

Women's Police Stations and Domestic Violence

Evidence from Brazil

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Abstract

Although women's police centers have been gaining popularity as a measure to address domestic violence, to date no quantitative evaluations of their impacts on the incidence of domestic violence or any other manifestations of gender equality have been done. This paper estimates the effects of women's police stations in Brazil on female homicides, as a measure of the most severe form of domestic violence. Given that a high fraction of female deaths among women ages 15 to 49 years can be attributed to aggression by an intimate partner, female homicides appear the best available proxy for severe domestic violence considering the scarcity of data on domestic violence. The paper uses a panel of 2,074 municipalities and takes advantage of the gradual rollout of women's police stations from 2004 to 2009, to estimate the effect of establishing a women's police station

on the municipal female homicide rate. Although the analysis does not find an association on average, women's police stations appear to be highly effective among some groups of women: women living in metropolitan areas and younger women. Establishing a women's police station in a metropolitan municipality is associated with a reduction in the homicide rate by 1.23 deaths per 100,000 women (which roughly amounts to a 17 percent reduction in the average homicide rate in metropolitan municipalities). The reduction in the homicide rate of women ages 15 to 24 is even higher: 5.57 deaths per 100,000 women. Qualitative work suggests that better economic opportunities and less traditional social norms in metropolitan areas may explain the heterogeneous impacts of women's police stations in metropolitan areas and outside them.

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Women's Police Stations and Domestic Violence: Evidence from Brazil

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1. Introduction

Domestic violence affects 30 percent of all ever-partnered women in the world. One-third of women will suffer physical or sexual intimate partner violence or sexual violence by a non-partner (Garcia-Moreno et al. 2013). Over the last decades, it has been increasingly recognized as a grave problem and a public policy concern through international conventions, such as CEDAW or Belem do Para, and by national governments, as well. An increasing number of countries are enacting concrete measures to reduce domestic violence, ranging from more comprehensive legislation to launching networks of one-stop-centers for women in a situation of violence. For example, 9 Latin American countries passed new legislative measures to prevent and punish domestic violence between 2005 and 2015: Argentina in 2009, Brazil in 2006, Colombia in 2008, Costa Rica in 2007, El Salvador in 2011, Guatemala in 2008, Mexico in 2007, Nicaragua in 2012, and Venezuela in 2007¹. In the same decade, Peru, Mexico, Brazil, and El Salvador, among others, launched or expanded facilities to provide comprehensive support to victims of domestic violence². Unfortunately, rigorous evaluations of policies and programs aimed at curbing domestic violence are scant. Inherent difficulties in collecting reliable data and ethical considerations that frequently prevent randomization make effects of interventions to address domestic violence particularly difficult to study.

Women's police centers are one such intervention that has been gaining popularity over the last decade. So far, such police centers have been adopted by Argentina, Bolivia, Ecuador, Ghana, India, Kosovo, Liberia, Nicaragua, Peru, the Philippines, Sierra Leone, South Africa, Uganda and Uruguay. Within Latin America, Brazil has the largest operation with almost 500 stations in 2009. A large push in establishing them occurred after the 2006 law Maria da Penha against domestic violence. As of 2010, Peru had 27 women's police stations, Nicaragua had 37, and Ecuador had 34 (Jubb 2010). Despite their growing popularity, little is known about actual effectiveness of such police stations. To our knowledge, no quantitative evaluations of the impacts of women's police centers on incidence of domestic violence or any other manifestations of gender equality

¹ Women, Business and the Law: <http://wbl.worldbank.org/>

² *Ciudad Mujer* in El Salvador (<http://www.ciudadmujer.org/model/womens-city-centers-in-el-salvador/>), Centros Emergencia Mujer in Peru (http://www.mimp.gob.pe/index.php?option=com_content&view=article&id=831&Itemid=429), Centros de Referência Especializado de Atendimento à Mulher (CREAMs) in Brazil.

have been carried out, although there are qualitative studies that indicate their importance for women (Jubb and Izumino 2002).

