5-19-2015

Crime, Institutions and Sector-Specific FDI in Latin America

Luisa Blanco
Pepperdine University

Isabel Ruiz
University of Oxford

W. Charles Sawyer
Texas Christian University, w.c.sawyer@tcu.edu

Rossitza Wooster
Portland State University, wooster@pdx.edu

Crime, Institutions and Sector-Specific FDI in Latin America

Luisa Blanco
Associate Professor of Economics
School of Public Policy
Pepperdine University
California, USA
lblanco@pepperdine.edu

Isabel Ruiz*
Official Fellow in Economics
Harris Manchester College
University of Oxford
Oxford, UK
isabel.ruiz@economics.ox.ac.uk

W. Charles Sawyer
Hal Wright Professor in Latin American Economics
Texas Christian University
Texas, USA
w.c.sawyer@tcu.edu

Rossitza Wooster
Associate Professor of Economics
Portland State University
Portland, USA
wooster@pdx.edu

Acknowledgments: The authors thank Nathan Ashby for kindly sharing the data on organized crime from the WEF (2014). We would also like to thank Alberto Davila, Jeff Nugent, Tushar Bharati, Monica Garcia-Perez, Cesar Corredor, Lina Cardona and participants at the American Society of Hispanic Economists (ASHE) sponsored sessions at the Southern Economic Association (2014) meetings, the Western Economic Association International Annual Conference (2015), the Latin American Studies Association Meetings (2015) and the International Trade and Finance Association Meetings (2015) for helpful comments and suggestions. All errors are our own.

***Correspondence:** Isabel Ruiz, Harris Manchester College, University of Oxford, Oxford OX1 3TD, United Kingdom. Tel: +44(0)1865 271026

Crime, Institutions and Sector-Specific FDI in Latin America

Abstract: *This article looks at the impact of crime and institutions on FDI into Latin America and the Caribbean during the 1996-2010 period. FDI is disaggregated into primary, secondary and tertiary sectors and three variables related to violent crime are used: homicides, crime victimization, and organised crime. We find that the significance of institutions disappears with the presence of crime. The impact of crime on FDI depends on the sector and types of crime considered. Higher homicide rates are associated with less FDI in the secondary while organised crime reduces tertiary sector FDI. Crime victimization has a significant negative impact on the tertiary and in some estimations of the secondary sector. Crime has no impact on primary sector FDI.*

Keywords: Foreign Direct Investment, sector specific FDI, crime, institutions, Latin America

JEL: F210, F230, O190

Crime, Institutions and Sector-Specific FDI in Latin America

I. Introduction

Factors affecting economic growth and development have often been used to study crime trends but recent studies have also begun to examine how the prevalence of crime, especially violent crime, can affect economic growth (see for example Detotto and Otranto, 2010). One of the channels through which high rates of crime can impact economic growth is through the destruction of physical and human capital as well as serving to discourage future domestic and foreign investment. For developing countries, foreign direct investment (FDI) is of particular importance to economic growth as it allows for the development of productive capacity, infrastructure, and technological improvements that may not be possible to fund domestically. At the same time, the destabilizing effects of crime in the host country as well as the loss in productivity and the increase in security costs are likely to reduce FDI flows.

Historically, Latin America and the Caribbean (LAC) is one region where the need to attract FDI has coexisted with the reality of high crime rates (Soares and Naritomi, 2010). Since the 1980s, economic growth in the region has lagged behind rates of growth for middle-income countries in general, and of East Asia, in particular. The reasons for this are not perfectly understood but the accumulation of capital is part of the problem. National savings rates in Latin America tend to be low relative to faster growing middle-income countries. Given this, inflows of FDI become even more important to enhance economic growth. As a result, understanding the determinants of FDI inflows in Latin America indirectly helps to explain overall economic growth in the region.

There is a substantial body of literature on the determinants of inward FDI into Latin America.[1] However, there are still a number of issues concerning these inflows for which

there is little or no knowledge. Most importantly, the overwhelming majority of empirical research on FDI is concerned with overall inflows. Yet, there is some evidence that the determinants of FDI vary by sector of the economy (Walsh and Yu, 2010). Unless one makes the strong assumption that FDI determinants are invariant across sectors, there may be important information about the drivers of FDI inflows that is lost in the process of aggregation. Even if the determinants are common, it is unlikely that their influence would be identical across all sectors. This is particularly true in the case of Latin America as FDI in the region has been overweight in primary commodities. As a result, any disaggregation of the data by sectors may yield important insights regarding sectoral dynamics (Ferraz et al., 2011; Hecock and Jepsen, 2014).

Crime can be seen as a component of the broader concept of institutional quality which has been an important determinant of FDI in LAC. In general, previous literature has shown that the presence of weak institutions is a limiting factor of economic growth in developing countries (Engerman and Solokoff, 1997; Acemoglu et al., 2003, 2005). One of the channels through which better institutional quality matters for growth may be through increased inflows of FDI. While this idea is not original to this paper, it is of particular interest for Latin America. Institutional quality has usually not been thought of as a strength in the region. Prior to the 1980s, the region was characterised by a collection of authoritarian regimes not generally noted for enhancing institutions critical for economic development such as the rule of law. The economic and political turmoil of the "Lost Decade" of the 1980s produced political changes that spurred improvements in institutional quality in many countries of the region. A historical account of the evolution of institutions for the region shows that there is a link between improvements in institutional quality and growth in Latin American economies (Przeworski and Curvale, 2007).[2] What is particularly interesting for our purposes is that FDI in the region began a long boom. It went from 0.7 percent of GDP in 1990 to nearly 4.6

percent of GDP in 2013 (United Nations, ECLAC, 2013). Logically, the increase in FDI and the improvement in institutional quality should be related. However, although there is some evidence that better institutional quality has a positive impact on the overall flows of FDI (Fukumi and Nishjima, 2010; Penfold, 2014), little is known about how changes in institutional quality affect FDI by sector and these effects are unlikely to be uniform.

Moreover, in the case of Latin America, the relation between crime and institutions seems paradoxical. While there has been a reported improvement in the quality of institutions, crime has also increased and it is at the forefront of the public policy agenda. In the last decade crime rates have increased significantly, leading to the region receiving the title of one of the most violent regions of the world (Di Tella et al., 2010; UNDP, 2013). A recent study about crime and violence in Latin America states that the homicide rates in Latin American countries are considered by the World Health Organization to be at an epidemic level (UNDP, 2013). The statistics are staggering. According to a World Bank report, Latin America and the Caribbean countries not only account for over 30 percent of the world's homicides but also include seven of the top-ten countries with the world's highest homicide rates. In addition, 42 cities in the region make the list of the 50 cities with the highest homicide rates in the world (World Bank, 2013).

The improvement in institutional quality may be indeed counteracted by the crime trends and therefore, the overall impact on FDI needs to be explored. This divergence between improvements in institutional quality along with increasing crime rates may have potentially important impacts on the trajectory of FDI. There is evidence in the literature that in Latin America, violent crime has generated distrust in institutions (Blanco, 2013; Blanco and Ruiz, 2013; Corbacho et al., 2015). Distrust in institutions can in turn be reflected in weaker business networks, and it can increase the costs of setting up and expanding businesses in

Latin America. Therefore, crime should not be overlooked and needs to be taken into account in the study of the determinants of FDI. After all, as hypothesised by Pshiva and Suarez (2002), violent crime in developing countries may help explain the Lucas (1990) puzzle of capital not flowing to developing countries. In addition, as we have stressed above, a sectoral analysis becomes pertinent in this context as it would be naive to expect the impact of crime to be identical across sectors.

The focus of this article is to investigate the impact of institutional quality and violent crime on FDI. We contribute to the literature by looking at how crime and institutions are interrelated as determinants of FDI in different sectors in Latin America and the Caribbean. Because the incidence of crime may have a differential impact across sectors of the economy, we explore the possibility that it affects FDI in some sectors more than others. To this end, we decompose total FDI inflows into primary, secondary and tertiary sectors. We use three indicators related to violent crime: homicide rates, crime victimization index, and organised crime index. These three measures capture different but related aspects to crime. We find that the significance of institutions disappears with the presence of crime and that the impact of crime on FDI depends on the sector and types of crime considered. In particular, the homicide rate has a robust negative and significant impact on the secondary sector while organised crime matters only for the tertiary sector. Interestingly, crime victimization impacts both the secondary and tertiary sector. The primary sector on the other hand, seems non responsive to crime.

