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**Criminal Violence and the Subnational Distribution
of Foreign Direct Investment**



Importante

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Abstract

How does violence affect foreign direct investment (FDI) in developing countries? Most research on this question examines political violence, such as war, terrorism, or political instability. However, we know little about how criminal violence – which has wreaked havoc in many countries – might affect FDI. Furthermore, most studies of FDI have analyzed cross-national variation, not looking within countries. This paper analyzes effects of criminal violence on FDI in Mexican states between 1999 and 2012. This case is important to understand because Mexico is one of the top global recipients of FDI. At the same time, violence related to drug trafficking organizations has killed tens of thousands of people in Mexico in recent years, but scholars are just beginning to understand the conflict's wider effects. The paper's models use original data on territory of drug-trafficking organizations. Interestingly, measures of criminal violence and organized crime are not directly associated with FDI. However, we find a conditional deterrent effect: Factors theorized to attract FDI (democracy, economic growth, and human capital proxied with average schooling years) are only associated with FDI when homicide rates are low.

Keywords: Foreign direct investment, Criminal violence, Criminal organizations, Homicides, Mexico

Resumen

¿Cómo afecta la violencia a la inversión extranjera directa (IED) en países en vías de desarrollo? La mayoría de la literatura sobre esta pregunta examina los efectos de la violencia política, por ejemplo, guerra, terrorismo o inestabilidad política. Sin embargo, sabemos muy poco sobre cómo la violencia criminal – que ha hecho estragos en muchos países – puede afectar a la IED. Más aun, la mayoría de los estudios sobre IED analizan la distribución de ésta entre países, sin fijarse en la distribución subnacional. Este artículo analiza los efectos de la violencia criminal sobre la distribución de IED en los estados mexicanos entre 1999 y 2012. Este caso es de particular importancia porque México es uno de los principales receptores de IED en el mundo. Al mismo tiempo, la violencia relacionada con las organizaciones que trafican drogas ha matado a decenas de miles de personas en México en los últimos años, pero recién estamos empezando a entender las repercusiones más amplias de este conflicto. Los modelos de este artículo usan datos originales sobre el territorio de las organizaciones de tráfico de drogas. Llamativamente, las medidas de violencia criminal y crimen organizado no están directamente asociadas con la IED. Sin embargo, encontramos un efecto condicional disuasivo: Los factores que tradicionalmente atraen a la IED (democracia, crecimiento económico y capital humano medido como años de escolarización) sólo se asocian con mayor IED cuando las tasas de homicidio son bajas.

Palabras clave: Inversión extranjera directa, Violencia criminal, Organizaciones criminales, Homicidios, México

Introduction

How does violence affect foreign direct investment (FDI) in developing countries? Foreign investment can be crucial to economic development, so scholars in recent years have sought to explain the substantial variation in FDI patterns. Some studies examine how *political* violence may deter FDI (e.g., Powers and Choi 2012), but very little has been explored about the possible relationship between criminal violence and investment. Our paper seeks to address this question using subnational data on Mexico. In doing so, we intend to contribute to the literature in three ways. First, beyond the focus on FDI, we add to the relatively small but growing body of work exploring political and economic consequences of *criminal* violence. Second, the Mexican case is particularly important to understand, given the amount of FDI Mexico receives, and the scale of the violence and related human rights issues in recent years. Finally, the subnational focus permits a more fine-grained analysis while holding country attributes constant.

Crime, including criminal violence, has important political and economic consequences, and therefore is increasingly drawing attention from scholars. The involvement of criminal organizations such as drug-trafficking organizations (DTOs), especially in the Mexican case, creates a number of challenges for both governance and development. Criminal organizations, especially when they are transnational, can “by their very nature undermine civil society, destabilize domestic politics, and undercut the rule of law” (Williams 1994). Recent studies have shown criminal violence can deter political participation (Bravo Regidor and Maldonado Hernández 2012; Trelles and Carreras 2012) and in some cases affect the economy (Daniele and Marani 2011; Gaviria 2002). Systematic studies on these topics are fairly new, so a number of questions remain.