This paper attempts to provide quantitative evidence on the effects of women's police centers in Brazil, or Delegacias Especializadas de Atendimento das Mulheres (DEAMs) on female homicides, as a measure of the most severe form of domestic violence. Given that a high fraction of female deaths among women aged 15 to 49 can be attributed to aggression by an intimate partner, as we will demonstrate in detail in the data section, and the scarcity of other data on domestic violence, female homicides appear the best available source of data for the analysis of the effects of DEAMs on the most violent violence against women.

The choice of focus on Brazil, as opposed to a different country which has implemented a similar intervention, is partially due to availability of the data that allow for undertaking such analysis. In addition to that, domestic violence has been an endemic problem in the country, as well as an important policy concern over the last decade. Brazil is among the leaders in Latin America in terms of prevalence of violence against women: it ranks 11th in the list of 32 American countries in female homicide rate, and fourth in Latin America, only behind El Salvador, Guatemala and Honduras – all countries with much lower levels of economic development and recent history of violent civil conflict. Much of the violence in Brazil is perpetrated by family members: Movimento Nacional de Direitos Humanos (MNDH, or National Movement of Human Rights) estimates it to be close to 70 percent. Moreover, 66.3 percent of accused in homicides against women are their partners (AGENDE 2007).

The Brazilian government has been actively trying to address this issue: in 2003, establishment of a new ministry, the Secretaria de Políticas para Mulheres (SPM), triggered an increase in governmental funding to services aimed at prevention and treatment of domestic violence, including DEAMs. In 2005 the first National Conference on Policies for Women took place, and the first National Plan of Women's Policies was created, with elimination of violence against women as one of its foci.

The year 2006 saw the enactment of the Maria da Penha law, internationally lauded legislation aimed at curbing domestic violence. The law creates mechanisms to prevent and restrain domestic violence in accordance to the country's Constitution, the convention of Bélem do Pará and CEDAW: it introduces special courts on domestic violence, establishes assistance and protection

measures for victims. The law gave an additional impetus to the expansion of DEAMs, which are considered to be an important part of the infrastructure needed for implementation of the Maria da Penha law.

These efforts appear to be paying off at least in some areas. For instance, over time more women are denouncing the perpetrators, as the culture gradually acknowledges that domestic violence is not to be tolerated. From 2007 to 2009 calls to the women’s help hotline Ligue 180 doubled (Comunicacao Social, Secretaria de Politicas para as Mulheres 2013). Other indicators suggest a less optimistic picture: in spite of a dip in 2007 after the passing of the Maria da Penha law, the female homicide rate continues rising as it has over the last decade (Figure 1). This seeming incongruity with the increase in anti-violence efforts by both women denouncing and policy makers providing more resources underscores the importance of a careful analysis of the effectiveness of interventions.

