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Has Foreign Direct Investment exhibited sensitiveness to crime across countries in the period 1999-2004? And if so, is this effect non-linear?

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Section1: Introduction:

Foreign Direct Investment, FDI henceforth, are *"...international capital flows in which a firm in one country creates or expands a subsidiary in another..."* (Krugman and Obstfeld p.169, 2000). These flows are important for countries that fail to domestically fund investments. Moreover, they promote economic growth by aiding in the diffusion of technologies and delivery of new ideas.

According to economic theory FDI location is determined by transport costs and proximity to resources (Krugman and Obstfeld, 2000). Also, concentration of related industries lowers trade costs, inducing agglomeration economies which lures future investment (Venables, (1996)).

However, despite the theoretical framework concerning the effect of uncertainty on investment (Pindyck, 1989), crime and uncertainty stemming from it are rarely empirically tested as factors of FDI. The current paper contributes to literature by utilizing crime data to answer "*whether FDI exhibited sensitiveness to crime across countries over the period 1998-2004 and whether this effect varied with countries' wealthiness*".

Intuitively, crime should lower investment since it raises probability of being victimized, causing investment costs to soar (i.e. insurance costs) without matching increases in real returns. The first part of the analysis answers whether this holds. The reasoning for nonlinearity across wealthiness is based on the Solow growth model, which states that low per capita output is a result of low per capita capital (Mankiw ch7, 2006). So, the *marginal productivity of capital*, *MPK* thereafter, in poor countries maybe higher. We thus want to test if higher MPK compensates for crime.

This effort was fueled by FDI's importance. In addition, UK was recently declared the European capital of violent crimes[1], which prompted the author to ask how this affected FDI. To address this question, principal component analysis is used to generate indexes capturing the *Violent, Financial* and *Property crime levels* within countries. We extend literature by being the first to generate indexes for *property* and *financial* crime. To the author's knowledge this is the first time the latter is tested. However, our distinctive contribution is the examination of the effect of crime according to the countries' wealthiness. The paper adopts the system GMM estimator to deal with potential crime endogeneity ignored by so far literature.

We confirm previous work, by finding that only *violent* related crimes discourage foreign investors. Furthermore, we fail to reject the hypothesis that the effect of crime on inflows is homogeneous across countries irrespective of wealthiness. Our aim is twofold, first to ignite a discussion of different channels of causality for crime and economy. Second, we argue that to enjoy the merits of *FDI* apart from improving economic conditions, *violent crime* should be tackled also.

The remaining of the paper is organised as follows. The next section initially discusses the main results of literature, while it concludes with a rigorous review of related research. The empirical model adopted along with implications and solutions follow. Section 4 describes the data, and finally section 5 presents our results and some robustness checks. The paper concludes in the final section.

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[1] http://www.telegraph.co.uk/news/newstopics/politics/lawandorder/5712573/UK-is-violent-crime-capital-of-Europe.html

Section 2: Literature Review:

So far empirical literature has been plentiful in examining theoretical and other determinants of FDI. A consensus exists that Venables' (1996) claim of agglomeration economies attracting investment indeed holds (Agiomirgianakis et. al. (2004), Hood and Young, (1997)). Others find that in contrast to labour costs' fading effect, real exchange rates influence location decisions (Barrel and Pain (1997, 1999)).

Some depart from traditional economic theory to find that government infrastructure and the legal system impact inflows (Globerman and Shapiro, 2002). Furthermore, government itself can either through provision of public incentives (Barrios, et al., 2003) or tariff manipulation (Barnes and Davidson, 1994) alter a location's attractiveness. Moreover, export oriented policies should attract more FDI, which is confirmed empirically with inflows being more prone to liberal trade regimes.

The accelerator investment model, proxy of market size, is commonly found to explain investment variation sufficiently, thus reinforcing theory (Agiomirgianakis et al., (2004), Bhasin et. al., (1994) and Morrissey and Rai, (1995)). Less commonly absorbing capacity (GDP per capita) and rail infrastructure exert a positive effect (Agiomirgianakis et. al. (2004)). We refine Agiomirginakis et.al. (2004), who examined aggregate FDI determinants, by considering crime.

Literature also suggests that noneconomic factors may determine inflows as a "good" institutional framework[2] is valued by investors (Benassy-Quere et. al., (2005)). However, crime which affects property rights, was mostly ignored and "*thrown*" in the unobservables. A recent strand of literature, though, reverses the traditional causality and examines the effect of crime on the economy. Habib and Zurawicki (2001) established that if a country is perceived as corrupted then investments inflows fall. More related though to our paper are Daniele and Marani, (2008) and Krkosk and Robeck, (2009), who acknowledged the correlation of organised and street crime with *FDI* inflows. While Peri, (2004) identified the macroeconomic consequences of murders.

Danielle and Marani, (2008) focus on *Mafia*'s effect on FDI inflows in Italian provinces over a 5 year period. Their main contribution is their *Mafia* index constructed from murder, bomb attacks, extortion, arson and criminal associations. Murder and bomb attacks are included to overcome underreporting of arson and extortion. They account for the slow response of FDI to Mafia attacks by lagging Mafia index one period.

Krkoska and Robeck, (2009) use survey data in which businesses evaluated their experience, loss and perception of crime, to examine how perceived organised and street crime affected business investment and *FDI*. Perceived crime was instrumented on the experience and loss from crime.

Finally, Peri, (2004) employs Italian provincial data for 40 years to investigate the effect of murder on economic activity (employment rate, per capita income). The paper's distinguishing feature is the classification of provinces in low, medium, high and very high murder rates and testing whether the last three differ significantly.

[2] Lack of corruption, and security of property rights

Overall evidence signifies the negative macroeconomic effects of Violent crimes. Daniele and Marani concluded that out of theft, *Mafia* and total crime, only *Mafia* is significantly negatively affecting FDI. It remained so even when controlling for agglomeration and GDP per capita, although Mafia coefficient halved. Their panel analysis controlled for market size, openness, infrastructure and incentives.

The results of Krkoska and Robeck suggest that at national level experience and loss from organised crime affect positively crime perception, implying fear of recidivism. Furthermore, their panel analysis of 26 countries over 3 years indicates that *perceived* crime (organised, street) is negatively influencing FDI inflows even when controlling for market size, natural and skill endowments, and existing stock of FDI. An important contribution, showing that bad experience makes investors unwilling to invest.

Lastly, Peri demonstrates the overall depressing effect of murders on economic activity. Furthermore, when provinces are classified only very high murder rate decreases economic activity, hinting that crime hinders the economy above a threshold. A panel analysis was followed, which controlled for the growth rate of the working population, civic involvement, Europe proximity and coastal province. Employment rate and per capita GDP in the start of period were included to capture any convergence trend.

Overall, Daniele and Marani indicate that it is *Mafia* related crimes rather than total crimes that deplete FDI inflows. This implies that investors are not afraid of one off random crimes like theft, but fear of crimes that will hinder them on a consistent basis. An interesting result, which we test at the national level.

