12-2018

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Documentos de Investigación

Banco de México

Working Papers

N° 2018-24

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December 2018

Documento de Investigación
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The Impact of Crime and Other Economic Forces on Mexico's Foreign Direct Investment Inflows*

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Abstract: This paper examines the effect of different crimes on Foreign Direct Investment (FDI) inflows into the 32 Mexican states. Using a state-quarter panel data for the period 2005 to 2015, we estimate alternative models of FDI, with fixed effects throughout a flexible lag-lengths methodology and System Generalized Method of Moments (SGMM) models in order to identify the determinants of FDI inflows into the country. The dependent variable in our model is the annual inflow of FDI and the independent variables are state level indicators (real wages and electricity consumption), and macroeconomic forces (the real exchange rate and interest rate). We find that homicides and thefts have negative statistically significant effects on FDI, while other crimes show no effects. Partitions of the sample suggest higher negative effects in the most violent states.
Keywords: Crime, Foreign Direct Investment, Mexico, Panel Data
JEL Classification: C33, F21, F52, P45

Resumen: El trabajo examina el efecto de diferentes tipos de crimen sobre los flujos de Inversión Extranjera Directa (IED) a los 32 estados de México. Empleando un panel de datos estatales trimestrales para el periodo 2005-2015, estimamos especificaciones alternativas de IED, con modelos de efectos fijos con rezagos flexibles y con el Método Generalizado de Momentos en Sistemas (SGMM), a fin de identificar los determinantes de los flujos de IED al país. La variable dependiente en nuestras especificaciones es el flujo anual de IED, y las variables independientes incluyen indicadores a nivel estatal (salarios reales y consumo de electricidad) y fuerzas macroeconómicas (el tipo de cambio real y la tasa de interés). Los resultados sugieren que los homicidios y los robos tienen un efecto negativo estadísticamente significativo sobre la IED, en tanto que otros crímenes no ejercen efecto alguno. Al dividir la muestra en estados más violentos y estados menos violentos, se encuentra que en los primeros los efectos negativos del crimen sobre la IED son mayores.
Palabras Clave: Crimen, Inversión Extranjera Directa, México, Datos Panel

*This paper was written while the first author was still working as an Economist at Banco de México. An earlier version of this paper was presented at the 92nd Annual Conference of the Western Economic Association International (WEAI) in San Diego, California, and at the VII Congreso de Investigación Financiera IMEF in Mexico City. The authors thank Maria Esther Caballero, Brian Cadena and Leonardo Torre for very detailed comments that helped improve this paper, and Eva González for her assistance in preparing the political maps of the Mexican regions. The usual disclaimer applies.

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1. Introduction

According to the 2016 World Investment Report, a document prepared by the United Nations Conference on Trade and Development (UNCTD), Mexico was the thirteenth largest Foreign Direct Investment (FDI) recipient in 2014 ($26 billion) and 2015 ($30 billion). Among other factors, Mexico's macroeconomic discipline and the recent enactment of several important economic reforms in the telecommunications and financial sectors, have been factors contributing to the significant FDI inflows. Figure 1 shows the average FDI inflows per state in Mexico during the period 2005-2015. Indeed, Mexico's productivity has recovered since 2009, even in the face of external shocks and an uncertain world economy (OECD, 2017). Nevertheless, despite those sound economic policies and ambitious structural reforms, drug-related crimes have escalated considerably across the country during the last decade. Figure 2 gives account of the total number of homicides since 2000. The picture makes it clear how crime has significantly risen since 2007.

Indeed, diverse literature has emerged to study such phenomenon. For example, Albuquerque (2007) finds that homicides have been highly concentrated on the Mexican side of the US-Mexico border region. Regarding literature analyzing the effect of homicides on the Mexican economy, Pan et al. (2012) report that the growth rate in per capita real GDP in any given state is positively influenced by the growth rate of such variable in the neighboring state, but negatively correlated with the crime growth rate in neighboring states. Benyishay and Pearlman (2014) find strong evidence that higher theft rates reduce the probability that Mexican microenterprises expand their operations; while González-Andrade (2014) concludes that there is a small negative relationship between economic growth in Mexico and crime rates. Similarly, Cabral et al. (2016) look at Mexico's labor productivity (GDP per worker) across its 32 sub-national entities from 2003 to 2013 and find that crime had a negative effect on Mexican labor productivity during the "war on drugs" period, which started in 2006.[1] BenYishay and Pearlman (2013) study how homicides affect the hours worked by employees in different categories and find that hours worked drop between 1% and 2%, with the larger impacts occurring among self-employed workers. In a different paper, Flores and Rodriguez-Oreggia (2014) develop spatial econometric analysis at the

[1] A conceptually different study attempting to identify the effects of crime on the Mexican economy, is Liu et al. (2013), who analyze the effect of crime rates of Mexican states on economic variables such as wages and unemployment rates. Furthermore, Blanco (2013) uses surveys to estimate satisfaction with democracy and trust in institutions as functions of independent variables, including illegal trade activity.

Mexican municipal level for the 2007-2008 period and find that army intervention is effective in reducing crime on the area, but it also shifts crime to other nearby places where no army presence exists. Similarly, Balmori de la Miyar (2016) finds that military intervention decreases GDP per capita up to 0.5% in some states.

Papers analyzing the effect of crime on FDI in Mexico at the state level include Ashby and Ramos (2013), who find that FDI inflows decrease as the level of organized crime in the home country increases. Another is Garriga and Phillips (2015), who report that measures of criminal violence and organized crime are not directly associated with FDI inflows, while factors theorized to attract FDI (democracy, economic growth, and average schooling years) are only associated with FDI entries when homicide rates are low.

Our paper adopts the empirical framework on the determinants of FDI employed before for Mexican states by Mollick et al. (2006), Ashby and Ramos (2013), Ramos and Ashby (2013), Garriga and Phillips (2015), and Alarcón-Osuna (2016), but is not limited to homicides as the main measure of crime. We explore instead the variability of quarterly data, together with a rich dataset of criminal statistics, including homicides, theft, property and other crimes. Our first important finding is that a predefined lag-length (e.g., k=1 or k=4) for our model does not capture the effects of crime on FDI. Once a flexible lag-length approach is adopted, we observe that homicides and thefts have negative statistically significant effects on FDI into Mexican states, while other crimes show no effects.[2] When we split the sample across the 16 most violent and least violent states (by ranking states in descending order for each kind of crime), the results suggest higher effects in more violent states: i.e. coefficients for both homicides and theft become larger in absolute value among the most violent states. Interpretations of our findings are provided, as well as a discussion of alternative empirical models to serve as robustness checks.

The structure of the paper is as follows: Section 2 lists some recent international literature addressing the effect of crime on economic activity. Section 3 describes the dataset and includes maps of Mexico at the state level to illustrate FDI patterns and homicide rates across the states.

[2] While in English thefts refer to non-violent crimes and robbery to violent crimes, in this paper we refer to thefts as the sum of both violent and non-violent crimes. The reason is that the original data set for Mexico includes both violent and non-violent crimes under one category.

Section 4 describes the empirical model; while results are provided in section 5. The last section of the paper offers concluding remarks.

2. Literature on Crime and Economic Activity

A number of studies have emerged trying to measure the effect of drug-violence on economic variables at the country, state and municipal levels. In the international arena, several studies have been proposed to analyze the effect of crime on economic growth. Most of those papers conclude that there is a negative correlation between per capita output and crime. Cárdenas and Rozo (2008) for Colombia, Estrada and Ndoma (2014) for Guatemala, and BenYishay and Pearlman (2014), Enamorado et al. (2014) and Balmori de la Miyar (2016) for Mexico offer evidence for Latin America. It has also been suggested that the relationship may be non-linear, as Detotto and Otranto (2010) identify asymmetric impacts of crime in recession and expansion periods in Italy. More recently, Goulas and Zervoyianni (2015) examine crime and per capita output growth in a panel of 26 countries and find that potential gains exist from reducing crime rates during periods when markets are pessimistic. On the other hand, when markets are optimistic and there is economic growth, crime is found not to be an important deterrent to economic growth.

