WPS6768

Policy Research Working Paper 6768

Economic Growth and Crime against Small and Medium Sized Enterprises in Developing Economies

Asif Islam

The World Bank
Development Economics
Global Indicators Group
February 2014

Policy Research Working Paper 6768

Abstract

Several studies have explored the relationship between economy-level crime rates or individual-level crime and economic growth. However, few studies have examined the relationship between economic growth and crime against firms. This study uses data for about 12,000 firms in 27 developing countries and finds that economic growth is negatively associated with crime. This relationship is stronger for small and medium firms than large firms. The study also explores several economy-wide factors and their influence on the growth-crime relationship for small and medium enterprises. The results are robust to various sensitivity checks.

This paper is a product of the Global Indicators Group, Development Economics. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at aislam@worldbank.org.

Economic Growth and Crime against Small and Medium Sized Enterprises in Developing Economies

Asif Islam

Enterprise Analysis Unit
Development Economics
The World Bank, Washington DC, 20433
Email: asif.m.islam@gmail.com

Tel: 651-246-4017

JEL Classification: K40, O10, O40, O50
Keywords: Crime, Firms, Economic Growth, Development

Economic Growth and Crime against Small and Medium Sized Enterprises in Developing Economies

1 Introduction

A distinction exists between crime experienced by firms and households. The former typically face both a higher risk and greater damage from crime than the latter (Hopkins 2002). Within the developing world context, rising crime experienced by firms can have direct consequences. The already vulnerable business climate in developing economies can further deteriorate. Crime may also retard the growth and performance of small and medium firms. Given that developing economies tend to be plagued by corruption and limited public resources to control crime, a key question is whether the burden of crime, especially for small and medium sized enterprises (SMEs), will be alleviated as developing economies grow. The relationship between crime experienced by firms and economic growth has been under-researched. While some studies analyze specific aspects of crime and corruption in SMEs such as tax payments (Baliamoune-Lutz and Garello, 2014) or how the quality of institutions shapes the performance of SMEs in developing countries (Aidis et al., 2012; LiPuma et al., 2013), this study fills the gap in the literature with a specific focus on how economic growth directly affects crime, such as robbery, vandalism, and theft, experienced by small and medium enterprises in developing economies.

A fairly substantial theoretical and empirical literature already exists exploring the effect of economic growth or labor market conditions on crime (Fajnzylber et al, 2002; Donohue and Levitt, 2001; Gould et al, 2002; McDowall and Loftin, 2009; Bushway et al., 2012). Typically, most empirical studies on crime in developing economies either use cross-country crime data

from police reports or focus on household crime data in a specific city or country. While both types of studies are useful, they also face a few challenges. The limitation of using police reports is that given the low level of confidence in police especially in developing countries, crime tends to be under-reported in police reports (Soares, 2004). The limitation of the household crime studies is that they omit crime faced by firms, which tends to be more frequent and cause greater damage. These studies are also limited to the incidence of crime faced by households, which does not account for the financial costs incurred by the victim. Furthermore, although household level crime studies may have a lower degree of under-reporting of criminal activity than police reports, there is still the difficulty of drawing general policy inferences that are based on idiosyncratic country data. This is a particularly difficult obstacle to overcome as even if various household crime surveys in different countries were pooled together, there is still the issue of differences in sampling and methodology of how the surveys were undertaken. Finally, most of these household surveys are unable to address time invariant omitted variables as the data are typically available for one period of time. By using firm-level survey data that are comparable across economies as they use the same sampling methodology, we are able not only to explore the impact of per capita economic growth on crime, but also to overcome most of the obstacles faced by studies based on household surveys.

This study contributes to the literature by making several improvements: (i) This study explores the effect of economic growth defined as real GDP per capita on both the incidence of crime and the burden of crime for firms in developing economies using firm surveys. The focus of this analysis is on small and medium sized firms but we also mention whether the results hold for a full sample of small, medium, and large firms. This is a vast improvement on the literature which

has mainly explored household-level crime. (ii) A unique firm level data set with about 12,000 firms in 27 developing countries maintained by the World Bank's Enterprise Analysis unit (Enterprise Surveys) is used that follows a consistent methodology across surveys and therefore allows for cross comparisons between economies. This alleviates the external validity issue faced by most survey level studies on crime.

Our results indicate that economic growth may actually reduce crime in developing countries. We find that an increase in real GDP per capita growth by 1 percent is associated with a 0.30 percent reduction in the losses due to crime for firms of all sizes in developing economies. More importantly, we find that this relationship is stronger for small and medium firms than large firms. That is, a 1 percent increase in real GDP per capita growth is associated with a 0.33 percent reduction in losses due to crime for small and medium firms as opposed to a 0.21 percent reduction for large firms. We also find that several macro-variables tend to amplify or reduce the effect of economic per capita growth on crime experienced by small and medium sized firms. Despite the improvements of this study over the literature in several aspects, there are some issues that need to be addressed which are typical of studies that are cross-country in nature. There is still the issue of time varying omitted variables, as well as the issue of reverse causality. Addressing these endogeneity issues is challenging given the data at hand, but we try and limit them in the following manner. We limit omitted variable bias by checking if our specification is robust to additional potential explanatory variables including ethnic fractionalization, security costs, corruption, human capital, government spending, and trade. In order to limit endogeneity, we also use the percent of land in the tropics and a malaria risk index as instruments and find that the results are retained, if not magnified.

Given the data limitations, it is impossible to completely justify a causal link. Thus, at worst, this study quantifies the correlation between economic growth and crime against firms, and then explores this relationship further in terms of several socio-economic and firm characteristics. Our results are robust to several other sensitivity checks.

Mechanisms

Crime can take many forms, with different implications. For this study we have data available for property crime, which mainly includes theft, robbery, vandalism and arson. Several studies have explored the mechanisms of the effect on economic growth and crime. In general, economic growth increases job market opportunities, consequently raising the opportunity cost of individuals engaging in illegitimate activities (Becker, 1968). Along similar lines, per capita economic growth may increase employment, further decreasing the rewards for criminal activity. Generally, unemployment has been empirically associated with increases in criminal activity (Machin and Meghir, 2000; Donohue and Levitt, 2001). Furthermore economic growth may increase tax revenues resulting in higher government budgets for crime prevention (Cook, 2010; Levitt, 2004). Both mechanisms propose an inverse relationship between economic growth and crime. However, economic growth also serves as an indicator of increasing prosperity and thus the effect on crime may depend on the level of risk aversion (Ehrlich, 1973). Increasing prosperity may increase the number of options encouraging crime-prone behavior such as individuals leaving their houses more often, increasing alcohol consumption, or owning more cars. Furthermore economic growth can increase the reward for committing a crime as the society gets wealthier. Finally legal institutions, being typically slow to adapt, may find it difficult to deal with rapid economic growth and thus provide more leeway for criminals to

escape punishment, therefore reducing the costs of engaging in illegitimate activities. In general, empirical findings have indicated a negative relationship between economic growth and crime (Fajnzylber et al, 2002; Bourguignon, 1999; Dutta, 2009).

