Reporting Other Theft	Reporting Burglary	Reporting Robbery	Reporting Assault	Police Cor-ruption
NEW ZEALAND	17.11	14.06	10.16	0.94	7.72	78.78	54.07	70.10	61.11	42.57	..
NIGERIA	18.97	22.92	13.28	8.90	11.12	52.24	14.71	43.90	38.96	18.18	12.59
NORWAY	7.02	3.07	0.85	0.63	3.28	56.67	25.00	80.00	50.00	26.67	..
PANAMA	18.24	10.55	15.03	3.31	6.52	39.42	27.59	29.37	30.77	28.30	2.97
PARAGUAY	20.84	20.07	24.18	10.22	6.18	46.25	23.85	37.69	12.50	32.35	2.92
PHILIPPINES	13.04	10.69	4.91	2.25	1.79	24.85	12.08	29.06	25.53	32.88	1.07
POLAND	13.06	8.03	4.43	2.52	4.37	51.26	22.03	44.24	31.60	29.81	2.17
PORTUGAL	10.21	2.67	3.68	1.60	1.66	43.23	32.00	36.23	46.67	20.00	0.64
ROMANIA	20.25	18.99	5.34	1.77	5.79	56.54	20.35	49.22	25.64	21.48	0.59
RUSSIA	21.06	15.40	7.31	4.52	6.64	32.14	17.03	40.00	27.89	24.31	3.64
SLOVAK REP.	24.21	14.91	8.40	1.85	4.17	64.58	62.69	59.26	50.00	30.91	4.30
SLOVENIA	11.43	4.86	4.55	1.38	4.91	60.88	38.73	42.86	38.89	30.41	0.04
SOUTH AFRICA	25.91	13.04	15.60	7.80	12.10	64.84	27.18	54.64	40.25	27.13	1.60
SPAIN	17.26	4.81	4.66	2.88	2.29	39.06	41.92	35.33	19.55	24.55	..
SWAZILAND	34.73	26.53	34.57	9.41	16.86	63.33	23.45	69.13	59.04	19.35	..
SWEDEN	14.49	6.69	2.70	0.52	4.33	69.18	49.15	51.69	69.57	28.57	0.07
SWITZERLAND	9.55	6.48	3.58	0.89	3.07	73.42	47.59	64.14	53.85	31.46	0.21
TANZANIA	29.65	24.72	15.38	6.54	0	83.64	26.51	58.91	..	62.07	..
TUNISIA	30.55	26.23	17.01	8.12	2.87	65.85	38.03	56.29	42.11	72.00	..
UGANDA	22.31	35.25	29.49	8.25	13.28	51.37	6.82	36.09	25.86	14.95	3.10
UKRAINE	15.81	24.26	8.16	4.90	5.32	35.80	13.32	45.41	31.13	20.66	1.21
UNITED KING.	14.37	5.64	5.95	1.18	5.29	78.25	50.12	74.17	57.78	37.44	0.08
UNITED STATES	12.40	7.18	7.41	1.79	6.23	62.08	40.64	64.82	62.69	44.44	0.11
YUGOSLAVIA	19.80	12.71	6.34	1.36	9.27	45.63	20.93	44.62	35.71	22.11	6.95
ZAMBIA	23.99	22.22	37.31	7.46	18.49	62.65	12.00	54.83	26.47	21.14	..
ZIMBABWE	17.52	23.35	17.71	4.78	12.87	56.34	21.00	52.44	35.56	14.05	1.70

Table 4: Simple Correlation Results:

* Significant at 5%

	Crime rate	Car Theft	Other Theft	Burglary	Robbery	Assault
Crime rate (average)	1					
Car Theft	0.8661*	1				
Other Theft	0.8923*	0.7275*	1			
Burglary	0.9264*	0.7251*	0.7400*	1		
Robbery	0.8140*	0.6713*	0.6666*	0.6923*	1	
Assault	0.8483*	0.6014*	0.6761*	0.8273*	0.6700*	1
Reporting crime (average)	-0.4272*	-0.3032*	-0.4451*	-0.3626*	-0.4998*	-0.2682*
Reporting Car Theft	-0.2963*	-0.2231	-0.2373	-0.2222	-0.3555*	-0.0946
Reporting Other Theft	-0.5466*	-0.3819*	-0.5706*	-0.4773*	-0.5072*	-0.4303*
Reporting Burglary	-0.2343	-0.1413	-0.2135	-0.1911	-0.3917*	-0.0605
Reporting Robbery	-0.3580*	-0.2507*	-0.3764*	-0.3033*	-0.4580*	-0.1858
Reporting Assault	-0.24	0.0313	-0.183	-0.1563	-0.2432*	-0.3072*
Control of Corruption	-0.5573*	-0.5190*	-0.6083*	-0.4730*	-0.4484*	-0.3327*
Police Corruption	0.4277*	0.2380	0.4206*	0.3672*	0.4781*	0.3427*
Gini Coefficient	0.6419*	0.4284*	0.5383*	0.6254*	0.5979*	0.6368*
Literacy Rate	-0.6180*	-0.4149*	-0.5709*	-0.6391*	-0.4832*	-0.5167*
Urbanization	-0.4693*	-0.3028*	-0.5064*	-0.5232*	-0.2582*	-0.4031*
Ethnic Differences	0.4780*	0.2871*	0.5024*	0.4306*	0.4263*	0.5423*
Death Penalty	0.081	0.0179	0.2277	0.1057	-0.0786	0.0869
Young Population (log)	0.6283*	0.5068*	0.6793*	0.5969*	0.4387*	0.4442*
Abortion Legal	-0.3235*	-0.1688	-0.3157*	-0.3443*	-0.4090*	-0.2796*
Democracy	-0.4671*	-0.4502*	-0.5098*	-0.4208*	-0.3328*	-0.2686*
No of Procedures (log)	0.3577*	0.3159*	0.3642*	0.3015*	0.4656*	0.109
Duration of Enforcement (log)	0.2867*	0.2336	0.2213	0.2768*	0.3608*	0.1319
Parking Tickets (log)	0.4707*	0.4483*	0.4700*	0.4075*	0.3803*	0.3041*
Population near Sea (log)	-0.4806*	-0.3324*	-0.5020*	-0.4063*	-0.4023*	-0.5420*
Trust others	-0.4958*	-0.4170*	-0.4665*	-0.4403*	-0.5142*	-0.3801*
Membership	0.001	0.0846	0.1499	0.1903	-0.1024	0.1993
Social Activism	-0.235	-0.1943	-0.2669	-0.1621	-0.2307	-0.0493
Justify Stolen Goods	0.2092	0.3324*	0.2187	0.2143	-0.0263	-0.0345
Justify Bribery	0.0407	-0.0034	0.0339	-0.0089	0.0928	-0.1056

Table 4 (continued): Simple Correlation Results:

* Significant at 5%

	Reporting crime	Reporting Car Theft	Reporting Other Theft	Reporting Burglary	Reporting Robbery	Reporting Assault	Control of Corruption	Police Corruption
Reporting crime (average)	1							
Reporting Car Theft	0.8869*	1						
Reporting Other Theft	0.8427*	0.6830*	1					
Reporting Burglary	0.8320*	0.7504*	0.5906*	1				
Reporting Robbery	0.8254*	0.6637*	0.5650*	0.6100*	1			
Reporting Assault	0.5280*	0.3281*	0.3728*	0.2605*	0.3926*	1		
Control of Corruption	0.7219*	0.5752*	0.7047*	0.6020*	0.5417*	0.1996	1	
Police Corruption	-0.4699*	-0.4247*	-0.4016*	-0.4441*	-0.2917*	-0.3621*	-0.5834*	1
Gini Coefficient	-0.4205*	-0.3089*	-0.5331*	-0.224	-0.3427*	-0.2214	-0.4249*	0.4088*
Literacy Rate	0.3025*	0.1215	0.4147*	0.3250*	0.1771	0.1441	0.4615*	-0.5007*
Urbanization	0.4734*	0.2636*	0.5347*	0.3998*	0.3095*	0.153	0.5984*	-0.3768*
Ethnic Differences	-0.3462*	-0.1347	-0.3661*	-0.2144	-0.2816*	-0.2164	-0.3970*	0.5364*
Death Penalty	-0.1248	-0.0129	-0.1365	0.0293	-0.1651	-0.0373	-0.2243	0.2057
Young Population (log)	-0.6600*	-0.4332*	-0.7004*	-0.5093*	-0.5079*	-0.175	-0.7602*	-0.5118*
Abortion Legal	0.3730*	0.2162	0.2715*	0.3198*	0.3916*	0.0784	0.2832*	-0.3979*
Democracy	0.5404*	0.4263*	0.5597*	0.4470*	0.3920*	0.0567	0.7502*	-0.5057*
No of Procedures (log)	-0.6249*	-0.4853*	-0.4469*	-0.5990*	-0.5770*	-0.2238	-0.7012*	0.4034*
Duration of Enforcement (log)	-0.4861*	-0.3349*	-0.3368*	-0.4700*	-0.4430*	-0.3409*	-0.5572*	0.3927*
Parking Tickets (log)	-0.3624*	-0.2459	-0.3424*	-0.2597*	-0.3365*	-0.1982	-0.5523*	0.3402*
Population near Sea (log)	0.2915*	0.1217	0.4683*	0.1604	0.1732	0.0856	0.3107*	-0.2947*
Trust others	0.5393*	0.3301*	0.4689*	0.4868*	0.4491*	0.2316	0.6222*	-0.1670
Membership	0.3350*	0.3763*	0.1333	0.3134*	0.3578*	0.4563*	0.2211	-0.2995
Social Activism	0.5298*	0.4510*	0.5082*	0.4166*	0.4394*	0.2895*	0.6150*	-0.3762*
Justify Stolen Goods	-0.122	-0.1986	-0.0539	-0.1056	-0.0835	-0.0247	-0.3759*	0.0106
Justify Bribery	-0.1899	-0.2014	-0.1934	-0.1604	-0.1269	-0.1779	-0.2265	-0.0615

Table 4 (continued): Simple Correlation Results:

* Significant at 5%

	Gini Coef-ficient	Literacy Rate	Urbanization	Ethnic Dif-ferences	Death Pen-alty	Young Population (log)	Abortion Legal
Gini Coefficient	1						
Literacy Rate	-0.4614*	1					
Urbanization	-0.4377*	0.7267*	1				
Ethnic Differences	0.3937*	-0.3200*	-0.3188*	1			
Death Penalty	0.2246	-0.3698*	-0.4185*	0.1498	1		
Young Population (log)	0.5122*	-0.6668*	-0.8227*	0.3811*	0.3572*	1	
Abortion Legal	-0.5061*	0.4063*	0.3307*	-0.1817	-0.3414*	-0.3602*	1
Democracy	-0.3477*	0.5038*	0.5865*	-0.1759	-0.2821*	-0.7187*	0.4143*
No of Procedures (log)	0.3251*	-0.3378*	-0.4146*	0.1652	0.2115	0.4960*	-0.3308*
Duration of Enforcement (log)	0.2688*	-0.4039*	-0.4736*	0.0924	0.1504	0.4848*	-0.2801*
Parking Tickets (log)	0.3468*	-0.5779*	-0.5102*	0.2856*	0.2396	0.5243*	-0.2910*
Trust others	-0.4512*	0.1933	0.3515*	-0.3754*	0.073	-0.3699*	0.2798*
Membership	0.0099	-0.1929	-0.1658	0.1952	0.3418*	0.0549	-0.1683
Social Activism	-0.4334*	0.1986	0.3786*	-0.2016	-0.1077	-0.4702*	0.3011*
Justify Stolen Goods	0.0202	0.0033	-0.2266	0.1654	-0.1394	0.2617	0.1646
Justify Bribery	-0.0188	0.0784	-0.0337	0.0197	-0.1994	0.1059	0.0897