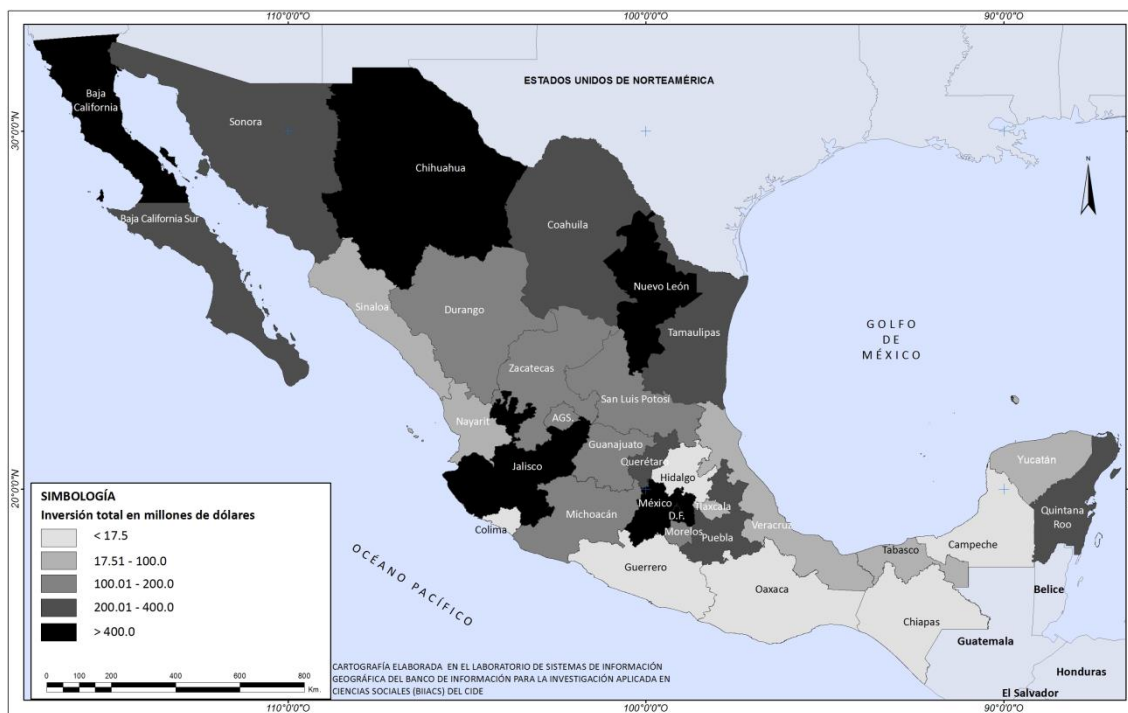
This paper focuses on Mexico, which is important and interesting for several reasons. First, Mexico receives a great deal of FDI, especially for a developing country. In recent years it has ranked in the Top 20 FDI recipients globally. A recent survey by the United Nations asked leaders of international firms which countries would be top prospective FDI hosting countries in 2013-2015, and Mexico ranked No. 7 in the survey, behind Brazil and Germany (UNCTAD 2013). At the same time, Mexico faces enormous challenges with organized crime. The government started militarily confronting DTOs in 2006, and the resulting violence has left more than 70,000 dead and tens of thousands missing (Johnson 2013).¹ Organized crime violence is increasingly an issue in many areas, such as other parts of Latin America, West Africa, and Southeast Asia, so the Mexican situation can speak to other cases as well.

Subnational quantitative analysis, as opposed to cross-national studies, offers a number of advantages to social science research. Snyder (2001) argues that comparing units such as states or provinces within a single country holds country-level attributes

¹ These numbers come from the government in early 2013, but are debated.

constant, adding important control to the study. He also notes that more precise coding is possible, leading to more accurate causal inference. Of course the tradeoff is that it is unclear to what extent conclusions from one country can be applied to other, but a mix of cross-national and sub-national studies can help scholars build a more coherent and convincing body of literature. A number of studies of FDI have used the subnational approach to understand investment, in countries such as India (Mukim and Nunnenkamp 2012), Mexico (Ashby and Ramos 2013), Poland (Chidlow et al. 2009), and the United States (Halvorsen and Jakobsen 2013; McMillan 2009). A subnational focus on Mexico makes sense, given the heterogeneity of the Mexican subnational units, and the variation in the FDI inflows they receive. Map 1 illustrates the heterogeneity of subnational allocation of FDI. States are identified according to the quintile of average annual FDI received between 1999 and 2011. It also should be noted that cross-national comparable data on crime is not available for many countries, so at this point subnational studies are probably the most feasible way to quantitatively study consequences of crime.

MAP 1. AVERAGE ANNUAL FDI RECEIVED PER MEXICAN STATE BETWEEN 1999 AND 2011, IN MILLIONS OF U.S. DOLLARS, BY QUINTILES.



Note: Map created with data from the Mexican Secretary of Economy (Secretaría de Economía 2013).

The rest of the paper proceeds as follows. In the next section we discuss the literature on determinants of FDI subnationally and generally, and then focus on how violence is likely to affect foreign investment. We argue that criminal violence should generally reduce FDI levels. We consider violence directly, as well as the concept of organized crime presence and territory disputed between criminal organizations. In the following section we discuss our data, including original data on Mexican organized crime in Mexican states over time. Our empirical analysis returns some expected results, but others that are relatively surprising. We find that measures of criminal violence are generally *not* directly associated with FDI. However, we find an important conditional relationship: democracy, economic growth, and the average education level of the public are only associated with FDI at lower levels of violent crime. These factors are theoretically important, and often found to be related to FDI in cross-national studies, but the relationship has not been found in most studies of Mexico. Our results provide an answer to the puzzle. Widespread violence conditions the relationship between these important factors and foreign investment.

Literature and argument

Subnational distribution of FDI

The IPE literature has identified a series of key variables that explain FDI levels to across countries. The baseline model usually includes market size, development, GDP growth, some proxy for regime type, and for political instability (i.e., Biglaiser and Staats 2010; Büthe and Milner 2008; Jensen 2006). It is common to include lagged values of the dependent variable because there is a temporal dependence between past and present investment decisions. The list of variables varies depending on the research question. However, it is less clear what should a baseline model look like to explain subnational distribution of FDI.

A few studies explore what factors affect the subnational distribution of FDI, particularly in México.² Interestingly, some of the variables that robustly explain FDI flows among countries do not explain subnational distribution of FDI. For example, one study finds that agglomeration economies and international infrastructure (measured as phone lines per capita) explains some FDI inflows (Mollick et al. 2006). Another study (Jordaan 2008) finds that regional market, wages, infrastructure and agglomeration economies explain non-maquiladora FDI. However, those variables are highly correlated with each other and results are sensitive to model specification.

Samford and Ortega Gómez (2014) study three types of FDI flows to Mexican states: resource-, market-, and efficiency-seeking FDI. Several of the factors

² We do not discuss here a growing literature on subnational distribution of FDI in other developing countries for space considerations. See for example (Chidlow et al. 2009; Halvorsen and Jakobsen 2013; Kandogan 2012; McMillan 2009; Meyer and Nguyen 2005; Mukim and Nunnenkamp 2012).

traditionally associated with FDI inflows are significant determinants of subnational FDI allocation, but surprisingly they have coefficients with signs in opposite directions than in international models (Samford and Ortega Gómez 2014:20).³ Interestingly, they find that only resource-seeking FDI is deterred by total crime. On a 1994-2004 sample, Escobar Gamboa (2012) includes spatial lags in his models (the distance between the state and Mexico City or the U.S. border). He finds that FDI is attracted by higher levels of education and by lower levels of criminality. Most of the variables in Escobar Gamboa's models, however, do not produce robust results.⁴ Similarly, in Ashby and Ramos's two studies of subnational variation in Mexican FDI, there are no control variables that are consistently statistically significant.