Part of the mixed effects obtained from the determinants of FDI may be due to reverse causation that exists between FDI inflows and the real economy. There is, for instance, no consensus in the literature about the effect of FDI on wages. Some argue that FDI does not have a general positive effect on wages, but creates instead a higher positive impact on skilled wages than on non-skilled wages, thus generating a dispersion between these two types of wages. For the Mexican economy, in particular, Feenstra and Hanson (1997) document rising wage differentials in maquiladoras, Chiquiar (2008) examines changes in regional wage differentials in the 1990s, and Kato-Vidal (2013) searches for crowding-out effects of foreign investment on wages. In a study for more than

100 developing and developed countries, Figini (2011) finds that the effect of FDI on wages differs between countries depending on each country's level of development: while FDI increases wage inequality in developing countries, in developed countries wage inequality decreases.

Another example of bidirectional effects arises through the exchange rate. A weaker Mexican peso may make foreign acquisitions more attractive to foreigners. However, there are long lags in determining investment decisions at the local market and capital inflows, which should lead to an appreciation of the currency. Several studies analyze the effect of the exchange rate on FDI inflows in host countries. Most of the literature agrees that the value of the local currency, expectations about the value of the local currency, and exchange rate volatility are important factors for modeling FDI inflows. For example, Kiyota and Urata (2004) in a study for Japan, and Udomkerdmongkol et al. (2009), in a study for 16 emerging market countries, find that currency appreciation, the expectation of local currency depreciation, and exchange rate volatility, have a negative impact on FDI inflows. Martínez and Jareño (2014), in a study for Latin America, find that exchange rate is an important and significant factor to explain the FDI evolution in this region. Russ (2007) indicates that a multinational firm's response to increases in exchange rate volatility differs depending on whether the volatility arises from shocks in the firm's native or host country. Other authors find there is no significant link between exchange rate and FDI flows: Dewenter (1995) for data on foreign acquisitions of U.S. targets during 1975-89 and, more recently, Xaypanya et al. (2015) in ASEAN countries. Obviously, the cost of capital is important for investment decisions and the interest rate may signal to foreign companies the willingness to control inflation and reduce macroeconomic uncertainty.

In addition to wages, exchange rates and interest rates, other factors may also play a role in dictating the behavior of FDI inflows, which could make "omitted variables" the reason why the literature is inconclusive. Majocchi and Presutti (2009), in a study for Italy, find that clusters and agglomeration of foreign firms are important factors to attract multinational firms. Kolstad and Villanger (2004) in a study for 75 countries find that improvements in political rights, and civil liberties increase FDI inflows, while reductions in corruption in the host country do not have any effect on FDI inflows. Thomas and Grosse (2001), in a study for Mexico, and Agarwal and Feils (2007), in a study for Canada, both find that political risk and the level of economic development are important factors to explain FDI inflows. Kinda (2010) uses firm-level data across 77 developing countries to show that physical infrastructure problems, financing constraints, and institutional problems discourage FDI inflows. Asiedu and Lien (2011) employ dynamic panels for 112 developing countries from 1982-2007 and find that democracy promotes FDI arrivals under certain conditions, notably if the value of the share of minerals and oil in total exports is low. Luo et al. (2008) examine multinational corporations (MNCs) and find that previous levels of FDI arrivals, human capital, and geographic distances and cultural gaps are important influencing factors to attract FDI inflows. Agarwal and Feils (2007) and Xaypanya et al. (2015) find that infrastructure facilities and the level of openness are important factors to explain the FDI inflows into a host country. Alarcón-Osuna (2016), in a study for Mexico at the state level during the period 2007-2012, shows that tertiary and postgraduate enrollment have positive effects on FDI inflows, thus highlighting the role of education. Meanwhile, using aggregate data, Vásquez-Galán and Oladipo (2009) and Cuadros et al. (2004) observe that FDI Granger causes exports, but not the other way around, while Pacheco-López (2005) reports evidence of bidirectionality.

As it can be observed, most of the previous studies look at the effects of FDI on per capita real GDP, labor productivity, wages, or try to pinpoint the drivers of FDI inflows. In this paper, however, the objective is to determine to what extent crime affects FDI inflows at the state level in Mexico. In particular, we pay particular attention to different types of crimes as well as the time and extent of their effects on FDI inflows.

3. The Data

The dependent variable used in this paper is Total Foreign Direct Investment (FDI) inflows at the state level. FDI data is available on a quarterly basis from the Ministry of the Economy in current U.S. dollars. Those figures are transformed into real dollars using the U.S. consumer price index (CPI) (2010=100), which comes from the U.S. Federal Reserve.

Table 1 presents some descriptive statistics of the variables in our empirical model. It is worth noticing that FDI averages 201 million U.S. dollar per quarter, but its volatility is significant, with foreign capital flows ranging from -1,290 to 3,800 million. The reason for these negative flows is that there might be occasional capital repatriations by foreign multinationals. Since our model is estimated in logs, we do not take into consideration FDI outflows. While we tried to use alternative techniques to deal with these negative observations, such as the procedure employed by Ashby and Ramos (2013), the results were more appropriate when we omitted those negative flows.[3] Once non-positive flows were omitted, the variability was reduced, with the minimum FDI flows observed being 252,330 dollars, and we still end up with 1,304 observations. Complementing the description of FDI flows, Figure 1 shows that foreign capital inflows have been geographically concentrated mostly in the northern and some central states of Mexico.

In Table 2, we provide average state indicators for the main variables in our model over the sample period 2005 Q1-2015 Q4. It is clear that Mexico City, the country's capital, receives significantly

[3] Ashby and Ramos (2013) transform the data in logs so that lnFDI=(1+FDI) when FDI>=0 and equal to –|ln(FDI)| when FDI<0. This transformation, however, brought in our case coefficients much larger than expected. For such reason, observations with negative FDI were excluded, which represented 7.4% of the total observations.

more FDI inflows than the rest of the country (1,310 million on average per quarter) and by amounts that clearly exceed the national average.[4] Nuevo León and Estado de México follow Mexico City, receiving 621 and 612 million dollars on average per quarter, respectively. Our estimates indicate that during the analyzed period, Mexico City is the most important recipient of foreign capital, with 20.3% of the total FDI inflows received by the country, followed by Nuevo Leon, Estado de México, Chihuahua and Jalisco. Together, these states captured 51.4% of the average FDI received by Mexico during the period 2005-2015. On the other hand, the five states with the lowest FDI values are Yucatan, Tlaxcala, Campeche, Colima and Chiapas, which together captured just 2.4% of the average FDI flows received over the sample period.

Regarding the crime variable, the data series employed is collected from the National Public Security Executive Office (Secretariado Ejecutivo del Sistema Nacional de Seguridad Publica). These official crime statistics are published on a monthly basis and are converted into quarterly observations by aggregating monthly data into quarters. The four crime variables included in the analysis are "homicides", "thefts", "property crimes" and "other crimes", with the latter including kidnapping, extortions, and fraud, among others. Homicides, thefts and property crimes contain roughly 60% of the total crimes reported by the source.

Looking at the homicide rates in Table 1, the quarterly average is 7.3 per 100,000 people, roughly 29 homicides per year. However, the variability across states is significant as shown in Figure 3. For example, the peaks in homicide series in Chihuahua, Durango and Sinaloa are visible in the middle of the period, probably identified with the intensification of the "war on drugs" in Mexico. Figure 3 shows the mean of the homicide rates at the state level during the period analyzed in this

[4] Mexico's FDI figures have been recently revised by the officials to eliminate the bias introduced by the fiscal registration of FDI flows.

paper. Results show that in terms of homicides, the states with the highest quarterly rates are Sinaloa (16.44 homicides per 100,000 people), Chihuahua (15.55) and Guerrero (14.55). On the other hand, the states with the lowest murder rates are Yucatan (2.47), Baja California Sur (3.78) and Campeche (3.84). These numbers suggest that homicides are highly concentrated in some geographic regions of the country. For example, the average number of homicides for every 100,000 people in Sinaloa is 7 times higher than the number of homicides committed in Yucatan. Figure 4 also shows that most of the states in the center of the country rank among those with the lowest level of homicides.

Looking at crimes other than homicides in Table 2, the average highest rates are found in Baja California (486 per 100,000 people), property crimes in Baja California Sur (139.63) and other crimes in Yucatan (415), while the lowest rates of thefts, property and other crimes are all observed in Campeche (17.7, 6.5 and 24.6, respectively). Overall, homicides are less frequent (quarterly mean of 7.3), followed by property crimes (59), and thefts and other crimes are more common (means of 142 and 155, respectively.) However, the ratio of mean to standard deviation is similar, ranging from 1.46 in thefts to 1.62 in property crimes.