Our findings point at the importance of looking at sector specific dynamics. Previous evidence suggests that since the primary sector is resource seeking, it is less vulnerable to the quality of institutions and therefore, we might expect firms to be less sensitive to crime. In this context, our results for the primary sector are sensible. The secondary sector is impacted

only when we consider homicide rates and crime victimization. FDI in the secondary sector mostly refers to manufacturing and it is motivated by cost advantages in the form of low labour costs. Homicides rates reflect the most violent form of crime and therefore might influence perceptions of production cost, and ultimately affect FDI in this sector.

In the tertiary (services) sector, firms are generally motivated to invest with the purpose of serving that specific market. Investment in this sector is associated with tourism, education, financial services, and real estate, among others. Our analysis shows that, on average, crime victimization and organised crime have a robust significant and negative impact on FDI flows to this sector. Since much of the service sector encompasses activities in which human interaction matters (tourism is a primary example here), a high prevalence of organised crime may create a generalised perception of danger and therefore discourage investment. In addition, the racketeering practices of many mafia-like organizations are likely to affect services more than manufacturing because the latter is more insulated from day-to-day interaction with the local business environment and relies less on such interaction to build a customer base. The findings also relate to anecdotal evidence from Venezuela where the escalation of crime has forced business (such as restaurants) to change their business practices as an ever-growing number of customers do not feel safe to visit after dark (Rosati, 2015). In fact, Venezuela now stands as having one of the highest crime rates in the world, the second highest after Honduras.

The next section (section II) provides a conceptual framework and the empirical evidence. This is followed by a section (section III) describing the data used and the empirical methodology employed. Section IV and V provide a description of the results and the robustness tests, and this is followed by a conclusion (Section VI).

II. FDI, Institutions and Crime: Conceptual Framework and Empirical Evidence

Our paper focuses on the impact of crime on sectoral FDI. Loosely speaking, our approach looks at a wider definition of crime by focusing on violent crime, where we take into account three different crime measures: homicide rates, crime victimization and organised crime. Previous work in the literature has focused on the impact of political instability and corruption on domestic and foreign investment. While these are important, and could arguably be linked to the general definition of crime, they have already been studied on their own right and/or through the links between FDI and institutions. In general, some of the findings also indicate that the impacts of institutional improvement differ depending on the sector where FDI flows. For example, the primary sector seems to be less vulnerable to the quality of institutions while market-seeking sectors seem to be more responsive.[3]

Why focus primarily on crime? There is a long quest in the economic literature trying to understand the determinants of FDI (see for example, Blonigen and Piger, 2011). In the particular case of Latin America, FDI has been thought of as conducive to economic growth (De Melo, 1997; Borensztein et al., 1998), and the potential externalities of FDI are linked to economic development and employment.[4] Therefore, there has been a strong desire to understand the determinants of FDI into the region and the different channels through which Latin American countries are able to attract FDI in order to create a more positive environment for foreign investors. While many of the countries in the region have had impressive achievements in generating welcoming environments to foreign investors, crime has been a major concern for most countries of the region and it has reached peak levels during the last decade (Gaviria, 2002; Soarez and Naritomi, 2010).

It is very likely that the increasing levels of crime can act as a deterrent for foreign firms setting up different types of investment in the region. In particular, crime can potentially affect both greenfield investments and merger and acquisitions (M&A), having consequences

for both the stock of FDI through reduction or closure of operations and/or the flow of FDI through reduced new investment and reinvestment and by lowered incentives to expand. Firms may delay expansion or further investment because high crime can add to the firm's costs (damaged infrastructure, unstable market demand, high security costs, insurance and other legal costs) and can force firms to choose locations that are low in crime but otherwise suboptimal (Amin, 2014; Dadzie et al., 2014). More broadly, crime can have a strong impact on institutional stability and the overall business environment (Soares and Naritomi, 2010).

Despite the escalating importance of crime in the Latin American region, the literature on crime and FDI is scant. While there is previous evidence on the impact of crime on domestic investment, to our knowledge, Gomez Soler (2012) might be the only empirical analysis on the impact of crime on FDI in the Latin America region. While there is a dearth of empirical evidence of the impact of crime on FDI at the country level for the Latin American region, there are several analyses at the state level for Mexico (Madrazo Rojas, 2009; Ashby and Ramos, 2013; Ramos and Ashby, 2013) and at the firm level for Colombia (Pshisva and Suarez, 2010).

Using data on organised crime from the World Economic Forum for 19 Latin American countries between 2002 and 2010, Gomez Soler (2012) finds there is no significant correlation between crime and aggregate FDI. Analyses that focus on Mexico and use state level data show that crime has a negative effect on FDI. Madrazo Rojas (2009) finds that homicide rates have a negative effect on FDI when using total FDI at the state level between 1998 and 2006 from Mexico. Ashby and Ramos (2013) expand on Madrazo Rojas' (2009) approach by studying the impact of homicide rates on FDI in different sectors. They find that crime has a negative effect on FDI in the agriculture, commerce and financial services sectors, but a positive effect in the oil and mining sectors. They also find that crime has no

effect on the manufacturing sector. Ramos and Ashby (2013) expand on this work by showing that high crime rates do not deter investment from high-crime countries into Mexico.

In a related vein of research, Pshisva and Suarez (2010) use firm level data for Colombia and document that crime (in the form of kidnappings) targeted at firm owners has a negative effect on investment. However, overall violent crime appears to have an insignificant impact. In their exploratory analysis, Pshisva and Suarez (2010) also consider aggregate FDI and do find a negative impact of kidnappings on net foreign direct investment for 196 countries. Other analyses on the effect of crime on FDI for other countries outside Latin America show also a negative effect of crime on FDI.[5] The question remains as to why and how would FDI be impacted by crime. Looking at aggregates may confound the different dynamics occurring in different sectors. For example, one might hypothesise that crime should not be as detrimental in the primary sector and that, instead, armed conflict might be a more important explanation for natural resource driven investment. Thus the impact of crime clearly becomes an empirical question.

Our paper is distinct from the above literature in four broad ways. The obvious distinction is that we take into account the interplay between institutions and crime, therefore addressing not only the potential problems of omitted variable bias, but also the paradox described above in the introduction (better institutions but also increasing levels of crime). Second, we are studying flows of FDI into a single region, Latin America and the Caribbean. The vast majority of the literature on FDI is concerned with the overall flows of FDI into a host country or a relatively large number of countries. Third, and most important, our paper presents a decomposition of the overall flows into three broad sectors. We argue that moving forward, the studies of the determinants of FDI into developing countries needs to focus on sectorial differences. Fourth, our analysis uses three different indicators related to crime, which allows us to capture different dimensions of crime and provide new insights on the

crime-FDI link. As outlined above, our paper falls into the broader literature on FDI in Latin America by combining these aspects in a unique way. The following section details the methodology and data used in the analysis.

III. Methodology and Data

For our investigation on the impact of institutions and crime on FDI we specify our model as follows:

$$FDI_{i,j,t} = \beta_1 Crime_{i,t} * \sum_j^k Sector_j + \beta_2 Institution_{i,t} * \sum_j^k Sector_j + X_{i,t}^{'}\delta + \varepsilon_{i,j,t} \quad (1)$$

In Equation 1, the dependent variable is the natural log of a country's FDI inflow as share of GDP in country *i*, sector *j*, and period *t*.[6] $X_{i,t}$ represents standard control variables in the literature and $\varepsilon_{i,j,t}$ represents the error terms for country *i* and sector j, in period *t*. Our coefficients of interest are β_1 and β_2 where we interact the crime variables and institutional variables with sectoral dummies. This approach follows a similar method as the ones used by Ashby and Ramos (2013) and Dadzie et al. (2014) who both looked at the impacts of crime on investment (domestic and international into a single country). Since we want to understand sectoral dynamics, the interactions are important in allowing us to interpret the effect of these variables in the different sectors more accurately.[7]

We use sectoral FDI for the 1996-2010 period for 18 Latin American and Caribbean countries for which we were able to get data on sectoral FDI and crime (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, and Venezuela). FDI data is disaggregated into primary, secondary, and tertiary sectors, and sectoral data was obtained from UNCTAD/DITE (2013). Our estimations are based on an unbalanced panel

data since many of the variables are not available at all times for all countries during the period of analysis.[8] The control variables considered here are those commonly included in FDI models: the initial level of real GDP per capita, total population, trade openness, exchange rate, and inflation (all variables in natural logs). Data for these variables was obtained from the World Development Indicators (World Bank, 2013). For robustness we also consider other variables such as surrounding market potential, capital openness, and polity.[9] The accompanying notes in Table A1 in the Appendix, which includes the summary statistics for all the variables used in our estimations, also includes a description of variable definitions, methodological aspects and relevant transformation.

