Firms and Labor in Times of Violence: Evidence from the Mexican Drug War

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Preliminary –comments, suggestions are welcome!!

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Violence in Mexico has reached unprecedented levels in recent times. After the government crackdown on drug cartels, nation-wide homicides almost tripled between 2006 and 2010. Using longitudinal plant-level data and information on plants' detailed product portfolios and technology, this paper studies the impact of violent conflict on firms, exploiting this period of heightened violence in Mexico commonly referred to as the Mexican Drug War. The empirical strategy uses spatiotemporal variation in violence across Mexican cities and an instrumental variable strategy relying on the triggers of the Drug War against potential endogeneity of violence surge. It controls for observable and unobservable differences across cities and firms as well as for product-specific business cycles. The results show significant negative impact of the surge in violence on plants' output, product scope, employment and capacity utilization. Violence is felt across all plants as a negative blue-collar labor supply shock, leading to significant decline in skill-premium. The effect of violence outbreak on output and plants' survival likelihood is very heterogenous, increasing with reliance on local demand, local sourcing and with intensity of female employment. The results reveal significant distortive effect of the Mexican Drug War on manufacturing and suggest that the Drug War accounted for more than 30% of the aggregate decline in manufacturing employment in Mexico over 2007-2010.

Keywords: Drug War, Mexico, Firms, Trade, Technology, Labor, Productivity, Reallocation

JEL Classifications: L25; L60; O12; O14; O54; R11; F14

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1 Introduction

Even after taking observed differences in the production factors into account, there is still a very large 'unexplained' cross-country variation in income (Caselli 2005). It matters not only what production factors are employed and how much, but also the environment in which production takes place. In Ciudad Juárez, Mexico, for example, 283 homicides were reported per 100,000 inhabitants in 2010, while the rate in El Paso, in Texas, was just 0.8 per 100,000. The distance between the two cities is just a few miles, but the levels of violence are orders of magnitude apart. Apart from the direct consequences of violence on people involved, does a violent and conflict afflicted environment matter for firms, productivity, and the way the business is conducted?

Economic distortions that slow down or prevent efficient reallocation of resources between heterogeneous firms are important barriers to economic development.[1] As a potential economic distortion, violence is a common condition - one in four people on the planet, more than 1.5 billion, live in conflict affected areas with very high levels of criminal violence (World Development Report 2011). Yet it is under-studied mostly because the large scale micro data needed to study mis-allocation is hard to obtain from conflict affected areas. When combined with weaker institutions, common in developing countries, organized crime and violence can be detrimental to economic development and convergence between high and low-income countries. This paper studies the impact of violent conflict on firms, utilizing the recent period of escalation of violence in Mexico commonly referred to as the Mexican Drug War in a natural experimental set-up.

[1] For example, Hsieh and Klenow (2009) report that removing distortive barriers would result in a 30-60 % gain in TFP in manufacturing in China and India, leading to a 60-120 % increase in output. While Hsieh and Klenow (2009) remain agnostic about particular types of frictions or specific distortive factors that drive wedges between marginal products across plants, studies mostly focus on adjustment costs on inputs (e. g. severance payments, borrowing constraints), imperfect competition, macroeconomic uncertainty, government-business ties (e.g. state-owned enterprises, corruption) and the like.

Since 2007 there has been a drastic increase in drug-related homicides in Mexico. The number of homicides increased almost 200% from 2007 to 2010 (see Figure 1), an increase attributed to unexpected and unintended consequences of a change in the government's drug enforcement policy and further fueled by a plausibly exogenous increase in cocaine prices during the period (Dell (2015), Lindo and Padillo-Romo (2015), Castillo et. al. (2016)).[2] In numbers of violent deaths Mexico had more than three times as many killings as Iraq and Afghanistan combined in 2010.[3], [4]

I employ longitudinal plant-level data covering all Mexico for the period 2005-2010 and utilize the escalation of violence due to the Mexican Drug War to derive causal implications of a conflict afflicted environment on manufacturing activities and allocative efficiency. As a developing country, long suffering from drug trafficking, but also long benefiting from international fragmentation of production, Mexico provides an appropriate context to study the impact of heightened violence. The period of analysis is marked by substantial variation in violence over time and among geographical markets across the country (Figures 2-3).

Mexican cities that are prone to increased violence may well have special characteristics, as the location of drug trafficking organizations (DTOs) are not random (Dell, 2015). And these locations may be attracting particular types of firms, perhaps firms with technology more resilient to outbreaks of violence. Longitudinal data allow me to control for observable and unobservable such differences between firms and cities using plant-fixed effects and to control for industry-specific aggregate shocks using industry by year fixed effects.

[2]Angrist and Kugler (2008) emphasize the importance of demand channels in causing violence and show that plausibly exogenous increase in cocaine prices trigger violence in Colombia.

[3]There has been 26 thousand homicides in Mexico in 2010; Iraq Body Counts reports 4,167 civilian deaths from violence, Williams (2012) reports deaths of 2,777 civilians and 711 soldiers in Afghanistan in the same year.

[4]Drug trafficking is one of the central factors driving increases in violence in Latin America. Drug trafficking regions in these countries had homicide rates twice as high as in locales with low drug trafficking (World Bank, 2011).

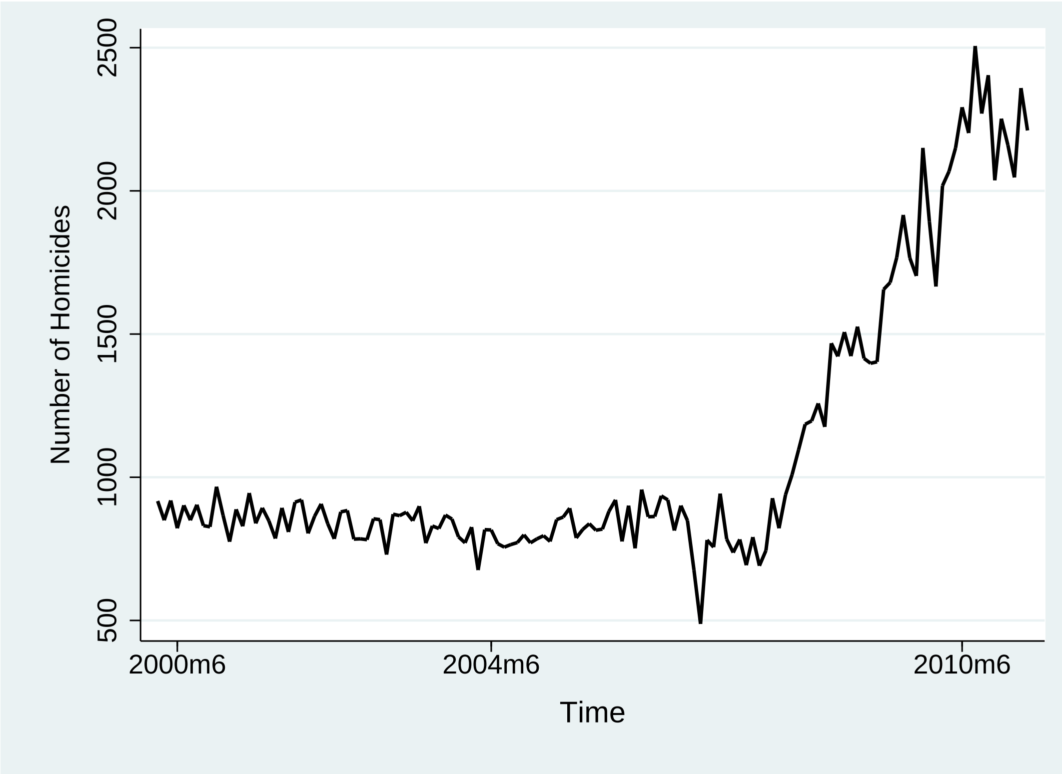

Figure 1: Surge in Violence in Mexico
The monthly number of homicide occurrences are from INEGI.

Dube and Vargas (2013) examines the impact of income shocks on armed conflict in Colombia and show that increased rent opportunities due to a positive oil price shock leads to an increased likelihood of conflict in oil extraction areas, and an increase in local income due to an increase in coffee prices leads to a decline in conflict in areas where coffee production concentrates. Such income shocks may lead to correlated plant-level outcomes and conflict intensity, and bias the impact of violence, downward or upward, depending on the source of income shocks. The empirical strategy in this paper focuses on the plausibly exogenous increase in violence due to the Mexican Drug War and controls for size of crop production, precious metal extraction as well as the size of oil production at the local labor market level. Violence as measured by the homicide rate may still be influenced by other factors than the plausibly exogenous outbreak of violence and convolute the results. To address such concerns, I develop an instrumental variable strategy utilizing the widely agreed triggers of the Drug War. The results show that heightened violence leads to significant decline in plant-level output, employment and capacity utilization. More specifically, plants located in local labor markets that experience more than average increase in homicide rate experience 13% disproportionate decline in production. The impact is not short-run or temporary, and outbreak of violence due to the Drug War has dynamic implications such that firms' product-scope also decreases significantly as well as plant growth. Further, the Drug War triggers plant closings. More specifically, a marginal change in the homicide rate from the average in a metropolitan area increases the likelihood of plant exit 2.2 percentage points.

The literature that relates conflict and crime to economic outcomes largely focuses on aggregate outcomes such as regional income or stock market returns (Guidolin and La Ferrara, 2007, and Abadie and Gardeazabal, 2003).[5] Abadie and Gardeazabal (2003) show that economic outcomes and stock market returns in the Basque Country were negatively affected by the outbreak of terrorist events. On the other hand, Guidolin and La Ferrara (2007) emphasize that violence is not necessarily perceived as negative by investors by showing that Angolan diamond firm returns were hurt due to the end of civil war in Angola. To understand under what conditions an economy reacts to violence in a certain way requires identifying channels through which violence and conflict impact an economy. Micro-level studies can zoom in on the way firms and worker behaviour interact with violence and potentially shed light into these channels.

Micro-level empirical studies are yet rare, but emerging. Ksoll, Macchiavello, and Morjaria (2016) use the increased ethnic violence following the disputed 2007 presidential election in Kenya, and study the effect on about 100 flower firms. They quantify significant negative effect on weekly export volumes of these firms. Their analysis points to worker absence as a

[5] A branch of literature studies the local economic impact of international war and finds insignificant long-term effects (Davis and Weinsten, 2002 and Miguel and Roland, 2011).

main channel through which violence affects firms. Rozo (2017) uses micro data and shows that reduction in violence in Colombia following President Uribe's election leads to market expansion, and Klapper, Richmond, and Tran (2013) focus on civil unrest in Cote d'Ivoire following the coup d'etat in 1999, and find that the conflict leads to a drop in firm productivity. However, focusing on firm productivity as an only outcome without being able to document the associated changes within firms in detail may limit our understanding of the channels and sources of productivity effects (Utar, 2014). Amodio and Di Maio (2017) study Palestinian firms during the Second Intifada and show that firms were affected by the conflict indirectly via border closure and their use of imported materials decrease as a result.