Krkosk and Robeck made an important breakthrough by capturing the negative effect of perceived crime on FDI inflows. An influential paper, but with little observations. We build on their analysis and generate expected crime by using lags for instruments.

Peri's finding of nonlinear effects implies that the presence of very high crime levels exacerbates the true effect of low crime levels when pooled together. The present paper augments nonlinearity analysis by considering nonlinearity over country's wealthiness.

One point of criticism is that literature has ignored potential crime endogeneity and multicollinearity issues. Crime literature highlights GDP per capita, growth rate and education's effect on decision concerning involvement in criminal activities (Barnett, 2008; Buonanno and Leonida, 2005; Donohue and Levitt, 2001; Ehrlich, 1975; Fanjnylber et al., 2002; Imrohoroglu, et al., 2001). Therefore, including them in the same specification with crime causes collinearity, but excluding them generates biases as their explanatory power is thrown in the unobservables, since they are correlated with crime. Although one period lag of crime is used, contemporaneous education level and GDP per capita are not unrelated to their previous period's level, thus not perfectly unrelated to previous period's crime. The model and solutions adopted to overcome this and other issues are discussed in the next section.

Section3: Empirical Specification:

The present paper examines data on 75 countries over a seven year period, 525 observations. As our data spans overtime we adopt panel data analysis, which exploits both the time and cross sectional dimension. To address our question, the two models below are estimated.

$$\ln\frac{FDI}{GDP}_{i,t} = \gamma_1 \ln c\hat{rime}_{i,t} + \ln x'_{it}\beta + a_i + \varepsilon_{i,t} \tag{3.1}$$

$$\ln\frac{FDI}{GDP}_{i,t} = \gamma_1 \ln c\hat{rime}_{i,t} + \gamma_2(poor * \ln c\hat{rime}_{i,t}) + \gamma_3(mid * \ln c\hat{rime}_{i,t}) + \ln x'_{it}\beta + a_i + \varepsilon_{i,t} \tag{3.2}$$

Subscript "*i*" stands for country and "*t*" for year. ε_{it} is a white noise process distributed normally and independently with constant variance ($\varepsilon_{it} : IN(0,\sigma^2_\varepsilon)$). a_i encapsulates unobserved time invariant individual effects.

Natural logarithms are used to capture the elasticity of *FDI* with respect to different determinants. Also, coefficients measure the expected percentage increase in FDI/GDP for a unit percentage increase of the respective variable The dependent variable is *FDI* as share of real *GDP*, indicating the importance of FDI for an economy. FDI instead is chosen, because foreign investors are more likely to inflate news over crime.

Measuring Crime

'Crime' is categorized in three broad categories, each examined separately as Danielle and Marani (2008). Homicides, assaults and rape constitute *violent crimes*, the first category. The second category, *Property crimes* are measured by burglaries and thefts. The final category, *financial crimes*, includes frauds and embezzlements.

However, each crime measure individually captures an incomplete snapshot, i.e. homicides portray violent crimes incompletely. Furthermore, tables A1-A3[3] depict that assaults are highly correlated with rapes, while burglary with theft. Frauds are, though, moderately correlated with embezzlements. We adopt principal component analysis[4] [5] to generate crime indexes for *Violent, Property and Financial Crimes,* so that all possible information is exploited when measuring crime levels and to solve collinearity issues.

Table A4 provides the results for the "*violent*" index. The first two components have a cumulative variance proportion of "*92.3%*", indicating their significance. "Component 1" weights positively all three elements, possibly measuring overall level of violent crimes with higher values implying more crime. Whilst, components 2 and 3 weight positively only homicide and rape, respectively. In table

[3] Table numbers starting with "*A*" are in the Appendix.
[4] Original crime rates were normalized as follows: (X-min_x)/(max_x-min_x), by year.
[5] *PCA* derives linear combinations of variables by using eigenvalues and eigenvectors.

A7, component 1 is positively correlated with non-normalized homicide, assaults and rape. Subsequent analysis proceeds with component 1.

Components encapsulating *property crime* are created with elements theft and burglary, in table A5. Component 1 explains "*82.4%*" of the variance proportion and both elements have positive coefficients, probably measuring overall property crime. The analysis utilizes the first component, which is positively correlated with theft and burglary rates, table A8.

Lastly, *Financial crime* created with frauds and embezzlements is considered in Table A6. "*69.7%*" of the variation is explained by the first component, which weights positively both crimes. Although, component 2 is significant by explaining "30.2%" of variance proportion, we cannot rationalized the negative weight on embezzlement. Component 1 is highly positively correlated with both non-normalized fraud and embezzlement, table A9[6].

To sum up, we employ the first component of each crime index, to measure the effect of the respective crime on *FDI*. We hypothesize that in model 3.1 all three crime indexes will affect inversely direct investment, since crime stimulates social uncertainty and weakens the enforcement of property rights. Also, it disturbs normal business conduct.

The second model (equation 3.2) forms the main contribution of the present paper, where crime indexes are interacted with country's wealthiness to test if the coefficient on crime differs across categories. Countries are classified into three categories based on their 7 year average GDP per capita. Poor economies are situated in the lower 25% of the distribution, rich in the top 25% (default case) and middle in the between. Two possible scenarios arise a priori; either rich countries have a better institutional framework, allowing them to enjoy certainty benefits and a steadily higher influx of investment, therefore γs will be negative. Or, higher MPK in poorer countries compensates for crime. Therefore γs will be positive. The current study evaluates which theory is more likely to hold with the latter seeming more attractive since crime itself upsets certainty.

Control Variables:

x'_{it} denotes the vector of control variables included. Literature argues that liberal trade regimes attract capital inflows. Hence, our control for openness (***lnOpen***), sum of imports and exports as shares of real GDP, is expected to positively affect inflows.

Real GDP growth rate (***lnDY***) is also expected to attract FDI as it controls for market size and growth prospects which promote economies of scale. In addition, the inclusion of GDP per capita (***lnY)*** proxies for purchasing power of host economy, however it's effect is ambiguous as it may proxy for labour costs, as well.

Krugman and Obstfeld (p.175, 2000) argue that the decline in dollar led to a surge in U.S. inward investment. So, we anticipate exchange rates (***lnExch***) to affect negatively FDI since they hurt competitiveness. In addition, some specifications include year dummies (***Year***) to incorporate for exogenous events i.e. Euro expansion. Efforts to dig out public incentives were fruitless, however last period's taxes (***$lntax_{t-1}$)*** are used. Higher taxes in last period should discourage contemporaneous location.

[6] Saci and Holden (2008) follow similar description.

As a specification test we control for inflation (***lnDeflator)***. High inflation should lower inflows as it decreases competitiveness. Moreover, measures of workforce (***lnEduc)*** and infrastructure (***lnrail, lnroad***) quality are included, both increase the productivity capacity of an investment and are likely to increase inflows.

