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Femicide Rates in Mexican Cities along the US-Mexico Border

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Mexican cities along the US-Mexico border, especially Cd. Juarez, became notorious due to high femicide rates supposedly associated with maquiladora industries and the NAFTA. Nonetheless, statistical evaluation of data from 1990 to 2012 shows that their rates are consistent with other Mexican cities' rates and tend to fall with increased employment opportunities in maquiladoras. Femicide rates in Cd. Juarez are in most years like rates in Cd. Chihuahua and Ensenada and, as a share of overall homicide rates, are lower than in most cities evaluated. These results challenge conventional wisdom and most of the literature on the subject.

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Femicide Rates in Mexican Cities along the US-Mexico Border

1. Introduction

Mexican cities along the border with the United States periodically attract unwanted attention due to high homicide rates. As shown in Albuquerque (2007) the high levels of violence originate from deficient law enforcement and legal systems, chaotic urbanization, and high population densities. Against this background of violence, femicide, broadly defined here as female homicide, has brought notoriety to the south border region, the most evident case represented by the female murders of Cd. Juarez, the Mexican city that sits across the border from El Paso, Texas. The literature on the phenomenon however, despite being vast, usually does not rely on methodical data analysis. This paper tries to further the debate by statistically evaluating the phenomenon and the main theses in the field.

High quality data collected by the authors and produced by medical examiners (*médicos legistas*) in Mexican cities from 1990 to 2012 allow for detailed victim profiling. Unfortunately, the sample period of the study could not be extended beyond 2012, as the then incoming Peña Nieto's administration suppressed public access to the Sistema Municipal de Bases de Datos (SIMBAD) database. Based on the authors' stored data collected from this unique database, femicide rates in Mexican border cities will be compared to the rates in the most populous non-border cities in the same states, and panel data analysis will be used to evaluate possible relations among variables. The results, as will be seen next, conflict with conventional wisdom and part of the scholarly work concerning the subject.

2. Gender Violence and Femicide

The United Nations defines violence against women as "any act of gender based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women” (United Nations General Assembly, 1993). A summary of the scholarship concerning violence against women and relevant to the subject under investigation is presented in this section.

Campbell et al. (2003) discuss femicide in the US and report that it is the leading cause of death among African-American women aged 15 to 45 and the seventh cause of death for women in general. Homicides perpetrated by intimate partners represent in between 40% and 50% of all femicides. Male homicides by intimate partners on the other hand are relatively less common, representing approximately 6% of overall male homicides, suggesting that patterns of household violence are gender asymmetric. Homicides perpetrated by intimate partners are usually preceded by physical abuse. The authors conducted a multisite controlled experiment to identify risk factors for femicide in abusive relationships and found that a partner unemployed and not looking for a job and partners who never lived together were the two most important predictors of fatalities.

Bott et al. (2005) consider the case of low and middle income countries, and find that gender-based violence is a complex phenomenon, affected by many factors that work at different levels. Per the authors, a characteristic of the research in the field of gender-based violence prevention is the methodological weaknesses of most studies, despite recent progress. Glaeser & Sacerdote (1999) find that the main reason for higher crime rates in big cities, when compared to small cities and rural environments and after controlling for many variables, is the higher percentage of female-headed households, which per the authors are more prone to victimization than other types of households. Less efficient law enforcement and higher economic returns to crime have a less important impact but are also significant factors in their study.

Frye et al (2008) study neighborhood-level factors in intimate partner femicide (IPF) in New York City and find that IPF relative to other types of femicide is more likely when the victim is foreign-born or young, while none of the factors indicative of neighborhood social disorganization were significantly associated with IPF relative to other femicide categories. Per the authors, homicide was the second main cause of death among women aged 20 to 24 years of age in the US in 2002, with approximately a third of femicide victims being killed by intimate partners. Race, socioeconomic status, and foreign country of birth are some of the most important risk factors for femicide victimization. Smith et al. (2014) examine the phenomenon of intimate partner homicide (IPH) and in the sample studied they find that 77% of the victims are female while 96% of the perpetrator victims (defined as death of the perpetrator because of homicidal act) where males.

In the case of the US-Mexico border region, fast industrialization and increased trade in the period following the North American Free Trade Agreement (NAFTA) led to large scale migration of Mexicans towards cities along the border, as discussed in Mollick (2003), Cañas et al. (2005), Mollick et al. (2006), Mollick & Cabral (2009), Mollick & Ibarra-Salazar (2013), and Cañas et al. (2013). Interestingly, Gruben (2001) suggests that the increase in maquiladora employment growth observed from the NAFTA's inception to 1999 can be explained by changes in demand and supply factors but not by the NAFTA, which as an explanatory variable was found to not be statistically significant. The expansion of maquiladora industries (export-led manufacturing operations in specially designated free trade zones) has attracted many young Mexican female workers, see Atkinson & Ibarra (2007). Job opportunities are more common in the border region, but high population densities, chaotic urbanization resulting from fast growth, and the activity of drug cartels tended to exacerbate crime rates, with expected impacts on femicide rates. Albuquerque (2007) found that disparate outcomes regarding homicide rates on the Mexican and American sides of the border originate not only from high population densities on the Mexican side but also from deficient law enforcement and justice systems, while cultural and economic factors do not seem to play an equally significant role. Notice that the relation between crime rates and economic activity levels at the border can present direct and reverse causality, leading to possible simultaneity bias in statistical regressions. For example, Fullerton, Jr. & Walke (2014, 2018) and Niño et al. (2015) show that crime rates have significant negative impacts on border economic activity. With this in mind, we will address the matter in further detail during the empirical section of this study.