We consider three crime variables: homicide rates, a crime victimization index, and an organised crime index. Homicide rates are obtained from the United Nations Surveys on Crime Trends and the Operations of Criminal Justice Systems (UN, 2014). We construct a crime victimization index using survey data from the Latinobarometro. Our crime victimization index represents the proportion of the population who has been themselves, or their relatives, victims of a crime. We also include in the model an organised crime index, which is provided by the World Economic Forum (2014). In its original form, the organised crime index is constructed with values of 1-7, where higher values represent fewer problems with organised crime. In order to make all out estimates consistent, we re-define this variable by multiplying it by minus one. Thus our estimated reports indicate that higher values of the index represent more problems with organised crime. We take the natural log of homicides and crime victimization since the distribution of these variables is skewed towards the right (the mean is greater than median). We do not use the log of organised crime not only because this variable is always negative, but also because it does not show a skewed distribution towards the right.

For the institutional variables, we first construct an indicator of governance related to institutions that are important for business. For this indicator we use the principal component of bureaucratic quality, control of corruption, and law and order. We also consider in our model other variables provided by the International Country Risk Guide Dataset (ICRG, Political Risk Services, 2013), such as the composite risk index. Table 1 presents the components of the composite risk measure. We also explore with the political risk index and its components since our emphasis is on institutions. We include each institutional variable that composes the political risk index at the time interacted with the sector dummies to avoid problems of multicolinearity. The results section only presents the results of those estimations for which we find that the interaction between the institutional variable from the political risk index and sector dummy are significant. We note that institutional variables from this dataset with higher values represent higher institutional quality (for example, higher values mean higher bureaucratic quality and law and order and less corruption).

Our analysis is based on a fixed effects model with robust standard errors for all three sectors (18 countries). Instead of estimating our model by sectors, the data is stacked (i.e. pooled for the different sectors for each country) as in that way we are able to increase the number of observations and increase our sample size. The UNCTAD FDI sectoral data is not consistently available over time and running a regression for each sector would result in a very small number of observations. Finally, we also include time dummies in all our estimations (since they are found to be significant as a group with an F test in all regressions). Note that, in Equation 1, we use lags of all variables in the right hand side to avoid problems of endogeneity.[10]

IV. Results

Table 2 displays the correlation matrix between the crime variables and institutional variables. As previously suggested in our discussion of the literature, crime is likely to be correlated to the institutional environment of a country. This table shows that the correlations of institutional variables with crime variables are relatively high, especially for the institutional variables related to governance and law and order. Not surprisingly, these correlations also depend on the type of crime. For example, crime, as measured by homicides, is negatively and statistically significantly correlated with governance (-0.55), law and order (-0.63) and socioeconomic conditions (-0.41). Crime victimization has the highest correlations with military in politics (-0.20) and internal conflict (-0.16). Finally, organised crime has significant correlations with law and order (0.73), governance (0.53), internal conflict (0.42) and political risk (0.38). Thus, the high correlation between institutional and crime variables might leads us to hypothesise that one of the channels through which institutions have an effect on FDI could be through the interplay between institutions and crime, an association that has not been explored in previous literature. For this reason, we first focus on the impact of the institutional variables on FDI alone and then we incorporate crime variables in the model.

Table 3 reports the results from estimating the model indicated in Equation 1. Column 1 explores the importance of governance for FDI inflows and, therefore, omits any form of crime interactions. We interact governance by sector of the economy in order to understand the differential impacts it has on FDI. Governance seems to play a positive role on FDI inflows although the interaction turns out to be only marginally significant (10 percent) for the primary sector (Column1). Columns 2, 3 and 4 include, in addition to the sectoral interactions with governance, the sectoral interactions with crime as represented by homicide,

crime victimization and the organised crime index, respectively. In this case, any remaining significance of the governance variable disappears. Instead, we observe that crime victimization has a significant negative impact in the tertiary sector at the 5 percent level, and a marginally significant negative effect in the secondary (Column 3). The homicide rate and organised crime index only show a significant negative impact on the secondary sector (Column 2) and tertiary sectors (Column 4), respectively. This suggests that the more individual-focused measures of crime (homicides) correlates more strongly with decreased FDI in the manufacturing sector while the more impersonal (organised crime) matters more for the service sector. Columns 5, 6 and 7 in Table 3 show the results when we exclude the governance indicator from these models. The results validate our previous estimates. The only difference is that when we exclude the governance indicator, crime victimization has a significant negative effect at the 5 percent level in the secondary sector instead of being marginally significant (column 3 versus column 7, Table 3). Interestingly, the size of the coefficients for our crime variables for the tertiary sector in columns 6 and 7 are relatively larger than the ones shown in columns 3 and 4, respectively. This finding suggests that the significant crime variables are also able to pick up some of the effect that institutions have on FDI. However, the change on the coefficients of the crime variables might also be the result of multicolinearity between the governance index and, in particular, with the organised crime variable. We note that since the governance variable is a composite index that contains bureaucratic quality, control of corruption and law and order, the former likely reflects partially the trends in crime.[11] We will discuss the issue of multicolinearity further in the robustness section and estimate alternative models that deal with this possibility.

Table 4 shows the results when we include in the model the composite risk index (columns 1-4) and the political risk index (columns 5-8) separately. As discussed above, the political risk index is one of the components of the composite risk index (see Table 1) and we

include one crime variable at the time in the estimations. We find that when the composite risk index and the political risk index are included without the crime variables (columns 1 and 5), these indices are positive and statistically significant at the 10 and 5 percent level for FDI in the tertiary sector. When the crime variables are added to the estimation together with the composite and political risk indices, crime turns out to be significant (in some cases) but the significance of the institutional indices for the tertiary sector disappears. This is a similar finding to what we obtained when the governance indicator with the crime variables were included in the model in Table 3, but the significance of the governance indicator was only marginal in the model without the crime variables.

When comparing results in Table 4 with results in Table 3, specifically with the results shown for the model that excludes the governance index (columns 5-7 in Table 3) we observe that homicides rates have a significant effect on FDI in the secondary sector when we include them with the composite and political risk indices (columns 2 and 6), while crime victimization continues to show a negative significant effect at the 5 percent level on FDI in the secondary and tertiary sector (columns 3 and 7, where crime victimization has marginal significance when including the political risk index). When we add the index of organised crime (columns 4 and 8), we continue to observe that organised crime affects FDI in the tertiary sector.

We tested for the impact of all of the institutional variables that compose the political risk index on FDI (see Table 1 for details on the components of the index), without including the crime variables first. We show in Tables 5 and 6 the estimates of our model for the cases in which the variables from the political risk index were found to be significant. These estimations showed that of those variables, corruption, government stability, internal conflict and investment profile were the only ones to be statistically significant for FDI in the

secondary and tertiary sector at least at the 5 percent level. Table 5 includes the estimates from the models that include the corruption and government stability variables, and Table 6 includes the estimations for the models that include the internal conflict and investment profile variables. Table 5 shows that when we include the corruption variable, this seems to matter for the primary sector while government stability has a significant positive coefficient for FDI in the tertiary sector (columns 1 and 5). Similar to the results documented with the other institutional variables in Table 4, the significance of the institutional variables goes away when the crime variables are added to the model. Estimates in Table 5 show that when crime victimization and organised crime are included in the model with corruption (columns 3 and 4) and government stability (columns 7 and 8), crime continues to have a significant negative effect in the tertiary sector in both cases. Homicide continues to have a negative significant coefficient for FDI in the secondary sector (columns 2 and 6). Crime victimization has a significant negative effect at the 5 percent level when we include it with corruption, but it becomes marginally significant when we include this variable with government stability (columns 3 and 7).