Generally, there are mixed results regarding the effect of state-level market size, development and growth on FDI flows. This could be due to the relative absence of legal barriers to trade within the country, and to the fact that some activities associated with resource exploitation usually do not respond to those factors.

Violence and investment

A growing body of research looks at how violence affects investment, but the vast majority of these studies consider political, not criminal, violence.⁵ Some studies find a negative relationship between terrorism and FDI, whether the studies look at Spain and Greece (Enders and Sandler 1996), or a global sample (Abadie and Gardeazabal 2008; Bandyopadhyay et al. 2013). Abadie and Gardeazabal (2008) argue that even though terrorist attacks might only directly affect a small portion of the country's economy, they increase uncertainty and reduce the expected return to investment in a country. Consistent with this, Jensen and Young (2008) find that recent political violence (civil war or international war) is associated with higher prices for violence risk insurance. Collier (1999) finds that civil war is associated with a reduction in gross domestic product, and argues that this is because of capital flight.⁶

Other studies suggest the relationship between political violence and FDI is more complicated – if it exists at all. Li and Schuab (2004) fail to find a relationship between transnational terrorism and FDI, when controlling for many other economic and political factors. A later study by Li finds that when conflict is relatively predictable it is not related to FDI, but unexpected political violence reduces FDI (Li 2006). Enders and

³ For example, they find that market-seeking FDI is attracted by more strikes, less GDP per capita and states ruled by the PRI. Resource- and efficiency-seeking FDI are attracted by lack of electoral competition (proxied by unified governments).

⁴ See Table 4 (Escobar Gamboa 2012).

⁵ On differences between criminal and political organizations, and how these differences have policy implications, see Phillips (2015).

⁶ Other research looks at how political violence negatively affects domestic investment. For example, Singh (2012) studies the Punjab insurgency in India, and finds that districts affected by terrorist attacks have reduced rates of investment in long-term agricultural technology. Somewhat similarly, Camacho and Rodriguez (2012) examine Colombia and find that guerrilla attacks are associated with firms leaving the targeted area.

colleagues (2006) find that terrorism is negatively associated with U.S. FDI in OECD countries, but that there is no relationship in non-OECD countries. Powers and Choi (2012) find that FDI is only negatively related to “business-related terrorism,” but that FDI seems unaffected by other types of terrorism.

Some other research looks at the more general concept of “political instability,” which includes political violence. Although political instability should make foreign firms less likely to invest in a country, evidence on this matter is varied. Some analysis finds that instability is negatively associated with investment mixed (Asiedu 2006). In Büthe and Milner’s (2008) research, the instability variable is consistently negative, but is sometimes statistically insignificant or only marginally significant. Other research finds mixed results, depending on how political instability is characterized. Feng (2001) finds FDI negatively related to war deaths, but no relationship with many other measures such as political executions, coups, and revolutions. Some studies, however, fail to find a statistically significant relationship between instability and FDI (Asiedu 2002). Asiedu argues that this non-result is “not surprising” because many instable countries, such as Angola, also receive a great deal of investment. This implies that investors are not worried about the cost of instability. Overall, while there are theoretical reasons to expect that political violence discourages FDI, empirical studies have not consistently found support for that idea.

Beyond political violence and instability, a number of studies have examined how *criminal* violence, and other crime, might affect FDI. A few studies of the determinants of FDI use the number of reported crimes as control variables, but do not explore the nature of this association. On a 1994-2004 sample, Escobar Gamboa (2012) finds that criminality deters total FDI inflows. Samford and Ortega Gómez (2014) find that crime deters resource-seeking FDI, but not investment in other areas. One study uses survey research to infer that crime reduces investment in Latin America (Gaviria 2002). A more recent set of studies is especially relevant because the authors look at how crime affects FDI in Mexico. Madrazo Rojas (2009) shows that homicides are negatively associated with FDI between 1998 and 2006 in Mexico.

Two studies by a pair of authors find mixed results. Ashby and Ramos (2013) find that homicides are negatively associated with most sectors of FDI – but they do not find a negative association between homicides and FDI in aggregate in Mexico. In a second study, however, they find that FDI from high-crime countries is positively associated with FDI in high-crime parts of Mexico (Ramos and Ashby 2013). The Madrazo and Ashby and Ramos studies are important for a number of reasons, but it should be pointed out that these studies use general crime and homicide rates as independent variables. Ashby and Ramos claim to study organized crime, arguing that the majority of Mexican crime is linked to major organizations, but this is debatable.⁷

⁷ For example, the vast majority of homicides in Mexico are not connected to organized crime – even by government organized crime definitions, which are said to over-count. In our sample, the mean Mexican state-year has about 275 organized-crime homicides, according to the two measures used, during the years for which there are coverage. However, the mean Mexican state-year has 593 homicides. This suggests organized crime accounts for less than half of homicides, according to the best available data.

In one of their papers, they use data on drug-related homicides – the Mexican government’s measure of narcoviolence – as a robustness check, and do not find statistically significant results (Ramos and Ashby 2013). No other authors, as far as we are aware, have looked at how organized crime violence such as that in the Mexico case might affect FDI.