By studying a large scale firm-level data from a developing country, and focusing on a plausibly exogenous outbreak of violence I contribute to this literature in number of ways. First, I show that conflict afflicted environments have very heterogenous effects on firms, and therefore it significantly distorts the resource reallocation patterns between firms, and affect the long-run development of industrial capability. To my knowledge this is the first paper that reveals strongly heterogenous effects of violence. Then, a detailed study of the heterogenous effects allows me to identify different channels through which the violent environment affects firms. I find that firms are affected by the Drug War: 1) via labor market 2) via its effect on firms' demand 3) via its effect on firms' supply chain.

I show that blue-collar, unskilled, production workers are more vulnerable to increased violence than more skilled, non-production employees, and that violence works as a negative labor supply shock on unskilled workers. Wages of blue-collar workers increase as a result and firms start to use non-production employees more intensively. This labor market channel is particularly strong in plants with a female-intensive workforce, suggesting that unskilled women living in poorer neighborhoods drop out of the labor force, as the risk of life outweighs the benefit of working. The labor market effect is also strong for lower wage plants, and plants with lower unionization rate among production workers.

The Mexican Drug War doesn't only operate through the labor market but also, by causing disruptions in domestic, local transactions, it favors international trade over internal trade, leading to reallocation from domestically oriented establishments towards export and import intensive establishments.

By focusing on the firm-level impact of the violence due to the Drug War, this study complements Dell (2015) who examines the impact of change in the drug enforcement policy of the Mexican government on violence and drug trafficking. She establishes causal relationship between the drug crackdowns and increased violence and finds that drug crackdowns were not effective in decreasing the drug trafficking activities. Although Dell (2015) does not focus on the economic impact of the Drug War, in her brief analysis using the labor force survey and drug trafficking routes she shows at the municipality-level that female labor force participation, but not male, were affected negatively by the Drug War. My results at the firm level collaborates and further these findings. Recent studies also show negative association of the Mexican Drug War with service FDI (Ashby and Ramos, 2013), regional growth (Enamorado, et al ., 2014), income inequality (Enamorado, et al. 2016) and percentage of working people (Robles et al, 2013). I contribute to this literature by providing micro-foundations of regional aggregate affects. I find that the Mexican Drug War leads to reallocation from more manual labor intensive plants towards less, from less unionized plants towards more and from plants selling locally towards more geographically diversified firms. My estimates suggest that the Mexican Drug War accounted for more than 30% of the aggregate employment decline in manufacturing between 2007 and 2010.

The next section lays out the framework of the empirical analyses with background information on the Mexican Drug War, describes the data, and presents a number of facts on the Drug War locations and firms located in these areas.

2 Violent Conflict and Firms: Sources of Variation and Measurement

2.1 Mexican Drug War and the Surge of Violence – Identifying Variation

After the election of president Calderón in December 2006 the Mexican government, aiming to decrease the organized crime in the country, changed the focus of their battle against the powerful drug cartels, from crop eradication to actively seeking to capture cartel leadership in an approach also known as the kingpin strategy.[6][7] The new strategy had an unfortunate and unanticipated consequence of increased violence, as the organized crime groups fragmented and began fighting each other for territorial control[8]. Table 1 shows the fragmentation of major cartels over the sample period.

Table 1: Fragmentation of Major Drug Cartels in Mexico

2006	2007-2009	2010
Pacifico cartel (Sinaloa)	Pacifico cartel Beltrán-Levya cartel	Pacifico cartel Pacifico Sur cartel Acapulco Independent cartel “La Barbie” cartel
Juárez cartel Tijuana cartel	Juárez cartel Tijuana cartel “El Teo” faction	Juárez cartel Tijuana cartel “El Teo” faction
Golfo cartel	Golfo-Zetas cartel	Golfo cartel Zetas cartel
La Familia Michoacana	La Familia Michoacana	La Familia Michoacana La Resistencia
Milenio cartel	Milenio cartel	Jalisco cartel-Nueva Generación

Source: Bagley and Rosen (2015).

[6] The kingpin strategy was developed by the US Drug Enforcement Administration (DEA) in 1992 to target and eliminate, by death or by capture, commanders, controllers and key leaders of major drug trafficking organizations. See also Cockburn (2015).

[7] Despite DTOs are not cartels in the sense that they do not control prices by colluding, the term “drug cartel” is used colloquially to refer to DTOs. Drug cartels and DTOs are used interchangeably in this paper.

[8] Lindo and Padilla-Romo (2005) show that the strategy led to increase in the homicide rate by about 60%

Another factor potentially fueling the heightened violence after 2008 was the decline in the supply of cocaine in the market. Castillo et al. (2016) argues that increased intensity of government seizures of drugs in Mexico's major cocaine supplier, Colombia, played an important role in the decline in cocaine supply. The resulting decline in the cocaine supply lead to increased cocaine prices in the US and intensified drug related violence especially in areas around the strategic drug trafficking routes to the US market.[9] Thus, after a decade of stable rates of violent crime, homicide rates almost tripled from 2007 to 2010. However, not every location was affected by the sudden surge of violence.

My spatial unit of analysis is a metropolitan area which consists of an employment core and the surrounding areas that have strong commuting ties to the core.[10] This allows me to focus on well-defined local labor markets rather than administrative units and also to not compare rural versus urban locations. Figure 2 and Figure 3 show the homicide rates in selected local labor markets (metropolitan areas) (also see Figure A-1). The spatial variation was mainly due to the presence of the drug trafficking organizations (DTOs) and the selective federal army operations that triggered the war. This plausibly exogenous outbreak of violent conflict allows me to study causal relationships between an increase in violence in the local environment and detailed establishment-level outcomes.

[9] Cocaine production in Colombia decreased 43 percent from a potential 510 pure metric tons in 2006 to 290 pure metric tons in 2009 according to a Justice Department report published in 2011 (National Drug Assessment Report).

[10] Mexican Statistical Institute, *INEGI*, constructed fifty-nine such local labor markets in collaboration with the National Population Council, *CONAPA*, and the Ministry of Social Development, *SEDESOL*.

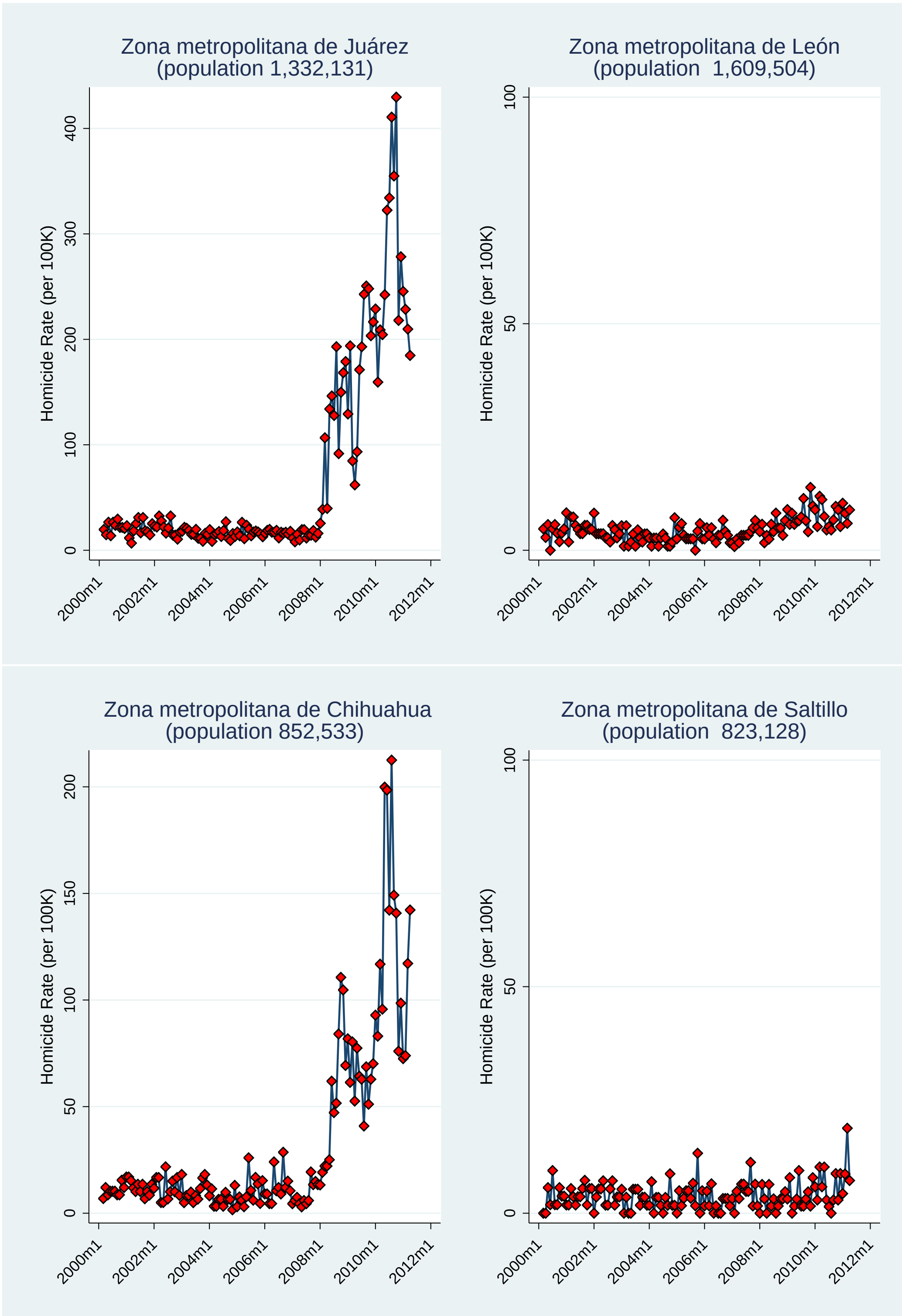

Figure 2: Homicide rates across selective metropolitan areas I

The number of homicide occurrences and population information is from INEGI. Population numbers in the figure titles are the 2010 population numbers. Homicide rates are calculated using the annual population figures, they are annualized monthly rate of homicides.