Among the control variables employed, wages are taken from the Mexican Social Security Institute (Instituto Mexicano del Seguro Social, IMSS) for employees in the formal sector (workers with social security benefits).[5] Daily wage data are available on a monthly basis; quarterly figures were obtained by calculating the average wage over the corresponding three-month periods. Nominal quarterly average wages were then converted into real U.S. dollars dividing them by the nominal peso-dollar exchange rate and then deflating them using the U.S. CPI. According to Table 2, the

[5] According to IMSS, the reporting of daily salaries is truncated to a maximum of 25 minimum wages, which allow us to prevent problems of outliers.

states that pay the highest daily real wages are Mexico City (24.8 dollars), Campeche (21.2) and Nuevo León (20.8), while those states that pay on average the lowest wages are Yucatan (13.4), Sinaloa (13.5), and Chiapas (13.5 dollars).

We also include the real exchange rate and interest rate as determinants of FDI inflows; both variables are obtained from Mexico's Central Bank (Banco de México). Both indicators are country-level rates, and for that reason are constant across states. The real exchange rate is calculated as a basket of currencies weighted according to the importance of Mexico's trade with other countries and is an indicator of Mexico's competitiveness: an increase in the real exchange rate indicates a real depreciation of the Mexican peso. Daily real exchange rate observations are averaged to obtain quarterly observations. The interest rate used (the equilibrium interbank interest rate from the Spanish acronym TIIE, "tasa de interés interbancaria de equilibrio") can be considered as the Mexican counterpart of the U.S. federal funds rate. It is available on a daily basis and the quarterly data are obtained also by averaging the daily rates. Finally, we include electricity sales at the state level, which may be a proxy for the level of infrastructure in the state or also of economic activity.[6] Data are available on mega-watts per hour from the Ministry of Energy on a monthly basis and are accumulated to generate quarterly series.

In Table 3, we report the correlation matrix for the main variables of our model. Real FDI inflows correlate positively with real wages (0.45) and electricity sales (0.51). The correlation between FDI inflows and crime series vary from negative and small for homicides (-0.10) to positive for thefts (0.22). Correlation of FDI with interest rate is weakly positive (0.09) and negative with real

[6] Notice that, while the variance of electricity sales might be due to weather differences across sates, this indicator captures well economic activity and differences in available infrastructure. In fact, a number of recent articles have employed satellite data on lights at night to measure economic activity and GDP growth across subnational regionals and cities (see, for instance, Keola et al., 2015 and Henderson et al., 2012).

exchange rate (-0.10). Overall, we do not find high correlation rates that could signal multicollinearity problems in the empirical model of FDI inflows below.[7] Not every type of crime is negatively correlated with FDI flows. This might suggest some quite complex dynamics and heterogeneous effects of crime in our econometric model. We address this problem by adjusting long-term lags to our FDI determinants. In addition, we also observe that not all the crimes positively correlate among themselves. Property crime is positively correlated with theft crime (0.61) and with other crimes (0.66), but the correlation between homicides and thefts is weaker (0.096), as it is between homicides and property (-0.16), as well as, homicides and other crimes (-0.10). Presumably, this might be due to the fact that, as observed in Table 2, not all crimes necessarily rank equally across states.

4. Empirical Model

Our empirical specification controls for traditional domestic and foreign determinants of FDI plus crime in its various forms. Defined in logs, the empirical equation employed is given by:

$$\ln(FDI)_{it} = \beta_i + \sum_{j=1}^{n} \beta_{1j} \ln(W)_{it-j} + \sum_{k=1}^{m} \beta_{2k} \ln(CRIME)_{it-k} + X\Gamma + u_{it} \quad (1)$$

where: FDI stands for the total Foreign Direct Investment inflows received by each of the 32 Mexican entities; W refers to real wages and *n* is the number of lags required to fully capture real wages dynamics; CRIME is any of the violence measures discussed in the previous section (homicides, thefts, property or other crimes) and *m* is the number of lags required to fully capture CRIME dynamics. In addition, X is a set of control variables, which include domestic and foreign

[7] We omit correlation figures for education and GDP per capita, which are highly correlated with real wages. Hence, our real wage variable carries two supply side considerations (labor productivity and human capital), and a demand side factor, as it affects consumption and hence GDP. There is also some mild correlation between wages and interest rates (0.61) and between wages and real exchange rates (-0.48). The correlation between the domestic interest rate and the real value of the Mexican peso is -0.42. A weaker peso may be associated with higher interest rates possibly because of its use to dampen exchange rate inflationary pressures.

factors that may influence FDI decisions. Across the set of domestic factors, we consider the interest rate, and electricity sales, which is our proxy of infrastructure (as well as another measure of economic activity). The real exchange rate and a dummy that control for the effects of the financial crisis can be taken as foreign factors affecting FDI flows to Mexico. We therefore combine domestic and external factors used before in the literature of FDI determinants in Mexico.[8]

Since our data has quarterly frequency and because FDI inflows respond to our different controls with an unknown delay order, we introduce in (1) several lags of our explanatory variables.[9] In order to define the appropriate number of lags for W, CRIME and each of our control variables in X, we use a flexible approach starting with a maximum number of lags equal to 6 (i.e. a year and a half). We then test the statistical significance of the coefficient and shorten the lag by one period if we cannot reject the null hypothesis that the effect of the longest lagged coefficient is zero, at least at the 5% significance level. Then, we continue shortening the lag length until the trailing lag coefficient is statistically significant or leave just one lag even if the independent variable is not significant. This procedure will imply the minimum lag-length as one quarter for each (RHS) series in (1) and the maximum as six quarters based on the data-dependent procedure.[10]

[8] A recent paper by Chanegriha et al. (2017) with panel data for 168 countries from 1970 to 2006 consider 58 potential variables and find about one third to be robust. They also identify three factors to be endogenously determined with FDI: current account balance to GDP, GDP growth, and per-capita GDP. We collect real GDP per capita in our dataset, but use real wages as the main demand variable, which may also indicate labor productivity (human capital) and the cost of labor.

[9] The intuition for using lags is that criminal activities present some trend, seasonality and cyclicality over time. Because of that, foreign investors assess crime patterns rather than just the prevalence of crime at the time of making investment decisions. Henceforth, crime figures today might not affect current FDI but rather FDI project in the future.

[10] A multiple-lag identification process akin to the one we followed in these papers is employed by Afonso and Gonzalez-Alegre (2011) to estimate a panel data autoregressive distributed lag model that captures the effects of fiscal variables on economic growth.

In general, we expect the full long-term effect of wages on FDI to be positive ($\sum_{j=1}^{n} \beta_j$>0), due to its role as proxy of labor productivity, although real wages may also reflect labor costs and their ultimate effect on FDI is ambiguous. For crime, in its various forms, we expect the full long-term effect to be invariably negative ($\sum_{k=1}^{m} \beta_{2k}$<0) due to the effect of violence and social unrest on business climate. A similar logic is expected for the rest of the control variables in our model: interest rate and electricity sales are both expected to have positive cumulative effects on total FDI. We use sales of electricity as proxy of local infrastructure which, we argue, is a signal of how attractive destinations are for the arrival of FDI. We interpret the interest rate as a proxy of domestic capital productivity, this statement comes from seminal papers such as Metzler (1950), and Ramsey (1970).

Due to the expected complementarity between domestic and foreign capital, an increase in the interest rate is assumed to have a positive effect on FDI. Finally, in theory an increase of the real exchange rate would imply a real depreciation of the peso against other currencies, which makes exports more competitive and thus FDI more likely to flow into Mexico. With this, the initial expected impact of the real exchange rate would be positive. Nevertheless, when RER moves up (a real depreciation of the peso against a basket of more than 100 currencies), the peso becomes weaker, which makes the required FDI flows to accomplish an investment project (in USD) lower. To the extent that the USD is a major currency in the basket to calculate the RER, a real peso depreciation will lead to lower FDI inflows in USD, thereby implying a negative impact on RER. Henceforth, having these two opposing effects linked to the real exchange rate, a priori we do not have a definitive positive or negative expected sign for this variable. Finally, we expect that the financial crisis might have reduced the flow of capital received by Mexico. For this variable, which takes values of unity from the first quarter of 2008 to the fourth of 2009, we expect thus a negative sign.