A large pool of unemployed may imply cheap labour costs and is likely to encourage location, but high unemployment might, also, imply powerful unions (Blanchard p. 125, 2003) which hinders inflows. To examine the validity of these theories; unemployment is examined (***lnunemp).*** Finally, previous investment both signals the quality of an economy and through reducing trade costs and increasing skilled labour generates agglomeration economies. Our paper uses a lagged dependent variable to capture the availability of agglomeration economies $\left(\ln\frac{FDI}{GDP}_{t-1}\right)$ as in Agiomirgianakis et.al (2004) and Danielle and Marani, (2008). Previous investment should motivate new FDI. It must be noted that FDI data could not be decomposed to industry level. Therefore, cannot control for number of firms in relevant industries as a measure of agglomeration economies.

Econometric issues and estimation strategy:

In what follows we identify econometric issues emerging and the estimation strategy pursued to overcome them. The first issue arises from using a lagged dependent variable and the data's small time dimension that result to within and GLS estimators being biased and inconsistent (Verbeek p.377, 2008). To illustrate this, check that lag of $\ln\frac{FDI}{GDP}_{i,t}$ is not independent of a_i, invariant overtime, which biases δ[7].

$$\ln\frac{FDI}{GDP}_{i,t} = \gamma_1 \ln \hat{crime}_{i,t} + \delta \ln\frac{FDI}{GDP}_{i,t-1} + \ln x'_{it}\beta + a_i + \varepsilon_{i,t} \qquad (3.3)$$

Another issue is that growth rate and GDP per capita may not be strictly exogenous explanatory determinants of FDI and maybe driven by common shocks such as productivity. A further issue is potential crime endogeneity. As stated earlier crime literature identifies various socioeconomic factors to affect crime decisions. However, some of these socioeconomic factors also impact *FDI.* Therefore, one should avoid treating crime as exogenous and model any endogeneity. Moreover, *property* and *financial* crime potentially suffer from simultaneity with FDI, as increased crime may decrease investment but increased investment, by expanding job opportunities, may itself induce criminals to select legal jobs.

These issues are circumvented by adopting the one step system Generalized Method of Moments estimator[8], as proposed by Arellano and Bover(1995)/Blundell and Bond(1998). GMM estimator takes the first difference of a model.

So:

[7] For more discussion of Dynamic Panels see Baltagi (ch.5, 2005) and Verbeek (Ch.10.4, 2008)
[8] Roodman (2006) and Verbeek(p.383, 2008) argue that system GMM is more efficient. According Judson and Owen (1999) for Time<10 one-step variant is better.

$$\ln\frac{FDI}{GDP_{i,t}} - \ln\frac{FDI}{GDP_{i,t-1}} = \gamma_1 \ln c\hat{r}ime_{i,t} + \delta \ln\frac{FDI}{GDP_{i,t-1}} + \ln x'_{it}\beta + a_i + \varepsilon_{i,t} - (\gamma_1 \ln c\hat{r}ime_{i,t-1} + \delta \ln\frac{FDI}{GDP_{i,t-2}} + \ln x'_{it-1}\beta + a_i + \varepsilon_{i,t-1})$$

$$\Delta \ln\frac{FDI}{GDP_{i,t}} = \theta\Delta \ln c\hat{r}ime_{i,t} + \varphi\Delta \ln\frac{FDI}{GDP_{i,t-1}} + \Delta \ln x'_{it}\beta + \Delta\varepsilon_{i,t} \quad . \quad (3.4)$$

a_i is eliminated, but $\Delta \ln\frac{FDI}{GDP_{i,t}}$ is by construction correlated with $\Delta\varepsilon_{it}$, through u_{it-1}. To avoid inconsistencies the endogenous variables $\left(\ln crime, \ln\frac{FDI}{GDP}\right)$ are instrumented. Strictly exogenous variables are instrumented by contemporaneous values. We use the system GMM, which exploits more information than difference GMM[9].

Crime and it's interactions are treated as endogenous, using only the second lag as instruments to avoid weakening the test of overidentifying restrictions. In a weak sense expected crime is also captured. *Growth rate* and *GDP per capita* are treated as predetermined, so that contemporaneous shocks influencing FDI might affect them in subsequent periods, such that $E(X_{i,t}, \varepsilon_{i,s}) = 0 \ \forall t \leq s$ but $E(X_{i,t}, \varepsilon_{i,s}) \neq 0 \ \textit{for all } t > s$. Therefore, these variables are instrumented by one period's lag.

[9] Under System GMM, "*FDI"* in the levels equation is instrumented on lags of ΔFDI and in first differences equation ΔFDI is instrumented on lags of *FDI.*

Section 4: Data:

Source:

Data on economic variables originates from World Bank's *World Development Indicators*, where *FDI* is recorded in current US dollars. In contrast, real GDP (used for growth rate and GDP per capita), exports and imports are all measured in constant 2000 U.S. dollars, while real exchange rates also use 2000 as their base year. Due to unavailability of capital tax rates, the analysis uses tax revenue as a GDP share to measure government interference. Furthermore, only education expenditure as a share of GDP was widely available, which is however positively correlated with literacy and enrollment rate (**table A12**). Unemployment was measured as a share of labour force[10]. Furthermore, World Bank database allowed the creation of two infrastructure variables; *rail,* encompassing total route in km, goods transported in millions of metric tons and passengers carried in millions, and *road*, encompassing total network in km and share of paved roads.

Crime data is expressed in rates per 100,000 inhabitants and is sourced from the *UN surveys on crime.* As already stated *principal component analysis* is applied to generate the following indexes; *Violent* (from assaults, homicide and rapes rate), *Financial* (from fraud and embezzlement rate) and finally *Property* (from burglary and theft rate).

Description:

Table A10 provides some summary statistics on key variables from raw data. Two notes; first, the analysis deals with unbalanced panel. Second, FDI/GDP expresses net inflows[11], thus the negative minimum value. By merely taking the logarithm valuable information is lost. So, it is transformed to "$\ln(1 + FDI/GDP)$" as in Chen (2004), so that negative values in raw data are negative in logs. Similar reasoning is applied with growth rates and crime, rail and road indexes whose minimum value is zero.

As seen average FDI/GDP, raised from "*0.045"* to *"0.048"* over the years examined resulting to "6.67%*"* increase. However, there was no upward trend as the mean of the whole series was *"0.044"*. When breaking FDI/GDP according to wealthiness in **graph 1**, then mean FDI/GDP is highest for rich countries. However, the standard deviation of poor and rich is highest suggesting large fluctuations. Note that "*23%*" of our sample are poor countries, "*51%*" are middle and "*26%"* are rich (**Chart 1**).

Furthermore, **table A10** reveals that average *violent crime index* experienced a "*60.8%"* increase. While, *Financial crime* index surged by *"89.6%".* Finally, *Property index* grew from *"0.34"* to *"0.464",* a "*36.5*%" increase. The increasing standard deviations may imply, though, that crime increases were not universal.

Graph 1

[10] Shares derived by multiplying percentages by 100

[11] Gross was unavailable.