With the above findings in mind, we propose hypotheses for criminal violence in general, and for organized crime in particular. While we expect criminal violence general should decrease FDI in a state, we highlight perhaps the most violent crime: homicide. This type of crime should have an especially strong negative impact on FDI, as higher homicide rates suggest higher fear for the lives of employees and their families. This could cause individuals to leave the state for a safer area, potentially raising employment costs for firms. Furthermore, if employees are killed, this introduces turnover costs, not to mention the fear inspired in other workers and related consequences. Homicide, as the arguably most severe form of criminal violence, should impose especially high costs for foreign firms. Even the then-president of Mexico, Felipe Calderón acknowledged in 2012 that crime is likely to deter FDI. “Yes, [crime] has a impact, of course,” he told a reporter (Caldwell 2012). Overall, this suggests the following hypothesis:

Hypothesis 1: Homicide is negatively associated with subnational FDI allocation.

Organized crime is an important subset of crime, but with particular characteristics. The literature suggests several ways that criminal organizations and their violence could affect business and foreign investment. We argue that organized crime affects the subnational allocation of FDI, and that this effect is different from the “regular” crime violence reflected by homicide rates. The most common argument is that organized crime deters investment (Ashby and Ramos 2013).⁸ Conflict between criminal organizations could make the environment volatile, increasing risks for investors. Organized crime could impose especially high costs on firms through extortion, corruption, and other means that go beyond “typical” crime. Some empirical research supports the idea that criminal organizations depress FDI. Daniele and Marani (2011) study Italy, and find that crime tied to the Mafia is negatively associated with FDI, but other types of crime are not related. They explain the lack of relationship between FDI and non-mafia crime by asserting that crime tends to happen in economically developed areas, but only certain types of crime deter investors. Overall, if crime is suspected to depress foreign investment, there are reasons to believe

⁸ Note that this argument is not necessarily intuitive. An alternative, although less-frequently-argued possibility, is that organized crime provides a hospitable environment for foreign investment. Theoretically, criminal organizations could provide some stability for foreign firm operations, even working directly with them, or substituting for the state in some ways. Another possibility is that the areas with a substantial amount of organized crime activity see an increase in “investment” that is actually money laundering operations. In other words, the investment includes front operations that appear and increase transactions as groups need to process more profits.

organized crime – with greater capabilities for violence – should be negatively related to investment as well, independently from the general level of homicide in the region. This suggests the following hypothesis:

Hypothesis 2: Organized crime violence is negatively associated with subnational FDI allocation.

There are reasons to doubt the above hypotheses. For one, at the national level, FDI increased in Mexico in recent years in spite of the major wave of organized crime violence. Subnationally, the story might be more complicated. We consider an additional argument, that criminal violence has a conditioning effect on FDI. It is possible that the effect of other variables could depend on levels of criminal violence. In particular, relatively low levels of criminal violence are likely to be a necessary condition for other factors to attract investment. For example, investors would like an educated workforce, but given the choice between two states with about equal levels of education, a firm will go to the state with the lower crime level. Economic growth is attractive to foreign firms, but growth might not be sufficient to attract a company if criminal violence is at very high levels – as we have seen in some Mexican states since the “drug war” began. This suggests the following hypothesis:

Hypothesis 3: A positive relationship between other factors and FDI will only occur at lower levels of criminal violence.

Research design

The unit of analysis of the study is the Mexican state-year, and our models cover from 2000 until 2012. Most models have 388 observations, covering the 32 Mexican federal entities for at about 13 years, depending on independent variable missing data. The dependent variable is new FDI measured as the state’s yearly FDI inflows divided by the state’s GDP. FDI as a share of income is a standard way to take into consideration heterogeneity in recipients’ economies. We use new FDI because this is less likely to be sticky, more likely to have any variation. However, results are similar when total FDI/GDP is used. The data come from the Mexican Secretary of Economy (Secretaría de Economía 2013). As Map 1 suggests, there is substantial variation throughout the 32 Mexican states in FDI. During the 1999-2011 period, the top recipient state by far was the capital Federal District (54.4% of the FDI received by the country). Other top FDI recipients include Nuevo Leon (10.7%), the state of Mexico (5.8%), and Chihuahua (4.2%).

For Hypothesis 1, we use a measure of homicides per 100,000 inhabitants. These data come from the Mexican federal government, and range from around 4 to 128.⁹ The highest value is for Chihuahua in 2011, but other state-years with high values are Chihuahua 2010 (108), Sinaloa 2011 (103), Durango 2010 (86), and Guerrero 2012 (78). The mean value is around 28, and the modal value is about 22.

For Hypothesis 2, we use a proxy for organized crime violence, *disputed territory*. We use a proxy because it is not clear that reliable data on violence by crime groups exist, especially for so many years.¹⁰ Certain territory is fought over by two or more criminal organizations. This market competition often occurs because groups want to control valuable transit points, but also because groups want to be the sole vendor of drugs (for example) in a given area, or the sole collector of extortion revenue. When a group is growing in strength, it might challenge other groups for territory. Regardless of the cause, when criminal groups compete, violence is often substantially higher. If organized crime violence generally is likely to deter FDI – as hypothesis 2 suggests – then states that are disputed territory should generally receive less FDI. To code this variable, information was gathered on the geographic territory of each major DTO in Mexico, each year. Sources used included searches of Mexican newspapers, STRATFOR maps, and policy reports (e.g., Guerrero Gutiérrez 2011). About 38% of state-years are coded “1” for the variable at some time in the sample. This variable was also used and is described more in Phillips (2015).