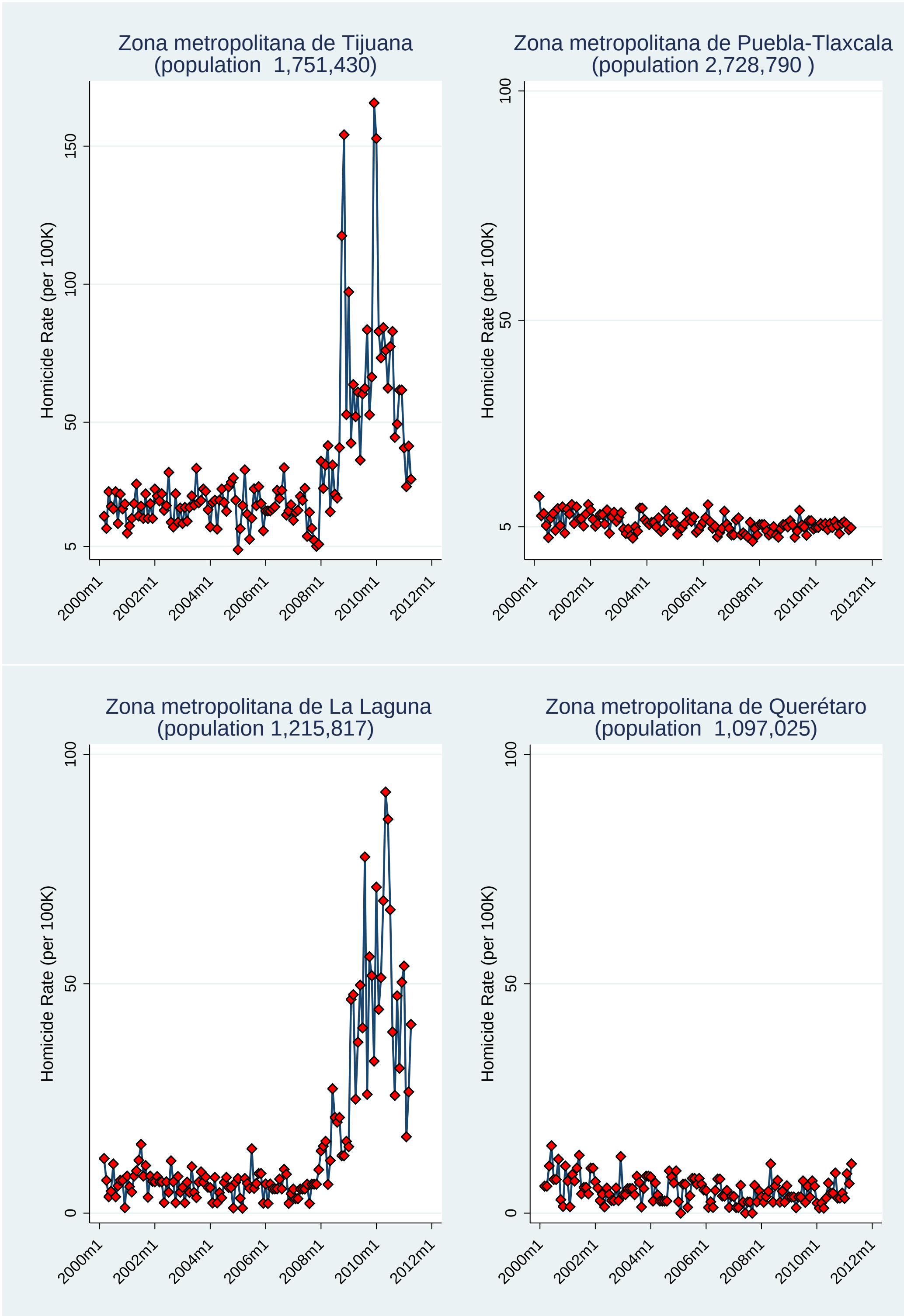

Figure 3: Homicide rates across selective metropolitan areas II

The number of homicide occurrences and population information is from INEGI. Population numbers in the figure titles are the 2010 population numbers. Homicide rates are calculated using the annual population figures, they are annualized monthly rate of homicides.

Although much of the violence has been due to fights between drug cartels, it also led to widespread random violence especially in poorer neighborhoods of affected locations. In October 2010 in Juárez a group of gunmen looking for a specific person stormed into a party, killing 13 people aged 13 to 32 including 6 women and girls and wounded others including a nine-year-old boy (Williams, 2012). The following month in the same city another group of armed men attacked three buses belonging to a auto parts manufacturer, as the buses took third-shift workers home in the early morning, killing and wounding many. The gang members were apparently looking for one worker, whom they took away from the scene (La Botz, 2011). In August of 2010 in San Fernando the army found the bodies of 72 South American migrants, men and women, killed and buried in a mass grave. It later appeared that they were killed when resisting recruitment by the Zetas.

From the news report we can identify at least two different ways that workers may be affected by the war. 1) Direct assaults or being directly involved by drug businesses. The annual profit estimates of the drug cartels in the US ranges between 18 to 39 billion USD (Mexico Drug War Fast Facts–CNN Library). With the amount of money involved, involvement of poor workers in logistics, transportation and other drug-related businesses may not be that surprising. 2) Being an indirect target by either DTOs or military/police forces. News reports document especially workers living in poor neighborhoods are being the victims of either cartels or the government forces by being in the wrong place in the wrong time. See e.g. Cardona (2010).

2.2 Data and Preliminary Evidence

The main data set used in this study is *Encuesta Industrial Mensual Ampliada* (*EIMA*) 2005-2010 which is a monthly survey of plants collected by the Statistical Institute of Mexico, *INEGI*, to monitor short-term trends in employment and output. It surveys 7,238 establishments covering 86% of the nation-wide manufacturing value-added. *EIMA* 2005-2010 covers plants for each of the 32 states and the level of coverage in 28 of the 32 entities is higher than 70%.[11]

I match *EIMA* with the annual survey manufacturing plants, *Encuesta Industrial Anual* (*EIA*) which provides detailed balance sheet information of the same manufacturing plants before the Drug War period of 2003-2007.[12] For the purpose of this study I focus on plants located in metropolitan areas. Table A-1 presents summary statistics.

While the plant-level analysis only covers the areas where the manufacturing activities take place, in order to see broad correlation patterns of violence with the geographic, economic and socio-economic characteristics of local areas, I use municipality-level data covering the whole of Mexico. Table A-2 presents the pairwise correlation coefficient of the average post-war homicide rates with various pre-war municipality characteristics. In general, violence outbreak is not negatively correlated with economic activities, indeed, if anything, it is positively associated with the output per capita. This may be driven by the fact that areas closer to the US were important locations for the DTO activities and hence for the government's military actions. The overall pattern in Table A-2 shows that the Drug war related violence was largely exogenous to local economic and socio-economic factors.

2.3 Preliminary Evidence

I begin by documenting the broad patterns of the data to obtain an aggregate insight into the relationship between heightened violence and plant-level outcomes.

[11] All plants that are more than 300 employees are included in the survey. Smaller plants are included according to the following criteria: For each detailed manufacturing activity, *clase*, plants are ranked according to their production capacity as of Economic Census 2004 and they are surveyed from the top until at least 80% of all production within each detailed production activity is covered.

[12] As both *EIA* and *EIMA* are based on the same survey design, 90 % of the plants surveyed in *EIMA* can be matched with *EIA*. Unfortunately *EIA* was replaced with a new survey based on a new sampling in 2008, therefore I only rely on *EIA* for initial, pre-Drug War, characteristics of the plants.

As a first step I compute the mean values of homicide rates and homicide numbers before and after the Drug War for each metropolitan area, that is across the 2005-2006 and 2008-2010 periods. I define local labor markets as High Intensity Drug War zones if the differences between pre- and post- period rate and number of homicides in any market are larger than the mean differences. Doing that identifies six metropolitan areas as 'high intensity drug war zones: Acapulco, Chihuahua, Juárez, La Laguna, Monterrey, and Tijuana. Notice that in my empirical application I will rely on a continuous measure of exposure to the war, namely the homicide rate. However this discrete scheme will help to understand the potential systematic differences between plants located in the war zones versus others. I first focus on the pre-war characteristics.

Table 2 shows the plant-level characteristics across the two areas as of year 2005. Plants have no significant difference in labor productivity, employment or the number of varieties produced per plant. Drug war affected zones are on average closer to the US border, and as a result significantly more plants export in areas that will be exposed to heightened violence after president Calderón's launch of the war on drug cartels. On the other hand, there is no difference across plants located in the war affected and war un-affected areas in terms of importing behaviour.[13]

[13] One should note that the sample does not include any maquiladora plants (export-processing plants), as such plants are surveyed separately by INEGI. See Utar and Ruiz (2013) for further details.

Table 2: Pre-Shock (2005) Plant Characteristics

	High Intensity Drug War Zones		Other Locations			
Plant-level variables	**Mean**	**SD**	**Mean**	**SD**	**Diff.**	**t-stat**
Log Value of Production	11.34	1.94	11.23	1.94	0.10	1.42
Log Capital per Worker	5.01	1.40	4.85	1.42	0.17**	2.99
Log N of Employees	4.59	1.31	4.57	1.31	0.02	-0.43
Log Labor Productivity	-1.06	1.12	-1.12	1.17	0.06	1.35
N of Varieties	3.07	2.87	3.22	3.13	-0.15	-1.31
Export Dummy	0.46	0.50	0.40	0.49	0.06**	3.23
Import Dummy	0.48	0.50	0.48	0.50	0.00	0.12

Note: Values are measured in 2010 thousand Mexican Peso. Labor productivity is measured as the value of production over an hour unit of labor. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

3 Conceptual Framework

Building on Hsieh and Klenow (2009), let's assume there is a single final good Y produced by a representative firm in a perfectly competitive final output market. This firm combines the output Y_s of S manufacturing industries using a Cobb-Douglas production technology:

$$Y = \prod_{s=1}^{S} Y_s^{\theta}$$

where $\sum_{s=1}^{S} \theta_s = 1$.

Taking the price of final good, P, as given, the first order condition ensures that $P_s Y_s = \theta_s PY$, $\forall s$.

P_s is the price of industry output Y_s, and $P \equiv \prod_{s=1}^{S} \frac{P_s}{\theta_s}^{\theta_s}$. Industry output, Y_s is a CES aggregate of M_s differentiated products: $Y_s = (\sum_{i=1}^{M_s} Y_{si}^{\frac{\sigma-1}{\sigma}})^{\frac{\sigma}{\sigma-1}}$.

Each differentiated product i in sector s is produced by firm i with a constant returns to scale Cobb-Douglas production function as follows:

$$Y_{si} = A_{si} K_{si}^{\alpha_s} L_{si}^{\beta_s} N_{si}^{1-\alpha_s-\beta_s}$$

where A, K, L, and N refer to TFP, capital, production labor and non-production labor respectively.

Assume that capital represents the capacity of a firm and it is fixed in the short-run.

Violence may be increasing transportation costs or lowering the demand; such distortions should increase the marginal products of all inputs proportionately. Let's denote such distortions as τ_{Yi}. Violence may also affect workers, among others by increasing the risk of travelling at night, by road blocks, or by increasing the risk to life especially in poor neighborhoods. Criminal organizations may also force workers to work for them. Especially production workers will be affected by such threats as they tend to have less formal education, earn less and live in poorer locations, and in locations which are more prone to drug-trade related violence (Ajzenman et al. 2015). Let's denote the distortions on blue collar and white-collar workers as τ_{Li} and τ_{Ni} respectively.

Suppose that firms are price takers in the input market. We can write the short-run profit as

$$(1-\tau_{Yi}) P_{si} Y_{si} - W_l (1+\tau_{Li}) L_{si} - W_n (1+\tau_{Ni}) N_{si} \tag{1}$$

W_l and W_n denote wages of production and non-production workers respectively. The single representative firm for sector s is a price taker and cost minimization determines the allocation of sector-level demand Y_s: $Y_{si} = Y_s(\frac{P_{si}}{P_s})^{-\sigma}$, $\forall i$. Expressing P_{si} in terms of firm i's output and the sector level price and output and substituting in equation 1 and maximizing 1 with respect to production and non-production labor, we have:

$$L_{si} = \frac{\sigma - 1}{\sigma} \beta_s \frac{P_{si} Y_{si}}{W_l (1 + \tau_{Li})} (1 - \tau_{Yi}) \tag{2}$$

$$N_{si} = \frac{\sigma - 1}{\sigma} (1 - \alpha_s - \beta_s) \frac{P_{si} Y_{si}}{W_n (1 + \tau_{Ni})} (1 - \tau_{Yi}) \tag{3}$$

Equations 2 and 3 show that output distortions, such as increased transportation costs or demand decline (one could also model violence as a negative output price shock), will proportionately decrease the demand for both production and non-production labor inputs. On the other hand, an increase in the distortion faced by production workers will only reduce the demand for production workers and increase their marginal product.