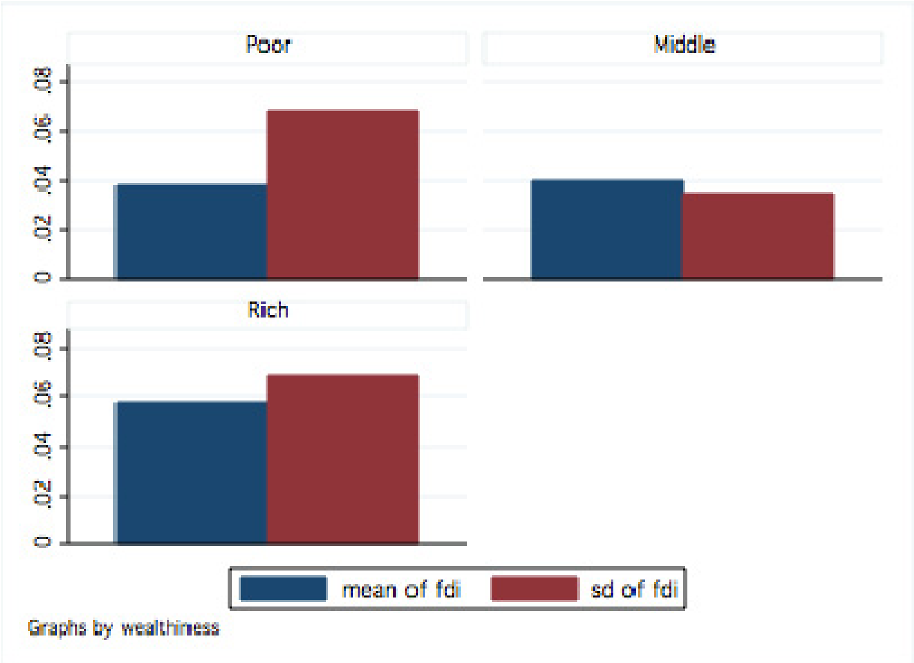
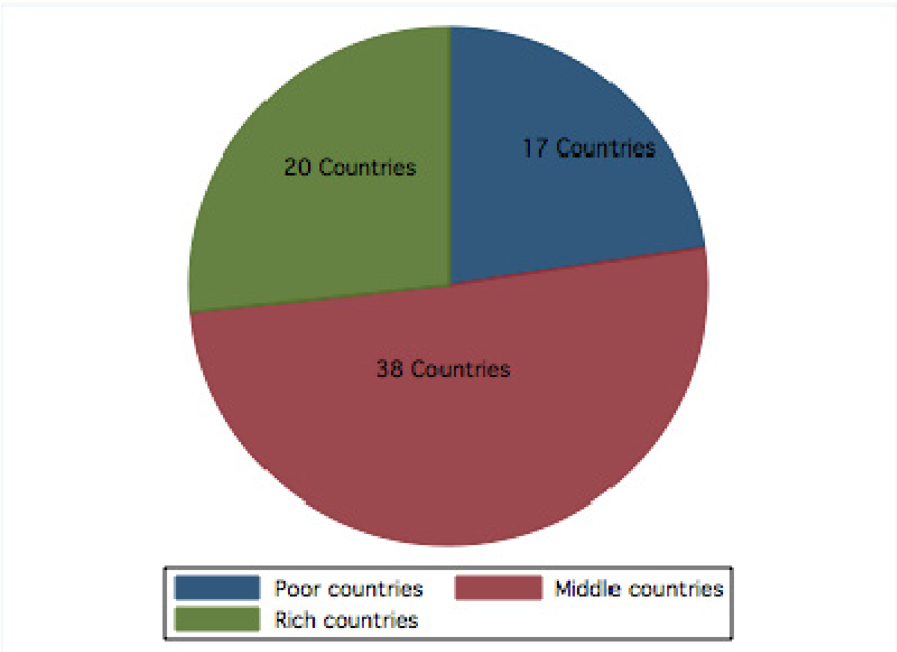


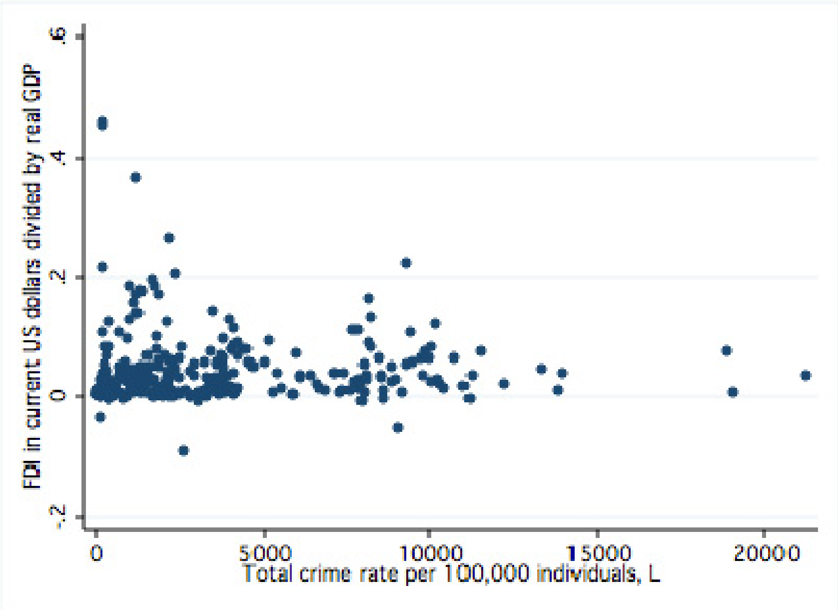
Chart 1



In **graph 2** the slight negative correlation of FDI/GDP with last period's total crimes[12] (allowing for adjustment lags) provides some support to our examination. More informative, still, are the correlation coefficients of FDI/GDP with last period's crime indexes, in **table A11**. FDI/GDP is inversely associated with *Violent* and *Property* crimes, but positively with *Financial* crime, which is puzzling but it could merely be that higher capital flows have increased the incentive to scam. The other two correlations confirm our earlier expectation.

Graph 2:

[12] It also includes drug trafficking and corruption



Further examination produces **Graph 3** where average crime increases as countries become richer, confirming Donohue and Levitt (2001) in that crime increases in average income. **Table A11** supplements **graph 3** by giving correlation coefficients of crime indexes with FDI/GDP for poor, middle and rich countries. Violent and property crimes are less negatively related with FDI/GDP for poor relative to rich countries, but for middle countries the relation is even less negative for violent and positive for property. Rich countries could be more affected by crime since it occurs more frequently.

Graph 3:

Financial crime's association with FDI has bizarre results. It varies greatly according to country's wealthiness ranking, **table A11**. Poor and rich countries level of correlation is negative, whereas it is highly positive for the middle category. Although, the positive relation for middle countries is peculiar, overall we find some evidence supporting our examination for differentiated crime effects.

Section 5: Results

In **tables 5.1** and **5.2** one finds the results of models 3.1 and 3.2, respectively[13]. The joint significance (*Wald*), instruments overidentifying restrictions (*Hansen*) and serial correlations tests are also provided, which are satisfactory. First order serial correlation in the residuals is anticipated with system GMM, so it suffices to find no second order serial correlation[14]. The Hansen test is preferred, since it is robust to heteroskedasticity and is not weakened by limiting the instruments.