The results in Table 6, which include estimates from the model that takes into account internal conflict (columns 1-4) and investment profile (columns 5-8) separately, are very similar to what we found before. When including internal conflict in the model and investment profile by themselves (columns 1 and 5), we find that lower internal conflict and higher investment profile are associated with greater FDI in the tertiary sector (recall that higher values of these variables represent better political and institutional environments). In columns 2-4, where we add the crime variables to the model with internal conflict, we continue to observe that crime victimization and organised crime have a significant impact on FDI in the tertiary sector, but the internal conflict variable is no longer significant. In columns 6-8, we include the crime variables in the model with investment profile and, once again, we

observe that crime victimization and organised crime have a significant negative impact on FDI in the tertiary sector. In both cases, when we include internal conflict and the investment profile with the homicide rate variable in the model (Table 6, columns 2 and 6), we find once again that it is homicide the variable that has a significant negative effect on FDI in the secondary sector. Crime victimization has a marginal significant negative effect when we include it with internal conflict and investment profile (columns 3 and 7, Table 6)

Before we move into the discussion of the robustness checks used in this analysis, we summarise here the main findings. First, we find that there is a correlation between institutional and crime variables, which is important to keep in mind when we have a model where institutional and crime variables are accounted for at the same time. Second, we observe that there are several institutional variables that have a significant effect on FDI in the tertiary sector but no effect in other sectors when we include them in the model without the crime variables. Third, in most cases we observe that when crime variables are added to the model, the significance of the institutional variables disappears. This finding is supportive of the important interconnection between institutions and crime. Fourth, we find that crime victimization and organised crime have a robust significant negative effect on FDI in the tertiary sector and the homicide rate has a significant negative effect in the secondary sector. Thus, an important implication of our findings is that, when analysing the impact of crime on FDI, it is important to use alternative measures of crime and not just focus on the most commonly used indicator (homicide rates). Moreover, as the quality of data improves over time, using disaggregated data by sector (and even firm specific data) should be the direction of future research on FDI in developing countries. While there may be global drivers of FDI, each sector has its own idiosyncrasies which need to be assessed and accounted for. Originally, we were cautious in hypothesizing what results should be expected at the sectoral

level but, in hindsight, crime should logically be a deterrent mainly for investment in the secondary and tertiary sector. Also, the type of crime should matter.

V. Robustness Tests

We tested for the robustness of our results by using the following strategies: 1) we use FDI inflows instead of FDI as a share of GDP, 2) we followed the previous strategy where we use FDI as a share of GDP as our dependent variable but include in the model only data that has not been interpolated (see Table A1 for more details), 3) we examine additional control variables to account for the possibility of omitted variable bias (surrounding market potential, capital openness and polity) to the baseline model with each crime variable included one at the time. All of our results remain qualitatively unchanged when we change estimation strategies suggesting that the findings presented above are robust to the specification changes we employed. Overall, the conclusion that the crime victimization and organised crime variables have a significant effect on FDI in the tertiary sector and homicides on the secondary sector, is maintained throughout all these estimations.

For robustness purposes, we also explore further the issue of multicolinearity. We performed a multicolinearity test for the models estimated in Table 4, columns 2-4, which include the governance indicator and the crime variables one at the time. The results of the test show that the Variance Inflation Factors (VIF) are greater than 10 for crime victimization and organised crime. For some of the control variables, as we expected, we also find that VIF are greater than 10 (i.e. for initial GDP, population, and trade). This is not uncommon with aggregate data but to identify whether multicolinearity problems are severe, we estimate the models shown in columns 5-7 of Table 4, without the control variables that showed high VIF. We do not observe loss of significance or changes of signs in the reduced models and find that crime victimization and organised crime continue to have a significant negative effect on

FDI in the tertiary sector and homicides continues to have a significant negative effect on the secondary sector. Thus, we conclude that while inclusion of the variables discussed above may introduce some multicolinearity in the estimations presented in Table 4, it is not severe enough to qualitatively change our results.

We also estimate our model including only Latin American countries. One could argue that there is a significant difference between Latin American and Caribbean countries, and for these reasons we estimate all the models shown in Tables 4-5 excluding the Dominican Republic, Jamaica, and Trinidad and Tobago. Tables A.2 and A.3 in the appendix show a selected set of estimates for the models estimated with the reduced sample.[12] Our previous results for the full sample are robust to using a reduced sample that includes only Latin American countries suggesting that the results are not driven by the Caribbean countries.

A final methodological consideration has to do with the fact that the literature on FDI has recently become more concerned with the presence spatial correlations (Blanco, 2012). It is worth noting that in our initial exploration of the data, we estimated the model separately for each sector and we did not find evidence of spatial interdependence. In our taken approach, looking at spatial correlation was not feasible as our methodological approach relies on stacking the sectoral FDI data and including sector-specific dummies. This does not allow for the introduction of a term that controls for spatial autocorrelation. Overall, we believe our approach is appropriate in this case because using the stacked data helps us to better account for the differential effect of crime and institutional variables on FDI.

VI. Conclusion

It has long been recognised that FDI has been a motor for economic development in middle and low-income countries. Latin America has benefited in many ways from these inflows and therefore, not only academics but also policy makers have sustained a quest to investigate,

determine and discern the drivers and determinants of FDI into the region. Of particular importance has been the role of institutions and its interplay with crime. While Latin American countries have made great advances in terms of institutional improvements, the region still remains as one of the most violent regions in the world.

In this paper, we study the impact of crime and institutions on foreign direct investment to Latin America. We pay particular attention to the interplay between crime and institutions. We find that there is correlation between the institutional and crime variables, where the significance of institutional variables tends to disappear when the crime variables are added to the model. In particular, we explore three different variables related to violent crime (homicides, crime victimization, and an organised crime index), and find crime victimization and the organised crime index to be statistically significant in most estimations for the tertiary sector, where increases in both measures of crime are associated with lower FDI in that sector. We also find that, in addition to crime victimization, higher homicides rates are associated with lower FDI in the secondary sector. This leads to an unfortunate conclusion. The transition to democratic government in the region over the last 25 years has led to significant improvements in institutional quality. Ceteris paribus, these improvements should have led to higher levels of FDI. However, our results indicate that the surge in crime in the region could work against the positive effects that better institutions have on FDI inflows in the region. Our results therefore point to another important reason for decreasing crime, and increasing efforts to make crime reduction an important matter of public policy.

The analysis in this paper also provides important insights related to the motivations of FDI and the importance of conducting sectoral analysis. We did not find a significant impact of crime on FDI in the primary sector. This was expected as FDI in the primary sector is largely motivated by the availability of natural resources in a specific country. Therefore, we might expect firms to be less sensitive to crime and our results corroborate this. The

results were somewhat less consistent with FDI in the secondary sector. We found that only when we consider homicide rates and crime victimization, crime has a significant negative effect on FDI in the secondary sector, but this was not the case when we considered organised crime. FDI in the secondary sector is motivated by cost advantages in the form of low labour costs and investment is also motivated with the purpose of serving the global market. From our findings, we could hypothesise that when firms chose to invest in the secondary sector in Latin America and the Caribbean, the rate of return is potentially high enough to offset some of the costs derived from crime. Our hypothesis here is that homicides rates, which reflect the most violent form of crime might influence the perceptions of production cost in the secondary sector and ultimately affect FDI in this sector. In the tertiary sector, firms are motivated in general, to invest with the purpose of serving that specific market. Investment in this sector is associated with tourism, education, financial services, real estate, among others. Thus, the impact of crime is likely to affect strongly the tertiary sector, which is what our analysis shows when we consider crime victimization and organised crime. Our hypothesis here is that crime victimization and organised crime might reflect better how crime affects individual behaviour, and therefore their consumption patterns. Thus, our analysis indicates that lower levels of FDI in the tertiary sector are to be expected if crime continues to be at such high levels in this region. Unfortunately, the persistence of crime would tend to make development in this sector slower than would otherwise be possible.

To develop a deeper understanding of the interconnection of institutions and crime for capital flows, further research at the firm level that focuses on the motivations of FDI is warranted. Data collected through interviews with top managers of multinational enterprises could provide important insights on how institutional deficiencies and high crime rates affects investment decision, and whether they will be discouraged by these environments or accommodate for these deficiencies. Previous experience in a specific country is likely to

play a role mitigating some of the detrimental effects of low institutional quality and crime, and this could be studied with firm level data.

Endnotes

[1] For general determinants, see Tumman and Emmert (2003), Trevino and Mixon (2004), Ferraz et al. (2011), and Reyes and Sawyer (2011), among others.
[2] Bertola (2011) offers an interesting historical account of the roots of institutions in Latin America.
[3] See Daude and Stein (2007), Schulz (2009) and Ali et al. (2010) for a summary of this literature, and Fukumi and Nishjima (2010) and Penfold (2014) for evidence on the link between institutions and FDI in Latin America.
[4] Martin and Bell (2006) and Chudnovsky, et al. (2008) have shown this to be the case for Argentina. Waldkirch, et al. (2009) present evidence on the positive effect of FDI on employment in Mexico.
[5] In fact, there is not much on the relationship between crime and FDI in general. Apart of the above described papers, a few of the papers have been done at the regional level for Italy (Daniel and Marani, 2011) and country level for Russia (Brock 1998).
[6] For robustness purposes, we also estimated our model using total FDI inflows instead of FDI inflows as a share of GDP. As discussed in the robustness section, the results supported our conclusions.
[7] Note that we do not include crime and institutions as variables on their own. This follows the recommendations by Yip and Tsang (2007). Since we use stacked data the interpretation of the results are better understood through the interactions. We control for sector characteristics by using panel data techniques.
[8] For the FDI variables we used linear interpolation to fill in for missing observations. Details on the process of interpolation are presented in the accompanying notes of table A.1 in the appendix.
[9] For more detail on the importance of capital openness, see Agosin and Machado (2007).
[10] All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period). Using the initial level of GDP per capita is important because our dependent variable is FDI as a share of GDP, which help us dealing with the issue of having GDP in both sides of the equation in the same form.
[11] The "law" element in "law and order" assesses the strength and impartiality of the legal system. The "order" element refers to a "popular observance of the law" (Political Risk Services, 2013). As explained by the ICRG, a country with a good judicial system may receive a high score but this is lowered if there is a high perception of crime (they cite widespread legal strikes). So while it does capture the "crime" aspect, the direct impact cannot be readily assessed. Our crime measures are akin to a "de Facto" measure of crime and are therefore a better indicator of its impact.
[12] Results for all estimations shown in Tables 4-7 for the reduced sample are available upon request.