4 Empirical Strategy

This section describes the empirical strategy that is used to identify the effect of increased violence on plant-level outcomes. Drawing from a longitudinal plant-level survey allows me to focus on within-plant comparisons and eliminates the possibility that unobservable characteristics of plants and their locations affect the results. I start with the following estimation equation:

$$lnY_{ijkt} = \alpha_0 + \alpha_1 Violence_{jt} + X_{tj} + \tau_{kt} + \eta_i + \varepsilon_{ikjt} \tag{4}$$

Y_{ijkt} is plant i's outcome in industry k located in metropolitan area j and time period t. $Violence_{jt}$ is the logarithm of number of intentional homicides per thousand people in the area. X_{tj} is a vector of time-varying metropolitan area characteristics. τ_{kt} denotes three-digit industry by time fixed effects and η_i denotes plant fixed effects that can be correlated with plant or municipality characteristics. By making comparisons within a plant over time, observable and unobservable time-invariant characteristics (e.g. productivity or technology differences across firms), local area characteristics that make the local area less or more attractive to drug cartels or businesses such as infrastructure, ports, and economic development are controlled for. Further, as I focus on plants in metropolitan areas in the analysis, potential correlation between rural versus urban characteristics of locations with the homicide rate would not affect the results. I leave out the metropolitan area that was affected by the Tabasco flood, so there are 58 metropolitan areas in the sample out of the 59 designated metropolitan areas of Mexico.[14]

Inclusion of industry by time fixed effects account for not only macroeconomic changes but also industry-specific time trends that may affect certain regions maybe due to potential geographic concentration of industries. It is especially important to control for industry-specific business trends due to the potential differential impact of the Great Recession.[15] Moreover, standard errors are allowed to have arbitrary patterns of correlation within each metropolitan area, and also separately within each 4-digit industry and two-way clustered for each metropolitan area and industry.

In addition to being driven by plausibly exogenous policy intervention in Mexico, the homicide rate may be responding to changing characteristics of local economy, labor market or other characteristics of local areas that can be correlated with plant-level outcomes, leading to endogeneity. Dube and Vargas (2013) study how different types of commodity shocks affect

[14] In late 2007 there was a big flood in the sate of Tabasco affecting over one million residents. The state capital went bankrupt as a result and thousands of businesses were affected. Since this event is likely to affect the opportunity cost of conflict and crime, I do not include plants in the flood area in the analysis.

[15] However, studies tend to find that the geographic heterogeneity of crime rate in Mexico does not correspond to the differential regional magnitude of the Great Recession (e.g. Ajzenman et al., 2015).

civil war outcomes and show that a sharp fall in coffee prices during the 1990s in Colombia leads to increase in violence differentially in municipalities cultivating more coffee. This is the opportunity cost effect of conflict and the presence of such shocks may lead to overestimation of the violence effect. Dube and Vargas (2013) also find that a positive income shock due to a rise in oil price intensifies attacks in oil producing regions. The increase in oil price increases the contestable income, thereby increases the conflict intensity. Such shocks are likely to lead to an underestimation of the violence effect on plant-level outcomes. In order to prevent a possible convolution of the results, the vector X_{tj} includes metropolitan-level employment shares of crop production, metal mining including gold, silver, copper, and uranium as well as oil and natural gas extraction.

Additionally the vector, X_{tj}, includes the pre-trends in homicide rate per metropolitan areas. To control for pre-trends the year dummies are interacted with the year 2002 level of homicide rates of the metropolitan areas. α_1 will measure the variation in within-plant outcomes specific to local markets that experience heightened homicide rate during the Drug War.

4.1 Instrumental Variable Strategy

Although the spatio-temporal variation in the homicide rate during the sample period is mainly driven by the Mexican Drug War, the variation in homicide rates especially in non-War areas may be influenced by other factors that may be correlated with plant-level performance. For example, increased productive capacity in an area may attract unskilled migrants, potentially driving socioeconomic inequality and that, in turn, contributes to an increase in local violence. Or maybe a positive oil price shock will boost the local economy in an oil extraction area and increase the contestable income for criminal organizations, leading to increased homicide rate as suggested by Dube and Vargas (2013). Such mechanisms will likely cause under-estimation of the impact of the Drug War as proxied by the homicide rate in an ordinary least square estimation. In order to rule out the possibility that the homicide rate is correlated with the error term and make sure that the results are driven by the plausibly exogenous escalation of violent conflict due to the unexpected consequences of a policy turn in Mexico, I conduct an instrumental variable strategy.

When the Calderon government decided to use federal army power on the drug cartels in 2007, Mexican states were offered to engage in joint military operations with the federal forces against the criminal organizations (*Operativos Conjuntos Militares*). Some states decided to opt in with the federal military operations and others opted out.[16] I utilize the federal army entrance in states as a measure of the implementation of the kingpin strategy, and thus of the unintended violence shock as the military is the main actor in implementing the kingpin strategy. Let FA_{st} be an indicator for state s whether it takes the government's offer. That is,

$FA_{st} = 1$ if state s agrees to participate in the joint military operations since 2007.

$FA_{st} = 0$ otherwise.

Note that $FA_{st} = 0$ before 2007. Federal army operations resulted in captures or killings of drug cartels leaders and that in turn triggered fights between cartels. I use the information on municipality-level locations of the Mexican drug cartels as documented by Coscia and Rios (2012). Let DTO_j be an indicator for metropolitan area j if there is an active criminal organization before the Drug War period of 2000-2006.[17] Interacting DTO_j with FA_{st} gives us the locations that are vulnerable to escalation in violence due to the unexpected consequence of the policy change.

Scholars also point out that the decline in cocaine supply from Colombia and the resulting change in cocaine prices intensified the war by increasing the rent opportunities (See Castillo et al. 2016 and Angrist and Kugler, 2008). To capture this effect, I regress the logarithm of

[16] Michoacán, Guerrero, and Baja California participated in 2007. Nuevo León, Tamaulipas, Chihuahua, Sinaloa and Durango participated in 2008. Other states were not involved.

[17] More specifically $DTO_j = 1$ if in any year over 2000-2006, a DTO is active in area j. The annual information on areas of operations of Mexican DTOs by municipality is from Coscia and Rios (2012).

retail cocaine prices in the US over the log of coca cultivated land (in hectar) in Columbia ($lnHectar^{CC}$) with three year lag and the annual log number of DTO ships ($lnShips^{CC}$) seized by the Colombian government with one year lag (equation 5).

$$lnP_t^{coke} = \beta_0 + \beta_1 lnHectar_{t-3}^{CC} + \beta_2 lnShips_{t-1}^{CC} + \varepsilon_t \tag{5}$$

Although with a limited number of observations, estimation of equation 5 results in statistically significant β_1 and β_2 coefficients with expected signs: namely, $\widehat{\beta_1} = -0.847$ with t-value -3.15 and $\widehat{\beta_2} = 0.347$ with t-value 11.43. I then use the predicted cocaine prices over the sample period by the Colombian supply developments and interact with the susceptible locations to the policy intervention, namely $DTO_j * FA_{st}$. In this way, I only use the time-variation in cocaine prices that are associated with the plausibly exogenous changes in Colombia.[18] Therefore :

$$I_{jt} \equiv FA_{st} * DTO_j * \widehat{lnP_t^{coke}} \tag{6}$$

where $\widehat{lnP_t^{coke}}$ denotes the predicted values of inflation and purity adjusted retail cocaine prices in the US (in logarithm). Assuming a strong correlation between the homicide rate and the instrument, the exclusion restriction is valid if $E[\varepsilon_{ijkt} I_{jt} | X_{tj}, Z_{it}, \tau_{kt}, \eta_i] = 0$.

5 Plants' response to violent conflict

Table 3 presents employment effects via estimation of equation 4 using OLS. Violent conflict is measured using the number of homicides per thousand inhabitants in panel A. The coef-

[18] Since 2000 Colombia implemented policies aimed at reducing the cultivation of coca together with policies that aimed at preventing drug shipments out of the country (Mejia and Restrepo, 2015).

ficient estimate in Panel A of column 1 means that an increase from zero homicides to one homicide per thousand people is associated with a 7.8% decline in the number of employees. In column 2 pre-trends in violence is controlled for, and the effect is quite similar, indicating that the identifying variation in the homicide rate is overwhelmingly coming from the Drug War. Dube and Vargas (2013) study how shocks to certain sectors such as crop production or oil extraction can affect the conflict intensity. In column 3 metropolitan-level employment of crop production, precious metal mining (gold, silver, copper, and uranium) as well as oil and natural gas extraction are controlled for, and the results are robust. The specification has three-digit industry by year fixed effects to control for potentially disproportionate impact of the Great Recession across local labor markets in Mexico, but what if there are finer industry-specific shocks that are felt differently across local markets? Recently Dell, Feigenberg and Teshima (2018) show that trade-induced decline in male employment may fuel violence. I add four-digit industry by year fixed effects, and the coefficient estimate in Panel A column 4 shows that violence, independent from any type of industry-wide shocks, leads to a decline in plant-level employment. Panel B of Table 3 repeats the exercise for the elasticity of employment with respect to local violence, and shows that the elasticity estimate is more robust to outside factors.

In addition to be driven by plausibly exogenous policy intervention in Mexico, the homicide rate may be responding to inter-temporarily changing characteristics of the local economy, or local labor markets, so we may not be able to claim causality in the negative relationship identified in Table 3. Addressing this, Table 4 presents the instrumental variable estimates of elasticity of employment with respect to violent conflict. Column 1 first shows the OLS estimates on employment, the estimate shows that when the homicide rate doubles plants' employment decreases by 2.5%. In column 2 the homicide rate is instrumented with $FA_{st} * DTO_j * \widehat{lnP_t^{coke}}$. The coefficient of interest is larger in magnitude and more precisely estimated; that shows that potential convoluting factors, such as a positive oil price shock (boosting the local economy with oil production, and causing increased criminal activities by increasing the contestable income), leads to underestimation of the violence effect in OLS. First stage results show that the instrument is indeed strongly correlated with the homicide rate. Instrumentation is strong, as indicated by the first-stage F statistics (Kleibergen-Paap F statistic) at the bottom of the table. The coefficient estimate in columns 2 tells us that doubling the homicide rate leads to a 5% decline in plant-level employment. Including controls for crop production, precious metal mining (gold, silver, copper, and uranium), oil and natural gas extraction does not affect the impact of violence on plant-level employment. Next, I include four-digit, instead of three-digit, industry by year fixed effects. The estimate moves only slightly. In column 5 I shut off all variation across very detailed five-digit industry by time. The violence effect is more precisely estimated and it gets larger in magnitude. And to remove any suspicion regarding convoluting factors such as trade competition or the Great Recession, I include product by year fixed effects in addition to plant fixed effects and pre-trends in the homicide rate. The two-stage least square estimate shows that increased violent conflict due to the Mexican Drug War causes significant decline in plant-level employment. More specifically, doubling the homicide rate in the local market leads to a 5.5 % decline in plant-level employment (column 6).