In columns 1-3 of table 5.1, we condition for real exchange rates, openness, GDP growth, tax revenues of previous period, GDP per capita and year dummies, but the latter are insignificant. Columns 4-6 control for inflation instead of taxes, and finally columns 7-9 account for signal effects and agglomeration economies.

Agiomirgianakis et.al. (2004) argued that an open trade regime is a necessary rather than a sufficient condition for attracting FDI. Nonetheless the positive and significant (except in columns 7-9) effect of ***openness*** on inflows suggests that an open regime smoothens trade activities. In columns 1-6 a unit percentage increase in the openness ratio leads to approximately "*0.035*" percentage expected increase in investment inflows, confirming Danielle and Marani (2008).

Furthermore, Barrel and Pain's (1998) claim that growth rate matters is verified since we estimate the elasticity of FDI with respect to ***market size***, to be positively significant ranging from "*0.236*" to "*0.429*" in columns 1-6. When a lagged dependent variable is included, in specifications 7-9, the effect is still significant but deflates. Finally, evidently ***signal*** and ***agglomeration*** effects influence contemporaneous location, because as seen in columns 7-9, the coefficient on the lagged dependent variable is positive and significant.

Some of our results, though, do not comply with other authors. In contrast to Barrel and Pain (1998) and Habib and Zurawicki (2001), we find that real exchange rates, GDP per capita and inflation determine inflows insignificantly. The insignificance of inflation and exchange rates may hint that price competitiveness is not that relevant.

Finally, unemployment, *human capital* and *physical infrastructure* are relegated in the **table A13**. Unemployment has an insignificant effect, while Expenditure on education proxies human capital, and our indexes on rail and roads measure the physical infrastructure. All three seem to be poor proxies as they change sign depending on crime used and when significant the interpretation is counterintuitive, i.e. increases in rail decrease inflows.

Interpretation of Crime

In Table 5.1 only ***violent crime*** (columns 1,4,7) exerts a consistently significant negative effect on inflows. In particular, a "*1%*" increase in the *violent crime index* is expected to reduce inflows by approximately "*0.07%*" thus answering our earlier question regarding UK's inflows.

[13] Table A17 lists all variables used and their source.

[14] When second order autocorrelation is detected two lags of FDI/GDP are included.

Property crime in column 3 and 6 is depressing inflows, whereas in column 9 it exerts an insignificant positive effect. Although in specification 6 property is significant, overall evidence rejects it as a determinant.

What's more we cannot argue that ***Financial crime*** (columns 2, 5, 8) exerts sufficient effect on inflows. The positive coefficient could merely indicate that they both increased over the period under examination, or it could be that financial crime increased a lot within groups of countries which is what biasses the results, we test for this possibility in table 5.2.

In table 5.2 the results of our ***nonlinear*** model are presented. Agglomeration, market size, purchasing power, openness, exchange rates and inflation are controlled as suggested by literature. The diagnostic tests given (joint significance of the model, instrument validity and serial correlation) are deemed as satisfactory.

When examining nonlinearities over the *violent index* according to country's wealthiness, then for poor countries a unit percentage increase in crime is expected to have a "*0.112%*" more positive impact on FDI relative to rich countries. However, inflows are more inelastic to violent crimes for middle countries ("*-0.054*") than for rich ones ("*-0.0646*"). Although, coefficients of *poor* and *middle* support a priori hypothesis about MPK compensating for crime, they are jointly insignificant.

As with the previous index, *financial crime* affects FDI more positive in *poor* by "*0.205%*" and *middle* countries by "*0.043%*" compared to rich countries. However, poor and middle are jointly insignificant with statistic "*0.27*", so evidence suggests that financial crime does not have a differentiated effect.

Finally, *Property crime* results are dubious as they suggest that overall property crime increases foreign investment inflows for poor countries. Despite supporting our hypothesis, the net effect is far too positive leading to the conclusion that property crime regression faces some bias. This may be a consequence of only 17 poor countries providing the data needed to estimate the model. Different specifications were tried, however this strange result persisted.

All in all, our finding that only *violent crimes* decrease significantly inflows confirm Danielle and Marani (2008) who suggested that out of *violent* (*Mafia*), *property* (measured by *thefts*) and *total crimes* only Mafia depressed inflows significantly. The insignificance of *property crimes* may be attributed to the ability of investors to easily protect themselves against burglaries and thefts. *Financial crimes* fail to gain frequent media coverage like murders, and as a result are not that preventive. Therefore, the positive relation found may imply that both rose overtime.

Finally, we failed to find sufficient evidence to support the hypothesis of heterogeneous effect over country's wealthiness. None of the two hypotheses made in the introduction seems to dominate the other with the one canceling the other off.

Table 5.1: Regression results of Model 1. Dependent Variable: Natural log of FDI/GDP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	Violent	Financial	Property	Violent	Financial	Property	Violent	Financial	Property
lngrowth	0.356*	0.258	0.386**	0.351**	0.236**	0.429**	0.327**	0.228**	0.288**
	(0.18)	(0.18)	(0.19)	(0.16)	(0.12)	(0.18)	(0.13)	(0.09)	(0.13)
lngdpcap	0.00635	0.00342	0.00588	0.00456	0.000194	0.0221*	0.00211	-0.00413	-0.00893
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
lnopen	0.0359***	0.0394***	0.0341***	0.0320***	0.0326***	0.0389***	0.0119	0.0102	0.00963
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
lnreal	-0.0563	-0.0241	-0.00209	-0.0491	-0.016	-0.0264	-0.0288	-0.00831	0.00863
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)
lntax $^{-1}$	-0.0021	-0.0155	0.00372						
	(0.01)	(0.02)	(0.01)						
lndeflator				-0.00722	-0.00398	-0.00353	-0.00536	0.00264	-0.0109
				(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
lfdi $^{-1}$							0.418***	0.374**	0.497***
							(0.16)	(0.16)	(0.14)
lnviolent	-0.0765*			-0.0755*			-0.0598**		
	(0.04)			(0.04)			(0.03)		
lnfinancial		0.0199			0.0152			0.0452**	
		(0.03)			(0.03)			(0.02)	
lnproperty			-0.0433			-0.121**			0.022
			(0.04)			(0.05)			(0.05)
Constant	0.263	0.156	-0.00361	0.281*	0.132	0.0277	0.173	0.0722	0.0984
	(0.16)	(0.16)	(0.17)	(0.16)	(0.17)	(0.17)	(0.15)	(0.15)	(0.17)
Observations	133	101	122	170	140	158	168	139	156
Number of groups	35	28	36	39	35	41	39	35	41
Wald test of joint significance ($\chi^2(k)$)- p-value [1]	0	0	0.00202	0	0	0	0	0	0
First order serial correlation test [2]	0.0168	0.04	0.0186	0.00635	0.0203	0.0126	0.00653	0.0213	0.00545
Second order serial correlation test [3]	0.923	0.98	0.777	0.604	0.396	0.339	0.103	0.408	0.227
Hansen p-value [4]	0.815	0.987	0.619	0.429	0.433	0.412	0.563	0.978	0.717
Instruments	40	40	40	35	35	35	45	45	45