Given the potential endogeneity of some right-hand side regressors included in equation (1)—such as real wages, the real exchange rate and the interest rate—we also revisit FDI determinants and the influence of crime using a dynamic specification. Following the estimation of equation (1), we define a more general equation in which we control for the persistence or inertia of FDI flows and the potential endogeneity implicit in some of our right-hand side determinants. The empirical model is:

$$\ln(FDI)_{it} = \alpha_i + \delta_1 \ln(FDI)_{it-1} + \delta_2 ln(W)_{it} + \delta_3 \ln(CRIME)_{it} + X\Gamma + u_{it} \quad (2)$$

A problem that emerges estimating equation (2) using OLS is that the lag of the dependent variable is correlated with the error term. The SGMM procedure derived by Blundell and Bond (1998) allows us to correct this bias by instrumenting the lagged dependent variable and any other endogenous regressor using lags and lagged differences of the suspected endogenous variable. SGMM estimators are said to be consistent in the absence of second-order autocorrelation in the residual and if the instruments employed are valid according to the Hansen test of over-identified restrictions. Since we need to restrict the number of instruments to avoid over-identification problems rather than using lags of the right-hand side regressors (except for FDI), we only employ contemporaneous effects of crime, as well as for the domestic and foreign factors implicit in the vector of controls.

5. Results

We employ a fixed lag-length approach for the estimation of equation (1), with k = 1 and k = 4. In Table 4, we observe that when one lag is used, estimates are not statistically significant. In all cases, the R^2 is 0.02 (within) or 0.01 (overall). If correct, this would suggest that none of the series used is able to explain FDI inflows across Mexican states, despite previous literature observing the contrary. When k = 4 is used, crime and wages remain not statistically significant. Interest rates have a positive coefficient (around 1.5) only at one lag, electricity has a positive coefficient (around 0.90) only at two lags, and the real exchange rates have negative coefficients in three out of the five columns (around -3.3) only at one lag. All these are according to expected signs and the overall fit of the model improves with the R^2 moving up to 0.07 (within) or 0.06 (overall). It is thus reasonable to conclude that some additional dynamics are necessary. It is less clear, however, that 1 year (k = 4) captures the necessary dynamics. We conjecture that the arbitrary lag-selection in Table 4 is not a good choice since each factor is assumed to have the same dynamic effect on FDI inflows, a very questionable assumption. For the nature of the socio-economic variables and given FDI as the dependent variable, there are indeed reasons to suspect that some flexible lag-length structure is required. In order to allow for sufficient dynamics and not to over-parametrize the fixed-effects model, we adopt a data-dependent procedure based on Campbell and Perron (1991), who chose the optimum number of lags using ADF unit root tests. This flexible autoregressive structure was explained earlier in the empirical model section and leads to Table 5.

Table 5 presents the estimations of equation (1) using Fixed-Effects methods for each crime subcategory (homicides, thefts, property and other crimes) using our approach to identify the lag length of each regressor. In column (1) we first estimate a benchmark model without crime, while columns (2) to (5) take into consideration the effects of the different crime categories on FDI flows.

The number of lags is consistent across our five models and for each variable except crime. First of all, we observe that only homicides and theft crimes, perhaps considered high-impact crimes, have negative and significant effects on FDI; the first form of crime is statistically significant 5 quarters after a crime is committed and the latter as long as 6 quarters after. Interestingly, the effect of thefts is slightly higher on FDI inflows (coefficient of -0.33) than on homicides (coefficient of -0.28). Property and other crimes are found to have no statistically significant effects on FDI inflows.

The effect of wages on FDI is positive and statistically significant at 5% significance level, with 3, 5 and 6 lags. For column (1), the net effect is positive using the 5% significance level. Interest rates also present the positive expected sign meaning that this variable could act as a proxy for capital productivity and thus there is a complementarity effect between domestic and foreign capital. The interest rate coefficient ranges from 0.26 to 0.36, while the net effect in the base model without crime is 0.34, meaning that an increase in the interest rate has in overall a positive effect into FDI inflows into the country in the following periods. Electricity, our proxy of infrastructure, is not statistically significant at any relevant level. For the real exchange rate, its cumulative effect is -0.22 in the baseline specification (column 1) This means that a depreciation of the Mexican peso decreases the FDI flows into the country. Finally, although the financial crisis dummy shows the expected negative sign, it is not statistically significant, which suggests FDI inflows are very persistent and not subject to transitional factors.

Overall, we find positive long-run effects of wages and interest rate on FDI. The dummy variable that captures the financial crisis is not statistically significant, suggesting that this event might not have disturbed the allocation of foreign investment arriving in Mexico. With respect to our various types of crime series, we observe negative statistically significant effects of crime on FDI for only two subcategories: homicides and theft crimes. On average, a 1 % increase in the homicide rate causes a reduction of 0.28% in FDI flows after five quarters. Meanwhile, a 1 % increase in theft crime causes a long-term contraction of 0.33% in FDI after six quarters.

5.1 Sample Partitions

Following this initial set of results, we split our sample into two groups containing the 16 most and least violent states in Mexico, according to the two subcategories that resulted significant in Table 5: homicides and theft crimes. The aim of this sample partition is to examine in more detail the magnitude and prevalence of the effects of crime on FDI inflows. We follow the same data-dependent procedure to establish the suitable number of lags in our right-hand side variables, providing that the dynamics of the subsamples are not the same than for the full sample.

We notice two important results from these partitions reported in Table 6. First, in homicides we realize that the 16 most violent states are the ones that are significantly affected in their FDI inflows. This time, the effect is observed only three quarters after crimes are committed and in a stronger way than across the full sample, with a coefficient of -0.43 (relative to -0.28 when we estimate the model for the full sample of 32 states where the effects of homicides are noticed five quarters after crimes were committed). This implies that a 1% increase in homicides reduces FDI inflows in 0.43%. No effects on FDI are observed across the 16 states with the lowest homicide rates. The second important finding in this partition is that theft is relevant across both subsamples, but differently. The 16 states with highest theft rates observe a negative impact on FDI only three quarter after the crime is committed, much faster than across states with lower theft rates in which, as with the full sample, the impact on FDI is observed only after six quarters. In addition, the impact on the former group is also more than three-fold than that of the latter. More precisely, for states with the highest theft rates a 1% increase in robberies results in a nearly 1% decrease in FDI flows (0.97%) nine months after the crime is committed, while for the states with lower theft rates it leads to only a 0.30% reduction in FDI after eighteen months.[11]

A problem we observe in this sample partition is that the coefficients for interest rate and the real exchange rate are now quite unstable: interest rates become negative and coefficients of RER change signs. This might have to do with the reduction in the sample size, but also perhaps with the implicit endogeneity of some of our right-hand side variables. In order to deal with the latter problem, in what follows we address endogeneity concerns and the persistence of our dependent variable employing a dynamic specification under SGMM estimation techniques.

5.2 Dynamic Specification

Table 7 presents the estimations of equation (2) employing SGMM, first for the benchmark model with no crime effects in column (1) and then for each of the crime categories in columns (2) to (5). The variables consider as endogenous in each estimation are the lag of FDI, real wages, the real exchange rate and the interest rate. For this specification, we instrument for FDI, real wages, the real exchange rate, and interest rate with lags and lagged differences of their own. In order to avoid the over identification of the model, we employ the collapse procedure suggested by Roodman (2009) to minimize the lagged instruments and achieve a specification with less instruments (14) than cross-sectional units (32).[12]

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[11] In Fonseca and Llamosas-Rosas (2018), and Box 3 of Banco de México's Regional Economic Report April-June (2016), a model of FDI flows across Mexican states included an indicator of fiscal capacity (fiscal margin), defined as the ratio of non-conditional to total fiscal transfers, as a determinant of foreign capital receipts. In this paper, we also build a similar index of fiscal capacity as the ratio of states' own to total revenues, which captures the ability of each state to rely on its own sources of revenue to attract FDI. When we introduced this variable in our models, in every regression showed the positive expected sign and was statistically significant. The estimations of the models, including the fiscal capacity control, are available from the authors upon request.

[12] When we include energy expenditures as endogenous, the number of instruments becomes 17. The results are very similar and diagnostic tests remain satisfactory.