We control for a series of factors that the literature associates with FDI levels. The models include the dependent variable lagged one year. *Turnover* is a proxy for democracy, and it indicates states where a party other than the Institutional Revolutionary Party (PRI) has been in control at some point since 2000, when democratic competition started. This measure was used by Benton (2008). The PRI controlled the country for 72 years, until 2000, and still controls about half the states. It is argued by Benton that states where party turnover still has not occurred are not fully democratic.¹¹ *GDP growth* is the percentage of change in the state’s GDP in the previous year. *Education* is average years of schooling of residents age 15 or older. The mean is about 8, and the variable ranges from 5.3 to 10.5.

Market size is the natural logarithm of the state’s population (Büthe and Milner 2008; Neumayer and Spess 2005). *GDPPC* is the state’s GDP per capita in constant 2012 U.S. dollars. Models also include a measure of road coverage in the state, to capture general infrastructure. We include two geographic controls: The Federal

⁹ The source is the Secretary of Interior (SEGOB). Data online here as of June 2015: <http://secretariadoejecutivo.gob.mx/incidencia-delictiva/incidencia-delictiva-fuero-comun.php> An alternate measure from Mexico’s National System of Health Information (SINAIS) and the National Institute of Statistics and Geography (INEGI) returns similar results.

¹⁰ The Mexican government reported data on organized crime homicides from December 2006 to late 2011. The Transborder Institute at the University of San Diego also has data on organized crime homicides from a slightly longer time period. Nonetheless, if these measures are included, they never achieve statistical significance.

¹¹ In these models, Turnover is used to indicate electoral competition. However, in economic matters the PRI can be considered a center-left wing party, and there is a literature suggesting that left-wing parties tend to attract more FDI (Pinto 2013; Pinto and Pinto 2008). However, other research shows that a more left-wing party (PRD) attracts more investment than the PRI (Garriga 2013). Therefore, the variable may be absorbing both effects.

District (DF) receives over 50% of the total FDI inflows to Mexico. Also, the *maquila* industry is located mainly along the border with the U.S. Therefore, we include *DF*, indicating whether the state is the Federal District, and *U.S. border*, indicating whether the state is on the with the U.S. border. Finally, we include a measure of the level of FDI Mexico received in the year, *New FDI in Mexico* to take into consideration national or global time trends in foreign investment. It is scaled as a natural logarithm.

The estimation technique is an ordinary least squares regression (OLS) with random effects and control for AR(1) disturbances. We use random effects to capture country-specific FDI determinants not included in the models. Hausman tests suggest there is not a systematic difference between the results of models with random and fixed effects, and random effects permits the inclusion of time-varying variables. Wooldridge tests show first-degree serial autocorrelation to be a problem, so the autoregression factor is included (Baltagi 2005). Independent variables are lagged one year because of reverse causality issues, and because we expect there to be delays in investment decisions.

Results

Table I shows the basic models, random effects regressions with the dependent variable FDI as a percentage of GDP. Across the models, there is surprising lack of statistical significance for most of the crime measures.