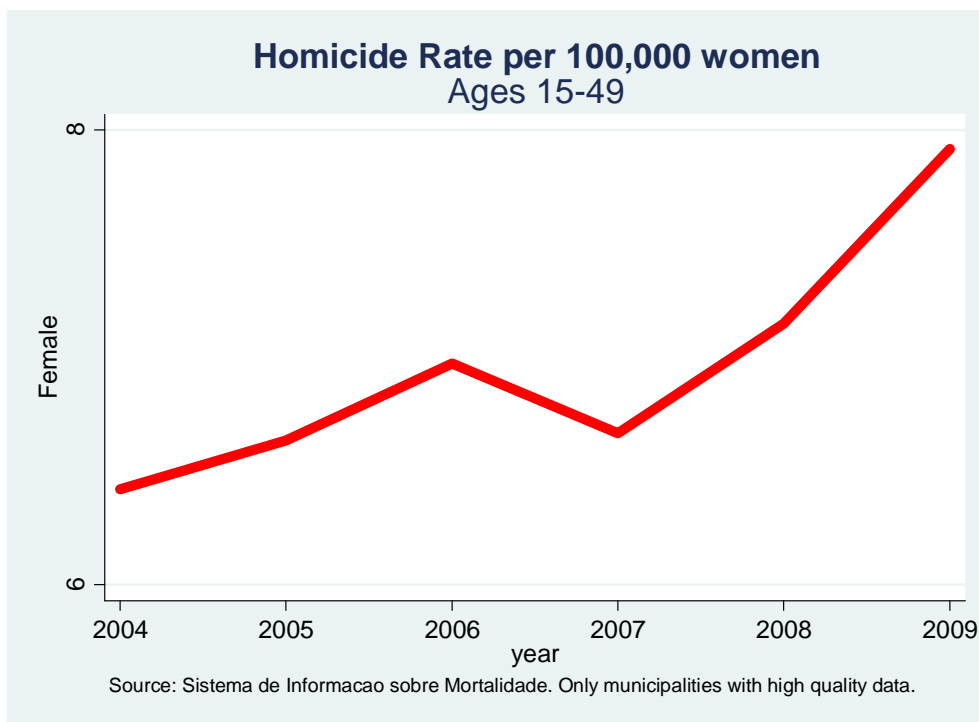


Figure 1

Thus, this paper attempts to make a twofold contribution: first, it adds to the literature on domestic violence by providing quantitative evidence on the effects of women’s police stations, an intervention that has been gaining popularity in the array of tools to address domestic violence.

Second, it provides evaluation of the effectiveness of an important component of Brazil's policy aimed at curbing domestic violence, focusing on understanding heterogeneity in its effects and providing practical policy recommendations.

The paper is structured as follows: first, we describe Delegacias Especializadas do Atendimento as Mulheres in Brazil and provide some summary statistics on the recent trends in violence in the country. Then we describe the data and estimation and results, with a particular focus on heterogeneity in the impacts. The fourth section concludes.

2. Women's police stations in Brazil

Delegacias Especializadas de Atendimento à Mulher (DEAMs), literally translated as specialized police service for women, constitute a part of the Civil Police and are focused on crimes such as rape and domestic violence that target women. Although not a legal requirement, the units are primarily staffed with women. Among other responsibilities, similar to those of a regular police station, DEAMs are charged with requesting urgent protective measures from the judge in case of domestic violence.

The first DEAM was established in Sao Paulo in 1985 (Jubb 2010). Other municipalities copied this model, and the network of DEAMs has been expanding ever since. Figure 2 illustrates expansion since 2000, when the first available municipal survey included questions on women's police station existence. As the women's movement grew and domestic violence became a national priority, in August of 2006 the law *Maria da Penha* turned the establishment of DEAMs into a federal matter as financing and establishment was facilitated by the central government. By 2009, DEAMs had been established in just under 500 municipalities (out of 5,564), where 60% percent of population age 15 to 49 resides.

Theoretical literature on intra-household bargaining would suggest that DEAMs are likely to trigger a reduction in domestic violence, through dissolution of abusive relationships as well as through lowering conflict in continuing relationships. Considering that a Nash equilibrium marriage is determined by each individual's options outside marriage, reservation utility is key to the partners' marital bliss (Manser and Brown 1980). Through issuing restraining orders and assisting with the court procedures, DEAMs may be contributing to creating safer outside options for battered women: if they decide to leave the marriage, they are less likely to become a victim of the abuser's retaliation. DEAMS do not just provide police protection, but also assist women

in finding safe havens and psychological treatment. Such guarantee of a safe outside of marriage option may discourage the use of violence within a marriage, regardless of whether it was used as a bargaining tool or direct utility was derived from it.

Improvements in women's outside options have been shown to trigger reduction in domestic violence. For example, Aizer (2010) demonstrates how better economic opportunities (relative to men) are associated with a reduction in hospitalizations due to domestic abuse in California. Stevenson and Wolfers (2006) find that adoption of unilateral divorce law in the US resulted into a drop in female homicide and domestic violence. In a more recent study, Brassiolo (2012) finds a decline in spousal conflict and in extreme partner violence in response to introducing less stringent divorce legislation in Spain. Heath (2012) finds an apparently perverse result in Bangladesh, where participation in the labor force is associated with increased risk of domestic violence, but only among women with low education or young age at marriage. The author suggests two alternative explanations for this heterogeneous effect. On the one hand, entering the labor force may not effectively change outside options of women with initially low bargaining power, but only marginally increases their bargaining power. In this case, husbands may use domestic violence instrumentally to counteract the increase in bargaining power, but only in marriages where women cannot flee. Alternatively, women facing domestic violence may self-select to participate in the labor force in order to be able to break the cycle of violence.