The results show that there is significant persistence of FDI flows with coefficients ranging from 0.53 to 0.68 (columns (2) and (5), respectively), except in the model featuring property crimes, when the standard error of lagged dependent variable becomes larger. Nonetheless, crime effects - including homicides and thefts - are muted, along with the effects of most of the other determinants of FDI. While the Hansen test and the Arellano-Bond test of second-order serial correlation suggest that our models are correctly specified, the ability of the model to capture FDI dynamics appears quite limited at this stage.[13] Column (5) for other types of crimes presents some statistically significant effects, including the crisis dummy as in column (1), although the coefficient of other crimes (estimated negative at -2.29) has a p-value of 0.055.

6. Concluding Remarks

This paper reexamines the determinants of FDI inflows in Mexico using not only standard factors previously studied in the literature, but also different types of crime (homicides, thefts, property and other types of crime), which may have affected foreign companies' decisions to invest in Mexico. The research design is built on a very simple premise put forward by Detotto and Otranto (2010): "Criminal activity acts like a tax on the entire economy: it discourages domestic and foreign direct investments, it reduces firms' competitiveness, and reallocates resources creating uncertainty and inefficiency." The rise in crime observed in Mexico in recent years makes it a suitable case study to assess whether this statement is empirically valid.

[13] A possible explanation for the inability of our model to capture FDI dynamics is that, even using lags and lagged differences to instrument endogenous regressors, our estimations cannot capture the lagged effects of crime and other explanatory variables on FDI. While we tried to include lags of our explanatory variables, the use of too many instruments tend to overidentify our models. It is because of this that SGMM might not be appropriate to employ the flexible lags approach.

In addition to the vast literature on the determinants of FDI across states or cities, this study builds upon previous work by Ashby and Ramos (2013), Ramos and Ashby (2013), and Garriga and Phillips (2015) for Mexico, but is not limited to homicides as a measure of crime and also explores the variability of quarterly data, which - to the best of our knowledge - has not been done before. Starting first with a fixed lag-length approach to model FDI determinants, we are unable to capture any significant effect of crime on FDI. Under a flexible lag-length approach that captures the changing dynamics of crime and other factors over time, we observe that homicides and theft crimes have negative statistically significant effects on FDI into Mexican states, while other type of crimes show no effects. When we split the sample across the 16 most violent and least violent states, the results suggest earlier and larger effects in more violent states with coefficients for both homicides and theft becoming higher in absolute value among the most violent states. We also find that dynamic panels indicate a significant degree of persistence in FDI inflows, in which, in most cases, the lagged dependent variable is responsible for all of the statistical significance, ranging from 0.53 (homicides) to 0.68 (other crimes), meaning that a 1% increase in FDI in a previous year increases current FDI inflows in a range between 0.53% and 0.68%. Further work should help to build a better understanding of what makes FDI inflows move into Mexico given the uncertainty and economic and social forces.

Our analysis shows that homicides and thefts are the two types of crime that more significantly affect Mexico's FDI inflows. Hence, fighting these forms of crime in the states that are more active in the reception of foreign capital flows must be a priority to maintain investment and the creation of new jobs. In addition, the strengthening of public safety continues to be one of the most important challenges faced by public policy legislators who should develop policies to promote the attraction of FDI inflows into local states. Therefore, it is also important to differentiate the effects that each type of crimes could have eventually on investment decisions.

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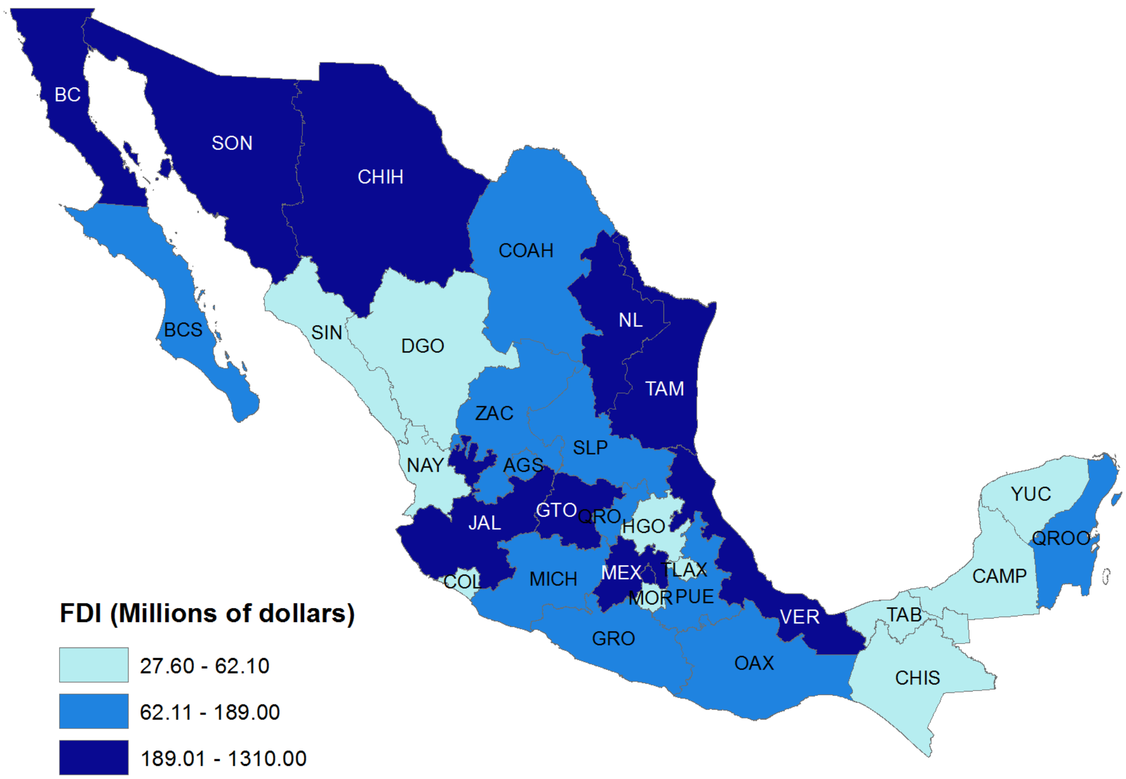
Figure 1. Average State FDI Inflows 2005-2015