A few mechanisms translate well with regards to crime against firms. Economic growth resulting in increasing economic opportunities of individuals makes firms less susceptible to theft, and rising government spending on crime prevention may complement a firm's security measures. However, in terms of risk prone behavior induced by economic growth, it is unlikely that alcohol consumption or increasing outings by individuals is highly correlated with crime against firms, although there may be increases in firm spending on expensive property across all sizes of firms that may attract criminal activity. Economic growth may also increase the number of firms of various sizes, therefore increasing criminal activity given the larger number of options available to criminals. It is expected that the rate at which legal institutions adapt to increasing economic growth will determine the level of crime against firms. A fast growing economy may not have the ability to cope with rapidly increasing crime. Furthermore, economic growth may allow firms to spend more on security measures, thus reducing the losses due to crime. However, we do find later in this study that controlling for security costs does not alter our main results.

The relationship between economic growth and crime experienced by firms may also depend on the size of the firm. On one hand, economic growth may increase the ability of larger firms to better protect themselves from theft and vandalism than small and medium firms which may lead criminals to target small and medium enterprises. A key presumption of this mechanism is that the benefits of economic growth are largely absorbed by large firms. On the other hand,

economic growth can increase the opportunities for small and medium firms to expand relative to large firms that may have reached their optimal size. Such an expansion may allow small and medium firms to protect themselves better, thereby reducing the degree of crime they face.

Given the wealth of theoretical mechanisms available in the literature, the objective of this study is to provide empirical verification of the effect of per capita economic growth on crime experienced by firms. Depending on which mechanisms dominate, we may have a positive or negative association between crime and economic growth.

We structure the rest of the paper as follows. Section 2 describes the data, section 3 provides the estimation and results, and sections 4, 5, and 6 provide instrumental variable estimations, robustness checks, and conclusions, respectively.

2 Data and Main Variables

The data for firm level variables are collected by the World Bank's Enterprise Surveys (ES). The Enterprise Surveys use standard survey instruments to collect firm-level data on a country's business environment from business owners and top managers. The surveys cover a broad range of topics including access to finance, corruption, infrastructure, crime, competition, labor, obstacles to growth and performance measures. The survey is designed to be representative of a country's private non-agricultural economy and only registered firms with at least five employees are included in the sample. The data consist of a random sample of 12,000 firms across 27 developing countries in different regions stratified by firm size, location, and sector using a consistent methodology. The survey year ranges between 2007 and 2009. Police data are

obtained from the United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems. This police data set consists of an unbalanced panel covering years between 2003 and 2008 for both developing and developed economies. Due to the unbalanced nature of the data set, only about 39 countries match between the ES firm level data and the UN country level police data. Accounting for issues such as missing questions and incorrect data, the sample size reduces to a cross-section of 27 developing economies.

Details of countries in the main sample and their respective survey years can be found in the first column of table A3 in the appendix. Data sources and descriptions of the variables can be found in table A1, with summary statistics in table A2.

2.1 Dependent Variable

The main dependent variable utilized is annual losses due to crime as a percentage of annual sales. This variable is derived from the survey question: "In fiscal year [insert fiscal year], what are the estimated losses as a result of theft, robbery, vandalism or arson that occurred on the establishment's premises calculated as a percent of annual sales?" In some instances the total value of losses is reported, and in that case the share of losses due to crime over total sales is manually calculated. Crime losses as a percentage of sales capture the intensity of crime. We make no distinction between a firm that has experienced no crime and a firm that has experienced crime but incurred no losses. Both firms get a zero value for the dependent variable. This adjustment may not affect our estimations much since we retain the same results when we examine the impact of per capita economic growth on the incidence of crime (see next paragraph). The crime losses variable averages 0.72% in the sample with a standard deviation of

3.9%. Using country averages across all firms, Azerbaijan has the lowest amount of crime losses at 0.20% of sales, while El Salvador has the highest with 1.73%.

We also estimate a model where the dependent variable is a dummy variable indicating whether or not a firm has experienced crime in the last fiscal year. The survey question is phrased as follows: "In fiscal year [insert last complete fiscal year], has this establishment experienced losses as a result of theft, robbery, vandalism or arson?" This estimation elucidates the relationship between economic growth and the incidence of crime as opposed to the burden of crime.

2.2 Explanatory Variable

The main variable of interest is annual real GDP per capita growth rate, which is available for the years the firm surveys were undertaken. The sample mean for the rate of economic growth is 2.66% and the standard deviation is 4.2%. Belarus and Romania are the fastest growing economies in the sample with growth rates of 10.2% and 9.6% respectively. The country level average of crime losses and economic growth rates are presented in table A4 for each country in the appendix. We also use 5 year averages (2002-2007) of real GDP per capita growth and find that the results are retained.

2.3 Other Explanatory Variables

We control for several firm level and country level variables. The degree of crime a firm faces may depend on its size, the sector it belongs to, and its locale (Amin, 2009; Glaeser and Sacerdote, 1999). The costs and benefits of criminal activity targeting firms may vary depending

on sector or size of the firm. Big cities tend to provide higher pecuniary benefits for criminals and also criminal activity may involve lower costs due to the low probability of arrest and higher probability of anonymity. We control for firm size using dummy variables for small and medium firms. A small firm is defined as a firm with fewer than 20 employees, while a medium firm has between 20 and 99 workers. Of course, when we examine the effect of economic growth on crime for small and medium firms, we only control for small firms using a dummy variable as we restrict the sample to only small and medium firms. We control for sector or industry by using a dummy variable for manufacturing firms. A priori it is not clear whether a manufacturing firm should have higher crime losses with respect to other sectors. We include a city size dummy variable that takes the value of 1 if the city has a population of 250,000 or greater, or is a capital city, and 0 otherwise. There is also evidence that female owned households as well as female owned firms have a positive association with higher crime rates (Glaeser and Sacerdote, 1999; Islam, 2013; Kelly 2000). We also include a dummy variable for whether a firm has at least one female owner. All these variables are from the Enterprise Survey's data set. We omit security costs from the base estimations due to concerns of simultaneity bias between crime losses and security costs, however later in the robustness section we do add it to the base specification and we find that the base estimation results are unaffected.