Conventional wisdom regarding Mexican border femicide tends to focus on poor working conditions for women employed in maquiladora industries and to attribute it to international trade and the NAFTA. For example, the Wikipedia (2022) article titled "Femicides in Ciudad Juárez," based on an extensive list of references that includes scholarly work and news reports, advances the following contributing factors of femicide in order of appearance: (1) organized crime and drug trafficking (2) maquila industry, (3) NAFTA, and (4) gender roles. Until 2020, the first subsection of the article titled "the nature of female homicides" stated that "the victims share common characteristics, and there are many similarities in the violent crimes committed against them. Most of the victims are young women who come from impoverished backgrounds and work in maquiladoras, as factory workers, in other sectors of the informal economy, or are students. In addition, many victims share common physical attributes, including dark skin, slender physique, and dark hair." This subsection was deleted from the page on June 26, 2020, but it exemplifies the slow pace of changes in conventional wisdom during the last three decades.

One of the main characteristics of the journalistic and academic literature on femicide in Mexican border cities, as exemplified by many references in the Wikipedia article above, is the use of qualifiers not supported by quality data. The following documents are representative of this methodological problem. Per a report by the Organization of American States (Inter-American Commission on Human Rights, 2003), "authorities in Ciudad Juarez presented information with respect to the killing of 268 women and girls since 1993. In a substantial number of cases, the victims were young women or girls, workers in the maquilas (assembly plants) or students… A significant number of the victims were young, between 15 and 25." Qualifiers such as "substantial" and "significant" are used in the statement without clear reference to reliable statistics that would support it. Another example is given by Wright (2001). The author states that "While the murder rate for women [in Cd. Juarez] is far less than that for men, it is significantly higher than statistics reveal for female homicides per capita in any other major city in Mexico or in the United States." The use of qualifiers such as "far less" and "significantly higher" are not backed by rigorous data analysis and can be misleading given the high variability of homicide rates across time in border cities, with lower rates during typical years and much higher rates during years marked by drug cartel conflicts.

Despite the predominant and popular perception that international trade and maquiladora employment are one of the main factors behind border femicide, economic research on violent crime generally shows the opposite: that greater levels of international trade and formal sector employment typically lead to improved socioeconomic outcomes, and that crime and socioeconomic development are usually negatively related. Liu et al. (2013) and Liu & Fullerton, Jr. (2015) are examples of scholarship that find this negative relationship in the case of Mexico. This article's contribution to the existing literature is therefore to confirm the latter results in the context of border femicide with the help of a unique high-quality database. In summary, quality homicide data is used here to critically analyze conventional wisdom and accepted views found in some areas of scholarly work that concern femicide in the border region. The article proceeds as follows: data sources are described and basic statistics are presented, followed by panel data regressions that are used to test the most common theses in the field, and finally conclusions are drawn.

3. Femicide Rates in Mexican Cities

Crime research in Mexico suffers from the limited availability of quality data, but reliable homicide data for Mexican cities could be gathered using the Sistema Municipal de Bases de Datos (SIMBAD) from the Instituto Nacional de Estadística y Geografía (INEGI), which temporarily made available to the general public detailed records on mortality causes produced by medical examiners. Albuquerque (2007) describes in detail a previous version of this database made available by the Núcleo de Acopio y Análisis de Información en Salud (NAAIS), and shows that the homicide data produced by medical examiners are highly correlated with data gathered by nongovernmental organizations and the press and do not show systematic error. As mentioned before, public access to the database was suppressed after 2012 by the Peña Nieto's administration, what explains the 1994 to 2012 sample period limitation of this study.

As such, Table 1 is built using data from the SIMBAD. The table describes population numbers (in 2010), homicide numbers by gender accumulated during the post-NAFTA period (1994 to 2012), share of femicides relative to overall homicides, and median and average yearly homicide rates by gender. Ten cities were selected for being the most representative per the goals of the study: five Mexican border cities (Tijuana, Cd. Juarez, Reynosa, Matamoros and Nuevo Laredo) and five Mexican non-border cities in the same Mexican states of the border cities (Cd. Chihuahua, Ensenada, Tampico, Cd. Victoria and Cd. Madero). Selection was based on the significance of the population size and location in Mexican border states.