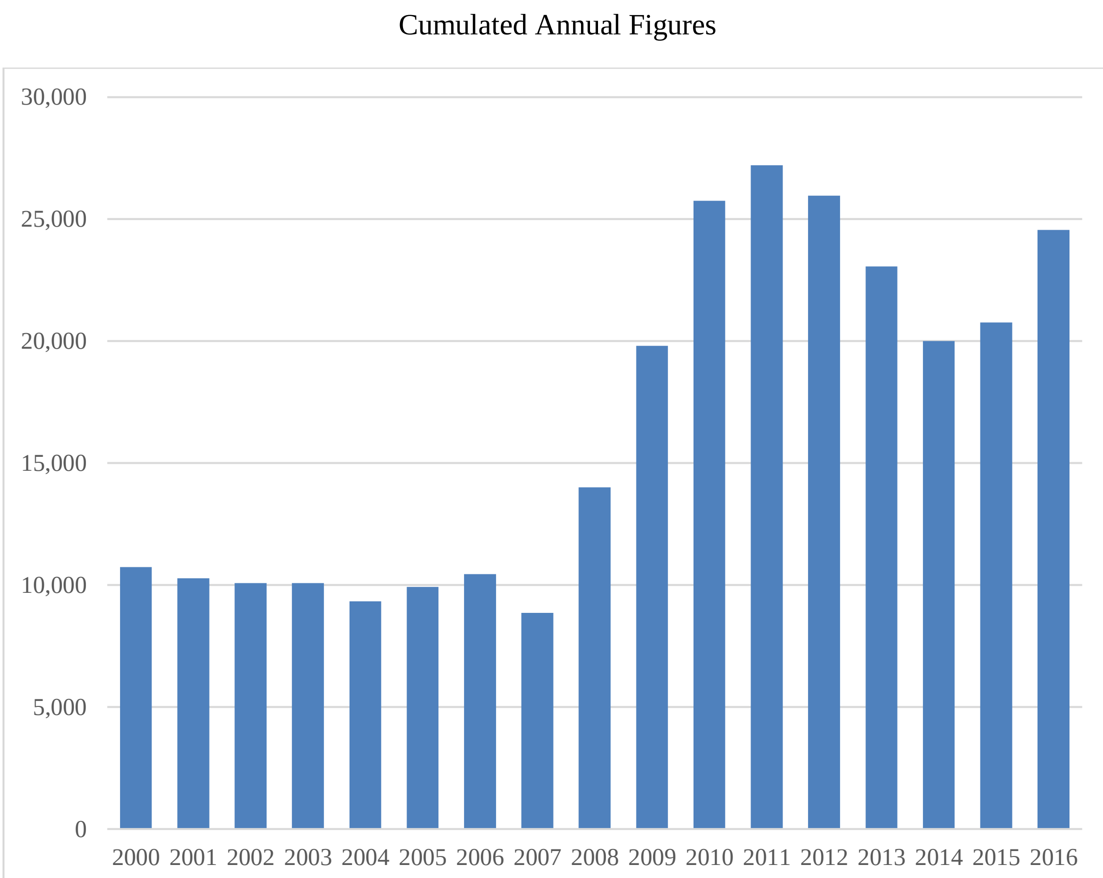


Aguascalientes (AGS)	Ciudad de México (CDMX)	Morelos (MOR)	Sinaloa (SIN)
Baja California (BC)	Durango (DGO)	Nayarit (NAY)	Sonora (SON)
Baja California Sur (BCS)	Estado de México (MEX)	Nuevo León (NL)	Tabasco (TAB)
Campeche (CAMP)	Guanajuato (GTO)	Oaxaca (OAX)	Tamaulipas (TAM)
Chiapas (CHIS)	Guerrero (GRO)	Puebla (PUE)	Tlaxcala (TLAX)
Chihuahua (CHIH)	Hidalgo (HGO)	Querétaro (QRO)	Veracruz (VER)
Coahuila (COAH)	Jalisco (JAL)	Quintana Roo (QROO)	Yucatán (YUC)
Colima (COL)	Michoacán (MICH)	San Luis Potosí (SLP)	Zacatecas (ZAC)

Source: Ministry of Economy.

The values correspond to the average FDI inflows at the state level during the period. The darkest color corresponds to the states with the highest FDI inflows, which oscillate between 189 million dollars and 1.3 billion dollars employing Jenks natural breaks classification method. Similarly, the states with the lowest FDI inflows are in white and correspond to values between 27 and 57 million dollars.

Figure 2. Number of Homicides at the National Level 2000-2016

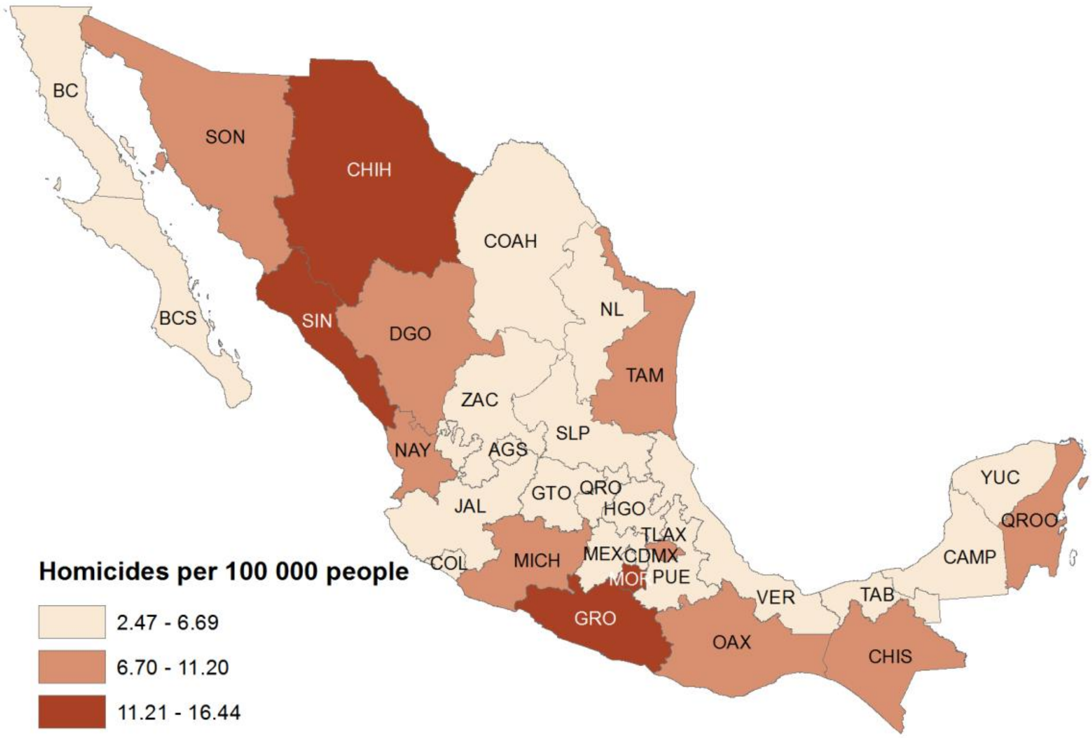


Source: National Public Security Executive Office, Interior Ministry.

Figure 3. Homicide Rates (per 100,000 population) by State

Source: National Public Security Executive Office, Interior Ministry.

Figure 4. Average Homicides 2005-2015



Aguascalientes (AGS)	Ciudad de México (CDMX)	Morelos (MOR)	Sinaloa (SIN)
Baja California (BC)	Durango (DGO)	Nayarit (NAY)	Sonora (SON)
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Coahuila (COAH)	Jalisco (JAL)	Quintana Roo (QROO)	Yucatán (YUC)
Colima (COL)	Michoacán (MICH)	San Luis Potosí (SLP)	Zacatecas (ZAC)

Source: National Public Security Executive Office, Interior Ministry.
The values correspond to the average number of homicides at the state level during the period. The darkest color corresponds to the states with the highest number of homicides, 11.2 to 16.4 per 100,000 people. Similarly, the states with the lowest homicide rates are in white and correspond to 2.5 to 6.7 per 100,000 people.

Table 1. Descriptive Statistics (2005-2015)

Variables	Obs.	Mean	Std. Dev.	Min	Max
Real FDI inflows (millions)	1408	201	359	-1,290	3,800
Positive flows of Real FDI (millions)	1304	220	364	0.25	3,800
Real wage	1408	16.43	3.64	9.1	32.0
Electricity sales (thousands)	1408	1,500	1,126	184	5,194
Interest rate	1408	5.87	2.04	3.3	10.1
Real exchange rate	1408	93.40	6.21	81.4	107.4
Crime rates (per 100,000 people)					
Homicide	1408	7.30	4.54	0.6	34.0
Thefts	1408	142.48	97.46	10.1	659.4
Property	1408	58.96	36.48	0	220.5
Other crimes	1408	155.23	100.88	2.9	560.5

Note: FDI and wages are in real dollars of 2010. Electricity rates are in megawatts per hour. Crime rates are per 100,000 people.

Sources: Own estimations using different websites.

Table 2. Average State Indicators (2005-2015)