References

Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen Y. (2003). Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth. *Journal of Monetary Economics*, 50(1), 49-123.

Acemoglu, D., Johnson, S., & Robinson, J. (2005). Institutions as a Fundamental Cause of Long Run Growth. In P. Aghion and S. Durlauf (eds), *Handbook of Economic Growth*, Amsterdam: Elsevier.

Agosin, M. R. & Machado, R. (2007). Openness and the International Allocation of Foreign Direct Investment. *Journal of Development Studies*, 43(7), 1234-1247.

Ali, F. A., Fiess, N. & MacDonald, R. (2010). Do Institutions Matter for Foreign Direct Investment? *Open Economies Review* 21(2), 201-219.

Amal, M., Tomio, B., & Raboch, H. (2010). Determinants of Foreign Direct Investment in Latin America. *Globalization, Competitiveness and Governability*, 4(3), 116-133.

Amin, M. (2014). Avoiding Crime in Latin America and the Caribbean, *World Bank Group*.

Asiedu, E. & Lien, D. (2009). The Effect of Corruption on Investment Growth: Evidence from Firms in Latin America, Sub-Saharan Africa and Transition Countries. *Review of Development Economics*, 13(2), 99-111.

Ashby, Nathan J., & Ramos, M. A. (2013). Foreign direct investment and industry response to organized crime: The Mexican Case. *European Journal of Political Economy*, 30, 80-91.

Bertola, L. (2011). Institutions and the Historical Roots of Latin American Divergence. Ch.2 in *The Oxford Handbook of Latin American Economics*, edited by Jose A. Ocampo and Jaime Ros, Oxford University Press.

Blanco, L. (2012). The Spatial Interdependence of FDI in Latin America. *World Development* 40(7), 1337-1351.

Blanco, L. (2013). The Impact of Crime on Trust in Institutions in Mexico. *European Journal of Political Economy,* 32, 38–55.

Blanco, L., and Ruiz, I. (2013). The impact of Crime and Insecurity on Trust in Democracy and Institutions. *American Economic Review*: Papers and Proceedings, 103, 323–346.

Blonigen, B. A. & Piger, J. (2011). Determinants of Foreign Direct Investment. *Canadian Journal of Economics*, 47(3), 775–812. DOI: 10.1111/caje.12091

Borensztein, E., De Gregorio, J. & Lee, J-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), 115-135.

Brock, Gregory J. (1998). Foreign Direct Investment in Russia's Regions 1993-95. Why so Little and Where Has It Gone? *Economics of Transition*, 6(2), 349-360.

Cameron, C., & Pravin, T. (2005). *Microeconometrics: Methods and Applications*. Cambridge University Press. Cambridge.

Campos, N., & Kinoshita, Y. (2008). Foreign Direct Investment and Structural Reforms: Panel Evidence from Eastern Europe and Latin America. IMF Working Paper 08/26.

Chinn, M., & Ito, H. (2008). A new measure of financial openness. *Journal of Comparative Policy Analysis: Research and Practice*, 10, (3), 309-322. [Dataset] Accessed on April 2013 from http://web.pdx.edu/~ito/Chinn-Ito_website.htm

Chudnovsky, D., López, A., & Rossi, G. (2008). Foreign Direct Investment Spillovers and the Absorptive Capabilities of Domestic Firms in the Argentine Manufacturing Sector (1992-2001). *Journal of Development Studies*, 44(5), pp. 645-677.

Corbacho, A., Philipp, J., Ruiz-Vega, M. (2015). Crime and Erosion of Trust: Evidence for Latin America. *World Development*, 70(2), 400-415.

Dadzie, C., Blanco, L., & Dony, C. (2014). Study on Crime and Investment in Latin America and the Caribbean. USAID. Development Experience Clearinghouse, PA-00K-4WM.

Daude, C., & Stein, E. (2007). The Quality of Institutions and Foreign Direct Investment. *Economics & Politics*, 19(3), 317-344.

Daniele, V., & Marani, Ugo. (2011). Organized Crime, the Quality of Local Institutions and FDI in Italy: A Panel Data Analysis. *European Journal of Political Economy*, 27(1), 132-142.

De Mello, L. R. (1997). Foreign Direct Investment in Developing Countries and Growth: A Selective Survey. *Journal of Development Studies*, 34(1), pp. 1-34.

Detotto, C. & Otranto, E. (2010). Does Crime Affect Economic Growth? *Kyklos*, 63, 330-345.

Di Tella, R., Edwards, S., & Schargrodsky, E. (2010). The Economics of Crime: Lessons For and From Latin America. University of Chicago Press, Chicago, IL.

Engerman, S. L., & Sokoloff, K. L. (1997). Factor Endowments, Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States. In Stephen Haber (ed), *How Latin America Fell Behind* (pp. 260-304). Stanford: Stanford University Press.

Ferraz, J., Mortimore, M., & Tavares, M. (2011). Foreign Direct Investment in Latin America. In Jose A. Ocampo and Jaime Ros (eds), *The Oxford Handbook of Latin American Economics*. Oxford: Oxford University Press.

Fukumi, A., & Nishijima, S. (2010). Institutional Quality and Foreign Direct Investment in Latin America and the Caribbean. *Applied Economics*, 42(13), 1857-1864.

Gaviria, A. (2002). Assessing the effects of corruption and crime on firm performance: evidence from Latin America. *Emerging Markets Review*, 3(3), 245-268.

Gómez Soler, S. (2012). The Interplay between Organized Crime, Foreign Direct Investment and Economic Growth: The Latin American Case. Pontificia Univ. Javeriana: Bogota.

Hecock, D. & Jepsen, E. (2014). The Political Economy of FDI in Latin America 1986–2006: A Sector-Specific Approach. *Studies in Comparative International Development*, 49(4), 426-447.

Kolstad., I., & Wiig, A. (2012). Digging in the Dirt? Extractive Industry FDI and Corruption. *Economics of Governance*, 14(4), 369-383.

Lucas, R. E. Jr. 1990. "Why Doesn't Capital Flow from Rich to Poor Countries? *American Economic Review*, 80 (2), 92-6

Madrazo Rojas, F. 2009. The effect of violent crime on FDI: The case of Mexico 1998-2006 (Master Thesis). Department of Public Policy, Georgetown Public Policy Institute.

Manrique, L. E. (2006). A Parallel Power: Organized Crime in Latin America. Real Instituto Elcano.

Marshall, M., & Jaggers, K. (2013). Polity IV Project [Dataset]. Accessed on April 2013. http://www.systemicpeace.org/polity/polity4.htm

Martin, A., & Bell, M. (2006). Technology Spillovers from Foreign Direct Investment (FDI): the Active Role of MNC Subsidiaries in Argentina in the 1990s. *Journal of Development Studies*, 42(4), pp. 678-697.

Penfold, M. (2014). Institutions and Foreign Direct Investment in Latin America: A New Emerging Reality. *LAC Working Papers in Political Economy*, No.3

Political Risk Services, (2013). International Country Risk Guide [Dataset]. Data purchased on January 2013. http://www.prsgroup.com/ICRG.aspx.

Przeworski, A. & Curvale, C. (2007) Instituciones políticas y desarrollo económico en las Américas: el largo plazo. In *Visiones sobre el Desarrollo en América Latina,* CIDOB/CEPAL.

Pshisva, R. & Suarez, G. A. 2010. Capital Crimes: Kidnappings and Corporate Investment in Colombia. In: *The economics of crime: Lessons for and from Latin America.* University of Chicago Press, 63-97.

Ramos, M. A., & Ashby, N. J. (2013). Heterogeneous firm response to organized crime: Evidence from FDI in Mexico. *Journal of International Management*, 19(2), 176-194.