(Table 1 appears approximately here)

Notice that the use of median rates is more adequate for comparisons across cities because, as a measure of central tendency, they are less affected by outlier events such as the violence spike caused by drug cartel conflicts that took place in Cd. Juarez during 2010. Table 1 also compares femicide rates in Mexican border cities with rates in non-border Mexican cities and American cities. The results go against many established perceptions. As discussed in Albuquerque (2007), homicide rates in Mexican border cities are typically high. However, this is mostly due to male homicide rates, as seen in Table 1. For example, median femicide rates in Mexican border cities are similar to the median rates of Cd. Chihuahua and Ensenada, while median male homicide rates are significantly higher in three of the Mexican border cities (Tijuana, Cd. Juarez and Nuevo Laredo).

Even though median femicide rates in the selected Mexican border cities are higher than in the selected Mexican non-border cities, deserving to be considered abnormally high, it is also true that male homicide rates are comparatively much higher. It could be argued therefore that an environment conducive to crime, as found in the border cities, may lead to higher femicide rates. Additionally, border cities tend to be larger and more urbanized, in part due to concentration of industrial activities, than non-border cities in the same states, so the observation of higher femicide rates in border cities is expected, per the results of the literature on violence against women outside of the border region discussed in the previous section.

When the femicide share of homicides is considered, it becomes clear that femicide is not an exclusive problem of Mexican border cities. Per Table 1, the most significant feature of those cities is high median and average rates of male homicide. For example, in Cd. Juarez, a city notorious for its cases of femicide, the femicide share of homicides is 9.7%, which is below the femicide shares of eight out of eleven selected cities (the exceptions are Tijuana, Nuevo Laredo and Cd. Chihuahua). When seen as an isolated figure, femicide may appear to be an idiosyncratic phenomenon of Cd. Juarez, but when considered against the backdrop of violence in the region, the numbers seem to become consistent with those found in other locations.

4. Panel Data Regressions

In this section, pooled estimated generalized least squares (pooled EGLS) regressions and panel VAR will be used to investigate the points presented in the previous section in an empirically rigorous fashion.

4.1 Least Squares Regressions

The choice of pooled least squares as the panel data estimation methodology was based on different technical and structural reasons. Firstly, cross-section or period random effects are not recommended in this case due to the small number of cross-section units and time periods. Instead, fixed effects could have been used. Nonetheless, to reduce parametrization, we preferred to use a deterministic time trend variable instead of period fixed effects, and to introduce two structural dummy variables instead of cross-section fixed effects: a border city dummy variable and a Juarez dummy variable. This estimation strategy has two advantages: it reduces parametrization at the same time that it allows for structural interpretation of fixed effects. Ordinary least squares was employed to estimate different model specifications, but the Breusch-Pagan test for residual independence could not reject the null hypothesis of no independence. As a result, cross-section SUR FGLS (Parks estimator) was employed, as it allows for contemporaneous correlation between cross-sections (clustering by period). For additional flexibility, estimates used cross-section SUR (PCSE) with degrees of freedom corrected coefficient covariance estimation. Estimates based on these regression choices were obtained using the econometric software EViews.

Now, regarding structural specifications, consider Equation (1) below, which uses male homicide rate as the explained variable:

$$male_{it} = \beta_0 + \beta_1 T_t + \beta_2 pop_{it} + \beta_3 maq_{it} + \beta_4 jobs_{it} + \beta_5 border_i + \beta_6 Juarez_i + \varepsilon_{it}, \quad (1)$$

where $1 \leq i \leq 10$ represents the city cross-section index for the ten selected Mexican cities, $1990 \leq t \leq 2012$ represents the time index, *T* is a deterministic trend, *male* represents male homicide rate measured as homicides per 100,000 city inhabitants, *pop* represents population in millions, *maq* is a dummy variable for the presence of maquiladora jobs in the city, *jobs* represents jobs in the maquiladora industry in the city in thousands, *border* is a dummy variable equal to one for the five Mexican border cities and zero for the five non-border cities, and *Juarez* is a dummy variable equal to one for Cd. Juarez and zero for all other cities. The total number of observations in the panel is 230. Equation (1) coefficient estimates are presented in Table 2.

(Table 2 appears approximately here)

Notice from this model that the estimated effect of population size (β_1) is economically and statistically significant and positive. The estimated effect of border location (β_5) is also economically and statistically significant and positive. In addition, Cd. Juarez has higher male homicide rates than other cities after controlling for the remaining factors, as shown by the economically and statistically significant estimate of the Cd. Juarez dummy variable (β_6). This dummy probably captures the effects of frequent drug cartel violence in the city. But most importantly, the estimated effect of maquiladora jobs on male homicide rates (β_4) is negative and economically and statistically significant.

Equation (2) is similar to Equation (1), except that the explained variable is femicide rate:

$$female_{it} = \gamma_0 + \gamma_1 T_t + \gamma_2 pop_{it} + \gamma_3 maq_{it} + \gamma_4 jobs_{it} + \gamma_5 border_i + \gamma_6 Juarez_i + \eta_{it}, \quad (2)$$

which led to the estimates reported in Table 2. The results for Equation (2) are like the results for Equation (1) except that the coefficients have smaller magnitudes reflecting the fact that femicide rates are lower than male homicide rates in all selected cities. As in the case of male homicide rates, the estimated effect of maquiladora jobs on femicide rates (γ_4) is negative and statistically and economically significant.