The decline in employment may be due to decline in demand, or due to labor market effects of violence or some combination of both. For example, roadblocks, or increased risk when travelling after dark (especially for production workers) may lead to less labor hours worked, and such shocks may lead to increase marginal costs of operating and an increase in price. Output demand may decline due to business closures, emigration or decrease in conspicuous consumption (Mejia and Restrepo, 2016). However, the demand shocks may lead to decline in prices. In situations where violence both leads to worker disruptions and also decreases output demand, the impact on prices will be biased towards zero. In column 1 of Table 5 I present the impact of violence on plant-level price. The estimate of elasticity of plant-level price with respect to violent conflict is positive and statistically significant. Doubling the homicide rate increases the prices on average by 3.1%. Column 2 and 3 of Table 5 present the effect on value of production and the product portfolio of plants. The results show not only a significant reduction in output but also in the number of varieties produced. This is an indication that demand channels are active as well and that the decline in production is not just temporary or short-run. Estimates show that doubling the homicide rate decreases the value of output by 8% and the number of varieties by 4%. Violence also decreases capacity utilization rates of plants substantially and leads to decline in productivity as measured by the output per hour worked.

Foreign demand is not likely to be affected by the Mexican War, but possible disruptions in high-ways and other international routes may deter international trade activities of Mexican firms. Martin, Mayer, and Thoenig (2010) shows that international trade may act as an insurance if international trade provides a substitute to internal trade during civil wars. The results show that neither the probability of exporting (column 7) nor the intensity of foreign sales over the total sales (column 8) are significantly affected by the Drug War.

5.1 Violent Conflict and Labor

Whether the violent conflict is felt as a negative demand shock or a productivity/marginal cost shock, the input usage should be similarly affected as the output. Table 6 presents the analysis of violence on different types of labor. Panel A shows the elasticity estimates for the total blue-collar, production, and total white-collar, non-production, workers. In Mexico, firms can employ workers in two ways: either by direct employment or by indirect employment via an external company. In case of direct employment, firms are required to pay social security contributions and pay severance payments at termination of a contract. In case of indirect employment, firms are not responsible for social security contributions and severance payments. The dependent variables in panel A include both directly and indirectly employed workers, where indirect workers are defined as employed, but not on the firm's payroll. The two-stage ordinary least square estimates shows that doubling the drug-related homicide rate in a local area leads to a 8.3% decline in the number of blue-collar employees. The impact on white-collar workers is positive but statistically insignificant. Focusing on hours worked in columns 3 and 4 shows that the decline in blue-collar hours as a result of a 100% increase in the homicide rate is 9.2%, but interestingly, white collar hours do not respond negatively to the heightened violence due to the Drug War.

In the presence of labor market frictions (such as severance payments), if the violence shock is felt purely as a demand shock, one expects: 1) a stronger decline in hours worked than in the number of employees for hourly paid workers and 2) a stronger response in indirect employment than in payroll employment. This is so, because it is cheaper to decrease workers' hours worked than laying them off, and it is cheaper to start cutting labor among indirect employees first, as firms have no or imperfect knowledge of how severe or permanent the shock will be (Bloom, 2009). The results in Panel B show that firms experience stronger decline among blue-collar workers that are on payroll than the total number of blue-collar workers (column 1 of panel A vs panel B). So there is no stronger reduction in indirect employment than in direct. Then the results in Panel B also show that the extent of reduction in blue-collar hours worked and the number of blue-collar employees is very similar (columns 1 and 3 of panel B). Together with the fact that white collar employees are not negatively affected and that there is an indication that white collar employees not on payroll increases as a result (columns 2 and 4 of panels A and B), these results show that the decline in employment is not entirely driven by potential demand decline due to violence and that the drug war's effect on the blue-collar labor force plays a larger role than the war's effect on demand.

Why, then, are blue-collar workers more affected by the war than skilled and higher paid white collar employees? If kidnapping risk, risk to life due to being in the wrong place in the wrong time increases (for all workers), this would lead to increased reservation wage for workers, a wage below which these risks outweigh the benefit of working. As blue collar workers are the lowest paid workers, the increase in reservation wage will be binding for lowest paid, blue-collar workers. Additionally, production workers are more likely to be prone to risk to life as they travel during nights and early mornings according to production shifts. Further, Ajzenman et al. (2015), as well as news reports as discussed above, emphasize that especially poorer workers and poor neighborhoods are being impacted by the drug war within metropolitan areas, making lower-paid workers more susceptible to brutality. If this is the case then one also expects the impact to be stronger on unskilled female workers, as they are less likely to be the bread-winners, hence they will have more elastic labor supply participation compared to male workers. Alternatively or additionally, expansion of the illegal sector, and increased demand for brutal male force may lead especially male workers to leave the legal sector for the illegal one. In both cases, blue collar workers' wages must increase.

Panel C of Table 6 shows the two-stage least squares estimates of elasticity of plant wages with respect to local conflict. Average wages are not affected (columns 1 and 2), but this is due to significant increase in blue-collar wages and corresponding decline in white collar wages in response to heightened violence. If it is the lower-wage individuals among blue-collar workers who leave the workforce, the increase in blue-collar workers' wages may be driven by selection. But given that the violence also causes decline in white collar wages, this shows that violence indisputably increases the relative wages of unskilled, manual workers, i.e. it decreases the skill-premium. Panel D of column 1 shows that the intensity of white-collar or skilled employees increases as a result. That is, increased violence due to the drug war works as a negative labor supply shock on blue collar workers, leading to decline in the use of blue-collar workers and a significant reduction in skill premium. The impact is not short-run or temporary as evidenced by the significant decline in employment growth, entirely driven by the reduction of blue-collar workers (columns 2-4 of Panel D). These results show that the Drug War has an *ability* to influence the technology of firms.

5.2 Heterogenous impact of violence on plants

Studying potentially heterogenous impact of violence will help to pinpoint the channels through which firms are affected. For this, I utilize the rich information on characteristics of plants as provided by the annual survey (*EIA*) and the technology survey (*ENESTyC*). My approach for studying the heterogenous response of plants is to partition the sample depending on plants' initial characteristics and conduct the analysis separately for the resulting sub-samples.

5.2.1 Labor Market Channel

The first panel of Table 7 presents the impact of violent conflict on employment and the value of production separately among low- and high- female intensive plants. For these regressions, the sample is divided depending on the median value of the female employee share of plants as of the initial year 2005 and equation 4 is estimated for each sample using 2SLS where the logarithm of the homicide rate is instrumented with the instrument described in equation 6. As the sample is partitioned according to various plant characteristics, I control for five-digit industry by year effects instead of the default three-digit industry by year fixed effects in these regressions to avoid any convoluting factors. The results show that plants with a female-intensive workforce experience three times stronger decline in employment. Doubling the homicide rate causes 12% decline in total employment for plants with female-intensive workforce as opposed to 4% for plants with male-intensive workforce. This is in line with the idea that by increasing the risk to life, a violent environment decreases the value of work and increases the reservation wages of workers. Female workers are more likely to be affected by this, since they are easier and more exposed targets of violence and since they tend to have more elastic labor supply. At the municipality-level, an analysis presented in the online appendix of Dell (2015), for example, shows significant negative effect of the Drug War on female labor force participation, and no effect on male labor force participation. If firms are affected not only through the labor market channel but also by decline in local demand, one expects that the difference between plants with female intensive workforce and other plants should decrease in output. The results confirm that. While the employment effect of violence on male-intensive plants is only one third of the effect on female-intensive plants, the output effect of violence on male-intensive plants is two thirds of the effect on female-intensive plants. That is, firms are affected by the Drug War both through its effect on local labor markets but also through its effect on local demand.

Next, I focus on low- versus high-wage plants. Low-wage plants must be more exposed to the labor market channel because the new reservation wage will be more binding for lower-wage plants. The results show that doubling the homicide rate causes a 10% decline in the total employment among the low-wage plants, while the employment impact is not significant among high-wage plants. The production effect, while concentrated among low-wage plants, as they are more exposed to the labor market channel, is not exclusive to low-wage plants. Among low-wage plants doubling the homicide rate causes a 13% decline in output, and among high wage plants the effect is approximately half as strong at 6%, and it is precisely estimated. Unionization would also be an important factor influencing workers' bargaining power, and hence their compensation level and amenities such as more secure worker transportation, secure production floors, etc. Such amenities would help to reduce the impact of violence on workers. Plants with higher than median level of unionization rate among their production employees do not experience significant decline in total employment, while plants with low degree of unionization experience 8% reduction in employment in response to doubling the homicide rate. Again the difference between these two types of plants decreases when we focus on the production effect: the effects are 8% and 10% respectively for plants with high and low rates of unionization (columns 4 and 5).

Finally, the last panel focuses on the impact among exporters versus non-exporters and show that the production effect of violence among non-exporters outweigh the impact on employment. Apart from potential wage differences, one expects that the labor market channel should not necessarily be different among exporters versus non-exporters, but exporter plants are less exposed to local demand channels. Taken together these results show that the labor market channel is an important channel through which manufacturing plants are affected.

5.2.2 Internal versus International Trade

The first panel of Table 8 presents the output elasticity of violence among domestic sales intensive versus export intensive plants. Export intensity is defined as the 75th percentile of the ratio of foreign sales over the total sales as of the initial year 2005. The output decline due to the Drug War is concentrated among domestic sales intensive plants. Doubling the homicide rate decreases the value of production by 15% for these plants. The reduction of output in response to local violence among export-intensive plants, on the other hand, is not significant. Panel B reports the output elasticity of violence among plants that do not export as of the initial year 2005. The results are similar: purely domestic consumer oriented plants experience a 13% reduction in production in response to increased violence, and the exporters' outputs do not significantly react to local violence. The results show that the Drug War decreases the final demand of the domestically selling firms. In panel C the sample is partitioned depending on the intensity of import in total material expenditure as of 2005. Plants that source mostly domestic inputs experience a 13% reduction in output due to heightened violence, while the average impact on plants that rely mostly on imported materials is 7.5% but statistically insignificant. These results show that local violence disrupts domestic trade, and as a result domestically selling and sourcing firms are disproportionately more affected by the escalation of violence due to the Drug War.

Next, I use the information on plants' sales and material purchases across different regions in the representative ENESTyC data-set and construct an entropy measure of firm diversification across industries. Panel D shows that the output elasticity of violence is larger the lower the rate of geographic diversification of sales. More precisely, doubling the homicide rate leads to 11% decline in value of production among plants with lower than the median level of sales diversification while the effect is not statistically significant among diversified establishments. Similar results are obtained when focusing on geographic diversification of inputs.