State	Real FDI inflows (USD millions)	Real wage (USD)	Homicide	Theft	Property	Other Crimes	Electricity Sales (thousands of MW/hour)
Aguascalientes	77	15.9	4.66	175.57	83.35	148.90	582
Baja California	294	18.1	6.15	485.96	106.29	290.37	2,330
Baja California Sur	140	17.0	3.78	320.89	139.63	275.89	457
Campeche	30	21.2	3.84	17.72	6.48	24.85	279
Chiapas	28	13.5	7.75	37.68	22.21	62.13	640
Chihuahua	439	16.7	15.55	211.82	73.52	155.09	2,507
Coahuila	177	17.1	5.79	154.14	80.21	144.75	2,379
Colima	29	15.5	6.47	136.15	42.24	181.95	393
Ciudad de México	1,310	24.8	4.25	245.69	80.58	156.32	3,470
Durango	57	13.4	11.20	130.91	49.56	113.85	705
Estado de Mexico	612	18.4	5.69	152.94	37.67	208.64	4,133
Guanajuato	244	15.1	6.69	132.73	75.27	159.71	2,382
Guerrero	70	15.1	14.55	69.90	29.75	109.41	683
Hidalgo	45	15.3	4.71	92.38	50.67	160.52	837
Jalisco	348	16.9	5.20	101.85	58.73	110.94	2,870
Michoacán	124	15.5	10.95	95.63	29.91	56.68	1,776
Morelos	62	17.9	12.69	242.12	98.35	273.68	602
Nayarit	45	14.3	8.32	68.45	43.19	101.34	314
Nuevo Leon	621	20.8	5.96	152.87	32.31	58.47	3,997
Oaxaca	80	14.6	7.39	66.41	52.87	138.54	597
Puebla	155	16.9	5.01	112.44	56.22	114.84	1,790
Queretaro	189	20.7	4.51	151.49	48.91	98.92	1,024
Quintana Roo	112	14.7	9.73	231.71	125.01	217.72	901
San Luis Potosi	153	16.1	4.33	91.72	76.12	157.33	1,314
Sinaloa	61	13.5	16.44	115.36	19.75	102.50	1,386
Sonora	212	15.2	8.77	111.04	49.87	147.20	2,447
Tabasco	47	15.9	5.45	158.05	57.72	388.92	740
Tamaulipas	208	17.1	8.10	166.74	32.14	157.46	2,113
Tlaxcala	32	15.0	8.16	66.58	20.39	68.28	445
Veracruz	196	15.5	4.63	68.17	47.77	91.90	2,570
Yucatan	37	13.4	2.47	86.41	112.71	415.03	742
Zacatecas	188	14.8	4.27	107.93	47.17	75.10	580
Total	201	16.4	7.30	142.48	58.96	155.23	1,500

Sources: Own estimations using different websites.

Table 3. Correlation Matrix

Variables	Real FDI inflows	Real wage	Homicides	Thefts	Property	Other Crimes	Interest Rate	Real Exchange Rate	Electricity Sales
Real FDI inflows	1								
Real wage	0.4478	1							
Homicide	-0.0982	-0.2722	1						
Theft	0.2223	0.199	0.0961	1					
Property	0.0667	0.1408	-0.1578	0.6113	1				
Other Crimes	-0.0343	-0.0352	-0.1044	0.4686	0.663	1			
Interest Rate	0.0889	0.6119	-0.1492	-0.0469	0.1572	0.0261	1		
Real Exchange Rate	-0.1046	-0.4771	0.1693	0.0759	-0.0602	-0.0221	-0.4204	1	
Electricity Sales	0.5127	0.2621	-0.0326	0.2092	-0.0348	-0.0606	-0.0928	0.0329	1

Sources: Own estimations using different websites.

Table 4. FDI Model on Crime with Fixed Effects and Fixed Lag-lengths

	Base Model (No Crime)		Homicides		Thefts		Property		Other Crimes	
	1 Lag	4 Lags	1 Lag	4 Lags	1 Lag	4 Lags	1 Lag	4 Lags	1 Lag	4 Lags
L1.Crime			0.07	-0.02	0.13	0.03	-0.02	-0.18	-0.02	-0.35
			(0.09)	(0.15)	(0.13)	(0.21)	(0.1)	(0.12)	(0.11)	(0.21)
L2.Crime				0.11		0.18		0.04		0.07
				(0.2)		(0.29)		(0.15)		(0.15)
L3.Crime				-0.23		-0.34		-0.03		0.1
				(0.16)		(0.36)		(0.17)		(0.23)
L4.Crime				0.18		0.19		0.21		0.1
				(0.13)		(0.3)		(0.18)		(0.15)
L1.Wage	0.42	-1.36	0.39	-1.49	0.25	-1.24	0.41	-1.31	0.42	-1.17
	(0.45)	(1.15)	(0.46)	(1.2)	(0.49)	(1.2)	(0.46)	(1.17)	(0.45)	(1.18)
L2.Wage		0.05		0.3		-0.24		-0.01		0.06
		(1.65)		(1.7)		(1.76)		(1.64)		(1.64)
L3.Wage		1.8		1.48		2.02		1.82		1.52
		(1.74)		(1.8)		(1.82)		(1.68)		(1.75)
L4.Wage		0.24		0.46		0.05		0.05		0.19
		(1.57)		(1.61)		(1.52)		(1.53)		(1.58)
L1.Interest Rate	-0.06	1.52**	-0.05	1.55**	0	1.52**	-0.04	1.45**	-0.06	1.51**
	(0.18)	(0.66)	(0.19)	(0.66)	(0.21)	(0.66)	(0.19)	(0.67)	(0.19)	(0.66)
L2.Interest Rate		-2.04		-2.08		-1.98		-1.89		-2
		(1.13)		(1.13)		(1.11)		(1.11)		(1.13)
L3.Interest Rate		0.03		0.01		-0.02		0.02		0.17
		(0.98)		(0.97)		(0.97)		(0.98)		(0.97)
L4.Interest Rate		0.68		0.71		0.73		0.67		0.58
		(0.51)		(0.51)		(0.53)		(0.5)		(0.5)
L1.Electricity	-0.28	-0.24	-0.29	-0.23	-0.28	-0.26	-0.28	-0.25	-0.28	-0.21
	(0.23)	(0.32)	(0.23)	(0.32)	(0.22)	(0.32)	(0.23)	(0.32)	(0.22)	(0.32)
L2.Electricity		0.90**		0.89**		0.94**		0.90**		0.87**
		(0.37)		(0.37)		(0.38)		(0.39)		(0.4)
L3.Electricity		0.15		0.17		0.13		0.12		0.13
		(0.34)		(0.34)		(0.35)		(0.34)		(0.33)
L4.Electricity		-0.16		-0.18		-0.12		-0.15		-0.11
		(0.28)		(0.28)		(0.29)		(0.28)		(0.28)
L1.Real Ex. Rate	-0.79	-3.33**	-0.88	-3.49**	-1.04	-3.22	-0.79	-3.31**	-0.8	-3.17
	(0.5)	(1.55)	(0.51)	(1.61)	(0.58)	(1.6)	(0.52)	(1.58)	(0.49)	(1.6)
L2.Real Ex. Rate		0.95		1.2		0.64		0.9		0.88
		(1.87)		(1.85)		(1.98)		(1.86)		(1.86)
L3.Real Ex. Rate		0.91		0.61		1.1		0.96		0.72
		(1.86)		(1.91)		(1.91)		(1.82)		(1.86)
L4.Real Ex. Rate		0.75		0.93		0.57		0.66		0.73
		(1.69)		(1.74)		(1.63)		(1.71)		(1.73)
Dummycrisis	-0.13	-0.12	-0.13	-0.11	-0.13	-0.12	-0.13	-0.14	-0.13	-0.14
	(0.08)	(0.11)	(0.08)	(0.11)	(0.08)	(0.11)	(0.08)	(0.11)	(0.08)	(0.11)
Sample Size	1272	1181	1272	1181	1272	1181	1269	1178	1272	1181
R2 Within	0.02	0.07	0.02	0.07	0.02	0.07	0.02	0.07	0.02	0.08
R2 Overall	0.01	0.06	0.01	0.06	0.02	0.06	0.01	0.06	0.01	0.06

Notes: Newey-West robust standard errors to heteroskedasticity and serial correlation are reported in parenthesis. The symbols ** and *** refer to levels of significance of 5% and 1%, respectively.