Robust standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

1 Null hypothesis: variables are jointly insignificant.

2 Null hypothesis: instruments used are valid and not correlated with the residuals.

3 Null hypothesis: errors in the first-difference regression exhibit no first-order serial correlation

4 Null hypothesis: errors in the first-difference regression exhibit no second-order serial correlation

Table 5.2: Dependent Variable Natural log of FDI/GDP			
VARIABLES	Violent	Financial	Property
lfdi -1	0.380**	0.293**	0.367***
	(0.15)	(0.14)	(0.11)
lngrowth	0.291**	0.259**	0.363***
	(0.12)	(0.10)	(0.14)
lngdpcap	0.00522	0.00618	0.00688
	(0.00)	(0.01)	(0.01)
lnopen	0.0151*	0.0151*	0.0192**
	(0.01)	(0.01)	(0.01)
lnreal	-0.0432	-0.0229	-0.00464
	(0.04)	(0.04)	(0.03)
lndeflator	-0.00769	0.00117	-0.0179**
	(0.01)	(0.01)	(0.01)
lnviolent	-0.0646**		
	(0.03)		
poor*lnviolent	0.112		
	(0.13)		
middle*lnviolent	0.0102		
	(0.03)		
lnfinancial		0.00283	
		(0.03)	
poor*lnfinancial		0.205	
		(0.18)	
mid*lnfinancial		0.0434	
		(0.03)	
lnproperty			-0.0249
			(0.03)
poor*lnproperty			0.754***
			(0.22)
mid*lnproperty			0.0207
			(0.02)
Constant	0.225	0.0631	0.069
	(0.18)	(0.16)	(0.17)
Observations	168	139	156
Number of groups	39	35	41
Wald test of joint significance($\chi^2(k)$) p-value	0	0	0
First order serial Correlation test-p-value	0.00988	0.0248	0.0132
Second order Correlation test p-value	0.106	0.41	0.435
Hansen p-value	0.993	0.991	0.963
Instruments	62	57	60
Test of joint Significance of Poor and Middle $\Pr > \chi^2(2)$	0.675	0.2704	0.002

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Same notes as previous table.

Robustness checks

In table A14 the model specification is altered to examine the robustness of our results. In columns 1-3, Population and growth are used to proxy for market size and opportunities, as in Habib and

Zurawicki (2001). While, in the last three columns customized crime indexes, *lncustviolent*, *lncustfinancial* and *lncustproperty* are examined. Within each index the weights are distributed equally and indexes within 0 and 1 interval. Earlier results continue to hold as only violent related crimes seem to reduce inflows, though insignificantly.

In table A15 the last specification of **table 5.1** is estimated with difference GMM estimator. According to *Wald test* the variables are jointly insignificant. Furthermore, coefficient signs on *open* and *real exchange rates* change depending on crime tested. So, use of system GMM is validated as it offers more intuitive results.

Finally, table A16 revisits hypothesis about differentiated crime effects, but for violent crime only which was the only consistently significant. In essence we examine only the possibility of different effect only for poor countries, where in column 1 poor are countries lying in the bottom 50% of the distribution, while in column 2 those in the lower 10%. However, as before we fail to argue that MPK compensates for crime. In other words cannot find evidence that poor countries are significantly less affected by crime.

Limitations

The most notable weakness of the present analysis is the use of reported cases as measures of crime rates. Potential measurement errors may arise, however this is beyond the tasks set to be dealt with. The use of net inflows rather than gross, is another criticism, but it was the only available.

An important limitation is the failure of many countries to respond fully to all three crime surveys. Some countries reported homicides but failed to report to fraud (i.e. Australia), while others did not participate in two consecutive surveys (i.e. Armenia). We could have worked just with countries participating in all three survey, however this would limit the sample well below 100 observations, not accounting for the missing economic data, and degrees of freedom would be very low.

Furthermore, countries that report crime data may be better organised, thus leading to possible selection bias, which prevent us from getting the true effect of crime. However, we did not incorporate for this potential bias, but if we had worked just with countries reporting consistently then our sample might have been even more biased. The argument for sample selection bias arises especially for *financial* crimes, because frauds need specific conditions both to be committed and detected. In other words some countries are more likely to report fraud rates. In particular, we find that average GDP per capita for countries reporting financial crime is much higher than those not reporting. So, financial crime's positive coefficient may suggest something else.

At this point one should note the unavailability of controls such as workforce education and government involvement. These are important determinants of FDI and their absence from the final model is a major concern.

According to Kroska and Robeck (2009) and Habib and Zurawcki (2001) it is the perception of crime investors hold that matters. However, we could not derive sufficient determinants of crime that are orthogonal to FDI. Therefore, we were unable to test whether effect expected crime differs from the effect of actual crime. Expected crime should be more relevant as investors are likely to be affected from other variables apart from previous crime when determining the security level of a country. For example, there might have been an outburst of crimes but police responded quickly by solving all cases which could offer a sense of security to investors. By just considering previous crime one essentially ignores other factors relevant to crime.

Conclusions and Extensions:

In conclusion, this paper utilized principal component analysis to examine crime as a determinant of direct investment flows whether this effect varies with country's wealthiness. Crime was classified into Violent, financial and property. Furthermore, analysis addressed possible crime endogeneity. Our results cemented existing literature by confirmed that only violent crimes exerts a significantly negative effect on FDI. However, no evidence exists that this effect is alleviated for poorer countries. In other words, poorer countries cannot rely on higher MPK to cushion crime's effect.

Our results suggest that apart from accelerating growth and liberalizing one's trade regime, violent crime should be tackled for one to achieve full capacity of FDI. Hence, devoting resources towards reducing crime is justified both on social and economic grounds. If crime reduction measures are successful then one can expect foreign investors to respond positively.

The present analysis may be extended in several ways. One may argue that should have been crime changes are in the core of the analysis. Therefore, a natural extension of the present model is to examine how changes in crime rates affect investment. Another extension in an augmentation of Krkoska and Robeck (2009) by considering crime instruments that are orthogonal to investment such that the effect of crime expectations is captured. Investors are likely to incorporate other factors apart from previous crime when forming a perception about future crime level. Therefore, expected crime might have a more significant effect than actual crime on investment.