	Democracy	No of Pro-cedures (log)	Duration of Enforce-ment (log)	Parking Tickets (log)	Trust oth-ers	Member-ship	Social Activism
Democracy	1						
No of Procedures (log)	-0.4434*	1					
Duration of Enforcement (log)	-0.3744*	0.7564*	1				
Parking Tickets (log)	-0.4930*	0.4353*	0.5475*	1			
Trust others	0.3674*	-0.6252*	-0.4742*	-0.3763*	1		
Membership	0.0606	-0.3039*	-0.3723*	-0.1590	0.202	1	
Social Activism	0.5992*	-0.4561*	-0.4645*	-0.4188*	0.4642*	0.3281*	1
Justify Stolen Goods	-0.2496	0.1888	0.2957*	0.3834*	-0.3838*	-0.0736	-0.2291
Justify Bribery	-0.0986	0.2071	0.3504*	0.1200	-0.3809*	-0.1044	-0.2392

	Justify Stolen Goods	Justify Bribery
Justify Stolen Goods	1	
Justify Bribery	0.6691*	1

Table 5: Regression Results for Crime Incidence

Beta coefficients are reported. t statistics in parenthesis. Errors are corrected for heteroscedasticity.. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent.

	Car Theft (1)	Other Theft (2)	Burglary (3)	Robbery (4)	Assault (5)	CRIME (6)
Police Corruption (ICVS)	0.2063 (1.78)*	0.0760 (0.70)	0.2319 (2.39)**	0.0394 (0.31)	0.2775 (3.19)***	0.1917 (2.34)**
Crime Reporting	-0.1973 (-1.28)	-0.1882 (-1.19)	-0.1304 (-1.18)	-0.3600 (-2.62)**	-0.1597 (-1.86)*	-0.0945 (-0.74)
Gini Coefficient	0.2968 (1.71)*	0.1114 (0.79)	0.2972 (2.23)**	0.3817 (2.92)***	0.4892 (3.76)***	0.3434 (2.44)**
Literacy Rate	-0.5035 (-2.63)**	-0.1922 (-1.31)	-0.5127 (-3.26)***	-0.6660 (-2.94)***	-0.5572 (-3.81)***	-0.4963 (-3.18)***
Urbanization Rate	0.5684 (2.78)***	0.2702 (1.81)*	0.2126 (1.32)	0.4968 (3.37)***	0.2364 (1.42)	0.4032 (2.70)***
Ethnic Fractionalization	0.0351 (0.22)	0.2924 (1.78)*	0.1372 (1.41)	0.0705 (0.54)	0.2257 (2.06)**	0.1785 (1.42)
Death penalty	-0.1369 (-1.09)	0.0289 (0.20)	-0.1473 (-1.34)	-0.2831 (-2.72)***	-0.0774 (-0.86)	-0.1066 (-0.96)
Young population (log)	0.4728 (2.30)**	0.5156 (3.03)***	0.4184 (2.82)***	0.0274 (0.18)	0.0106 (0.07)	0.4276 (2.68)***
Abortion Legal	0.1582 (1.11)	0.0416 (0.30)	-0.0544 (-0.46)	-0.0481 (-0.34)	0.0345 (0.32)	0.0364 (0.28)
N	57	57	57	57	57	57
Rsq.	0.6993	0.6258	0.6960	0.7259	0.7097	0.6921
F-test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 6: Regression Results for Crime Reporting

Beta coefficients are reported. t statistics in parenthesis. Errors are corrected for heteroscedasticity.. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent.