In addition to a potential to lower domestic violence through providing safer outside options for women, DEAMs may be discouraging violence through other channels. Specifically, perpetrating violence becomes more risky, when DEAM provides a convenient way to report it for any witness.

As in any developing country, implementation is a challenge. On average, each DEAM has 2.6 officers, often below the recommended number of officers based on the size of the city (SENASP 2010). Other limitations include limited hours of operation, or lack of specific services. A 2010 report (Sardenberg and Queiroz de C. Gomes 2010), which consisted of surveys & interviews in 40 DEAMs³ located in capital cities of all but two states, reports that 65 percent were only open during commercial hours, and only 58% investigated homicides. Over half offered psychological orientation to victims, but less than a fourth offered legal assistance. However, in another report

³ The specific stations were chosen "for their relevant role in National Policy Confronting Violence against Women" (page 13).

(Secretaria Especial de Políticas para as Mulheres & Secretaria Nacional de Segurança Pública 2007) over 60% of DEAMs found their relations with the judicial system to be good or optimal, but relations with social services and safe houses were also lacking. These findings come from the around 250 DEAMs each year who returned survey questionnaires between 2003 and 2005. This is significant lack of response as data from the Secretaria da Mulher and municipal surveys indicate that in 2004, there were almost 400 DEAMs.

Given the shortcomings in implementation, it is particularly important to evaluate whether DEAMs have an effect on the incidence of domestic violence, and to assess the magnitude of this effect. To our knowledge, no such statistical analysis has been undertaken, and our study is a first attempt.

3. Data

It is notoriously difficult to obtain the data on domestic violence. Self-reported measures gravely underestimate the problem (Ellsberg et al. 2001). Moreover, measurement issues related to self-reported data are a challenge because of selection issues regarding the revealing of the incidents. Although overall violence in the household may be falling, women may report more domestic violence as their outside options improve and fear of retaliation subsides or as it is perceived as more socially acceptable to renounce abusers. On the other hand, women who are abused but live in a world where violence against them is a cultural norm may not perceive the injustice.

Data from Brazil's national household survey illustrates this challenge. In 2009, PNAD (Pesquisa Nacional por Amostra de Domicílios) included a section on victimization and justice. The questions on crime include asking if the subject had suffered aggression within the last year and the identity of the perpetrator. There is certainly underreporting taking place, as only 1.65% of women aged 15-49 admit having ever been a victim of aggression, and only .5% report that the last incidence of aggression was by a domestic partner. This is much lower than the numbers presented by the 2005 WHO study, where 29-37% of Brazilian women interviewed reported having been victims of domestic violence. The discrepancy may arise due to the fact that the focus of the WHO study was domestic violence, so the enumerators were women trained to elicit trust from respondents. As a single question on a survey focused more on economic measures, the need for establishing a rapport of this caliber would be less important for the PNAD survey team, and the enumerators were not necessarily women. The WHO study also finds that 20% of women had

not told anyone about the domestic abuse they experienced; this type of person would be unlikely to admit to suffering domestic abuse on a brief survey.

There are no other nationally available surveys which include questions on domestic violence, and given the problematic reporting concerns, we turn to another measure of domestic abuse: the female homicide rate. We choose this variable for two reasons. We will argue that this measure is a good proxy for most extreme forms of domestic violence, which lead to women's deaths. Conditional on this variable being a good indicator for the most severe form of domestic violence, there is a strong imperative to focus on this outcome first, as death is the ultimate limitation of freedom.