At the country level we control for the number of police per 100,000 population. The variable is obtained from the United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems. The variable is typically lagged by 1 year to reduce potential simultaneity bias between crime losses and police presence. Due to data constraints, for some countries the variable is lagged by more than one year. The specific details of the number of lags are available

in table A3 in the appendix. We also control the level of development of the economy using real GNI per capita. Inequality is controlled for using the country-wide Gini index. Both variables are prominent in the literature (Fajnzylber et al., 2002; Soares, 2004; Demombynes and Ozler, 2005). Increasing inequality typically increases the proportion of poor who may engage in criminal activity as well as the greater reward for engaging in criminal activity. For cases where data for the exact date are unavailable, we use data for the closest date available. The exact years of data used for GNI per capita and the Gini index are presented in table A3 in the appendix. We finally control for country size using the total population of the country. These data are available from the World Bank's World Development Indicators. Data source and description of the variable can be found in table A1, with summary statistics in table A2.

3. Estimation

We estimate the following equation (1) using OLS when the dependent variable is crime losses over sales, and Logit when the dependent variable is a dummy variable indicating whether a firm experienced crime in the last fiscal year.

$$(1) \quad crime_{ij} = \beta_1 GDPgr_j + \beta_2 Policelag_j + \beta_3 Fem_{ij} + \beta_4 GNIcap_j + \beta_5 GINI_j + \beta_6 Population_j + \beta_7 Small_{ij} + \beta_8 Medium_{ij} + \beta_9 \text{LargeCity}_{ij} + \beta_{10} Manf_{ij} + \varepsilon_{ij}$$

Where $crime$ is the losses due to crime as a % of sales or a dummy variable representing whether a firm experienced crime in the last fiscal year, $GDPgr$ is the real GDP per capita growth rate, $Policelag$ is the lagged number of police per 100,000 population, Fem is a dummy representing female ownership, $GNIcap$ is the real Gross National Income per capita, $GINI$ is the Gini coefficient, $Population$ is the total population of the economy, $Small$ and $Medium$ are firm size

dummies, *LargeCity* is a dummy variable for cities with population of 250,000 and greater, or capital cities, and finally *Manf* is a dummy variable for manufacturing firms. When we restrict the sample to only small and medium firms, we omit the *medium* firm size dummy variable.

There is, of course, some concern about whether this specification adequately captures the economic growth-crime relationship. We include several other control variables, including security costs, as a specification test in the robustness section and find that they do not affect the results.

All estimates are based on standard errors clustered at the country level. In the later sections we add additional variables and interact them with the variable of interest to elucidate several relationships between these variables, economic growth, and crime faced by small and medium sized firms. The usual econometric issues of endogeneity and omitted variable bias are of concern. Reverse causality is an issue given that higher crime can lead to slower economic growth. We also have the issue of omitted variable bias as economic growth may be correlated with several factors. Both issues are challenging given data limitations. We address this by using various checks as presented in the robustness section including instrumental variable estimation and panel estimations using a panel data set.

3.1 Base Regression Results

The base results are presented in table 1. Column1 indicates that firms in faster growing economies are less likely to experience crime. Column 2 shows that an increase in GDP per capita growth by 1 percent is associated with a 0.30 percent reduction in the losses due to crime

as a percentage of sales.[1] Both results are significant at 1%. We repeat the estimations in column 1 and 2 with the restriction that the sample includes only small and medium firms. As shown in columns 3 and 4 table 1, the results are largely the same. The sign and significance of the estimation results in columns 1, 2, 3 and 4 of table 1 are unchanged when all controls are excluded. A 1 percent increase in economic growth is associated with a reduction in crime loss as a percentage of sales by 0.24 percent with a 1 % level of significance for the whole sample of small, medium and large firms when all controls are excluded from the estimation. When restricting the sample to just small and medium firms, the corresponding figure is a 0.25 percent reduction in crime loss as a percentage of sales. These results indicate that economic growth may be a deterrent for criminal activity against firms. One reason could be that economic growth increases the opportunity cost of criminal activities leading to less crime. This is consistent with studies for individual level crime (Bourguignon, 1999; Fajnzylber et al., 2002).

A few other results stand out. Small and medium firms are less likely to experience crime than large firms, but face higher losses due to crime as a percentage of sales, which has been also found in previous studies (Amin, 2009). Firms with female owners are both more likely to experience crime, and also face a higher percentage of losses due to crime over sales. A couple of results retain significance but switch signs when comparing the impact on likelihood of experiencing crime (incidence of crime) and the losses due to crime as a percentage of sales (burden of crime). GNI per capita is positively associated with the likelihood of experiencing crime while negatively associated with the losses due to crime as a percentage of sales. That is, with higher income, crime against firms may become more widespread but also more petty.

[1] We replicated the estimations using a 5 year average of real GDP per capita growth. The results were retained and are available upon request.

Income per capita has generally shown non robust results with regards to individual level crime in the literature (Fajnzylber et al., 2002; Soares, 2004).[2] The size of the country in terms of population is positively associated with losses due to crime as a percentage of sales, but no significant association with the incidence of crime. Thus, in larger economies, firms may experience higher losses due to crime.

We now consider how several country and firm-level factors may influence the relationship between economic growth and the burden of crime on firms, particularly for small and medium firms. We examine the strength of the relationship between economic growth and crime and how it depends on factors such as firm size, police, female ownership and management, governance and voter turnouts in elections. The effect of economic growth on crime may differ depending on the size of the firm, as the ability for firms to protect themselves from criminal activity and their attractiveness as potential targets of criminal activity vary by firm size. Economic growth may not only increase labor market opportunities, but may also capture the quality of legal and public institutions (Lederman et al., 2002). The effects of police and governance on crime have been explored in the literature, and thus we expect the relationship between economic growth and crime may be strengthened or weakened by these factors. We also use voter turnout as a proxy for social organization, and thus we are able to examine whether the effect of economic growth on crime losses is strengthened by social organization, or weakened by its presence. Finally, given the robust positive relationship between female ownership and management and crime, which is consistent with empirical relationship between female headed households and crime, we examine whether economic growth weakens or strengthens this relationship. We do

[2] Due to the lack of continuous data for GNI per capita for some countries, we use the GDP growth rate instead of the GNI growth rate as our indicator for economic growth. This is typical in the literature (Fajnzylber et al, 2002).

also comment on whether these relationships hold when considering the whole sample instead of the restricted small and medium firm sample, and by and large this seems to be the case. We use the OLS estimation results in table 1, column 4 as the base results for the small and medium firm sample as with OLS estimations there is a more straightforward interpretation with regards to the magnitude of the effects of interaction variables. However, it is worth noting that both the Logit and OLS estimations provide qualitatively similar results for economic growth

3.2 Small and Medium Firms and per Capita Economic Growth Interaction

Column 1 of table 2 presents the estimation results of the interaction between small and medium firms and economic growth using the full sample of small, medium, and large firms. The interaction is negative, implying that economic growth reduces crime losses for small and medium firms to a greater extent than large firms. A one percent increase in per capital economic growth is associated with a 0.33 percent decline in crime losses for small and medium firms, statistically significant at the 1% level. The corresponding figure for large firms is 0.21 percent, statistically significant at the 5% level. The implication is that an increase in per capita economic growth is far more beneficial for small and medium firms than large firm with regards to crime. Thus pro-growth policies may be one way of insulating small and medium firms from crime.