Equation (3) encompasses Equation (2). It uses femicide rate as the explained variable and adds male homicide rate as one of the explanatory variables to the previous equation:

$$female_{it} = \alpha_0 + \alpha_1 T_t + \alpha_2 pop_{it} + \alpha_3 maq_{it} + \alpha_4 jobs_{it} + \alpha_5 border_i + \alpha_6 Juarez_i + \alpha_7 male_{it} + \mu_{it}. \quad (3)$$

Equation (3) regression does not suffer from simultaneity problems when male homicide rate is exogenous to femicide rate. This assumption is probably valid, given the fact that the large majority of violent crime perpetrators are males and due to the understanding that most explanatory factors of violent crime represent male characteristics. The estimated coefficients of Equation (3) are shown in Table 2.

Notice that, among the nondeterministic variables in the regression, only population and male homicide rate are statistically significant when the latter is added to the regression. Per the results, location dummy variables and maquiladora jobs have only indirect effects on femicide rates through the effects of male homicide rates, probably acting as a proxy for violent crime in general. The coefficient for Cd. Juarez, for example, is slightly positive but not statistically significant, meaning that, when controlled for the effects of male violence represented by the male homicide rate variable, femicide rates in Cd. Juarez are not statistically different from rates in other selected cities. More interestingly, the coefficient for maquiladora jobs in this regression is neither economically nor statistically significant when male homicide rate is used as a control variable, what can be seen as evidence that the presence of maquiladora industries in the border region does not contribute to augmented femicide rates, on the contrary it possibly reduces femicide rates indirectly through reductions of male homicide rates, as shown by the estimates of the third and first regressions, or maybe directly, as shown by the estimates of the second regression. These results are consistent with previous empirical research that found similar beneficial effects of maquiladora jobs growth on the reduction of crime rates in American south border cities, see Coronado & Orrenius (2007).

4.2 Panel vector autoregression (Panel VAR)

In what follows, R version 4.2.2 was used as econometric package (R Core Team, 2019). The following specialized R libraries were also employed: plm version 2.6-2 was used for panel unit root tests (purtest), see Croissant & Millo (2008) and Kleiber & Lupi (2011), and panelvar version 0.5.4 was used for panel VAR model selection, estimation and interpretation, see Sigmund & Ferstl (2021). To confirm the results in the previous subsection, panel VAR, a methodological framework better suited to handle simultaneity problems, was employed to generate orthogonalized impulse response functions (OIRFs) relating maquiladora jobs, male homicide rates and femicide rates. Estimates were obtained using logarithmic versions of these three endogenous variables, and the logarithmic of population was used as an exogenous control variable.

Table 3 shows panel unit root test results for the four variables. Four types of tests were employed: (i) Maddala-Wu is the inverse chi-squared test presented in Maddala and Wu (1999), also called P test by Choi (2001); (ii) Choi’s modified P and (iii) Choi’s inverse normal are both tests described in Choi (2001); and (iv) Im-Pesaran-Shin is the test proposed in Im, Pesaran and Shin (2003). Schwarz information criterion (SIC) was used as lag selection criterion in all tests, and deterministic components preferentially included intercept and time trend, unless leading to unavailable results, in which case they were reduced to intercept only, and finally to no deterministic component if necessary. Panel unit root test results indicate that the null hypothesis of nonstationarity is typically rejected. The only exception is population, for which the null hypothesis of nonstationarity is not rejected by two among the four tests. Given that only one variable is possibly nonstationary, panel cointegration testing is not necessary. Panel VAR models do not suffer from inconsistent estimates (spurious regression) due to nonstationary variables (Phillips and Moon, 2000), so long-run information is preserved with the choice of not applying first-difference transformations to the variables.

(Table 3 appears approximately here)

The point estimates and typical 90% intervals of the OIRFs are shown in Figure 1. Panel VAR results confirm most of the assumptions or findings of the previous subsection and reveal some new data features, among them, (a) that the effects of male homicide rate and femicide rate innovations on maquiladora jobs during the studied period is not economically significant, (b) that the effects of male homicide rate innovations on femicide rates is statistically and economically significant, (c) that the effects of femicide rate innovations on male homicide rates, although statistically significant, is less economically significant than the other way around, (d) that the effects of maquiladora job innovations on male homicide and femicide rates are negative, and (e) that innovation effects tend to peak between the 3rd and 4th year following innovations.

5. Critique of Conventional Wisdom and Field Scholarship

As seen in the previous section, there is little statistical evidence that the maquiladora industry jobs, because of international trade or the NAFTA, increase femicide rates in border cities, much on the contrary, the data tends to show that the effect of increased maquiladora jobs is a reduction of femicide rates. These results and the statistics shown in Table 1 contradict common theses about femicide in the US-Mexico border cities such as exemplified by Wright (2001), the report of the Organization of American States (Inter-American Commission on Human Rights, 2003), and most of the references listed in the Wikipedia article discussed in Section 2. To confirm this critical assessment of the literature, data from femicides in Cd. Juarez were aggregated per occupation, age and marital status. The results once more contradict the conventional wisdom and the existing literature. For example, the report of the Organization of American States (Inter-American Commission on Human Rights, 2003), as explained in Section 2, states that "in a substantial number of cases, the victims were young women or girls, workers in the maquilas (assembly plants) or students. … A significant number of the victims were young, between 15 and 25." This statement presents a victim profile that is only partially in agreement with the data. Figure 2 describes the occupation of femicide victims in Cd. Juarez from 1998 to 2003, a period representative of the report investigation. A large majority of victims is not employed or has unknown occupations. Only 10% of the victims work in manufacturing, the category closer to the stereotypical female maquiladora worker, therefore not representative of most victims.