Why is the female homicide rate a good proxy for most extreme forms of domestic abuse, resulting in death of the victim? Much evidence supports the assumption that domestic violence is responsible for most of the female homicides in Brazil. Movimento Nacional de Direitos Humanos (MNDH) estimates that close to 70 percent of murdered Brazilian women are victims in the sphere of their domestic relations. These are not that different internationally: in South Africa, Israel, Canada or the US, 70% of female homicides are from domestic violence (United Nations Office on Drugs and Crime, 2011).

Other statistics support the MNDH estimate: 66.3 percent of the accused in homicides against women are their partners (AGENDE 2007). Of all female murders, 40 percent occur inside the family home or residence, where domestic violence is most likely to occur (Waiselfiz 2012). By comparison, the portion of male murders occurring inside the family residence was 14.7%. Brazil is also developing a questionnaire for victims of violence in the health system. This is not yet scaled up nor consistently applied within all hospitals, however, in 2011, of the almost 50,000 women in the database who indicated the identity of an attacker, 70 percent were family. Notably, in California, 70% of female hospital visits due to aggression are from domestic violence (Aizer 2010).

Despite the reporting bias in the PNAD data, discussed above, the answers of those who were willing to voice their experience of abuse also render support to our hypothesis. 70 percent of all perpetrators of aggression admitted by women were a partner, family, or known by the female victim. Men, in comparison, are more likely to admit having been a victim of an unknown person; 58% of reported perpetrators against men were individuals with whom the man did not have an

acquaintance. This discrepancy in identity of the perpetrator by sex of the victim is reflected in the location of the aggressive act. Women are four times more likely than men to admit to an enumerator having been victimized in the home; 45% of acts of violence reported by women took place in their own residence.

Additionally, to improve the quality of our proxy, we limit the sample to women aged 15 to 49. According to Waiselfisz (2012), the fraction of aggressions perpetrated by intimate partners is the highest for this age group. For women beyond the age of 50, while primary aggressor is still a partner or an ex-partner, children are responsible for over 17 percent of aggressions. Though this is still considered domestic violence, our analysis is more appropriate to partner relationships. The same age group was used in the WHO study in 2005 (García-Moreno et al. 2005).

Another advantage of using homicide data is the absence of reporting bias: it is impossible to self-report (or not) a homicide. Nevertheless, it is indisputable that the chosen metric has multiple limitations. First, it only captures the most violent forms of domestic violence – those resulting in death of the victim. Our paper will not be able to provide any insights on the dynamics of lighter forms of violence. Second, it is a noisy estimate: although it is well established that a large share of female homicides are due to domestic violence, there are no precise time-specific estimates of the magnitude of this share. In spite of these concerns, we find this measure to be superior to the alternatives due to its reliability.

Our data come from Brazil's national mortality data base SIM (Sistema de Informacoes sobre Mortalidade), a registry of every death in the nation. We consider a death to be a homicide if it is classified as one, or if, in a separate question with more specific delineations of the cause of death as defined by the WHO international classification of diseases, the cause of death is coded to be aggression (the discrepancy is only 5%.) Data on homicides are also collected by individual states' department of public security, but these are more difficult to access. We were able to perform a small data validation exercise, comparing SIM data with homicides⁴ records from Sao Paulo department of public security. Concordance has improved over time, from a 30 percent difference in 1998 to a 4 percent difference in 2005, the most recent year for which the state level data are available. This remaining discrepancy between these numbers and the SIM data base has been recognized as resulting from slight differences in definitions: deaths resulting from legal

⁴ Transit homicides, or traffic accidents, were excluded from both data bases.

interventions and some other situations (such as finding corpses) classified as homicides in the health data are not included in the police definition (Poverty Reduction and Economic Management Sector Unit Latin America and the Caribbean Region 2006).