3.3 Number of Police and per Capita Economic Growth Interaction

The interaction term between the number of police and economic growth is positive and significant at the 5% level of significance for the sample of small and medium sized firms. The overall association of economic growth with crime losses for small and medium sized firms is still negative at the sample mean number of police after interacting economic growth with police.

However, looking at the extremes of the sample, economic growth has no significant association with crime losses at the sample maximum number of police, but has a large and significant negative association at the sample minimum number of police. The results are presented in column 2 of table 2. The effect of increasing economic growth by 1 percent is associated with a 0.27 percent reduction in crime losses at the sample mean number of police and 0.48 percent reduction in crime losses at the lowest number of police in the sample, both results statistically significant at 1%. The number of police turning point, after which the association between economic growth and crime losses is insignificant, in the sample is 430 per 100,000 of population, which is at the 88^{th} percentile of the sample. These results are retained when we use the full sample of small, medium, and large firms. The implication of these results may indicate that a larger police force may be a substitute for the economic growth when it comes to reducing crime against firms. Thus during times of low economic growth and potentially high levels of crime, expanding the police force may be a viable alternative.

3.4 Female Ownership, Female Management and per Capita Economic Growth Interaction

The interaction term between female ownership and management and economic growth is positive and statistically significant at 10% for the sample of small and medium sized firms. Economic growth is associated with a reduction in crime losses whether or not a firm has a female or male owner, but the magnitude of the association is larger if the firm has a female owner, or both a female manager and at least one female owner as shown in columns 3 and 4 of table 2. The results indicate that a 1 percent increase in economic growth is associated with a 0.34 percent reduction in the dependent variable for female owned firms in contrast to 0.24 percent reduction in crime losses for firms that do not have a female owner. The magnitude is

even greater for firms with both a female owner and female manager at 0.44 percent reduction in contrast to 0.24 percent reduction for firms that have all male owners and male managers. These results are largely retained when using the full sample that includes large firms. An interpretation of this result is that economic growth may benefit the more vulnerable or less well off in a society and female owned or managed firms are less susceptible to crime.

3.5 Governance and per Capita Economic Growth Interaction

We use ICRG's Quality of government indicator as a measure of governance. The interaction term between Quality of Government and Economic growth is positive and statistically significant at 5 % as shown in column 1 of table 3. Economic growth has a negative and significant association with crime losses experienced by small and medium sized firms at the sample mean of the governance indicator. However, this relationship turns insignificant at the sample maximum of the governance indicator. At the sample minimum level of governance, the association of economic growth with crime losses has a larger magnitude while retaining significance, when compared to the mean level of governance. A 1 percent increase in economic growth is associated with an approximately 0.28 and 0.43 percent reduction in crime losses for the sample mean and minimum quality of governance respectively. These results are largely retained when extending the sample to large firms. One interpretation is that better governance is a substitute for the crime-reducing effect of economic growth.

3.6 Voter Turnout and per Capita Economic Growth Interaction

Social disorganization theory indicates that factors that diminish the effectiveness of informal social controls increase criminal activity (Kelly, 2000). Here we consider one indicator of social

disorganization – voter turnout in elections. The interaction term between voter turnout and economic growth is positive and statistically significant at 1% as shown in column 2 of table 3. An increase in economic growth is significantly associated with a decrease in crime losses experienced by small and medium sized firms at the mean level of voter turnout. However, this relationship loses significance at the sample minimum of voter turnout, but actually has a larger magnitude and retains significance at the sample maximum of voter turnout. A 1 percent increase in economic growth is associated with a 0.23 percent reduction in crime losses at the sample mean level of voter turnout and a 0.59 percent reduction in crime at the minimum level of voter turnout, both results statistically significant at 1%. The turning point where the effect of an increase in the economic growth ceases to be significant is a voter turnout above 0.8, which is at the 88th percentile of the firm sample. These results are largely retained when the sample is extended to large firms. This result indicates that a higher voter turnout, possibly indicating greater social organization, is a substitute for the effect of economic growth on crime.

Two major concerns about the estimation results are that the relationship between economic growth and losses due to crime are reverse causality and omitted variable bias. Essentially, an increase in losses due to crime can deter economic growth which would imply that economic growth is correlated with the stochastic error term, hence biasing the estimates. Similarly, economic growth may be capturing something else such as institutions that are not included in the estimations, thus producing biased and inconsistent estimates. We mitigate this possibility by using instrumental variable estimations and subjecting the base estimates to several robustness checks.

4. Instrumental Variables

We use two instruments for economic growth: the % of land in tropics for each country, and malaria risk index, which is the proportion of each country's population that live with risk of malaria transmission in 1994 developed by Sachs and Gallup (2004). Both these variables have been found to be an important determinant of economic growth (Sachs et al, 1998). We report the results in table 4 for the sample of small and medium sized firms. The first stage estimation results presented in column 2 shows that while % of land in tropics is significant, malaria ecology is not. We include the latter variable in order to pass the test of overidentifying restrictions. The overall results are retained without the malaria risk instrument. The second stage estimation results are presented in column 1 of table 4. The coefficient of real GDP per capita growth using instrumental variables estimation method retains the sign and significance of the base estimations. The magnitude increases slightly from -0.08 in the base estimations to -0.14 in the estimations using the instrumental variables. As indicated in the bottom of table 4, the Sargen-Hansen test of overidentifying restrictions is not rejected for all conventional levels of significance. Thus we cannot reject the null that all the instruments are valid. We also reject that the estimation is underidentified at 5% level of significance. We replicate the instrumental variable estimations in table 4 by extending the sample to large firms. The results are largely retained.

However, the results should be treated with caution. It is possible that the instruments may not satisfy the exclusion restriction. Geographical factors such as % of land in tropics may be correlated with institutional factors or other unobservables that may be correlated with crime.

Thus the potential endogeneity of our instruments cannot be ruled out completely, and these results should be interpreted as a robustness check.