(Figure 2 appears approximately here)

To make sure that the results are not affected by the choice of period, the exercise was redone using occupation data for femicides in Cd. Juarez in 2010, which is the most violent year in the entire sample, and the results are shown in Figure 3. Again, the share of victims who work in manufacturing is small, this time equal to only 3%.

(Figure 3 appears approximately here)

Additionally, as can be seen in Figure 4, it is true that the number of victims with ages between 15 and 24 is significant, corresponding to 36% of the femicides. However, victims with ages above 24 represent 48% of the femicides. Reports on femicides in Cd. Juarez tend to focus their attention on women younger than 25, not doing justice to the larger share of women who are older than 25 at the time of death.

(Figure 4 appears approximately here)

The common characterization of femicide victims as young and single maquiladora workers also does not match the marital profile of the victims, which is composed in its largest part by women who, at least once in their lives, lived with an intimate partner (married, cohabiting, divorced, separated or widow), as shown in Figure 5.

(Figure 5 appears approximately here)

The thesis by Wright (2001) that "while the murder rate for women [in Cd. Juarez] is far less than that for men, it is significantly higher than statistics reveal for female homicides per capita in any other major city in Mexico or in the United States" is not supported by the figures shown in Table 1 and the regression analyses in previous section. The author of the article also assumes that most victims work or are connected to maquiladora industries, an essential thesis of the article, yet another empirically unsound statement, as shown in Figure 2 and 3 and in the regression analysis of the previous section.

The notion that the femicide victims in Cd. Juarez are young maquiladora workers unfortunately takes the focus of the debate away from many victims who do not fit into the stereotype, only contributing to the lack of understanding of the serious problem of femicide in the border region. In particular, the characterization of maquiladora industries as one of the main drivers of femicide along the US-Mexico border may run against the interest of poor Mexican women and workers, since reduced job opportunities could be one of the main factors contributing to higher female economic dependency on males and, consequently, to more violence against women, a hypothesis that is supported by the high proportion of victims who are unemployed or who have occupation unknown, as shown in Figures 2 and 3.

6. Conclusions

The results in this article go against established perceptions regarding femicide in Mexican cities along the US-Mexico border. It is found that, among the variables used in the regressions, male homicide rate has economically and statistically significant effects on femicide rates. Cities with larger populations have higher male homicide and higher femicide rates. Additionally, cities located along the border have higher male homicide and higher femicide rates. On the other hand, increased availability of maquiladora jobs appears to reduce femicide rates indirectly through reduced male homicide rates or directly. In other words, once the effects of male homicide rates and population sizes are factored in, femicide rates in Cd. Juarez and other border cities are found to not be statistically different from femicide rates in other Mexican cities under consideration. Moreover, femicides as a share of homicides were lower in Cd. Juarez than in most cities in the study.

The thesis that maquiladora industries, international trade and the NAFTA are among the main drivers of femicide along the US-Mexico border region, which is commonly found in many specialized articles and in government and press reports, is not corroborated by the data used in this article. The tendency to stereotype female victims in the border region as young maquiladora workers is probably not in the interest of potential female victims of violence that, in a significant number of cases, are women who have or have had male partners, are unemployed, and are not young. These results suggest that decreasing levels of economic dependency of females on males through increased availability of jobs and defusing border policies and activities that contribute to abnormally high levels of violent crime among males are the starting points towards the reduction of high femicide rates in Mexican border cities.

More precisely, the findings in this article can inform policies concerning homicides in general and femicides in particular in the US-Mexico border region. On one hand, instead of restrictions to international trade and industrial development, policies should promote economic opportunities in general, and economic emancipation opportunities for women in particular. On the other hand, beyond economic emancipation, policies that promote the protection of women against domestic or partner violence, through increased gender emancipation and the availability of safe spaces, should be integral components of any effort to reduce femicide rates in the region.