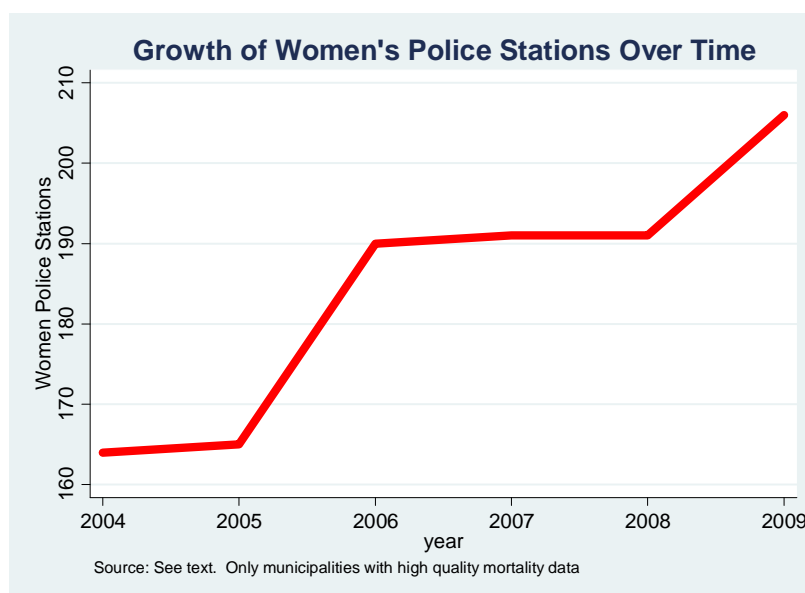
To improve the quality of the data, we limit the sample to municipalities that have been consistently meeting the international standards in quality control, i.e. where no more than 10 percent of deaths remained unexplained within any given year of the analysis. While in any one year only about 1,200 of Brazil's 5,564 municipalities failed to meet these standards, only 2,130 municipalities have been adhering to it consistently during our panel time frame (2004 – 2009). These 2,130 municipalities in our final sample cover thirty five percent of the population. They differ in several dimensions from the rest of the country. They are more likely to have had a DEAM by 2009 and are more densely populated. While their overall per capita GDP and per capita GDP from industry is lower than in the group of low-quality data municipalities, they have higher per capita GDP from agriculture. The municipalities with high quality mortality data appear to be spending more: per capita municipal expenditures are higher. However, additional spending seems to mostly favor health sector: while they spend more compared to the rest of the country on hospitals and basic health, they spend less on police: per capita expenditure on civil defense and likelihood of having a municipal police force are lower. The municipalities in our sample also have a higher percentage of women enrolled in Bolsa Familia, and the size of the average per woman transfer is also higher. These comparisons suggest that our analysis is limited to municipalities that are not representative of the entire universe of Brazilian municipalities. We will take this into consideration when interpreting our results.

Information on the dates when women's police stations were established in various municipalities comes from three sources. The Secretaria Presidencial da Mulher⁵ (SPM) provided a list of DEAMS, and 104 within our municipalities of interest had the dates of establishment. We found information for an additional 14 municipalities through the Internet. These dates were further supplemented by the MUNIC (Pesquisa de Informações Básicas Municipais) municipality survey run by Brazil's statistical office IBGE (Instituto Brasileira de Geografia e Estatística). In 2004, 2006 and 2009 municipalities were asked if they had a DEAM⁶. Notably, some of the

⁵ Ministry of Women.

⁶ Although the survey is annual, the question about DEAMs appeared in the survey only in 2004, 2006, and 2009.

municipalities that report the presence of a DEAM in the MUNIC survey do not appear in SPM records. For municipalities registered with SPM, the exact date of establishment is used. For municipalities that only appear in MUNIC data, the year when their presence in a municipality is reported for the first time is considered the year of establishment. We note that this uncertainty regarding the dates of establishment makes for a noisy treatment variable. This implies that our estimates will be lower bounds, as in some years (the years between MUNIC surveys) DEAMs may have been established, but the municipalities are not counted as treated if their establishment has not been identified by the SPM.