	Car Theft (1)	Other Theft (2)	Burglary (3)	Robbery (4)	Assault (5)	CRIME (6)
Police Corruption (ICVS)	-0.4521 (-3.25)***	-0.1452 (-0.84)	-0.4006 (-2.02)**	-0.1315 (-1.48)	-0.2518 (-1.58)	-0.3465 (-2.21)**
Crime Incidence	-0.2895 (-2.81)***	-0.4568 (-2.39)***	-0.0462 (-0.32)	-0.5599 (-4.05)***	-0.2897 (-1.84)*	-0.3833 (-3.09)***
Gini Coefficient	-0.3442 (-2.28)**	-0.2652 (-1.72)*	-0.2194 (-1.17)	-0.0081 (-0.07)	-0.0205 (-0.11)	-0.2301 (-1.54)
Literacy Rate	-0.6103 (-3.16)***	-0.2130 (-1.30)	-0.2508 (-1.41)	-0.6231 (-5.22)***	-0.2677 (-1.45)	-0.5220 (-4.06)***
Urbanization Rate	0.5142 (3.73)***	0.3419 (2.19)**	0.4855 (2.89)***	0.6567 (4.32)***	0.3869 (2.01)**	0.5547 (3.59)***
Ethnic Fractionalization	0.2336 (1.65)	0.1237 (1.07)	0.2249 (1.63)	0.0862 (0.61)	0.0412 (0.09)	0.1873 (1.63)
N	55	55	55	55	55	55
Rsq.	0.5131	0.5258	0.3833	0.4276	0.2656	0.5499
F-test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 7: Regression Results for Police Corruption

Beta coefficients are reported. t statistics in parenthesis. Errors are corrected for heteroscedasticity.. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent.

	Car Theft (1)	Other Theft (2)	Burglary (3)	Robbery (4)	Assault (5)	CRIME (6)
Crime Incidence	-0.1725 (-1.00)	-0.0761 (-0.37)	-0.0939 (-0.64)	0.2110 (1.21)	-0.3437 (-1.49)	-0.1915 (-0.86)
Crime Reporting	-0.4536 (-2.93)***	-0.1223 (-0.70)	-0.3232 (-3.01)***	-0.1075 (-1.23)	-0.1547 (-1.54)	-0.388 (-3.19)***
Gini Coefficient	0.0213 (0.11)	0.1510 (0.90)	0.1001 (0.59)	0.0224 (0.12)	0.3200 (2.36)**	0.0750 (0.46)
Literacy Rate	-0.5123 (-2.94)***	-0.2508 (-1.56)	-0.3281 (-2.16)**	-0.1897 (-1.13)	-0.3129 (-2.01**)	-0.4073 (-2.77)***
Urbanization Rate	0.3420 (2.71)***	0.1514 (0.78)	0.2732 (1.71)*	0.0627 (0.10)	0.2018 (1.37)	0.3122 (2.18)**
Ethnic Fractionalization	0.3485 (2.05)**	0.3702 (1.57)	0.3651 (2.05)**	0.3298 (1.74)*	0.4397 (1.96)*	0.3689 (1.81)*
Parking Tickets (log)	0.1365 (0.78)	0.1325 (0.79)	0.1674 (1.21)	0.0936 (0.59)	0.0991 (0.70)	0.1379 (0.82)
N	54	54	54	54	54	54
Rsq.	0.5144	0.4085	0.4799	0.4415	0.4608	0.4760
F-test (p-value)	0.0000	0.0010	0.0001	0.0000	0.0007	0.0001

Table 8 – 2SLS Results

t statistics in parenthesis. Errors are corrected for heteroscedasticity.. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent.

- **Instruments for Crime**: Existence of death penalty; Proportion of young population; Legality of abortion, Trust to other households (World Values Survey), Justify buying stolen goods (World Values Survey)
- **Instruments for Crime Reporting**: Social activism, Membership to voluntary organizations (World Values Survey)
- **Instruments for Police Corruption**: Number of parking tickets, Proportion of households who justify bribery (World Values Survey)