Reyes, J. A., & Sawyer, W. C. (2011). *Latin American Economic Development*. London: Routledge.

Rosati, A. 2015 (June 11). Hugo Chavez' Legacy: Venezuelans are terrified of the Dark. Bloomberg business. Retrieved online: http://www.bloomberg.com/news/articles/2015-06-11/caracas-bar-hopping-rule-no-1-never-get-caught-out-after-dark

Soares, R. & Naritomi, J. (2010). Understanding High Crime Rates in Latin America. In Rafael Di Tella, R. D., Edwards, S., & Schargrodsky, E. (Eds), *The Economics of Crime: Lessons for and from Latin America* (pp. 19-55). University of Chicago Press.

Schulz, H. (2009). Political Institutions and Foreign Direct Investment in Developing Countries: Does the Sector Matter? Social Science Research Network. Available at: http://dx.doi.org/10.2139/ssrn.1403983.

Tintin, C. (2013). The Determinants of Foreign Direct Investment Inflows in the Central and Eastern European Countries: The Importance of Institutions. *Communist and Post-Communist Studies*, 46(2), 287-298.

Trevino, L., & F. Mixon. (2004). Strategic Factors Affecting Foreign Investment Decisions by Multinational Enterprises in Latin America. *Journal of World Business*, 39(3), 233–243.

Tuman, J., & Emmert, C. (2003). The Political Economy of U.S. Foreign Direct Investment in Latin America: A Reappraisal. *Latin American Research Review*, 39(3), 9–28.

United Nations Surveys on Crime Trends and the Operations of Criminal Justice Systems, UN-CTS (2014) Crime Trends and the Operations of Criminal Justice Systems Data

collection. Available at: https://www.unodc.org/unodc/en/data-and-analysis/United-Nations-Surveys-on-Crime-Trends-and-the-Operations-of-Criminal-Justice-Systems.html

UNCTAD/DITE (2013) United Nations Conference on Trade and Development Data Extract Service Desk, (UNCTAD/DITE) FDI disaggregated by sectors in Latin America [data purchased by authors].

United Nations Development Programme (2013) Citizen Security with a Human Face: Evidence and proposals for Latin America. Regional Human Development Report 2013-2014. UNDP, New York, NY.

Waldkirch, A., Nunnenkamp, P., & Bremont, J. E. A. (2009). Employment Effects of FDI in Mexico's non-Maquiladora Manufacturing. *Journal of Development Studies*, 45(7), 1165-1183.

Walsh, P. & Yu, J. (2010) Determinants of Foreign Direct Investments: A Sectoral and Institutional Approach. IMF Working Paper 10(187), 1-27.

World Bank. (2013) World Development Indicators [Dataset]. Accessed on April 2013. http://data.worldbank.org/data-catalog/world-development-indicators

World Economic Forum (2014). Global Competitiveness Index. Available at: http://www.weforum.org/reports/global-competitiveness-report-2014-2015

Yip, P., & Tsang, E. (2007). Interpreting Dummy Variables and their Interaction Effects in Strategy Research. *Strategic Organization*. 5 (1), 13-30.

Table 1. Components of the Composite Risk Index

Economic Risk	GDP per head Real GDP growth Annual inflation rate Budget balance as a percentage of GDP Current account as a percentage of GDP
Financial Risk	Foreign debt as a percentage of GDP Foreign debt service as a percentage of exports of goods and services Current account as a percentage of exports of goods and services Net international liquidity as months of import cover Exchange rate stability
Political Risk	Government stability Socioeconomic conditions Investment profile Internal conflict External conflict Corruption Military in politics Religious tensions Law and order Ethnic tensions Democratic accountability Bureaucracy quality

Table 2. Correlations

	Homicide rate	Crime victimization	Organised crime
Homicide rate	1.0000	0.0598	0.6672*
Crime victimization	0.0598	1.0000	0.2528*
Governance	-0.5583*	0.0660	-0.5326*
Composite risk	-0.2818*	-0.0840*	-0.2992*
Political risk	-0.3945*	-0.0922*	-0.3810*
Bureaucratic quality	-0.1577*	0.1259*	-0.0232
Corruption	-0.2934*	0.1097*	-0.3072*
Democracy	-0.3721*	-0.0812*	-0.2970*
Ethnic tension	0.1353*	-0.1463*	0.0197
External conflict	-0.0316	0.0404	0.038
Government stability	0.0927*	0.1099*	0.1536*
Internal conflict	-0.2353*	-0.1636*	-0.4198*
Investment profile	-0.1584*	-0.1262*	-0.1550*
Law and order	-0.6396*	-0.053	-0.7265*
Military in politics	-0.3048*	-0.2025*	-0.2562*
Religion in politics	-0.1214*	0.0984*	-0.0818
Socioeconomic cond.	-0.4157*	-0.0433	-0.3297*

Correlations between the crime variables and the institutional variables and between the crime variables themselves. (*) Represents statistical significance at least at the 5 percent level. Use natural logarithm for homicide rate and crime victimization.

Table 3. Model with governance indicator and crime variables

Dep Var: FDI/GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Governance * Prim Sector	0.4354*	0.4620*	0.1922	0.3774			
	(0.2559)	(0.2576)	(0.2099)	(0.2780)			
Governance * Secondary Sec	-0.0607	-0.1346	-0.2341	0.1494			
	(0.1437)	(0.1615)	(0.1774)	(0.1734)			
Governance * Tertiary Sector	0.2536	-0.0348	-0.0676	-0.1986			
	(0.2579)	(0.2130)	(0.2381)	(0.2418)			
Ln(Crime) * Primary Sector		0.4144	-0.4573	-0.3357	0.0820	-0.3893	-0.3333
		(0.4860)	(0.6791)	(0.4660)	(0.4598)	(0.6698)	(0.4581)
Ln(Crime) * Secondary Sector		-0.6046**	-0.8364*	-0.1200	-0.5337**	-0.9057**	-0.1253
		(0.2395)	(0.4312)	(0.1845)	(0.2404)	(0.4459)	(0.1839)
Ln(Crime) * Tertiary Sector		0.2257	-1.1062**	-0.4705***	0.3201	-1.1274**	-0.4835***
		(0.4169)	(0.4750)	(0.1584)	(0.3715)	(0.4274)	(0.1673)
	(0.8664)	(0.9370)	(1.2457)	(1.6755)	(1.0372)	(1.2343)	(1.6640)
Constant	-22.4079	-75.047	-78.4308	-147.4074	-80.8826	-78.269	-153.9414
	(42.4791)	(52.1586)	(48.9377)	(96.2909)	(55.9210)	(50.2772)	(101.9239)
Controls	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓
R-squared	0.2588	0.086	0.0989	0.1274	0.0645	0.0902	0.1192
Observations	951	486	513	342	486	513	342
Number of groups	52	49	43	48	49	43	48
Obs. per group, min.	2	2	2	1	2	2	1
Obs. per group, max	26	15	15	9	15	15	9
Obs. per group, avg.	18.29	9.918	11.93	7.125	9.918	11.93	7.125

Robust standard errors in parenthesis. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level. Estimations derived from the model including homicide rates shown in columns 2 and 5, including crime victimization index shown in columns 3 and 6, and including organised crime index in columns 4 and 7. Fixed Effects model used in all estimations. Control variables are GDPpc, population, trade openness, exchange rates and, inflation. All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period).

Table 4. Model with composite and political risk indices and crime variables

Dep Var: FDI/GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Risk * Prim Sec	0.0341	-0.0018	0.0185	0.0472	0.019	0.0441	0.0547	0.0554
	(0.0250)	(0.0304)	(0.0292)	(0.0556)	(0.0265)	(0.0462)	(0.0331)	(0.0457)
Risk * Sec Sec	0.0159	-0.0413	-0.0361	-0.0124	0.0022	-0.0386	-0.0263	0.0096
	(0.0188)	(0.0332)	(0.0282)	(0.0349)	(0.0148)	(0.0260)	(0.0232)	(0.0356)
Risk * Ter Sec	0.0573***	-0.0024	0.0051	0.0049	0.0430**	-0.0059	0.0087	0.0233
	(0.0194)	(0.0180)	(0.0214)	(0.0312)	(0.0191)	(0.0199)	(0.0253)	(0.0310)
Ln(Crime) * Prim Sec		0.0756	-0.3808	-0.3597		0.2579	-0.4826	-0.3861
		(0.4565)	(0.6918)	(0.4754)		(0.5290)	(0.7170)	(0.4598)
Ln(Crime) * Sec Sec		-0.5394**	-0.9896**	-0.1395		-0.5493**	-0.8266*	-0.1126
		(0.2356)	(0.4193)	(0.1934)		(0.2313)	(0.4275)	(0.1774)
Ln(Crime) * Ter Sec		0.3154	-1.1301***	-0.5028***		0.3227	-1.1281**	-0.4962***
		(0.3721)	(0.4004)	(0.1593)		(0.3666)	(0.4538)	(0.1689)
Constant	-22.0488	-94.1629	-83.2166	-147.7054	-22.4555	-88.0652	-83.1827*	-183.9376*
	(43.0743)	(61.0375)	(53.4288)	(96.6263)	(43.8346)	(56.1365)	(45.3810)	(107.9696)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.2679	0.0727	0.0987	0.1275	0.2579	0.0808	0.1114	0.1262
Observations	951	486	513	342	951	486	513	342
Number of groups	52	49	43	48	52	49	43	48
Obs. per group, min.	2	2	2	1	2	2	2	1
Obs. per group, max	26	15	15	9	26	15	15	9
Obs. per group, avg.	18.29	9.918	11.93	7.125	18.29	9.918	11.93	7.125