5. Robustness

We check for robustness in terms of model specification. Several studies have shown that demographics and human capital (Kovandzic and Sloan, 2002; Kelly, 2000; Di Tella and Schargrodsky, 2004; Usher, 1997), corruption (Gaviria, 2002), fractionalization (Fajnzylber et al, 2000), trade (Ghosh et al., 2011), prison population (Kovandzic and Sloan, 2002; levitt, 2004), and government spending (Naidoo, 2006) are factors that influence crime. We add sets of variables that proxy for the aforementioned factors and present the results for small and medium sized firms in table A5. We also include firm level variables such as total employees and security costs as a % of total sales and check if they affect our estimation of interest. We also control for inflation, using it as an indicator of macroeconomic stability. As shown in table A5, including these sets of variables does not improve the goodness of fit, the explanatory power of the model, or eliminate the statistical significance of the variable of interest. There is a marginal improvement in the goodness of fit when considering a continuous measure of firm size and security spending. However, the significance of the coefficient of interest is unaffected.

We also worry that extreme observations in the sample may be driving the results. Thus we omit the top 1%, bottom 1 %, and top and bottom 1% observations of losses due to crime as well economic growth, to see if our results are retained. As indicated in table A6, the significance of our results is unaffected.

Finally, we worry that our results may be dominated by certain countries. Thus we drop one country at a go from the sample of small and medium sized firms and see if the coefficient of economic growth retains the signs and statistical significance. As indicated by figure A1, the results are not dominated by any particular country in the sample as we retain the sign and significance at 5%.

6. Conclusion

This paper contributes to the literature by examining the relationship between economic growth and crime against firms, a fairly under-researched area especially with regards to small and medium sized firms. The paper finds a negative relationship between firm losses due to crime and economic growth. We find that an increase in real GDP per capita growth by 1 percent is associated with a 0.30 percent reduction in the losses due to crime as a percentage of total sales experienced by firms. This figure is larger for small and medium firms (0.33 percent) than larger firms (0.21 percent). The suggested mechanism for this effect is that economic growth increases opportunities elsewhere and thus increasing the opportunity cost of crime. Furthermore, economic growth may result in small and medium firms growing faster and increasing performance, thus allowing them to better protect themselves from criminal activity. The results of this study are consistent with the literature that finds similar beneficial effects of economic growth on crime experienced by households.

An important policy implication is that per capita economic growth maybe an effective tool for policy makers to deal with crime targeting businesses, especially small and medium firms. Policies that promote growth may be an alternative to costly measures that improve the

deterrence of criminal activity. Pro-growth policies may have the dual effect of benefiting both the private sector directly as well as indirectly by reducing the degree of criminal activity they face. It is also important to note that a large proportion of firms are in the informal sector in developing economies. While this study has focused on formal firms, a natural extension would be to examine the informal sector.

TABLE 1: GDP GROWTH AND CRIME AGAINST FIRMS

	Logit: Experienced Crime	OLS: % of Losses Due to Crime Over Sales	Logit: Experienced Crime	OLS: % of Losses Due to Crime Over Sales
	Full Sample		Small and Medium Firms sample	
	1	2	3	4
Real GDP per Capita Growth	-0.0941***	-0.0808***	-0.0914***	-0.0833***
	[0.0226]	[0.0208]	[0.0224]	[0.0201]
Police per 100,000 persons lagged	-0.0008	-0.0011*	-0.0006	-0.0010*
	[0.0009]	[0.0005]	[0.0008]	[0.0006]
Firm with Female Owner	0.1357**	0.1181*	0.092	0.1815**
	[0.0621]	[0.0632]	[0.0579]	[0.0834]
Real GNI per capita in 100s	0.0040**	-0.0058***	0.0035**	-0.0063***
	[0.0018]	[0.0012]	[0.0016]	[0.0014]
GINI	-0.0023	-0.0065	-0.0011	-0.0019
	[0.0121]	[0.0113]	[0.0115]	[0.0113]
Population in Millions, Total	-0.004	0.0034*	-0.0012	0.0038*
	[0.0035]	[0.0017]	[0.0032]	[0.0020]
Small firm dummy variable	-0.8113***	0.4023***	-0.4262***	0.2446***
	[0.1138]	[0.0940]	[0.0557]	[0.0846]
Medium firm dummy variable	-0.3551***	0.1664**		
	[0.0820]	[0.0658]		
Large City or Capital dummy variable	0.0157	0.0331	0.0012	0.0826
	[0.0657]	[0.0953]	[0.0728]	[0.0974]
Manufacturing firm dummy variable	-0.6394***	-0.2238**	-0.4717***	-0.1835*
	[0.0741]	[0.0813]	[0.0667]	[0.1032]
Number of Countries	27	27	27	27
Number of Observations	12801	12274	9482	9160

* significant at 10%; ** significant at 5%; *** significant at 1%, Standard errors in brackets clustered at the country level

TABLE 2: GDP GROWTH AND CRIME AGAINST FIRMS – SME, POLICE, AND FEMALE MANAGER INTERACTIONS

Dependent variable	% of Losses Due to Crime Over Sales	% of Losses Due to Crime Over Sales	% of Losses Due to Crime Over Sales	% of Losses Due to Crime Over Sales
	Full Sample	Small and Medium Firms sample		
	1	2	3	4
Real GDP per Capita Growth	-0.0563**	-0.1699***	-0.0713***	-0.0699***
	[0.0258]	[0.0479]	[0.0200]	[0.0215]
Real GDP per Capita Growth x Small and Medium Firms	-0.0319*			
	[0.0166]			
Real GDP per Capita Growth x lagged Police		0.0003**		
		[0.0001]		
Real GDP per Capita Growth x Female Owner			-0.0280*	
			[0.0145]	
Real GDP per Capita Growth x firm with female owner and manager				-0.0591*
				[0.0293]
Firm with female owner and manager				0.4792**
				[0.1940]
Police per 100,000 persons	-0.0011**	-0.0020**	-0.0010*	-0.0009*
	[0.0005]	[0.0009]	[0.0006]	[0.0005]
Firm with Female Owner	0.1161*	0.1674*	0.2575**	
	[0.0617]	[0.0837]	[0.1055]	
Real GNI per capita (in 100s)	-0.0057***	-0.0065***	-0.0063***	-0.0060***
	[0.0012]	[0.0015]	[0.0014]	[0.0015]
GINI	-0.0064	-0.0019	-0.0017	0.0007
	[0.0114]	[0.0115]	[0.0112]	[0.0108]
Population in Millions, Total	0.0034*	0.0029	0.0039*	0.0040**
	[0.0017]	[0.0021]	[0.0020]	[0.0019]
Small and Medium firm dummy variable	0.3622***			
	[0.0871]			
Small firm dummy variable		0.2409***	0.2422***	0.2240***
		[0.0850]	[0.0851]	[0.0774]
Large City or Capital dummy variable	0.0255	0.0944	0.0811	0.0828
	[0.0934]	[0.0957]	[0.0972]	[0.0966]
Manufacturing firm dummy variable	-0.2414***	-0.1922*	-0.1838*	-0.1750*
	[0.0815]	[0.1032]	[0.1029]	[0.1015]
Number of Countries	27	27	27	27
Number of Observations	12274	9160	9160	9237