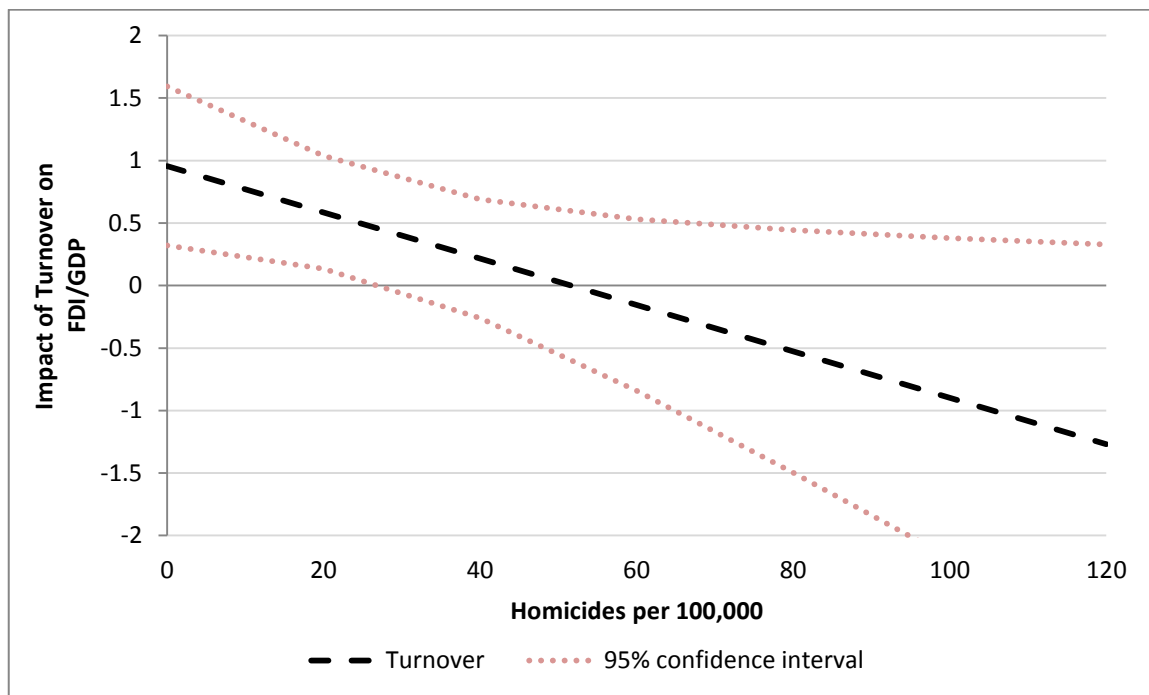
TABLE I. REGRESSIONS OF NEW FDI/GDP IN MEXICAN STATE-YEARS, 2000-2012

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6
HOMICIDE RATE		-.007 (.006)		.004 (.008)	-.001 (.006)	.016 (.049)
DISPUTED TERRITORY			-.0387 (.197)			
TURNOVER *				-.023* (.012)		
HOMICIDE RATE						
GDP GROWTH *					-.001*** (.000)	
HOMICIDE RATE						
EDUCATION *						-.003 (.006)
HOMICIDE RATE						
NEW FDI/GDP	.147*** (.051)	.150*** (.051)	.147*** (.051)	.155*** (.051)	.179*** (.051)	.155*** (.051)
TURNOVER	.441* (.230)	.423* (.228)	.445* (.231)	1.081*** (.409)	.385* (.221)	.425* (.226)
GDP GROWTH	-.000 (.003)	-.000 (.003)	-.000 (.003)	-.000 (.003)	.018** (.007)	-.000 (.003)
EDUCATION	.274** (.131)	.278** (.130)	.279** (.132)	.270** (.127)	.288** (.127)	.374 (.238)
MARKET SIZE	-.235 (.153)	-.220 (.151)	-.228 (.158)	-.221 (.145)	-.207 (.146)	-.216 (.149)
GDPPC	-.0118 (.0130)	-.0136 (.0130)	-.0115 (.0131)	-.0128 (.0128)	-.0171 (.0127)	-.0141 (.0130)
PORT	-.201 (.257)	-.217 (.253)	-.196 (.258)	-.221 (.242)	-.206 (.244)	-.201 (.252)
ROADS (LOG)	-.583*** (.212)	-.593*** (.209)	-.581*** (.212)	-.574*** (.200)	-.591*** (.201)	-.588*** (.206)
FEDERAL DISTRICT	2.757*** (.772)	2.659*** (.763)	2.729*** (.779)	2.553*** (.732)	2.544*** (.737)	2.558*** (.769)
BORDER	-.662* (.393)	-.689* (.388)	-.659* (.393)	-.587 (.377)	-.733* (.374)	-.703* (.383)
NEW FDI IN MEXICO	.038*** (.014)	.038*** (.014)	.038*** (.014)	.038*** (.014)	.038*** (.013)	.038*** (.014)
CONSTANT	.646 (2.737)	.595 (2.702)	.511 (2.801)	.366 (2.603)	.256 (2.617)	-.232 (3.133)
N	388	388	388	388	388	388
OVERALL R-SQUARED	.34	.35	.34	.36	.37	.35

Model 1 is a baseline model, not including any of the hypothesized variables. Results of control variables are discussed below. Model 2 tests measures of homicide per capita. The coefficient is statistically insignificant, suggesting violent crime in general has no impact on foreign investment. Hypothesis 1 is not supported. Model 3 tests *Disputed territory*, the measure of state-years in which criminal organizations are fighting over territory. This variable is also statistically insignificant, which goes against expectations. There does not appear to be a direct relationship between violent crime or organized crime violence and FDI. These non-results are very robust, which is discussed below.

Hypothesis 3, about conditional relationships with violent crime and other theoretical variables, is tested in Models 4-6. There is some support for the hypothesis. Model 4 shows the impact of *Turnover*, the measure of democracy, conditional on the homicide rate. The interaction term is negatively signed, but is only borderline significant ($p < .10$). Interestingly, the coefficient on *Turnover* is highly statistically significant in this model, and substantively larger than in models without the interaction term. The coefficient can be interpreted as the value of a democratic state-year when the homicide rate=0. In other words, when the homicide rate is very low, democratic alternation is positively associated with new FDI. To fully understand the impact of the interaction, Figure 1 plots the value of *Turnover* at different levels of the homicide rate. Consistent with the hypothesis, *Turnover* is only associated with new FDI when the homicide rate is low. *Turnover* is statistically significant at the $p < .05$ level until the homicide rate reaches about 25 per 100,000 citizens. The mean of the homicide rate in the sample is 28, so basically democracy is only associated with new FDI when the homicide rate is below average.