Robust standard errors in parenthesis. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level. Estimations derived from the model including homicide rates shown in columns 2 and 6, including crime victimization index shown in columns 3 and 7, and including organised crime index in columns 4 and 8. Estimations derived from the model including the composite risk index shown in columns 1-4 and including the political risk index in columns 5-8. Fixed Effects model used in all estimations. Control variables are GDPpc, population, trade openness, exchange rates and, inflation. All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period).

Table 5. Model with corruption and government stability (components of the political risk index) and crime variables

Dep Var: FDI/GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pol risk var * Prim Sec	0.4373**	0.1403	0.0754	-0.0215	0.1211	-0.0389	0.017	0.0249
	(0.1908)	(0.1838)	(0.1730)	(0.1010)	(0.0858)	(0.0847)	(0.1155)	(0.0793)
Pol risk var * Sec Sec	0.0327	-0.1168	-0.0942	0.0889	0.0359	-0.0879	-0.0538	0.0071
	(0.1589)	(0.1256)	(0.1037)	(0.1593)	(0.0654)	(0.0686)	(0.0641)	(0.0769)
Pol risk var * Ter Sec	0.0348	-0.141	-0.1075	-0.2263	0.1807**	-0.0159	-0.0195	0.0204
	(0.2332)	(0.1376)	(0.1836)	(0.1712)	(0.0788)	(0.0628)	(0.0812)	(0.0650)
Ln(Crime) * Prim Sec		0.2078	-0.4395	-0.3344		0.1002	-0.4656	-0.355
		(0.4787)	(0.6750)	(0.4559)		(0.4675)	(0.7171)	(0.4469)
Ln(Crime) * Sec Sec		-0.5940**	-0.8824**	-0.1431		-0.6095***	-0.8532*	-0.1292
		(0.2305)	(0.4221)	(0.1725)		(0.2176)	(0.4402)	(0.1736)
Ln(Crime) * Ter Sec		0.2174	-1.0451**	-0.4413**		0.3598	-1.1229**	-0.5017***
		(0.3935)	(0.4652)	(0.1688)		(0.3684)	(0.4479)	(0.1763)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓
Constant	-27.3145	-77.479	-75.2219	-149.1302	-27.9968	-72.6432	-76.0841	-155.7352
	(38.2716)	(52.3888)	(48.4299)	(101.0115)	(43.9298)	(56.6669)	(50.7307)	(102.9602)
R-squared	0.257	0.0756	0.0945	0.1237	0.2572	0.0702	0.0929	0.1196
Observations	951	486	513	342	951	486	513	342
Number of groups	52	49	43	48	52	49	43	48
Obs. per group, min.	2	2	2	1	2	2	2	1
Obs. per group, max	26	15	15	9	26	15	15	9
Obs. per group, avg.	18.29	9.918	11.93	7.125	18.29	9.918	11.93	7.125

Robust standard errors in parenthesis. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level. Estimations derived from the model including corruption shown in columns 1-4 and using government stability shown in columns 5-8. Estimations derived from the model including homicide rates shown in columns 2 and 6, including crime victimization index shown in columns 3 and 7, and including organised crime index in columns 4 and 8. Fixed Effects model used in all estimations. Control variables are GDPpc, population, trade openness, exchange rates and, inflation. All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period).

Table 6. Model with internal conflict and investment profile (components of the political risk index) and crime variables.

Dep Var: FDI/GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pol risk var * Prim Sec	0.0413	-0.0162	0.1102	0.0233	0.0168	0.0016	0.1025	0.1364
	(0.0743)	(0.0910)	(0.0753)	(0.1594)	(0.0894)	(0.1139)	(0.0886)	(0.1156)
Pol risk var * Sec Sec	0.0537	0.0234	0.0762	-0.0178	-0.0109	-0.0668	-0.0263	0.0221
	(0.0530)	(0.1295)	(0.0741)	(0.1400)	(0.0494)	(0.0629)	(0.0533)	(0.0633)
Pol risk var * Ter Sec	0.1517**	-0.0443	0.0921	0.0132	0.1603***	0.0472	0.0703	0.1049**
	(0.0619)	(0.0737)	(0.0625)	(0.0981)	(0.0469)	(0.0454)	(0.0419)	(0.0435)
Ln(Crime) * Prim Sec		0.0769	-0.3138	-0.3408		0.0737	-0.5125	-0.3209
		(0.4669)	(0.7063)	(0.4641)		(0.4659)	(0.7286)	(0.4456)
Ln(Crime) * Sec Sec		-0.5648**	-0.8928*	-0.1235		-0.5437**	-0.8517*	-0.073
		(0.2485)	(0.4608)	(0.1834)		(0.2308)	(0.4595)	(0.1879)
Ln(Crime) * Ter Sec		0.3194	-1.0581**	-0.4880***		0.3057	-1.2163***	-0.4559**
		(0.3796)	(0.4024)	(0.1677)		(0.3711)	(0.4099)	(0.1842)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓
Constant	-14.992	-83.8108	-55.7941	-154.64	-25.636	-83.7721	-88.2122*	-210.2772**
	(44.9366)	(62.5242)	(54.3212)	(102.7329)	(44.9393)	(57.9035)	(45.3673)	(102.9218)
R-squared	0.2504	0.0654	0.0984	0.1194	0.2565	0.0696	0.1025	0.1305
Observations	951	486	513	342	951	486	513	342
Number of groups	52	49	43	48	52	49	43	48
Obs. per group, min.	2	2	2	1	2	2	2	1
Obs. per group, max	26	15	15	9	26	15	15	9
Obs. per group, avg.	18.29	9.918	11.93	7.125	18.29	9.918	11.93	7.125

Robust standard errors in parenthesis. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level. Estimations derived from the model including internal conflict shown in columns 1-4 and using investment profile shown in columns 5-8. Estimations derived from the model including homicide rates shown in columns 2 and 6, including crime victimization index shown in columns 3 and 7, and including organised crime index in columns 4 and 8. Fixed Effects model used in all estimations. Control variables are GDPpc, population, trade openness, exchange rates and, inflation. All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period).

Appendix

Table A1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Levels					
FDI GDP share (160) [a, b, c]	1134	0.8588	1.3446	0.0000	16.5152
FDI inflow (160) [b]	1134	238.0611	416.7552	0.0000	7022.6000
GDP per capita initial [d]	1599	3560.6580	2220.2920	833.8649	14297.8900
Population	1674	24300000	39500000	1069199	193000000
Trade openness (12) [b]	1635	64.2583	40.8049	11.5457	562.0604
Exchange rate	1665	615.7166	2933.8790	0.0000	25000.0000
Inflation (15) [b, c]	1665	146.6854	936.6053	-27.6317	13611.6300
Homicide rate	663	25.1210	22.3102	3.2000	139.1321
Crime victimization (90) [b]	669	0.3865	0.0964	0.1188	0.7824
Organised crime	465	-3.8694	0.9689	-6.2781	-1.8000
Governance	1404	0.0809	1.0215	-2.4956	2.4671
Composite risk	1404	62.5685	10.8940	25.3800	82.3800
Political risk	1404	61.3277	10.6323	29.5000	81.7500
Bureaucratic quality	1404	1.8118	0.8632	0.0000	3.0000
Corruption	1404	2.7310	0.9564	0.0000	5.0000
Democracy	1404	3.9379	1.1537	1.0000	6.0000
Ethnic tension	1404	4.5567	1.1366	0.5000	6.0000
External conflict	1404	9.9808	2.0278	2.0000	12.0000
Government stability	1404	6.9728	1.9560	2.0000	11.0000
Internal conflict	1404	8.2023	2.3806	0.0000	12.0000
Investment profile	1404	6.7265	2.2496	1.1700	11.5000
Law and order	1404	2.8828	1.0695	1.0000	5.0000
Military in politics	1404	3.3827	1.5641	0.0000	6.0000
Religion in politics	1404	5.1860	0.6819	4.0000	6.0000
Socioeconomic conditions	1404	5.1654	1.4771	1.0000	8.5000
Capital openness [e]	1674	0.0938	1.5508	-1.8640	2.4390
Surrounding mkt. pot. [e]	1674	3333.1910	672.1175	2116.4440	6019.4790
Polity [e]	1581	5.9696	4.6597	-9.0000	10.0000
Natural logarithm					
Ln(FDI GDP share)	1134	-1.1871	1.6439	-6.9078	2.8043
Ln(FDI inflow)	1134	4.2418	1.8611	-2.9957	8.8569
Ln(GDP per capita initial)	1599	7.9847	0.6396	6.7261	9.5679
Ln(Population)	1674	16.1277	1.2689	13.8824	19.0807
Ln(Trade openness)	1635	4.0024	0.5748	2.4463	6.3316
Ln(Exchange rate)	1665	1.0110	5.9610	-25.1748	10.1266
Ln(Inflation)	1665	2.4478	1.7780	-1.7749	9.5187
Ln(Homicide rate)	663	2.8779	0.8343	1.1632	4.9354
Ln(Crime victimization) [f]	669	-0.9812	0.2507	-2.1301	-0.2454
Ln(Surrounding mkt. pot).	1674	8.0923	0.1953	7.6575	8.7028