* significant at 10%; ** significant at 5%; *** significant at 1%, Standard errors in brackets clustered at the country level

TABLE 3: GDP GROWTH AND CRIME AGAINST FIRMS – QUALITY OF GOVERNANCE AND VOTER TURNOUT INTERACTIONS

Dependent variable	% of Losses Due to Crime Over Sales	% of Losses Due to Crime Over Sales
	Small and Medium Firms sample	
	1	2
Real GDP per Capita Growth	-0.2469***	-0.3573***
	[0.0742]	[0.0941]
Real GDP per Capita Growth x Quality of Governance	0.2995**	
	[0.1338]	
GDP per Capita Growth x Voter Turnout		0.4022***
		[0.1417]
Quality of Governance	-2.1963**	
	[0.8490]	
Voter Turnout		-1.8393**
		[0.7621]
Police per 100,000 persons	-0.0018***	-0.0010*
	[0.0006]	[0.0006]
Firm with Female Owner	0.1739*	0.1736*
	[0.0855]	[0.0849]
Real GNI per capita (in 100s)	-0.0033*	-0.0046***
	[0.0018]	[0.0016]
GINI	-0.0192	0.0049
	[0.0132]	[0.0099]
Population in Millions, Total	0.0032*	0.0040**
	[0.0017]	[0.0019]
Small firm dummy variable	0.2432**	0.2455***
	[0.0938]	[0.0844]
Large City or Capital dummy variable	0.1042	0.0859
	[0.1047]	[0.0970]
Manufacturing firm dummy variable	-0.1662	-0.1717
	[0.1198]	[0.1071]
Number of Countries	24	27
Number of Observations	8299	9160

* significant at 10%; ** significant at 5%; *** significant at 1%, Standard errors in brackets clustered at the country level

TABLE 4: GDP GROWTH AND CRIME AGAINST FIRMS – INSTRUMENTAL VARIABLES

	% of Losses Due to Crime Over Sales IV Estimates Second Stage Results	Real GDP per capita Growth First Stage Results
	Small and Medium Firms sample	
	1	2
Real GDP per Capita Growth	-0.1438*** [0.0406]	
Police per 100,000 persons lagged	-0.0012* [0.0006]	-0.0073 [0.0051]
Firm with Female Owner	0.1615** [0.0782]	-0.1774 [0.1701]
Malaria Ecology Index		-1.2454 [1.8219]
% of land in the Tropics		-3.6897*** [0.9537]
Real GNI per capita in 100s	-0.0090*** [0.0020]	-0.0597*** [0.0188]
GINI	-0.0269 [0.0180]	-0.2665*** [0.0757]
Population in Millions, Total	0.0051*** [0.0016]	0.0353** [0.0163]
Small firm dummy variable	0.2501*** [0.0838]	0.0628 [0.0763]
Large City or Capital dummy variable	0.0757 [0.1017]	-0.0129 [0.2594]
Manufacturing firm dummy variable	-0.1834* [0.1013]	0.0797 [0.1029]
Number of Countries	27	27
Number of Observations	9160	9160
Instruments	Malaria Ecology Index, % of land in the Tropics	
Under-identification test (Kleibergen-Paap LM statistic) P-value:	0.0210	
Hansen J statistic (over-identification test of all instruments) p-value:	0.1155	

* significant at 10%; ** significant at 5%; *** significant at 1%, Standard errors in brackets clustered at the country level

References

Aidis, R., S. Estrin, and T. M. Mickiewicz (2012). "Size Matters: Entrepreneurial Entry and Government." *Small Business Economics* 38 (1): 119-139.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, R. Wacziarg (2003). "Fractionalization" *Journal of Economic Growth* 8(2), 155–194

Amin, M. (2009). "Crime, Security and Firms in Latin America" (Short Note). Available at: http://works.bepress.com/mohammad_amin/11 (accessed October 31, 2011).

Baliamoune-Lutz, M. and P. Garello (2014). "Tax Structure and Entrepreneurship." *Small Business Economics* 42(1): 165-190.

Barro, R., J-W. Lee. (2010). "A New Data Set of Educational Attainment in the World", 1950-2010. NBER Working Paper No. 15902.

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

Bourguignon, F. (1999). "Crime, Violence and Inequitable Development. Delta, Paris. manuscript.

Bushway, S., P. J. Cook, and M. Phillips (2012), "The Overall Effect of the Business Cycle on Crime" *German Economic Review* 13(4): 436-4446

Cook, P. J. (2010). "Property Crime Yes violence No." *Criminology and Public Policy*, 9(4), 693–697.

Demombynes, G., B. Ozler. (2005). "Crime and local inequality in South Africa," *Journal of Development Economics*, Elsevier, vol. 76(2), pages 265-292.

Di Tella, R., E. Schargrodsky. (2004). "Do Police Reduce Crime? Estimates Using the Allocation of Police Forces After a Terrorist Attack." *The American Economic Review* 94, 115–133.

Donohue, J., S. Levitt. (2001). "Legalized Abortion and Crime." Quarterly Journal of Economics. 116:2, pp. 379 –420.

Dutta, M., H. Zakir. (2009). "Determinants of Crime Rates: Crime Deterrence and Growth in Post-liberalized India." MPRA Paper No. 14478.

Ehrlich, I. (1973). "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy* 81, 521–565.

Fanjzylber, P., D. Lederman, N. Loayza. (2002). “Inequality and Violent Crime.” *Journal of Law and Economics* 45(1), 1–39.

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

Gaviria, A. (2002).” Assessing the Effects of Corruption and Crime on Firm performance: Evidence from Latin America.” *Emerging Markets Review* (3), 245-268.

Glaeser, Edward L., Bruce Sacerdote (1999). Why is There More Crime in Cities. *Journal of Political Economy* 107(6), 225-258.

Ghosh, A., P. E. Robertson, M-C Robitaille. (2011). “Crime, Factor Abundance and Globalization: Evidence from Cross-country Panel data.” Unpublished manuscript. Downloaded October 31, 2011
http://economics.adelaide.edu.au/events/ATW2011/Robertson.pdf

Gould, E. D., B. A. Weinberg, D. B. Mustard (2002), ‘Crime Rates and Local Labor Market Opportunities in the United States: 1979–1997.’ *Review of Economics and Statistics* 84, 45–61

Hopkins, M. (2002). “Crimes against Businesses: The Way Forward for Future Research.” *British Journal of Criminology*, 42(4): 782-797.

Islam, A.(2013), "Is There a Gender Bias in Crime Against Firms in Developing Economics?" *Women's Studies International Forum* 37(2013): 1-15

Kelly, M. (2000). “Inequality and Crime.” *Review of Economics and Statistics* 82 (4), 540– 554 (November).