Table 5. FDI Model on Crime with Fixed Effects and Flexible Lag-lengths

Variables	Base Model (No Crime)	Homicides	Thefts	Property	Other Crimes
	(1)	(2)	(3)	(4)	(5)
L1. Crime		0.05	0.11	-0.05	-0.23
		(0.17)	(0.26)	(0.09)	(0.16)
L2		0.08	0.16		
		(0.20)	(0.31)		
L3		-0.28	-0.44		
		(0.18)	(0.39)		
L4		0.30	0.25		
		(0.15)	(0.29)		
L5		-0.28**	0.17		
		(0.12)	(0.18)		
L6			-0.33**		
			(0.13)		
L1. Wage	-0.75	-0.97	-0.95	-0.69	-0.72
	(1.01)	(1.08)	(1.11)	(1.03)	(1.03)
L2	-2.99	-2.68	-3.14	-3.00	-2.98
	(1.57)	(1.71)	(1.68)	(1.57)	(1.56)
L3	4.93**	4.64**	5.26**	4.92**	4.76**
	(1.93)	(1.97)	(1.98)	(1.92)	(1.92)
L4	.525	0.99	0.45	0.55	0.62
	(1.61)	(1.58)	(1.59)	(1.61)	(1.60)
L5	-6.36***	-6.69***	-6.21***	-6.38***	-6.39***
	(1.97)	(2.01)	(2.01)	(1.98)	(1.99)
L6	5.95***	6.08***	5.96***	5.92***	5.77***
	(1.61)	(1.68)	(1.60)	(1.61)	(1.62)
L1. Interest Rate	1.27	1.17	1.18	1.25	1.24
	(.77)	(0.77)	(0.76)	(0.77)	(0.77)
L2	-1.07	-0.97	-1.00	-1.05	-1.02
	(1.18)	(1.16)	(1.16)	(1.18)	(1.18)
L3	.42	0.38	0.44	0.44	0.57
	(1.07)	(1.07)	(1.05)	(1.07)	(1.06)
L4	-1.08	-1.02	-1.06	-1.09	-1.17
	(1.27)	(1.27)	(1.27)	(1.28)	(1.28)
L5	2.91**	2.91**	2.97**	2.90**	2.94**
	(1.18)	(1.16)	(1.16)	(1.18)	(1.18)
L6	-2.57***	-2.65***	-2.71***	-2.56***	-2.58***
	(.60)	(0.58)	(0.58)	(0.59)	(0.59)
L1. Electricity	-.060	-0.05	-0.08	-0.06	-0.03
	(.27)	(0.26)	(0.28)	(0.27)	(0.28)
L1. Real Ex. Rate	-3.38**	-3.65**	-3.73**	-3.31	-3.46**
	(1.64)	(1.67)	(1.78)	(1.67)	(1.68)
L2	-1.88	-1.56	-2.01	-1.89	-1.88
	(1.86)	(1.94)	(2.01)	(1.86)	(1.83)
L3	3.80**	3.52	4.13**	3.79**	3.69
	(1.82)	(1.90)	(1.90)	(1.82)	(1.82)
L4	1.80	2.33	1.92	1.81	1.97
	(2.02)	(2.04)	(1.97)	(2.03)	(2.02)
L5	-6.34**	-6.67**	-6.16**	-6.35**	-6.40**
	(2.57)	(2.57)	(2.57)	(2.58)	(2.59)
L6	5.70***	5.87***	5.57***	5.67***	5.43***
	(1.78)	(1.84)	(1.79)	(1.79)	(1.82)
Dummy Crisis	-0.23	-0.24	-0.24	-0.23	-0.24
	(.121)	(0.12)	(0.12)	(0.12)	(0.12)
Sample Size	1120	1120	1120	1120	1120
R2 Within	.097	0.11	0.10	0.10	0.10
R2 Overall	.133	0.08	0.08	0.08	0.08

Notes: Newey-West robust standard errors to heteroskedasticity and serial correlation are reported in parenthesis. The symbols ** and *** refer to levels of significance of 5% and 1%, respectively.

Table 6. FDI Model on Crime with Fixed Effects and Flexible Lag-lengths Ranked by State Crime Levels

Variables	Homicide		Theft	
	Top 16	Bottom 16	Top 16	Bottom 16
L1. Crime	0.28 (0.23)	-0.08 (0.18)	0.41 (0.27)	-0.09 (0.32)
L2	0.09 (0.34)		0.47 (0.31)	0.07 (0.47)
L3	-0.43** (0.17)		-0.97** (0.35)	-0.33 (0.60)
L4				0.61 (0.33)
L5				0.18 (0.23)
L6				-0.30** (0.12)
L1. Wages	-2.08 (1.17)	.409 (.49)	-0.05 (1.25)	-1.08 (0.84)
L2	-2.88 (2.42)		-4.07** (1.90)	
L3s	5.88** (2.68)		6.20** (2.54)	
L4	-0.52 (1.73)		0.10 (1.80)	
L5	-8.75*** (2.71)		-7.82** (3.10)	
L6	7.54*** (2.37)		7.34*** (2.36)	
L1 Interest Rate	1.60 (1.33)	2.18*** (0.51)	0.48 (1.01)	2.01** (0.69)
L2	-1.39 (1.81)	-1.60 (1.18)	0.02 (1.59)	-1.71 (1.11)
L3	1.64 (1.58)	-1.51 (1.58)	1.24 (1.89)	-0.89 (1.24)
L4	-1.17 (1.55)	1.01 (2.09)	-2.94 (1.88)	1.28 (1.58)
L5	3.01** (1.25)	1.87 (2.11)	3.65 (1.73)	2.14 (1.61)
L6	-2.67*** (0.82)	-2.32** (1.01)	-2.57*** (0.78)	-2.29** (0.94)
L1.Electricity	0.20 (0.32)	-0.79 (0.58)	0.07 (0.37)	-0.32 (1.00)
L2				0.40 (0.67)
L3				-0.66 (0.43)
L4				0.50 (0.37)
L5				-1.11 (0.92)
L6				1.89** (0.76)
L1 Real Ex Rate	-6.29*** (1.67)	-0.55 (0.60)	-1.23 (1.53)	-3.32** (1.18)
L2	-0.17 (2.61)		-4.06 (2.19)	
L3	4.33 (2.60)		5.25** (2.42)	
L4	1.19 (1.55)		1.73 (2.67)	
L5	-9.16** (3.12)		-7.74 (4.21)	
L6	8.65*** (2.45)		6.50** (2.77)	
Dummy Crisis	-0.36 (0.24)	-0.18 (0.09)	-0.22 (0.16)	-0.35** (0.16)
Sample Size	564	556	570	550
R2 Within	0.16	0.07	0.14	0.13
R2 Overall	0.12	0.05	0.11	0.09

Notes: Newey-West robust standard errors to heteroscedasticity and serial correlation are reported in parenthesis. The symbols ** and *** refer to levels of significance of 5% and 1%, respectively.

Table 7. SGMM FDI Model: Dependent Variable is Total log FDI in USD.

Coefficients on	Full Sample				
	No crime	Homicide	Theft	Property	Other Crimes
	(1)	(2)	(3)	(4)	(5)
Lagged FDI	0.61**	0.53**	0.55**	0.40	0.68**
	(0.25)	(0.28)	(0.24)	(0.32)	(0.34)
Crime		-0.26	0.34	-1.71	-2.29
		(0.84)	(0.37)	(1.05)	(1.19)
Real Wage	-1.38	-1.18	-1.65	0.45	-2.14**
	(0.97)	(1.01)	(1.05)	(1.75)	(0.98)
TIIE	1.04	1.07	1.02	0.73	1.56
	(0.67)	(0.73)	(0.63)	(0.87)	(0.84)
Energy expenditures	-1.11	-1.09	-1.13	-2.66	-2.12**
	(1.04)	(1.04)	(0.80)	(1.63)	(0.84)
RER	2.37	3.36	0.41	4.39	5.44
	(2.25)	(6.27)	(2.75)	(4.60)	(4.24)
2008-2009 dummy crisis	-0.58**	-0.69	-0.45	-0.80	-0.96**
	(0.27)	(0.55)	(0.27)	(0.52)	(0.40)
Lags of end. vars./collapse	[2, 3]	[2, 3]	[2, 3]	[2, 3]	[2, 3]
Observations (N)	1,187	1,187	1,187	1,184	1,187
States	32	32	32	32	32
No. of Instruments	14	14	14	14	14
AB(2)	0.60	0.34	0.55	-0.11	0.08
p-value	[0.55]	[0.73]	[0.58]	[0.91]	[0.94]
Hansen	9.05	8.71	5.63	6.05	3.90
p-value	[0.25]	[0.19]	[0.47]	[0.42]	[0.69]
Endogenous vars.	FDI, RW, RER, TIIE	FDI, RW, RER, TIIE	FDI, RW, RER, TIIE	FDI, RW, RER, TIIE	FDI, RW, RER, TIIE

Notes: SGMM basic specification has lagged log FDI lagged once and all (RHS) contemporaneously also in logs. A constant is included but not reported in the table. Endogenous variables are FDI and labor and macroeconomic economic forces (real wages, interest rate and real exchange rates) with two lags and collapsed procedure to achieve number of instruments < cross-section units. Crisis dummy assumed as purely exogenous. Robust standard errors (with Windmeijer's finite-sample correction) are in parenthesis with two-step estimators. With orthogonal transformation, instruments are replaced with their deviations from past means.