5.3 Plant Closings

In the following I will examine the relationship between heightened conflict due to the Drug War and the likelihood of plant exit. I adopt a probit specification and regress the exit indicator of a plant on the number of homicides per thousand inhabitant of a metropolitan area where the plant is located. As always, I control for three-digit industry by year fixed effects to remove industry-specific business cycles. I, then, one by one control for detailed initial characteristics of plants (the logarithm of employment, the ratio of non-production workers over the total number of employees, the logarithm of capital per worker, the ratio of female workers over the total number of employees, the ratio of IT expenditure over the total expenses, the logarithm of labor productivity, the number of manufactured products, export indicator and import indicator), of local socio-economic structure (percentage of literates, percentage of female employment, percentage of car ownership, percentage of professionals, percentage of school enrollment, and percentage of economically active population), local economic structure (the logarithm of gross value-added per worker, the logarithm of the number of businesses, employment shares of crop production, precious metal mining, oil and natural gas extraction and manufacturing) and the pre-trends in the homicide rate. Table 9 shows the summary of these results. The coefficient in column 1 implies that marginal change in the homicide rate from the average of 0.085 increases the likelihood of plant exit by 3.3 percentage points. Adding controls mostly strengthens the effect of the homicide rate on plant exit in columns (2)-(3). Once the pre-trends are controlled for, the coefficient in column (4) implies a 2.2 percentage point increase in the likelihood of plant exit.[19]

Are all plants equally affected by the Drug War in terms of exit probability? The results in Table 10 reveals heterogenous impact. Column 1 shows that small plants (as defined by plants with up to 40 employees) are significantly more vulnerable to the War, as they are likely not to be able to cover the increased cost of operating in war-affected areas. Plants with higher ratio of female employees are also significantly more likely to exit, indicating once again the importance of the labor market disruption channel (column 2). Results in column 3 shows that intensity of foreign sales significantly decreases the impact of the Drug War on exit probability. This result confirms the importance of the demand channel. In column 4 the homicide rate is interacted with the intensity of import over total material expenditure. The results show that the intensity of foreign inputs strongly shields plants from exiting due to the Drug War. However, the war is not that bad for all firms. The results in column 5 shows that the survival likelihood of plants in the primary metal production (iron and steel) increases with the war as probably the war increases demand for them.

In sum, the Mexican Drug War is found to be an important determinant of plant exits. Dis-

[19] When instrumenting the homicide rate, a null hypothesis of exogeneity of the homicide rate is not rejected by Wald test of exogeneity, so I opted for the ordinary probit.

ruptions in demand, in supply chain as well as disruptions in local labor markets are also important channels at the extensive margin. Locally sourcing, locally selling and female worker intensive plants are especially badly affected by the war.

6 Concluding Remarks

In this paper I study microeconomic impacts of violent conflict. Exploiting the plausibly exogenous surge in violence and organized crime due to the Mexican Drug War, and employing longitudinal plant-level data from all metropolitan areas of Mexico, I show that violence causes significant decline in plant-level output, employment and the capacity utilization of Mexican manufacturing plants. The decline in output and employment has long term dynamic implications in the form of significant decline in product scope and plant growth.

Violence hits relatively unskilled, lower paid, production workers more strongly; behaving as a negative unskilled labor supply shock, increasing the reservation wage of unskilled workers, pulling down the skill-premium in the local labor markets and pushing up the skill-intensity of manufacturing establishments. That is, the violent conflict has an ability to influence the technology of manufacturing establishments. Female-intensive, lower-wage, less unionized, less capital-intensive establishments are more strongly affected by the labor market channel of the violence and experience stronger decline in employment. At the same time local violence hinders domestic trade but not international trade. As a result, plants selling and sourcing locally experience stronger decline in output.

At the extensive margin, the Mexican Drug War causes plant closings; the survival likelihood of plants decreases especially if they are smaller, female-intensive, domestically oriented plants. Overall the results show that both at the intensive and at the extensive margin, disruptions in the local labor markets, local demand and local input markets are important channels in which local violence affects firms. These results show that the Mexican Drug War significantly distorts efficient reallocation of resources by taking resources away from locally sourcing, and selling plants, and plants with female-intensive workforce towards internationally oriented, diversified, and bigger plants.

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Table 3: OLS Results– Violent Conflict and Plant-level Employment

	(1)	(2)	(3)	(4)
Specification: OLS				
Dep. Var.: Log Employment				
Panel A.				
Homicide Rate	-0.078***	-0.071***	-0.070***	-0.062***
	(0.020)	(0.023)	(0.023)	(0.020)
Panel B.				
Log Homicide Rate	-0.014	-0.025**	-0.025**	-0.025**
	(0.013)	(0.011)	(0.011)	(0.010)
For both panels:				
Plant Fixed Effects	✓	✓	✓	✓
3-dig Industry **x** Year Fixed Effects	✓	✓	✓	No
2002 Homicide Rate **x** Year FE	No	✓	✓	✓
Time-Varying Local Market Characs	No	No	✓	✓
4-dig Industry **x** Year Fixed Effects	No	No	No	✓
No of Observations	30,695	30,695	30,552	30,552
No of Plants	5,570	5,570	5,556	5,556
No of Local Markets (Clusters)	58	58	57	57

Note: The dependent variable is the logarithm of the number of employees. Violent Conflict is measured as the logarithm of the number of homicides per thousand inhabitant of each metropolitan area. Time-Varying Local Market Characteristics include metropolitan area-level employment shares of crop production, metal mining including gold, silver, copper, and uranium and the metropolitan area-level employment share of oil and natural gas extraction. Robust standard errors, reported in parentheses, are two-way clustered by local market (metropolitan area) and four-digit industry level. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 4: Violent Conflict and Plant-level Employment

Specification	(1) OLS	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV
Dep. Var. Log Employment						
Log Homicide Rate	-0.025**	-0.050***	-0.050***	-0.047**	-0.052***	-0.055***
	(0.011)	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)
Plant FEs	✓	✓	✓	✓	✓	✓
Time-Varying Local Market Characs	-	-	✓	-	-	-
2002 Homicide Rate **x** Year FEs	✓	✓	✓	✓	✓	✓
3-dig Industry **x** Year FEs	✓	✓	✓	-	-	-
4-dig Industry **x** Year FEs	-	-	-	✓	-	-
5-dig Industry **x** Year FEs	-	-	-	-	✓	-
Product **x** Year FEs	-	-	-	-	-	✓
No of Observations	30,695	30,695	30,695	30,695	30,694	30,682
No of Clusters (MZ)	58	58	58	58	58	58
First Stage						
Instrument ($FA_{st} * DTO_j * \widehat{lnP_t^{coke}}$)		0.118***	0.118***	0.120***	0.119***	0.119***
		(0.021)	(0.021)	(0.020)	(0.019)	(0.019)
Kleibergen-Paap F-excluded instrument		33.24	33.24	36.42	37.52	38.34

Note: The dependent variable is the logarithm of the number of employees. Violent Conflict is measured as the logarithm of the number of homicides per thousand inhabitant of each metropolitan area. Time-Varying Local Market Characteristics include metropolitan area-level employment shares of crop production, metal mining including gold, silver, copper, and uranium and the metropolitan area-level employment share of oil and natural gas extraction. Robust standard errors, reported in parentheses, are two-way clustered by local market (metropolitan area) and four-digit industry level. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 5: Mexican Drug War and Decline in Manufacturing Plants

Specification	(1) IV Log Price	(2) IV Log Value of Production	(3) IV Log No of Varieties	(4) IV Capacity Utilization	(5) IV Labor Productivity	(6) IV Export Indicator	(7) IV Export Intensity
Log Homicide Rate	0.031**	-0.079***	-0.039**	-3.308***	-0.053*	-0.020	-0.011
	(0.015)	(0.026)	(0.015)	(1.076)	(0.031)	(0.018)	(0.010)
Plant FEs	✓	✓	✓	✓	✓	✓	✓
Pre-Trends in Homicide Rate	✓	✓	✓	✓	✓	✓	✓
3-dig Industry **x** Year FEs	✓	✓	✓	✓	✓	✓	✓
No of Observations	28,812	30,817	30,817	30,148	30,035	30,858	30,831
No of clusters (LM)	58	58	58	58	58	58	58
Kleibergen-Paap F-excluded instrument	32.38	33.20	33.20	32.43	32.97	33.17	33.14

Note: Capacity utilization is the rate of utilization of the fixed assets of the plant. Labor productivity is the logarithm of the value of output per hour worked. Robust standard errors, reported in parentheses, are two-way clustered by local market (metropolitan area) and four-digit industry level. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 6: Violence as a Negative Supply Shock of Blue-Collar Workers

Specification: 2SLS	(1)	(2)	(3)	(4)
Panel A. Both Payroll and Indirect Employees				
Dependent Variable	BC Workers	WC Workers	BC Hours	WC Hours
Violent Conflict	-0.083***	0.043	-0.092***	0.066
	(0.024)	(0.036)	(0.025)	(0.045)
No of Observations	28,981	30,066	29,719	25,064
F-excluded instrument	33.81	33.25	32.41	34.14
Panel B. Employees on Payroll				
Dependent Variable	BC Workers	WC Workers	BC Hours	WC Hours
Violent Conflict	-0.092***	-0.016	-0.091***	0.014
	(0.026)	(0.033)	(0.023)	(0.033)
No of Observations	26,179	25,820	25,561	21,039
F-excluded instrument	33.19	33.41	32.32	34.27
Panel C. Monthly Wages				
Dependent Variable	Avg Wage	Avg Wage on Payroll	BC Avg Wage	WC Avg Wage
Violent Conflict	-0.026	0.002	0.099*	-0.084*
	(0.016)	(0.018)	(0.052)	(0.044)
No of Observations	30,073	26,084	24,682	24,676
F-excluded instrument	32.88	32.93	33.22	33.47
Panel D. Skill Intensity and Growth Rates				
Dependent Variable	Skill Intensity (WC/TotEmp)	Employment Growth	BC Growth	WC Growth
Violent Conflict	0.014*	-0.030*	-0.190**	0.059
	(0.007)	(0.017)	(0.082)	(0.116)
No of Observations	30,695	24,818	23,434	24,325
F-excluded instrument	33.24	27.17	26.46	27.48

Note: Violent Conflict is measured as the logarithm of the number of homicides per thousand inhabitant of a metropolitan area. All dependent variables are in logarithmic form except "Skill Intensity" which is the ratio of total number of white-collar employees over the total employment. All regressions include plant fixed effects, 3-digit industry by year fixed effects, and the pre-trends in the homicide rate per metropolitan area. Robust standard errors, reported in parentheses, are clustered two-way by metropolitan area and industry. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 7: Heterogenous Impact of the Drug War on Employment and Production–Labor Market Channel

	Employment Effect		Production Effect	
	(1)	(2)	(3)	(4)
Sample:	Low Female Intensive	High Female Intensive	Low Female Intensive	High Female Intensive
Violent Conflict	-0.039*	-0.118**	-0.102***	-0.152*
	(0.023)	(0.050)	(0.034)	(0.077)
Sample:	Low Wage	High Wage	Low Wage	High Wage
Violent Conflict	-0.101**	-0.017	-0.119*	-0.061***
	(0.045)	(0.025)	(0.066)	(0.020)
Sample:	Low Union Rate	High Union Rate	Low Union Rate	High Union Rate
Violent Conflict	-0.082***	-0.021	-0.099**	-0.077*
	(0.027)	(0.028)	(0.045)	(0.042)
Sample:	Non-exporter	Exporter	Non-exporter	Exporter
Violent Conflict	-0.060**	-0.027	-0.130***	-0.010
	(0.026)	(0.027)	(0.041)	(0.037)

Note: Each cell shows the 2SLS estimation of the coefficient of log homicide rate on the logarithm of the total number of employees (columns 1 and 2) and the logarithm of the value of production. All regressions include plant fixed effects, industry by year fixed effects, and pre-trends in the homicide rate. Standard errors are clustered for each metropolitan area.