Notes:

Methodological considerations and variable transformations:

(a) Some of the values for FDI inflows are non-positive (5 cases). The natural logarithm transformation for those values is equal to the natural logarithm of half the minimum value among observations in the sample greater than zero. This is the form of truncation recommended by Cameron and Trivedi (2005).

(b) We use linear interpolation for the variables. In parenthesis we denote the number of observations filled in with linear interpolation. Due to missing observations in the FDI data, we also use linear interpolation for our dependent variable. After filling in for missing data in this way, we find that 14 percent of the total number of observations used in the analysis were created by linear interpolation, which is a reasonable percentage. We are aware that using this amount of interpolated data is likely to understate reported standard which is why we estimate our model in the robustness section using the FDI data without linear interpolation (see robustness section).

(c) Summary statistics for all variables but FDI are using the first lag. The natural logarithm for the non-positive values (FDI and Inflation) are truncated with the natural logarithm of half the minimum positive value.

(d) For initial GDP per capita we use real GDP in 2000 constant US dollars. This variable is time variant as it is initial level a five year period. Trade openness is exports plus imports as a share of GDP and the exchange rate variable is the official exchange rate, where it is expressed as the number of local currency units per US dollar.
(e) We construct surrounding market potential as in Blanco (2012). Capital openness data is obtained from Chinn and Ito (2008), and polity data from the polity IV database (Marshall and Jagger, 2013).
(f) There is some lack of consistency in the year 2000 and some of the 1999 data is missing for the Latinobarometro data. We therefore assume that the observations are missing for this year. Thus, we fill in with linear interpolation for the years 2000 and 1999. As a note of caution, we should add that this survey does not have weights that would allow us to infer that the proportions we estimate are completely representative of the entire population.

Table A2. Model with governance indicator and crime variables – Reduced sample of Latin American Countries

Dep Var: FDI/GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Governance * Prim Sector	0.5490**	0.6029**	0.1647	0.2982			
	(0.2308)	(0.2737)	(0.2080)	(0.2419)			
Governance * Secondary Sec	0.0298	-0.0373	-0.2229	0.2995			
	(0.1302)	(0.1905)	(0.1750)	(0.2109)			
Governance * Tertiary Sector	0.3876	-0.0543	-0.0813	-0.1801			
	(0.2625)	(0.2544)	(0.2440)	(0.2703)			
Ln(Crime) * Primary Sector		0.5673	-0.3917	-0.7085	0.2382	-0.3239	-0.6935
		(0.5526)	(0.7067)	(0.5255)	(0.5338)	(0.6985)	(0.5187)
Ln(Crime) * Secondary Sector		-0.6326**	-0.9220**	-0.3166	-0.6475**	-0.9850**	-0.313
		(0.3016)	(0.4205)	(0.2350)	(0.2917)	(0.4363)	(0.2391)
Ln(Crime) * Tertiary Sector		0.4761	-1.1046**	-0.7320***	0.6697	-1.1299**	-0.7613***
		(0.4736)	(0.4814)	(0.1605)	(0.4442)	(0.4316)	(0.1610)
Controls	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓
Constant	-67.5481	-56.3397	-78.9115	-30.5498	-73.6169	-78.3608	-42.9301
	(79.5257)	(59.8166)	(48.5924)	(130.1472)	(68.8607)	(49.7379)	(139.7019)
R-squared	0.2921	0.1088	0.1009	0.1412	0.0788	0.0933	0.1332
Observations	819	405	499	280	405	499	280
Number of groups	43	40	40	39	40	40	39
Obs. per group, min.	2	2	4	1	2	4	1
Obs. per group, max	26	15	15	9	15	15	9
Obs. per group, avg.	19.05	10.12	12.47	7.179	10.12	12.47	7.179

Robust standard errors in parenthesis. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level. Estimations derived from the model including homicide rates shown in columns 2 and 5, including crime victimization index shown in columns 3 and 6, and including organised crime index in columns 4 and 7. Fixed Effects model used in all estimations. Control variables are GDPpc, population, trade openness, exchange rates and, inflation. All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period).

Table A3. Model with composite and political risk indices and crime variables - Reduced sample of Latin American Countries

Dep Var: FDI/GDP	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Risk * Prim Sec	0.0322	0.0022	0.0101	0.0185	0.0221	0.0538	0.0491	0.0382
	(0.0263)	(0.0338)	(0.0292)	(0.0587)	(0.0271)	(0.0534)	(0.0331)	(0.0423)
Risk * Sec Sec	0.0184	-0.0349	-0.034	-0.005	0.0103	-0.0246	-0.0231	0.0351
	(0.0192)	(0.0373)	(0.0291)	(0.0377)	(0.0147)	(0.0269)	(0.0235)	(0.0361)
Risk * Ter Sec	0.0608***	-0.0009	0.0053	-0.0075	0.0511**	-0.0076	0.0085	0.0188
	(0.0200)	(0.0197)	(0.0219)	(0.0307)	(0.0194)	(0.0229)	(0.0259)	(0.0371)
Ln(Crime) * Prim Sec		0.2324	-0.323	-0.6709		0.4708	-0.4086	-0.7067
		(0.5390)	(0.7145)	(0.5188)		(0.6158)	(0.7426)	(0.5199)
Ln(Crime) * Sec Sec		-0.6775**	-1.0695**	-0.319		-0.6585**	-0.9124**	-0.3101
		(0.2655)	(0.4067)	(0.2426)		(0.2693)	(0.4193)	(0.2315)
Ln(Crime) * Ter Sec		0.6614	-1.1349***	-0.7711***		0.6027	-1.1320**	-0.7676***
		(0.4398)	(0.4032)	(0.1582)		(0.4509)	(0.4582)	(0.1642)
	(0.0636)	(0.3662)	(0.2898)	(0.4875)	(0.0645)	(0.3543)	(0.2547)	(0.4712)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓
Constant	-48.8315	-85.7367	-84.0561	-42.496	-53.8312	-73.0161	-82.4657*	-70.0876
	(85.1247)	(76.1934)	(53.6103)	(136.0052)	(85.4640)	(69.1904)	(45.3859)	(137.7638)
R-squared	0.2891	0.0845	0.0998	0.1346	0.283	0.0936	0.1104	0.1386
Observations	819	405	499	280	819	405	499	280
Number of groups	43	40	40	39	43	40	40	39
Obs. per group, min.	2	2	4	1	2	2	4	1
Obs. per group, max	26	15	15	9	26	15	15	9
Obs. per group, avg.	19.05	10.12	12.47	7.179	19.05	10.12	12.47	7.179

Robust standard errors in parenthesis. ***, **, and * represent statistical significance at the 1, 5, and 10 percent level. Estimations derived from the model including homicide rates shown in columns 2 and 6, including crime victimization index shown in columns 3 and 7, and including organised crime index in columns 4 and 8. Estimations derived from the model including the composite risk index shown in columns 1-4 and including the political risk index in columns 5-8. Fixed Effects model used in all estimations. Control variables are GDPpc, population, trade openness, exchange rates and, inflation. All variables are entered as lags except initial GDP (initial level of GDP for each 5 year period).