Kovandzic, T. V., J. J. Sloan. (2002). “Police Levels and Crime Rates Revisited - A county-level analysis from Florida (1980-1998).” *Journal of Criminal Justice* 30, 65-76.

Lederman, D., Laoyza, N., and A. M. Menendez,(2002). “Violent Crime: Does Social Capital Matter? *Economic Development and Cultural Change* 50(3), 509-539 (April 2002).

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

Lipuma, A. J., S. L. Newbert, and J. P. Doh (2013). “The Effect of Institutional Quality on Firm Export Performance in Emerging Economies: A Contingency Model of Firm Age and Size.” *Small Business Economic* 40 (4): 817-841.

Machin, S., C. Meghir (2004). "Crime and Economic Incentives." *Journal of Human Resources*, 39(4): 958-979

McDowall, D. and C. Loftin (2009), "Do United States City Crime Rates Follow a National Trend? The Influence of Nationwide Conditions on Local Crime Patterns", *Journal of Quantitative Criminology* 25, 307–324

Naidoo, J. (2006). "The Impact of HIV/AIDS on Crime in South Africa," http://www.sarpn.org.za, date accessed on 31 October 2011.

Sachs, J., J. L. Gallup. (2004). "The Economic Burden of Malaria." The Supplement to *The American Journal of Tropical Medicine & Hygiene*, vol. 64, no. 1, 2, pp 85-96.

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

Sachs, J., J. L. Gallup, A.. Mellinger. (1998). "Geography and Economic Development," in Pleskovic, Boris and Joseph E. Stiglitz (eds.), Annual World Bank Conference on Development Economics 1998 (April), The World Bank: Washington, DC.

Usher, D. (1997). "Education as a Deterrent to Crime," *Canadian Journal of Economics* 30, 367-84

APPENDIX

TABLE A1: VARIABLE DEFINITIONS

Variable	Definition	Data Source
Losses Due to Crime (% of sales)	Response to the Question: "In fiscal year [insert fiscal year], what are the estimated losses as a result of theft, robbery, vandalism or arson that occurred on establishment's premises calculated as a percent of annual sales" For cases where actual values were reported, % of sales was calculated.	Enterprise Surveys, World Bank
Experienced Crime	Response to the Question: "In fiscal year [insert last complete fiscal year], has this establishment experienced losses as a result of theft, robbery, vandalism or arson?"	Enterprise Surveys, World Bank
Real GDP per Capita Growth	Real GDP per Capita Growth Rate, constant 2000 USD	Word Development Indicators (WDI), World Bank
Police per 100,000 persons lagged	Police per 100,000 persons lagged. Due to data constraints, for some countries the lag is not exactly lagged by year. Specifics of all lag years can be found in the appendix.	United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems
Firm with Female Owner	Yes Response to Question: "Are any of the owners female?"	Enterprise Surveys, World Bank
Female Owner and Manager	Yes Response to Questions: "Is the Top Manager female?" and "Are any of the owners female?"	Enterprise Surveys, World Bank
Real GNI per capita (in 100s)	Gross National Income per Capita, Constant 2000 USD	Word Development Indicators (WDI), World Bank
GINI	Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	WDI, World Bank, Development Research Group
Population, Total in millions	Total Population	Word Development Indicators (WDI), World Bank
Small firms	Dummy is 1 if firm is small (<20)	Enterprise Surveys, World Bank
Medium firms	Dummy is 1 if firm is medium (20-99)	Enterprise Surveys, World Bank
Large City or Capital	Dummy is 1 if city is either the capital or has more than 250,000 population	Enterprise Surveys, World Bank
Manufacturing	Dummy is 1 for manufacturing firms	Enterprise Surveys, World Bank
Quality of Governance	Mean value of the ICRG governance variables "Corruption", "Law and Order", and "Bureaucracy Quality", scaled 0-1. Higher values indicate better quality of government. 1990-2007 average used.	International Country Risk Guide – The PRS Group
Voter Turnout	Turnout in parliamentary elections measured as the total number of votes cast divided by the number of registered voters.	IDEA: International Institute for Democracy and Electoral Assistance http://www.idea.int/vt/index.cfm
Polity 2	Index of Democracy (Polity 2). Score between -10 and 10 that indicate how democratic a country. Values increase with greater democracy. 1990-2007 average used.	Polity IV, http://www.systemicpeace.org/polity/polity4.htm

Years of Schooling	Average Years of Schooling of Population over 15. 1990-2007 average used.	Barro and Lee (2010)
Corruption	Corruption Perception Index: 10 point scale where higher values indicate less corruption. 1995-2009 average used.	Transparency International ww.transparency.org
Ethnic Fractionalization	Probability that two randomly selected people from a given country will not belong to the same ethnic group	Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003)
Language Fractionalization	Probability that two randomly selected people from a given country do not speak the same language	Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003)
Religious Fractionalization	Probability that two randomly selected people from a given country do not belong to the same religion	Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003)
Total Employees	Response to Question: "At the end of fiscal year [insert last complete fiscal year], how many permanent, full-time employees did this establishment employ?"	Enterprise Surveys, World Bank
Security Costs as a % of sales		Enterprise Surveys, World Bank
Proportion of Female Population	Population, female (% of total)	WDI, World Bank
Percentage of Population in Urban Agglomerates	Population in urban agglomerations of more than one million is the percentage of a country's population living in metropolitan areas that in 2000 had a population of more than one million people.	WDI, World Bank
Population Density	People per sq. km of land area	WDI, World Bank
Proportion of Population between 15 and 64	Population ages 15-64 (% of total)	WDI, World Bank
Life Expectancy		WDI, World Bank
Government spending on Public Order and Safety over total Government spending	Includes spending on police, fire protection services, law courts, and prisons	Government Financial Statistics (GFS), International Monetary Fund
Inflation		WDI, World Bank
Adult Prison Capacity	Prisons refer to "Prisons, Penal Institutions or Correctional Institutions" which means all public and privately financed institutions where persons are deprived of their liberty.	United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems
Judges	Number of judges per 1000 of population	United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems
Trade	Exports plus imports as a % of GDP	WDI, World Bank
Malaria Risk	Proportion of each country's population that live with risk of malaria transmission in 1994	Sachs and Gallup (2004)
% of land in Tropics		Sachs et. al. (1998)