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Figure 1

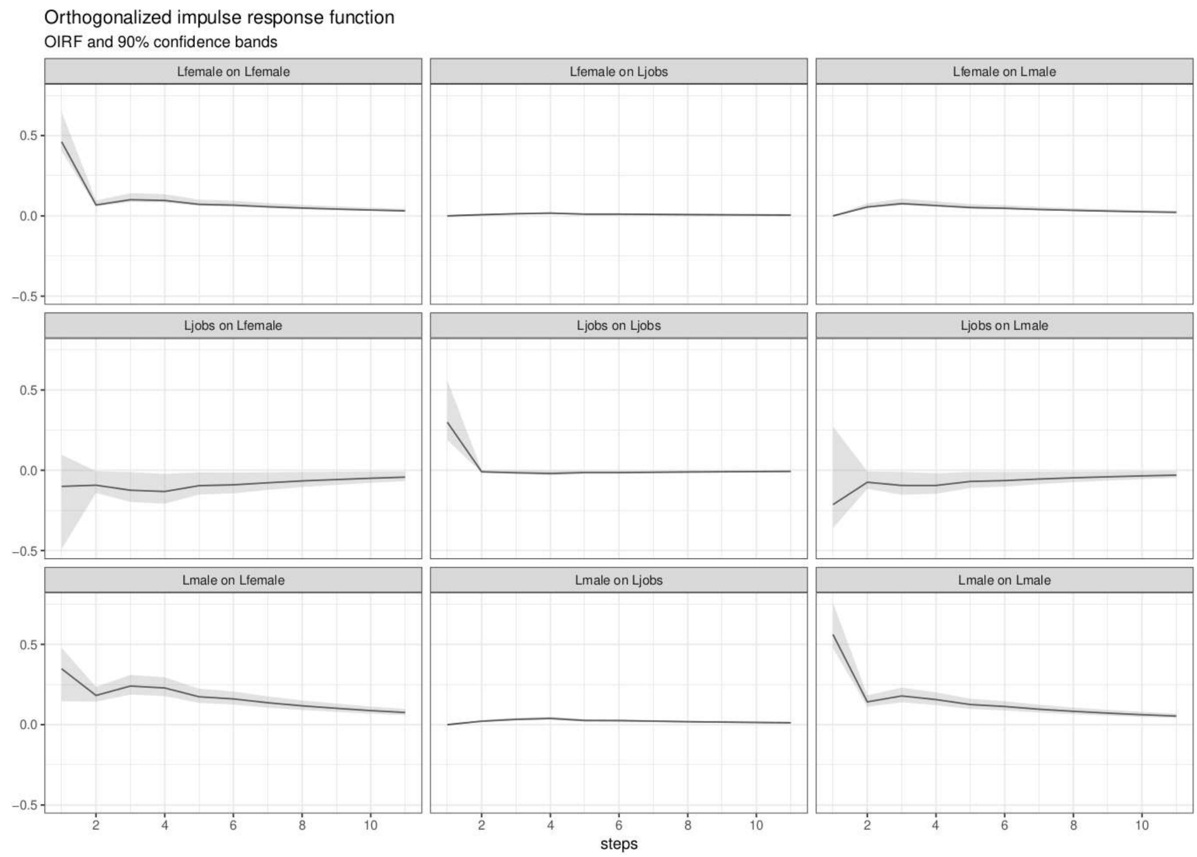

Figure 2

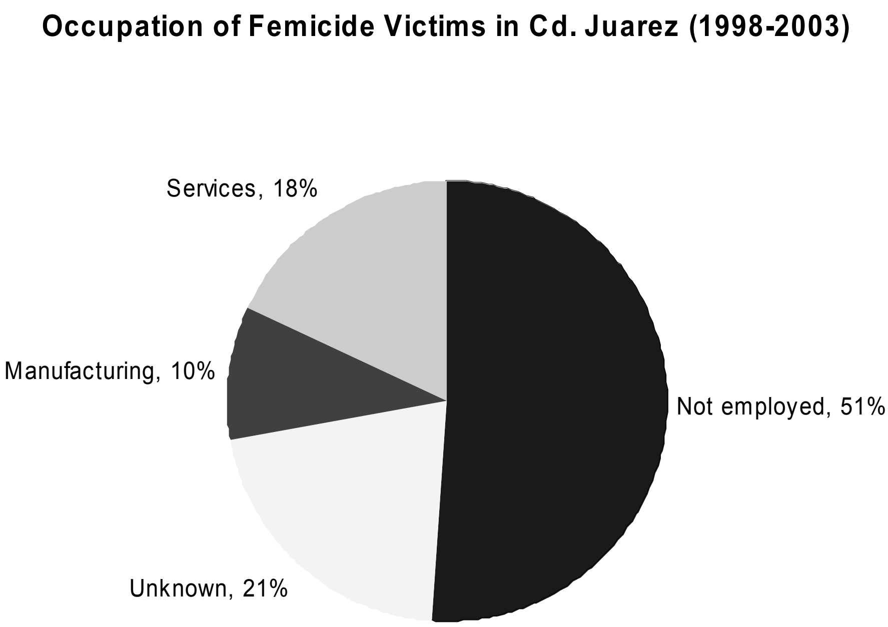

Figure 3

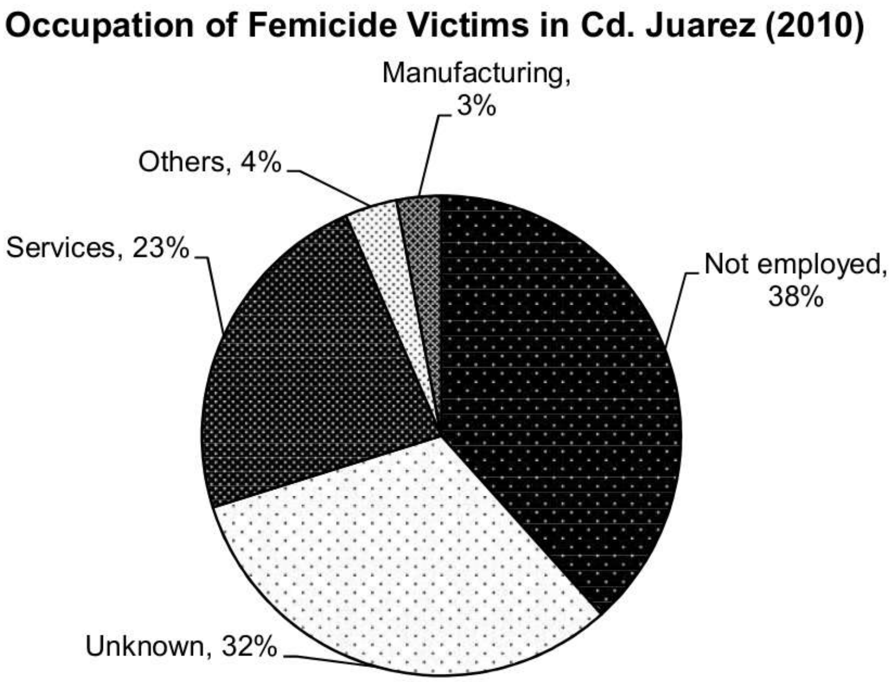

Figure 4

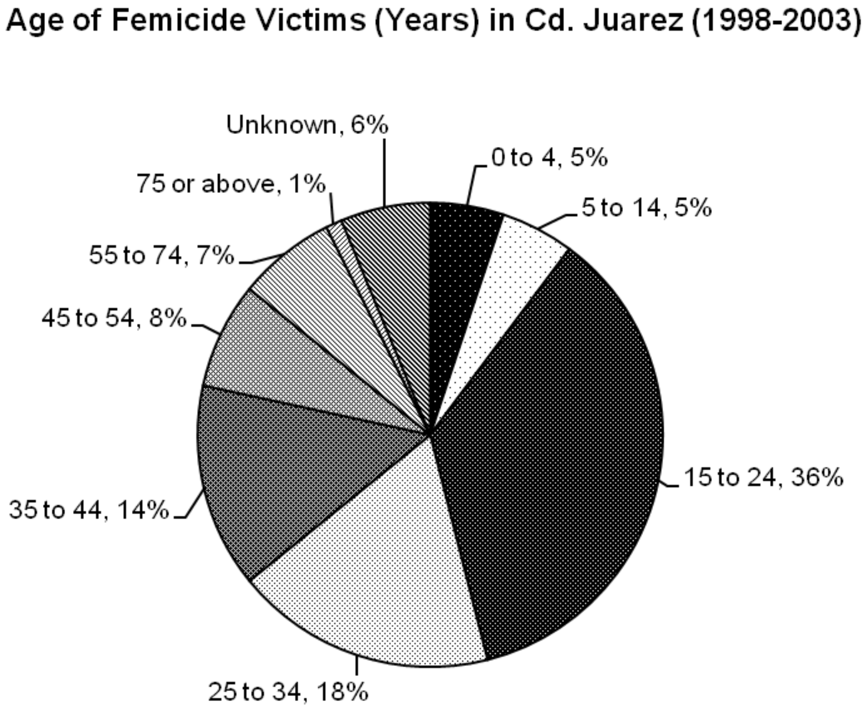