Table 8: Heterogeneity in Output Elasticity of Violence

Partition variable	Low	High
Panel A. Export Intensity (p75)	$<= p75$	$> p75$
	-0.146***	-0.030
	(0.043)	(0.056)
Panel B. Export Indicator	Non-exporters	Exporters
	-0.130***	-0.010
	(0.041)	(0.037)
Panel C. Import Intensity (p75)	$<= p75$	$> p75$
	-0.130***	-0.075
	(0.046)	(0.052)
Panel D. Geog. Diversity of Sales	$<= p50$	$> p50$
	-0.114***	-0.052
	(0.036)	(0.052)
Panel E. Geog. Diversity of Materials	$<= p50$	$> p50$
	-0.088**	-0.082
	(0.038)	(0.060)

Note: Each cell shows the 2SLS estimation of the log homicide rate on the logarithm of the value of production when the sample is partitioned according to the value of the variable on the left of the respective row. Each regression includes plant fixed effects, five digit industry by year fixed effects, and the pre-trends. Standard errors are clustered at metropolitan area level.

Table 9: Mexican Drug War and Plant Closings

Specification: Probit	(1)	(2)	(3)	(4)
Homicide Rate	0.435***	0.486***	0.515***	0.359**
	(0.148)	(0.109)	(0.141)	(0.145)
3-dig. Industry **x** Year FE	✓	✓	✓	✓
Plant Characteristics	no	✓	✓	✓
Local Economic Characs.	no	no	✓	✓
Local Socio-Economic Characs.	no	no	✓	✓
Pre-Trends in Homicide Rate	no	no	no	✓
Pseudo R^2	0.067	0.071	0.074	0.075
No of Observations	26,288	22,572	22,415	22,415
No of Clusters	58	57	55	55

Note: Violent Conflict is measured as the the number of homicides per thousand inhabitant of a metropolitan area. Plant Characteristics include year 2005 values of plant size (employment), log capital per worker, IT-intensity, non-production intensity, labor productivity, female worker intensity, exporter dummy, importer dummy, and the number of manufactured products. Local Economic Characteristics (metropolitan area-level) include the 2004 or 2005 values of log output per worker, log number of businesses, employment shares of crop, metal mining, oil extraction, and manufacturing. Local Socio-Economic Characteristics include year 2000 values of percentages of professionals, literate residents, school enrollment, people with own car, economically active population and female employees over female population. Robust standard errors, reported in parentheses, are clustered by metropolitan area. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 10: Violence and Plant Exit–Heterogenous Impact I

Specification: Probit	(1)	(2)	(3)	(4)	(5)
Homicide Rate	0.167	0.018	0.474***	0.568***	0.379***
	(0.173)	(0.149)	(0.145)	(0.142)	(0.143)
Homicide Rate **x** Small	0.417***				
	(0.146)				
Homicide Rate **x** Female Intensity		2.416**			
		(1.126)			
Homicide Rate **x** Export Intensity			-0.839*		
			(0.479)		
Homicide Rate **x** Import Intensity				-1.909**	
				(0.940)	
Homicide Rate **x** Metal Manufacturing					-6.649***
					(1.706)
Pre-Trends in Homicide Rate	✓	✓	✓	✓	✓
Plant Characteristics	✓	✓	✓	✓	✓
Local Economic Characs.	✓	✓	✓	✓	✓
Local Socio-Economic Characs.	✓	✓	✓	✓	✓
3-dig. Industry **x** Year FE	✓	✓	✓	✓	✓
Pseudo R^2	0.072	0.073	0.074	0.073	0.073
No of Clusters	55	55	55	55	55
No of Observations	22,415	22,415	22,333	22,415	22,415

Note: Violent Conflict is measured as the the number of homicides per thousand inhabitant of a metropolitan area. Plant Characteristics include year 2005 values of plant size (employment), log capital per worker, IT-intensity, non-production intensity, labor productivity, and female worker intensity. Local Economic Characteristics (metropolitan area-level) include the 2004 or 2005 values of log output per worker, log number of businesses, employment shares of crop, metal mining, oil extraction, and manufacturing. Local Socio-Economic Characteristics include year 2000 values of percentages of professionals, literate residents, school enrollment, people with own car, economically active population and female employees over female population. All interacted plant characteristics are the 2005 values, when interacted, linear effects are also controlled for if they are not already among the plant-level controls. Robust standard errors, reported in parentheses, are clustered by metropolitan area. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 11: Violence and Plant Exit–Heterogenous Impact II

Specification: Probit	(1)	(2)	(3)
Homicide Rate	0.852**	0.429	0.013
	(0.335)	(0.333)	(0.417)
Homicide Rate **x** SinglePlant	-1.083**		
	(0.458)		
Homicide Rate **x** Branch		0.456	
		(0.682)	
Homicide Rate **x** HeadQuarter			0.868**
			(0.386)
Pre-Trends in Homicide Rate	✓	✓	✓
Plant Characteristics	✓	✓	✓
Local Economic Characs.	✓	✓	✓
Local Socio-Economic Characs.	✓	✓	✓
3-dig. Industry **x** Year FE	✓	✓	✓
Pseudo R^2	0.087	0.087	0.087
No of Observations	10,608	10,608	10,608
No of Clusters	52	52	52

Note: Violent Conflict is measured as the the number of homicides per thousand inhabitant of a metropolitan area. Robust standard errors, reported in parentheses, are clustered by metropolitan area. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

7 Robustness and Additional Analysis

Table 12: Discrete Exposure: The Impact of Violence on Plant-level Production–Main Effects

Specification: OLS				
Violent Conflict ≡ Drug War Zones(j) * D2008(t)				
	(1)	(2)	(3)	(4)
Panel A.				
Dependent Variable	Production Value	Total Employment	Payroll Employment	Capacity Utilization
Violent Conflict	-0.129***	-0.055***	-0.075***	-4.401***
	(0.014)	(0.009)	(0.010)	(0.445)
Plant Fixed Effects	✓	✓	✓	✓
Industry **x** Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Controls	✓	✓	✓	✓
Pre-Trends in Homicide Rate	✓	✓	✓	✓
No of Observations	30,664	30,552	26,602	30,000
No of Clusters	57	57	57	57
Panel B.				
Dependent Variable	Avg Price	Avg Domestic Price	No of Varieties	Export (Indicator)
Violent Conflict	-0.016	-0.007	-0.041***	-0.004
	(0.024)	(0.017)	(0.004)	(0.008)
Plant Fixed Effects	✓	✓	✓	✓
Industry **x** Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Controls	✓	✓	✓	✓
No of Observations	28,668	28,335	30,678	30,705
No of Clusters	57	57	57	57

Note: Violent Conflict is measured as the interaction variable of the Drug War Zones as defined in the text and the dummy variable that takes 1 on and after 2008. All dependent variables are in logarithmic form. Time-Varying Municipality Controls include employment shares of crop production, metal mining including gold, silver, copper, and uranium and the municipality-level employment share of oil and natural gas extraction. Robust standard errors, reported in parentheses, are clustered by metropolitan area. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table 13: Discrete Exposure: Drug War and Composition of Workforce

Specification: OLS

Violent Conflict ≡ Drug War Zones(j) * D2008(t)

Panel A. Both Payroll and Indirect Employees				
Dependent Variable	BC Workers	BC Hours	WC Workers	WC Hours
Violent Conflict	-0.070***	-0.072***	-0.008	-0.010
	(0.009)	(0.011)	(0.009)	(0.013)
Plant Fixed Effects	✓	✓	✓	✓
Industry **x** Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Controls	✓	✓	✓	
Pre-Trends in Homicide Rate	✓	✓	✓	✓
No of Observations	28,847	29,581	29,927	24,941
No of Clusters	57	57	57	57

Panel B. On Payroll				
Dependent Variable	BC Workers	WC Workers	BC Hours	WC Hours
Violent Conflict	-0.086***	-0.033***	-0.088***	-0.011
	(0.010)	(0.009)	(0.013)	(0.013)
Plant Fixed Effects	✓	✓	✓	✓
Industry **x** Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Controls	✓	✓	✓	
Pre-Trends in Homicide Rate	✓	✓	✓	✓
No of Observations	26,064	25,707	25,450	20,940

Panel C.				
Dependent Variable	Skilled (WC) Labor Intensity	Average Wage	WC Average Wage	BC Average Wage
Violent Conflict	0.008***	0.009***	-0.052***	0.052***
	(0.002)	(0.003)	(0.015)	(0.010)
Plant Fixed Effects	✓	✓	✓	✓
Industry **x** Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Controls	✓	✓	✓	✓
Pre-Trends in Homicide Rate	✓	✓	✓	✓
No of Observations	30,552	29,931	24,567	24,570

Note: Violent Conflict is measured as the interaction variable of the Drug War Zones as defined in the text and the dummy variable that takes 1 on and after 2008. All dependent variables are in logarithmic form except "Export" which is a zero-one indicator of plant-level export. Time-Varying Municipality Controls include employment shares of crop production, metal mining including gold, silver, copper, and uranium and the metropolitan area-level employment share of oil and natural gas extraction. Robust standard errors, reported in parentheses, are clustered by metropolitan area level. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Table A-1: Summary Statistics

	Mean	Median	StDev	N
Number of Employees	235.875	99.6	485.662	30695
Number of Blue-Collar Employees	155.196	62.3	316.656	30695
Number of White-Collar Employees	70.325	22.3	225.261	30695
Log Value of Sales	11.235	11.2	2.041	30668
Number of Varieties	3.125	2.0	3.021	30695

Note: All values are expressed in 2010 thousand peso.

Table A-2: Pairwise Correlation of Pre-War Municipality Characteristics and Post-War Violence

Municipality Characteristics	Correlation Coefficient	Nobs
Manufacturing Share in overall economy	0.034	2,222
Log Output per Worker	0.081*	2,366
Log Gross Value Added	0.010	2,348
Average Establishment Size	0.036	2,357
Log Public Expenditure	0.015	2,113
Log Distance to the US	-0.341*	2,367
Socio-economic characteristics		
% of Economically Active Population (age 20-49)	-0.038	2,367
% of Households with Own Car	0.330*	2,367
% of Professionals among employed	-0.007	2,367

Note: Each cell shows the pairwise correlation coefficient of the municipality characteristics given in the respective row at first column and the average homicide rate over 2008-2012 (Post-War period) * indicates statistical significance at 5% level or better. The socio-economic characteristics are from the 2000 Census, Log output per worker, log gross value-added, average establishment size are from the 2004 census, manufacturing share in overall economy (measured in employment) is obtained from the IMSS (Social Security) 2005, Public expenditure data is from year 2005 and the distance to the US border is the author's own calculation.