TABLE A2: SUMMARY STATISTICS FOR FULL SAMPLE INCLUDING SMALL, MEDIUM, AND LARGE FIRMS

Variable	Mean	Std. Dev.	Min	Max	Data Unit
Losses Due to Crime (% of sales)	0.716	3.942	0.000	100.000	Firm
Experienced Crime	0.232		0.000	1.000	Firm
GDP per Capita Growth	2.656	4.213	-5.529	10.192	Country
Police per 100,000 persons lagged	287.894	108.187	90.110	480.013	Country
Firm with Female Owner	0.419		0.000	1.000	Firm
Female Owner and Manager	0.152		0.000	1.000	Firm
Real GNI per capita (in 100s)	37.345	31.014	2.257	141.816	Country
GINI	39.826	7.768	25.810	52.330	Country
Population, Total in millions	28.615	27.065	1.353	141.816	Country
Small firms	0.369		0.000	1.000	Firm
Medium firms	0.378		0.000	1.000	Firm
Large City or Capital	0.627		0.000	1.000	Firm
Manufacturing	0.537		0.000	1.000	Firm
Quality of Governance	0.525	0.101	0.351	0.791	Country
Voter Turnout	0.718	0.089	0.460	0.893	Country
Polity 2	6.153	3.926	-5.647	10.000	Country
Years of Schooling	8.066	1.816	2.850	11.689	Country
Corruption	3.369	0.960	1.982	6.091	Country
Ethnic Fractionalization	0.383	0.173	0.118	0.663	Country
Language Fractionalization	0.372	0.254	0.030	0.836	Country
Total Employees	121.246	478.223	1.000	20843	Firm
Life Expectancy	69.407	7.440	44.966	78.314	Country
Proportion of Female Population	50.957	1.339	48.750	54.020	Country
Percentage of Population in Urban Agglomerates	21.339	10.624	4.406	39.027	Country
Population Density	88.485	71.842	1.610	290.871	Country
Proportion of Population between 15 and 64	63.549	5.393	47.959	70.721	Country
Government Spending on Public Order & Safety over Total Spending	0.057	0.026	0.015	0.119	Country
Inflation	9.488	7.816	2.358	50.705	Country
Security Costs as a % of sales	1.514	5.373	0.000	384.615	Firm
Judges per 1000 of Population	13.166	11.808	0.760	47.020	Country
Adult Prison Capacity	41384	50603	1017	160327	Country
Trade as a % of GDP	84.496	36.049	37.354	182.512	Country
Malaria Risk Index	0.259	0.377	0.000	1.000	Country
% of land in tropics	0.370	0.454	0.000	1.000	Country

TABLE A3: POLICE, GINI, AND GNI PER CAPITA DATA AND SURVEY YEAR

Country Survey Year	Police per 100,000 persons lagged Year	GINI	GNI per Capita
Argentina 2009	2008	2009	2009
Azerbaijan 2008	2006	2008	2008
Belarus 2007	2004	2007	2004
Bosnia and Herzegovina 2008	2007	2007	2007
Costa Rica 2009	2006	2009	2009
Czech Republic 2008	2007	1996	2008
Ecuador 2009	2006	2009	2009
El Salvador 2009	2006	2007	2009
Estonia 2008	2007	2004	2008
Fyr Macedonia 2008	2006	2008	2005
Hungary 2008	2007	2007	2008
Kazakhstan 2008	2007	2007	2008
Latvia 2008	2007	2008	2008
Lithuania 2008	2007	2008	2008
Moldova 2008	2007	2008	2008
Mongolia 2008	2004	2008	2000
Nepal 2008	2006	2004	2000
Nicaragua 2009	2006	2005	2009
Paraguay 2009	2006	2008	2009
Peru 2009	2004	2009	2009
Philippines 2008	2007	2006	2008
Poland 2008	2007	2008	2008
Romania 2008	2007	2008	2008
Slovak Republic 2008	2007	1996	2008
Slovenia 2008	2007	2004	2008
Turkey 2007	2006	2008	2007
Ukraine 2007	2006	2008	2007

TABLE A4: CRIME AND GROWTH - COUNTRY AVERAGES

Country	% of Losses Due to Crime Over Sales	Real GDP per Capita Growth
Argentina	0.63	-0.13
Azerbaijan	0.20	9.54
Belarus	0.72	10.19
Bosnia and Herzegovina	0.44	5.57
Costa Rica	0.54	-2.79
Czech Republic	0.48	1.58
Ecuador	1.11	-0.70
El Salvador	1.73	-4.00
Estonia	1.69	-4.99
Fyr Macedonia	0.50	4.76
Hungary	0.25	1.00
Kazakhstan	0.60	2.05
Latvia	0.42	-3.82
Lithuania	0.43	3.46
Moldova	0.54	7.97
Mongolia	0.52	7.67
Nepal	0.87	4.18
Nicaragua	1.68	-2.76
Paraguay	1.54	-5.53
Peru	0.64	-0.27
Philippines	1.32	2.27
Poland	0.45	5.11
Romania	0.36	9.59
Slovak Republic	0.64	5.99
Slovenia	0.26	3.33
Turkey	0.38	3.36
Ukraine	0.45	8.55

TABLE A5: ROBUSTNESS – ADDED CONTROLS

	Coefficient of Real GDP per Capita Growth	Adjusted R Squared
	Small and Medium Firms sample	
BASE	-0.0833*** [0.0201]	0.01
Fractionalization Ethnic, Language, Religion	-0.0641*** [0.0209]	0.01
Employees and Security Total Employees, Security Costs as a % of sales	-0.0840*** [0.0195]	0.02
Corruption and Democracy Corruption (Transparency International), Polity 2 Score	-0.0879*** [0.0203]	0.01
Population and Demographics Proportion of Female Population, Population Density, Proportion of Population between 15 and 64	-0.0576** [0.0231]	0.01
Human Capital Life Expectancy, Years of Schooling	-0.0870*** [0.0302]	0.01
Government Spending and Inflation Government Spending on Public Order & Safety, Inflation	-0.0563* [0.0309]	0.01
Judges and Prison Capacity Judges per 1000 of Population, Adult Prison Capacity	-0.0758*** [0.0240]	0.01
Trade Trade as a % of GDP	-0.0779*** [0.0213]	0.01

TABLE A6: ROBUSTNESS – EXTREME OBSERVATION DOMINANCE

Small and Medium Firms sample	Coefficient of Real GDP per Capita Growth
Dropping Extreme Crime Loss Observations	
Bottom 1%	-0.083***
	[0.020]
Top 1%	-0.034***
	[0.011]
Top and Bottom 1%	-0.034***
	[0.011]
Dropping Extreme Real GDP per Capita Growth Observations	
Bottom 1%	-0.078***
	[0.021]
Top 1%	-0.086***
	[0.020]
Top and Bottom 1%	-0.081***
	[0.021]

FIGURE A1: COUNTRY DOMINANCE – COEFFICIENT OF ECONOMIC GROWTH USING SAMPLE OF SMALL AND MEDIUM SIZED FIRMS