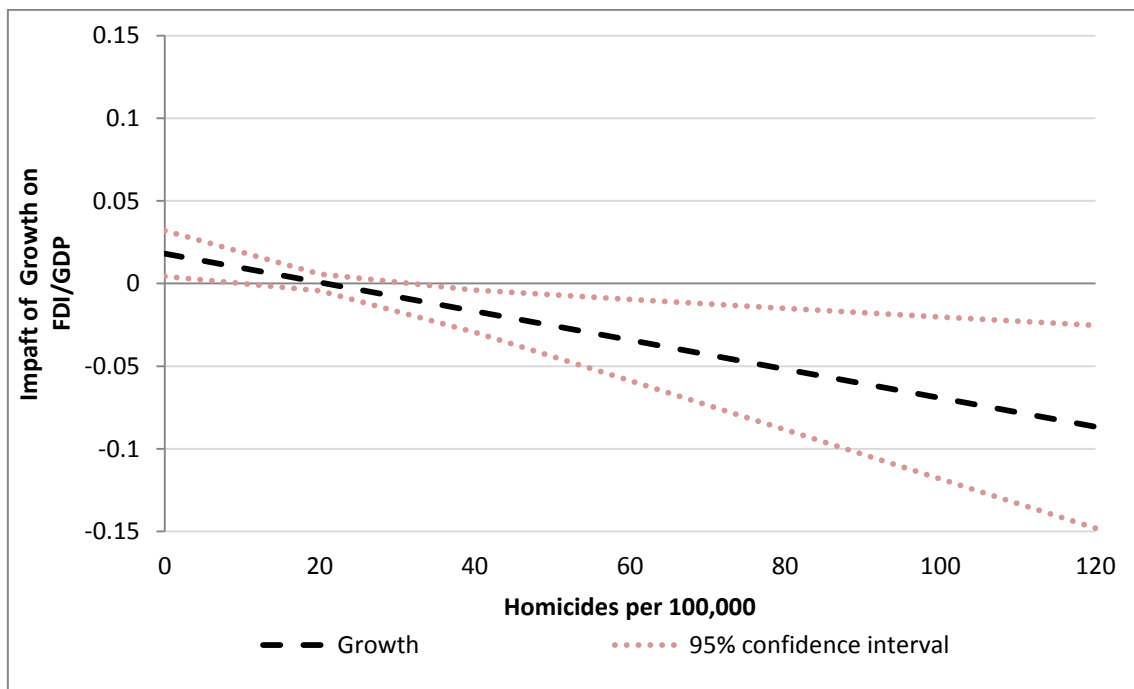
FIGURE 1. IMPACT OF TURNOVER ON FDI, CONDITIONAL ON HOMICIDE RATE



Model 5 tests the interaction of the GDP growth rate and the homicide rate. Interestingly, this is the only model in which the coefficient for *GDP growth* is statistically significant. Because of the interaction term, this coefficient is interpreted as

the impact of GDP growth when the homicide rate is 0. When the homicide rate is very low, GDP growth is positively associated with FDI. This is consistent with the hypothesis. As Figure 2 shows, growth is positively related to new FDI only in state-years where the homicide rate is about 15 per 100,000 people or below. This is about 15% of the country. In other words, in the 15% of Mexico where violent crime rate is lowest, economic growth seems to attract new FDI. At high levels of the homicide rate, there is a negative relationship between growth and new FDI. This is unexpected, and it is not clear what would explain this. Overall, however, hypothesis 3 finds support in the model.

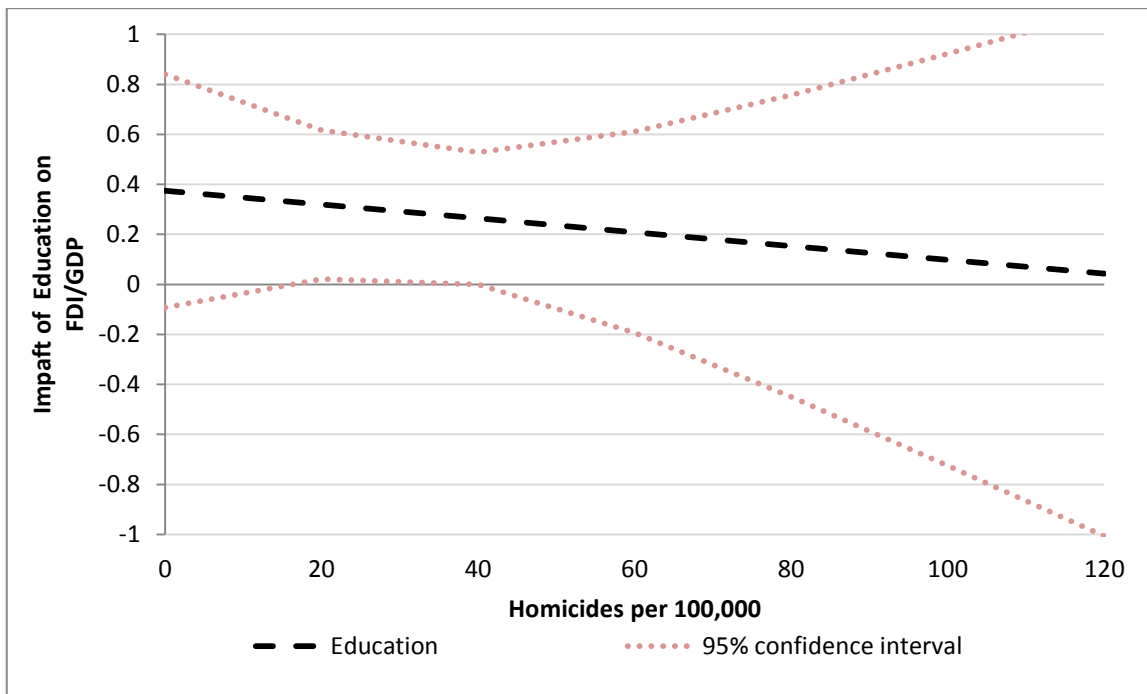
FIGURE 2: IMPACT OF GROWTH ON FDI, CONDITIONAL ON HOMICIDE RATE



Model 6 includes the interaction of *Education* and the homicide rate, to see if the impact of the education level of the workforce depends on violent crime levels. The interaction term is statistically insignificant, as are the component terms. To see if *Education* is statistically significant at different levels of the homicide rate, Figure 3 shows the relationship graphed. There is some evidence for a relationship consistent with the hypothesis – that education should only be related to new FDI at lower levels of crime. At the $p < .05$ level of statistical significance, which is used in the graphing, *Education* is only statistically significant when the homicide rate is between 15 and 35

per 100,000 people. These are fairly low levels. At the $p < .10$ level, however, *Education* is statistically significant when the homicide rate is between 0 and 45 per 100,000 people. Very few state-years have a homicide rate above 45. As a result, including marginally statistically significant values, higher education levels seem to attract more FDI as long as the homicide rate is not extremely high. The hypothesis finds some support.

FIGURE 3: IMPACT OF EDUCATION ON FDI, CONDITIONAL ON HOMICIDE RATE



Regarding the three variables used in interaction terms with the homicide rate, two of the three variables have results consistent with expectations in all models. *Turnover* is consistently positively signed, although it is only marginally statistically significant ($p < .10$). There is some evidence for the idea that states that have experienced democratic competition generally attract more new FDI. *GDP Growth* is statistically insignificant in all models except the interaction. This goes against expectations in the FDI literature, but the interaction term results help to explain that this is somewhat driven by the homicide rate. *Education* is consistently statistically significant and positively signed. State-years with more educated populations receive more new FDI, which is consistent with the literature.