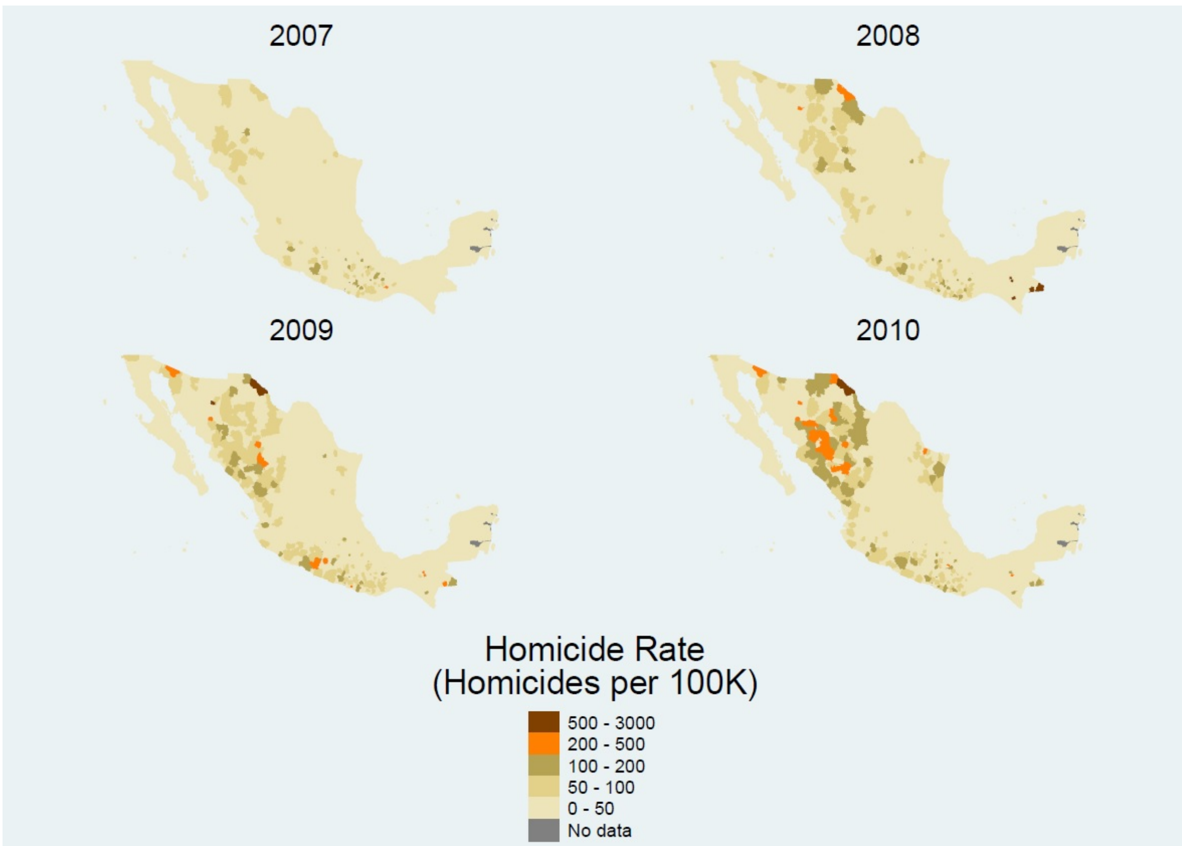

Figure A-1: Expansion of Violence in Mexico

Table A-3: The Impact of Local Violence on Plant-level Outcomes: OLS Results

Specification: OLS Violent Conflict ≡Homicides per '000 inhabitant	(1)	(2)	(3)	(4)
Panel A: Sales and Product Portfolio				
Dep. Var.	Value of Production	Quantity of Production	Number of Products	Capacity Utilization Rate
Violent Conflict	-0.107***	-0.091	-0.055**	-5.870***
	(0.035)	(0.060)	(0.023)	(1.991)
Plant Fixed Effects	✓	✓	✓	✓
Industry by Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Characs.	✓	✓	✓	
Pre-trends in Homicide Rate	✓	✓	✓	
No of Observations	30,664	28,661	30,664	30,000
No of LMs (clusters)	57	57	57	57
Panel B: Employment				
Dep. Var.	Employed People	Employed Hours	Employed People on Payroll	Employed Hours on Payroll
Violent Conflict	-0.070***	-0.067***	-0.063**	-0.058**
	(0.023)	(0.023)	(0.027)	(0.027)
Plant Fixed Effects	✓	✓	✓	✓
Industry by Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Characs.	✓	✓	✓	
Pre-trends in Homicide Rate	✓	✓	✓	
No of Observations	30,552	29,932	26,602	25,968
No of LMs (clusters)	57	57	57	57
Panel C: Composition of Employment				
Dep. Var.	Blue-Collar (BC) Workers	Employed BC Hours	White-Collar (WC) Workers	Employed WC Hours
Violent Conflict	-0.076***	-0.092***	0.006	0.039
	(0.022)	(0.025)	(0.043)	(0.028)
Plant Fixed Effects	✓	✓	✓	✓
Industry by Year Fixed Effects	✓	✓	✓	✓
Time-Varying LM Characs.	✓	✓	✓	
Pre-trends in Homicide Rate	✓	✓	✓	
No of Observations	28,847	29,581	29,927	24,941
No of LMs (clusters)	57	57	57	57

Note: Violent Conflict is measured as the number of homicides in thousand people in each metropolitan area. All dependent variables are in logarithmic form. Time-Varying Local Market (Metropolitan area) Characteristics include employment shares of crop production, metal mining including gold, silver, copper, and uranium and the local market-level employment share of oil and natural gas extraction. Robust standard errors, reported in parentheses, are two-way clustered by metropolitan area (57) and 4-digit industry (84) level. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

A Data Appendix

EIMA 2005-2010: *La Encuesta Industrial Mensual Ampliada* (*EIMA*) is a monthly survey of manufacturing plants carried out by *INEGI*. It constitutes the basis of Gross Domestic Product and Economic Indicators on employment, production, and productivity among others. It includes 230 economic classes of activity (clases de actividad) and covers 7328 establishments. Industry classification is SCIAN 2002. *EIMA* provides information on the number of white collar and blue collar workers, wages, hours and days worked, plant capacity utilization, quantity and value of production, sales, and export for each product.

In recent years there have been important changes in the way companies are organized. One of the most important is the one related to outsourcing of personnel. The *EIMA* captures information both of the personnel dependent on the corporate name, as well as that provided by a personnel service provider, so that now these two components of the personnel employed in the manufacturing sector are published.

EIA 2003-2007: *La Encuesta Industrial Anual* (*EIA*) is an annual survey of manufacturing plants carried out by *INEGI*. It provides detailed balance sheet information of the manufacturing plants including information on employment, fixed assets, wages, itemized expenses, itemized income, value of production, and inventories. The industry classification of plants is based on the North American Industry Classification System (NAICS), 2002.

Encuesta Nacional de Empleo, Salarios, Tecnología y Capacitación en el Sector Manufacturero (ENESTyC) 2005:

The *ENESTyC* is a representative establishment-level survey of manufacturing firms conducted in 1995, 1999, 2001, and 2005. This study employs ENESTyC 2005 which is representative based on 2004 Economic census information and covers 9920 manufacturing establishments as well as 685 maquiladoras.

Distance to the US border: I select more than 130 points across the US border with latitude and longitude information and obtain degrees/minutes/seconds angles (DMS) of each locality (village) in Mexico from INEGI. After converting the DMS measure to decimal degrees, I use the Haversine formula to calculate the great circle distance of each urban Mexican village (locality) to around 130 US border points.[20] I then take the minimum distance between each municipality's any urban locality to the closest border point.

Homicide Rates: Information on the number of homocides by municipality and month is obtained from INEGI. Homicide rates used in the descriptive analysis throughout the paper are calculated as the number of homicides in 100,000 people. Homicide rates used in the regressions are re-scaled and they are the number of homicides in 1,000 people. Municipality-level annual population numbers are calculated using the census data for years 1990, 1995, 2000, 2005, and the annual state-level population estimates of INEGI.

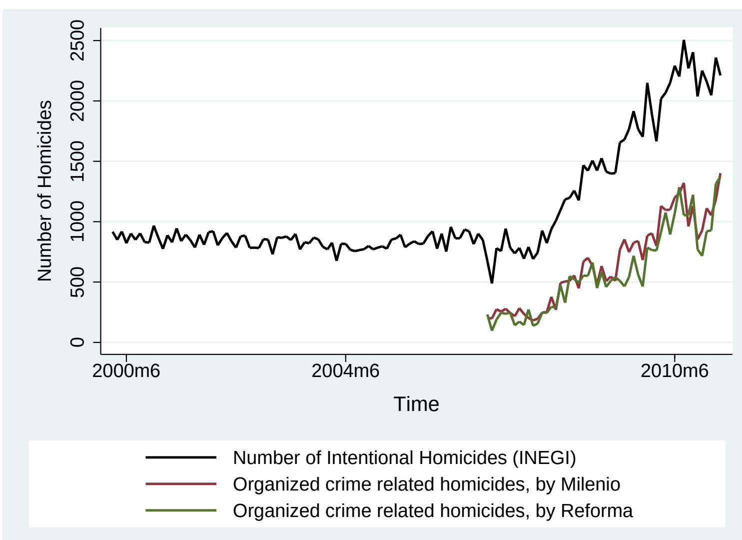

Figure A-2: Organized Crime Related Violence in Mexico

Cocaine Prices: Cocaine prices are purity-adjusted prices of a gram of cocaine in the US. The quarterly data is obtained from the annual reports of the National Drug Intelligence Center.

[20] I also use the Pythagorean theorem to calculate the km distance, obtaining very similar results.

The annual data source is the US Office of National Drug Control Policy, the data obtained from the United Nations Office on Drugs and Crime (UNODC, 2014).

Drug Trafficking Organizations: Yearly information on the municipalities in which Mexico's drug trafficking organizations operate comes from 'Knowing Where and How Criminal Organizations Operate Using Web Content' by Michele Coscia and Viridiana Rios published at the Association for Computing Machinery (ACM)'s International Conference on Information and Knowledge Management (CIKM) in 2012. Using computer science and big data techniques Coscia and Rios develop a framework that uses Web content to identify the areas of operation and modus operandi of Mexican drug trafficking organizations over 1990-2010.

Municipality-level data: The analysis makes use of a set of time varying municipality-level variables. These are the annual information on the municipality-level employment shares of crop production, metal mining including gold, silver, copper, and uranium as well as oil and natural gas extraction. The sources of annual municipality level data on employment across industries are the records of contributions to the Mexican Institute of Social Security (IMSS). The industry classification used in this data is the Mexican version of the North American Industrial Classification System (SCIAN) in its 2007 revision. INEGI is the source of the additional municipality-level variables, which include the number of strikes, the number of registered vehicles, the number of traffic accidents, the number of traffic accidents due to bad road conditions, and high-school success rate. Whenever used in the firm-level analysis these data are aggregated at the metropolitan level using the key provided by INEGI matching municipalities with metropolitan areas.