	2SLS			FIRST STAGE		
	Crime	**Crime Rep.**	**Pol. Corrup.**	**Crime**	**Crime Rep.**	**Pol. Corrup.**
Crime Incidence		-0.2906 (-1.54)	0.4151 (1.40)			
Crime Reporting	-0.4567 (-1.42)		-0.2774 (-2.13)**			
Police Corruption (ICVS)	0.1802 (0.80)	-0.9167 (-1.61)				
Gini Coefficient	0.0952 (0.47)	-0.3633 (-1.24)	0.1632 (0.93)	0.2636 (1.77)*	-0.4584 (-1.99)*	0.1223 (0.71)
Literacy Rate	-0.5382 (-1.55)	-0.9701 (-2.25)**	-0.4852 (-2.22)**	-0.1171 (-0.62)	-1.1371 (-3.88)***	-0.5153 (2.34)**
Urbanization Rate	0.5655 (3.35)***	0.8355 (3.44)***	0.1853 (0.95)	0.5274 (4.06)***	0.2858 (1.43)	0.3578 (2.38)**
Ethnic Fractionalization	0.0257 (0.25)	0.1680 (0.90)	-0.0054 (-0.04)	0.1260 (1.32)	-0.1557 (-1.06)	0.1146 (1.04)
Death penalty	-0.2932 (-2.19)**			-0.1331 (-1.32)	-0.3642 (-2.35)**	-0.1824 (-1.57)
Young population (0-15, log)	-0.1704 (-0.63)			0.5391 (4.43)***	-0.7811 (-4.15)***	0.3003 (2.13)**
Abortion Legal	0.2794 (1.93)*			0.1458 (1.12)	0.2288 (1.14)	-0.3170 (-2.11)**
Trust	0.0431 (0.40)			0.0179 (0.13)	0.1377 (0.67)	0.1052 (0.68)
Justify Buying Stolen Goods	0.1399 (1.73)*			0.1095 (1.21)	0.2377 (1.70)	0.0373 (0.36)
Social Activism		0.2274 (1.07)		0.0227 (0.23)	-0.1555 (-0.34)	0.2509 (2.84)***
Membership in voluntary organizations		-0.1597 (-0.65)		-0.0368 (-0.31)	-0.0624 (-1.04)	-0.3900 (-2.24)**
Parking Tickets (log)			-0.1081 (-0.73)	0.2270 (2.15)**	-0.2593 (-1.62)	0.0581 (0.48)
Justify Bribery			-0.0355 (-0.38)	-0.1414 (-1.32)	-0.0481 (-0.25)	-0.0661 (-0.53)
Rsq.	0.8068	0.6273	0.6487	0.6913	0.7166	0.6321
F-Test	0.0006	0.0000	0.0011	0.0000	0.0000	0.0003
N	38	38	38	38	38	38

Table 9 – 3SLS Results

t statistics in parenthesis. Errors are corrected for heteroscedasticity.. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent.

- **Instruments for Crime**: Existence of death penalty; Proportion of young population; Legality of abortion, Trust to other households (World Values Survey), Justify buying stolen goods (World Values Survey)
- **Instruments for Crime Reporting**: Social activism, Membership to voluntary organizations (World Values Survey)
- **Instruments for Police Corruption**: Number of parking tickets, Proportion of households who justify bribery (World Values Survey)

	Crime Incidence	Crime Reporting	Police Corruption
Crime Incidence		-0.4523 (-2.17)**	0.1927 (0.80)
Crime Reporting	-0.6011 (-2.43)**		-0.4013 (-3.31)***
Police Corruption (ICVS)	-0.2531 (-1.56)	-1.3500 (-3.03)***	
Gini Coefficient	-0.0295 (-0.19)	-0.2058 (-0.85)	0.0188 (0.13)
Literacy Rate	-0.5990 (-2.22)**	-1.1113 (-3.16)***	-0.6190 (-3.36)***
Urbanization Rate	0.5874 (4.42)***	0.8673 (4.30)***	0.3866 (2.45)**
Ethnic Fractionalization	0.2691 (1.91)*	0.1696 (1.56)	0.2488 (2.16)**
Death penalty	-0.2734 (-2.67)***		
Young population (0-15, log)	0.0538 (0.26)		
Abortion Legal	0.3750 (3.70)***		
Trust	0.0476 (0.59)		
Justify Buying Stolen Goods	0.1550 (2.54)**		
Social Activism		0.2292 (1.45)	
Membership in voluntary organizations		0.1168 (0.62)	
Parking Tickets (log)			-0.0228 (-0.21)
Justify Bribery			-0.0732 (-1.07)
Rsq.	0.7533	0.5435	0.6049
F-Test	0.0000	0.0000	0.0000
N	38	38	38