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Appendix

Table A1: Correlation of Violent crimes

Observations=312	Homicide	Assaults	Rape
Homicide	1		
Assaults	0.14	1	
Rape	0.2046	0.7658	1

Table A2: Correlation of Property crimes

Observations=292	burglary	theft
burglary	1	
theft	0.6581	1

Table A3: Correlation of Financial crimes

Observations= 248	Fraud	Embezzlement
Fraud	1	
Embezzlement	0.3809	1

Table A4: Principal Component Analysis Results of *Violent Crime index*

Principal components/covariance			Number of obs	312
			Number of comp.	3
			Trace	0.175
Rotation: (unrotated=principal)			Rho	1
Component	Eigenvalues	Difference	Variance Proportion	Cumulative Variance
Comp1	0.1077	0 .0541649	0.6165	0.6165
Comp2	0.05354	0 .041053	0.3065	0.9231
Comp3	0.01344	.	0.0769	1
	Principal Components(eigenvectors)			
	Component weights			
Variable	Component1	Comp2	Comp3	Unexplained
Homicide	0.2745	0.9577	-0.0867	0
Rape	0.58	-0.093	0.8093	0
Assaults	0.767	-0.2725	-0.5809	0

Note: comp=component; obs=observations

Table A5: Principal Component Analysis Results of *Property Crime index*

Principal components/covariance			**Number of obs**	**287**
			Number of comp.	2
			Trace	0.151
Rotation: (unrotated=principal)			Rho	1
Component	Eigenvalue	Difference	Variance Proportion	Cumulative Variance
Comp1	0.124025	0.0975295	0.8240	0.8240
Comp2	0.0264951		0.1760	1.000
	Principal components(eigenvectors)			
	Component weights			
Variable	Comp1	Comp2	Unexplained	
Theft	0.6972	0.7169	0	
Burglary	0.7169	-0.6972	0	

Note: comp=component; obs=observations

Table A6: Principal Component Analysis Results of *Financial Crime index*

Principal component			**Number of obs**	**248**
			Number of comp.	2
			Trace	0.1231764
Rotation: (unrotated=principal)			Rho	1
Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	0.0859419	0.0487074	0.6977	0.6977
Comp2	0.0372345	.	0.3023	1
	Principal components(eigenvectors)			
	Component weights			
Variable	Comp1	Comp2	Unexplained	
Fraud	0.6456	0.7637	0	
Embezzlement	0.7637	-0.6456	0	

Note: comp=component; obs=observations

Table A7: Correlation of Violent index components with original nonnormalised variables

312 Observations	Homicide	assaults	rape	violent_comp1	violent_comp2	violent_comp3
Homicide	1					
assaults	0.14	1				
rape	0.2046	0.7658	1			
violent_comp1	0.2153	0.9097	0.8625	1		
violent_comp2	0.3421	-0.2747	-0.1178	0	1	
violent_comp3	0.0669	-0.1771	0.467	0	0	1

comp= component

Table A8: Correlation of Property index components with original nonnormalised variables

287 Observations	theft	burglary	property_comp1	property_comp1
theft	1			
burglary	0.6606	1		
property_comp1	0.8874	0.8999	1	
property_comp1	0.3028	-0.4058	0	1

comp= component

Table A9: Correlation of Financial index components with original nonnormalised variables

248 Observations	fraud	embezzlement	financial_comp1	financial_comp2
fraud	1			
embezzlement	0.3809	1		
financial_comp1	0.7547	0.8679	1	
financial_comp2	0.5736	-0.4848	0	1

comp= component

Table A10: Summary Statistics of raw data

Whole period							1998						2004			
Variable	Observations	Mean	Std.deviation	Min	Max		Obs	Mean	Std. Dev.	Min	Max		Obs	Mean	Std. Dev.	M
FDI/ GDP	505	0.0436021	0.0543386	-0.0925379	0.4609472		71	0.0450789	0.0406847	-0.0249252	0.2315015		72	0.0481561	0.0694891	-0 5
Violent	312	0.2959706	0.328196	0	1.62147		57	0.2403401	0.3073047	0	1.367514		40	0.3858981	0.315248	0 6
Financial	248	0.3301346	0.2931585	0	1.224669		47	0.2231786	0.2271233	0	1.030627		34	0.4172488	0.3175549	0
Property	287	0.3933112	0.3522505	0.0000315	1.288678		55	0.3404494	0.3379043	0.0000501	1.203853		38	0.4636933	0.3850514	0 1

Table A11: Correlation of FDI/GDP with crime indexes for whole sample and according to wealthiness of countries:

Whole Sample				**Poor countries**			**Middle countries**			**Rich countries**	
Crime Variable (last period)	**Obs**	**Correlation with FDI/GDP**		**Obs**	**Correlation with FDI/GDP**		**Obs**	**Correlation with FDI/GDP**		**Obs**	**Correlation with FDI/GDP**
Violent	266	-0.1224		46	-0.1318		136	-0.0367		84	-0.2797

Whole Sample			Poor countries		Middle countries		Rich countries	
Crime Variable (last period)	Obs	Correlation with FDI/GDP	Obs	Correlation with FDI/GDP	Obs	Correlation with FDI/GDP	Obs	Correlation with FDI/ GDP
Financial	211	0.0173	38	-0.2429	121	0.3409	52	-0.1946
Property	243	-0.0523	35	-0.1786	131	0.1158	77	-0.3626

Table A12: Correlation of education expenditure and other measures of human capital quality

Variable	Observations	Correlation with education expenditure
Literacy rate	50	0.1663
Enrollment secondary school	405	0.4055

Table A13: Secondary Results

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	violent1	financial	property	violent1	financial	property
lngrowth	0.380**	0.262**	0.412**	0.446*	0.720***	0.601***
	(0.16)	(0.11)	(0.17)	(0.27)	(0.25)	(0.23)
lngdpcap	0.00389	-0.00036	0.0135	0.00873	0.0187*	0.0096
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
lnopen	0.0280***	0.0288***	0.0371***	0.0497***	0.0453**	0.0506***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
lnreal	-0.0435	-0.0231	-0.0148	-0.0651	-0.0817	-0.0573
	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)
lneduc_{-1}				-0.0389	-0.0778***	0.0293
				(0.04)	(0.03)	(0.04)
lnrail				-0.107*	-0.116**	0.0312

				(0.06)	(0.05)	(0.05)
lnroads				0.0285	0.0485	0.0786*
				(0.05)	(0.04)	(0.04)
lnunemp	-0.00075	0.00993	0.00778			
	(0.02)	(0.02)	(0.02)			
lnviolent	-0.0774**			-0.00325		
	(0.04)			(0.03)		
lnfinancial		0.0407			0.0173	
		(0.03)			(0.04)	
lnproperty			-0.0697*			-0.103*
			(0.42)			(0.06)
Constant	0.224	0.169	0.0355	0.147	-0.0117	0.31
	(0.17)	(0.18)	(0.15)	(0.24)	(0.39)	(0.33)
Observations	166	137	153	69	62	62
Number of id	39	35	41	25	22	24
Wald test of joint significance($\chi^2(k)$)-p-value [1]	0.000199	2.13E-09	1.93E-06	2.60E-08	0	8.56E-08
First order serial correlation test [2]	0.00458	0.0174	0.00914	0.139	0.155	0.144
Second order serial correlation test [3]	0.438	0.258	0.916	0.144	0.152	0.182
Hansen p-value [4]	0.506	0.874	0.707	0.948	0.999	0.961
Instruments	45	45	45	36	37	36

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

1 Null hypothesis: variables are jointly insignificant.
2 Null hypothesis: instruments used are valid and not correlated with the residuals.
3 Null hypothesis: errors in the first-difference regression exhibit no first-order serial correlation
4 Null hypothesis: errors in the first-difference regression exhibit no second-order serial correlation