Figure 5

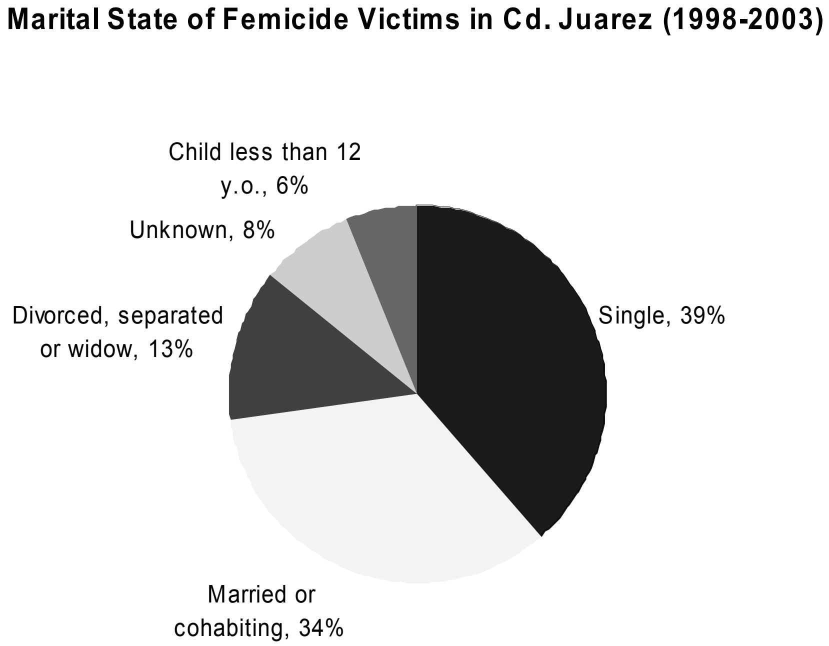
Marital State of Femicide Victims in Cd. Juarez (1998-2003)
Child less than 12 y.o., 6%
Unknown, 8%
Divorced, separated or widow, 13%
Single, 39%
Married or cohabiting, 34%