Regarding other control variables, the lagged dependent variable is statistically significant and positive in all models, consistent with expectations. *Market size* (population), *GDPPC* and *Port* are statistically insignificant in all of the models. This is

surprising when thinking of cross-national studies, which usually find these factors positively related with foreign investment. However, these results suggest important differences with within-country studies. The lack of significant results for most theoretically justified independent variables is also consistent with a number of subnational studies, including those of Mexico (Ashby and Ramos 2013, Escobar Gamboa 2012, Samford and Ortega Gómez 2014).

Roads is negatively signed, and statistically significant in all models. The negative relationship is unexpected, but at the subnational level the measure could indicate the geographic size of the state instead of being a reliable proxy for infrastructure – as it often is in cross-national studies. *Federal District* is consistently statistically significant and positive, suggesting the capital area is positively associated with foreign investment, relative to Mexico's 31 states. *Border*, the variable indicating states bordering the U.S., is negatively signed, but only borderline statistically insignificant. This is not consistent with expectations, but again there is a great deal of FDI throughout Mexico, such as tourism investment in beach areas, and mining operations wherever resources can be found. Finally, *FDI in Mexico* is positively signed and highly statistically significant, as expected. National trends in investment over time help explain state-level allocation.

We conducted a number of robustness checks. The results (including lack of significance for most hypothesized variables) are robust to the elimination of the lagged dependent variable, or to the removal of the national trend variable. Regarding the surprising lack of significance for the variables representing Hypotheses 1 and 2, we substituted various more specific measures for the homicide variable – e.g., only homicide involving guns, homicide of male victims, homicide of victims ages 20-39 – and the lack of significance is robust. When alternate measures of organized crime are included, such as the number of cartels in the state, or homicides connected to organized crime, they are similarly not statistically significant. There is not a clear direct relationship between criminal violence and new FDI, or FDI in general. If FDP/GDP is used as an alternate dependent variable, results generally hold.

Discussion

There are theoretical reasons to expect that criminal violence would deter foreign investors, and some studies have found some evidence of this occurring. However, the present study finds no direct evidence of such a relationship. Multiple tests fail to find a direct relationship between FDI and measures of homicide, and whether the state is “disputed territory” between criminal groups. This is surprising, given theoretical expectations. However, perhaps criminal violence does not generally deter investors because foreign firms are not directly affected by this violence. A number of analysts have suggested the majority of victims of the “drug war” have been members of the drug organizations, as a result of their inter-cartel and intra-cartel feuds. Some

workers at foreign firms have likely been victimized as well, but perhaps not at a level to seriously threaten business.

While this paper finds no evidence of organized crime *violence*, in terms of homicides or disputed territory, affecting FDI, it seems reasonable to expect that other aspects of organized crime indeed do have an effect. Extortion, for example, is a concern of many foreign firms (Jaimes Bello and Vielma Orozco 2013), but the few measures of extortion in Mexico are not reliable. Criminal organizations could also put pressure on firms in a number of ways, such as forcing them to transport illegal goods. This, too, is probably impossible to quantify. It could be that the direct measures of criminal violence and organized crime violence are not precise enough.

While there does not appear to be a direct relationship between criminal violence and FDI, there is apparently an indirect relationship. Three factors that the literature says should attract FDI are apparently only related to new foreign investment when the homicide rate is not high. This suggests an important role for criminal violence. Investors appear to only value traditional factors – democracy, economic growth, and human capital – as long as violence levels are not very high. This helps us partially answer the puzzle of why these theoretically justified variables are often statistically insignificant in subnational models of FDI in Mexico. The widespread violence provides an important conditioning factor.

Conclusions

This paper looked at how criminal violence and organized crime activity affects FDI allocation within Mexico. The paper separates the broader notion of criminal violence from organized crime violence. It also considers organizational aspects of crime – whether a state is disputed territory between groups, and how many groups operate in the state. Analyses, from 2000-2012, fail to find a direct relationship between FDI and criminal violence. Multiple measures of organized crime violence are not found to be directly associated with FDI allocation within Mexico. However, we find an important conditional relationship: democracy, economic growth, and human capital proxied by average education level of the public are only associated with FDI at lower levels of violent crime. These factors are theoretically important, and often found to be related to FDI in cross-national studies, but the relationship has not been found in most studies of Mexico. Our results provide an answer to the puzzle. Widespread violence conditions the relationship between these important factors and foreign investment.

It should be noted that other studies of subnational FDI allocation, particularly in Mexico, have not found results such as these. A few studies have suggested a relationship between criminal violence and FDI in Mexico (Escobar Gamboa 2012, Madrazo Rojas 2009, Samford and Ortega 2014), but usually examining smaller time periods, and almost always with simple homicide rates instead of direct measures of organized crime. In addition to a longer temporal domain and examining the Mexican government's organized crime homicides measure, the current study is unique among FDI analyses for its original data on criminal organization disputed territory.

At this stage of the project, we plan to continue developing the theoretical arguments, including with more exploration of the criminology and FDI literatures. Additionally, while we have conducted many robustness checks and alternate model specifications, we plan to continue these. Additional further steps include the replication of the analysis by sectors of investment, particularly to understand what sectors are more sensitive to criminal violence.

Overall, the topic of how violence affects FDI is important and understudied. In particular, the potential impact of criminal violence on investment still raises a number of questions. We attempt to address some of these issues by looking subnationally at an important case, Mexico. Hopefully other scholars will continue to explore how criminal violence affects economic outcomes, while also looking at the increasingly important phenomenon of organized crime violence. It is known that FDI is important for the economies of developing countries, so it is crucial to understand variation in the distribution of this investment.

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