Table A14: Robustness checks

Robustness check

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	population	population	population	Customised Violent	Customised Financial	Customised Property
lfdi $_{-1}$	0.261**	0.379**	0.374***	0.303**	0.317*	0.400***
	(0.125)	(0.162)	(0.125)	(0.120)	(0.170)	(0.128)
lfdi $_{-2}$	-0.161			-0.0977		
	(0.221)			(0.209)		
lnpopul	0.00122	-0.00013	0.000543			
	(0.003)	(0.002)	(0.001)			
lngrowth	0.118	0.23	0.226	0.260*	0.232**	0.292**
	(0.184)	(0.143)	(0.138)	(0.147)	(0.095)	(0.143)
lnenroll	0.0149	-0.027	0.0171			
	(0.016)	(0.026)	(0.019)			
lnopen	0.0274*	0.0102	0.0167**	0.0226*	0.0157	0.00636
	(0.015)	(0.011)	(0.008)	(0.013)	(0.012)	(0.010)
lnreal	-0.0409	-0.0191	-0.00063	-0.017	0.00282	0.0277
	(0.037)	(0.041)	(0.035)	(0.037)	(0.035)	(0.033)
lndeflator	-0.0033	0.000389	-0.00295	-0.00851	-0.0021	-0.00736
	(0.009)	(0.005)	(0.007)	(0.009)	(0.007)	(0.009)

lnviolent	-0.0559***					
	(0.018)					
lnfinancial		0.0566				
		(0.045)				
lnproperty			-0.0286			
			(0.024)			
lngdpcap				-0.00234	-0.00212	-0.0195**
				(0.006)	(0.005)	(0.009)
lncustviolent				-0.00569		
				(0.007)		
lncustfinancial					0.00173	
					(0.006)	
lncustproperty						0.0162**
						(0.008)
Constant	0.176 (0.175)	0.219 (0.278)	-0.0361 (0.219)	0.161 (0.145)	0.0458 (0.161)	0.127 (0.172)
Observations	123	130	147	129	139	156
Number of groups	35	32	38	39	35	41
Wald test of joint significance($\chi^2(k)$)-p-value[1]	0	0	0	0	0	0
First order serial correlation test[2]	0.0535	0.0321	0.0178	0.0428	0.0353	0.0151
Second order serial correlation test[3]	0.451	0.547	0.401	0.516	0.403	0.281
Hansen p-value[4]	0.573	0.661	0.456	0.763	0.956	0.758
Instruments	41	36	36	47	45	45

Robust standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

1 Null hypothesis: variables are jointly insignificant.
2 Null hypothesis: instruments used are valid and not correlated with the residuals.
3 Null hypothesis: errors in the first-difference regression exhibit no first-order serial correlation
4 Null hypothesis: errors in the first-difference regression exhibit no second-order serial correlation

Table A15: Difference GMM

Difference GMM.Dependent Variable FDI/GDP

	(1)	(2)	(3)
VARIABLES	violent	financial	property
lfdi $_{-1}$	0.366	0.372	0.573
	(0.414)	(0.272)	(0.397)
lngrowth	0.387** (0.183)	0.408 (0.295)	0.0426 (0.26)
lngdpcap	0.201 (0.194)	0.113 (0.159)	-0.202 (0.181)
lnopen	-0.0899 (0.0907)	-0.0524 (0.103)	0.158 (0.136)
lnreal	0.0238 (0.0671)	-0.00166 (0.0673)	0.035 (0.0739)
lndeflator	-0.00327	-0.0163	-0.00871
	(0.0436)	(0.0491)	(0.0362)

lnviolent	-0.180**		
	(0.0915)		
lnfinancial		0.111	
		(0.11)	
lnproperty			0.0664
			(0.0834)
Observations	118	95	108
Number of groups	38	34	39
Wald test of joint significance($\chi^2(k)$)-p-value [1]	0.013	0.879	0.667
First order serial correlation test [2]	0.0782	0.0411	0.0389
Second order serial correlation test [3]	0.904	0.758	0.235
Hansen p-value [4]	0.23	0.528	0.234
Robust standard errors in parentheses			
***** p<0.01, ** p<0.05, * p<0.1**			

1 Null hypothesis: variables are jointly insignificant.
2 Null hypothesis: instruments used are valid and not correlated with the residuals.
3 Null hypothesis: errors in the first-difference regression exhibit no first-order serial correlation
4 Null hypothesis: errors in the first-difference regression exhibit no second-order serial correlation

Table A16: Readjusting Wealthiness Threshold

Readjusting Wealthiness Threshold		
	(1)	(2)
VARIABLES	Poor= lower 50%	Poor= lower 10%
lfdi $_{-1}$	0.377**	0.262**
	(0.164)	(0.117)
lfdi $_{-2}$		-0.117
		(0.2)
lngrowth	0.323**	0.277*
	(0.130)	(0.148)
lngdpcap	0.00265	0.00575
	(0.006)	(0.005)
lnopen	0.0154*	0.0242**
	(0.008)	(0.011)
lnreal	-0.0283	-0.029
	(0.033)	(0.033)
lndeflator	-0.00859	-0.00896
	(0.006)	(0.007)
lnviolent	-0.0499*	-0.0574**
	(0.030)	(0.024)
poor50pcent*lnviolent	0.0312	
	(0.027)	

poor10pcent*lnviolent		0.118
		(0.123)
Constant	0.179	0.173
	(0.142)	(0.158)
Observations	168	130
Number of groups	39	38
Wald test of joint significance($\chi^2(k)$)-p-value [1]	0	0
First order serial correlation test [2]	0.0101	0.048
Second order serial correlation test [3]	0.110	0.487
Hansen p-value [4]	0.944	0.950
Instrumentws	55	53
Robust standard errors in parentheses		
***** p<0.01, ** p<0.05, * p<0.1**		

1 Null hypothesis: variables are jointly insignificant.

2 Null hypothesis: instruments used are valid and not correlated with the residuals.

3 Null hypothesis: errors in the first-difference regression exhibit no first-order serial correlation

4 Null hypothesis: errors in the first-difference regression exhibit no second-order serial correlation

Table A17:Variables used:

Code	Description	Source
	Economic data	
lfdi	Natural Logarithm of FDI/GDP	World development Indicators
lngrowth	Natural Logarithm of GDP growth rate	world development Indicators
lngdpcap	Natural Logarithm of Gdp per capita	World development Indicators
lnopen	Natural logarithm of sum of imports and exports over GDP	World development Indicators
lnreal	Natural Logarithm of real exchange rates	World development Indicators
lndeflator	Natural Logarithm of deflator ratio	World development Indicators
lntax	Natural Logarithm of tax	World development Indicators
lnunemp	Natural Logarithm of unemployment share	World development Indicators

Code	Description	Source
lneduc	Natural Logarithm education expenditure	World development Indicators
lnrail	Natural Logarithm of rail index	World development Indicators
lnroad	Natural Logarithm of road index	World development Indicators
lnenroll	Natural Logarithm of secondary enrollment ratio	World development Indicators
Crime data		
lnviolent	Natural Logarithm of violent crimes	UN
lnfinancial	Natural Logarithm of financial crimes	UN
lnproperty	Natural Logarithm of property crimes	UN