Table 1 – Femicide in Selected Cities

Region	Population 2010	Homicides from1994 to 2012		Femicide as Share of Homicides	Median Homicide Rate per 100,000		Average Homicide Rate per 100,000	
		Male	Female		Male	Female	Male	Female
Selected MX Border Cities	4,218,267	23,228	2,443	9.5%				
Tijuana (BCN)	1,549,291	6,848	603	8.1%	20.9	1.9	27.8	2.4
Cd. Juarez (CHH)	1,267,229	12,816	1,371	9.7%	20.2	2.7	55.3	6.0
Reynosa (TAM)	557,636	857	151	15.0%	8.8	1.7	10.0	1.7
Matamoros (TAM)	480,523	891	122	12.0%	10.1	1.4	11.1	1.5
Nuevo Laredo (TAM)	363,588	1,816	196	9.7%	17.5	2.7	28.6	3.1
Selected MX Non-Border Cities	2,063,987	6,054	721	10.6%				
Cd. Chihuahua (CHH)	794,139	4,017	414	9.3%	10.8	1.4	27.7	2.9
Ensenada (BCN)	464,135	944	146	13.4%	13.0	2.0	13.4	2.0
Cd. Victoria (TAM)	317,843	482	60	11.1%	5.0	0.8	8.6	1.1
Tampico (TAM)	292,841	391	70	15.2%	4.4	0.7	7.1	1.3
Cd. Madero (TAM)	195,029	220	31	12.4%	5.2	0.6	6.2	0.9

Table 2 – Equation Specifications, Coefficient Estimates, and Regression Statistics

Model & Dependent Variable	Statistic	Intercept	Time Trend (*T*)	Population (*pop*)	Border Dummy (*border*)	Juarez Dummy (*Juarez*)	Maquiladora Dummy (*maq*)	Maquiladora Jobs (*jobs*)	Male Homicide Rate (*male*)	Adjusted R-Squared	F-Statistic
Equation (1)	Point Estimate	-17.729	0.753	0.000069	16.740	42.831	2.286	-0.000469		0.650	72.008
Male	Standard Error	1.359	0.097	0.000004	1.820	4.013	1.240	0.000030			
Homicide	t-Statistic	-13.041	7.796	17.858	9.200	10.673	1.844	-15.647			
Rate (*male*)	P-Value	0.000	0.000	0.000	0.000	0.000	0.067	0.000			0.000
Equation (2)	Point Estimate	-1.332	0.094	0.000006	1.373	5.084	0.647	-0.000043		0.644	70.008
Femicide	Standard Error	0.221	0.015	0.000001	0.341	0.657	0.244	0.000005			
Rate	t-Statistic	-6.031	6.197	10.248	4.023	7.741	2.652	-9.064			
(*female*)	P-Value	0.000	0.000	0.000	0.000	0.000	0.009	0.000			0.000
Equation (3)	Point Estimate	0.320	0.028	-0.000001	-0.064	0.451	0.278	0.000001	0.090	0.935	471.558
Femicide	Standard Error	0.128	0.007	0.000000	0.226	0.441	0.181	0.000002	0.003		
Rate	t-Statistic	2.491	3.856	-2.539	-0.283	1.023	1.532	0.259	34.263		
(*female*)	P-Value	0.014	0.000	0.012	0.777	0.308	0.127	0.796	0.000		0.000

Sample: 1990 2012

Time dimension: 23

Cross-section dimension: 10

Total balanced pool number of observations: 230

Model and error degrees of freedom: 6 and 223 for Equations 1 and 2, 7 and 222 for Equation 3

Coefficient estimation method: cross-section SUR (PCSE) generalized least squares (Parks estimator)

Coefficient covariance estimation method: cross-section SUR (PCSE) with d.f. correction

Table 3 – Panel Unit Root Tests, p-Values (Logarithm of Variables)

Table 3 – Panel unit root tests, p-values, logarithm of all variables

Variable	Det.	Maddala-Wu	Choi's modified P	Choi's inverse normal	Im-Pesaran-Shin
Population	c, t	0.1794	0.1919	0.0657*	0.0872*
Maquiladora jobs	c, t	0.0791*	0.0652*	0.0430**	0.0548*
Male homicide rates	c, t	0.0230**	0.0089***	0.0341**	0.0473**
Femicide rates	c, t	0.0051***	0.0005***	0.0050***	0.0091***

Null hypothesis of nonstationarity, SIC used as lag selection criterion, maximum lag = 4, Det.=deterministic components, c=intercept, t=time trend, any=any deterministic component combination including none, NA=not available, statistical significance: *=10%, **=5%, ***=1%.