Since homicides due to domestic violence are a subset of our outcome variable, we include controls that are likely to impact domestic violence as well as violence more generally, such as street crime. We focus on demographic variables, especially the ones that may affect intra-household bargaining, and municipal characteristics. The primary source of our demographic variables is IBGE (Instituto Brasileiro Geografia e Economia, a national statistical agency). We include log of female population in our age group of interest and population density, as the number of homicides clearly depends on the size of the population and the proximity of people to one another. We also calculate the percent of population that is female, should scarcity of women influence how they are treated; indeed a significant negative correlation between this variable and the female homicide rate supports this hypothesis. Gender gap in education and access to own resources may affect intra-household bargaining. Thus we include the ratio of percent of female voters who have

finished primary to percent of male voters who have finished primary from Tribunal Superior Eleitoral. Given that voting is obligatory in Brazil for people aged 18 to 70, this is a good proxy for education gap. Administrative records from the Ministry of Social Development provide the fraction of women in a municipality receiving Bolsa Familia Brazil's conditional cash transfer program given to impoverished women for keeping their children in school, and the municipal per capita transfer amount.

To capture municipal wealth we include GDP per capita and GDP per capita from agriculture and industry from IBGE. FINBRA, a data base from the national secretary of the treasury, provides municipal spending information. We also include overall per capita municipal spending and per capita municipal spending on civil defense, intelligence, public security. The MUNIC survey also asks about other public safety organizations besides the women's police stations, so we dummies for if the municipality has a local militia and a Public Safety Council, as all these are likely to affect crime overall. Expenditure on hospital and health spending as well as having a municipal health council can prevent attempted homicides from becoming deaths. In an effort to take attitudes into account we also consider if the municipality has a human rights council and per capita spending on human rights and public communications.. Summary statistics are in Table 1 and we also include simple correlations of the right hand side variables with the outcome variables. We are considering the male homicide rate in addition to the female homicide rate as a placebo test. As men are much less likely to be victims of intra-partner violence, any effects on domestic violence instead of on the general crime rate should be restricted to women.

We use these data on treatment, outcomes and controls to form a municipal level panel spanning 2004 through 2009. The panel begins in 2004, after a law was passed in 2003 which required health professionals to report abuse to the police; this law could affect trends in domestic violence. Additionally, this is also the first year for which some of our key control variables become available. The panel ends in 2009, the last year for MUNIC data. Although DEAMs were only in 8% of municipalities in our sample in 2004, these covered more than 50% of women, growing to cover 62% of the female population by 2009.

In addition to quantitative data used to assess effectiveness of DEAMs in reducing domestic violence, our work also relies on qualitative data to understand the mechanisms through which DEAMs work and possible impediments to their smoother functioning. Qualitative data were

collected in the state of Pernambuco, Brazil, in order to better understand actual and expected behaviors related to domestic violence among different social groups, as well as the knowledge of Maria da Penha law and infrastructure supporting it, including DEAMs⁷. The qualitative study included in-depth interviews in four cities with women victims of violence, focus groups and questionnaires with general population (men and women), structured interviews with key informants (service providers, judicial professionals, administrative staff –referred to as ‘service providers’ from now on). The findings from this qualitative work are predominantly used to explain heterogeneity in impacts from the quantitative analysis. The entire qualitative report can be found at Mueller et al. 2012.

4. Empirical Strategy

To identify the effects of DEAMs on the homicide rate of women aged 15 to 49, we apply a difference-in-difference approach, taking advantage of the variation in the timing of establishment of DEAMs across various municipalities. We use the following specification:

$$Y_{mt} = \beta T_{mt} + \rho X_{mt} + \alpha_m + \gamma_t + \varepsilon_{mt} \quad (1)$$

where Y_{mt} is the outcome variable - homicide rate per 100,000 women aged 15 to 49 due to aggression in municipality m in year t . We also explore changes in the homicide rate of men in the same age group for two reasons. First, regressions on male homicide rates serve as placebo tests: we would not expect the male homicide rate to change with the women’s police stations targeted toward women’s safety. If the male homicide rate was also falling, we might assume that overall crime was changing due to increased police presence rather than domestic violence was going down due to greater attention to women. Second, regressions on male homicide rate allow us to explore the possibility of increase in male homicide if as a result of substituting women police officers for male police officers by municipalities. Fixed effect regressions⁸ with controls for municipal spending reveal that establishment of DEAMs is not associated with increase in any of the various police spending variables listed in the summary statistics in Table 1, suggesting that substitution is plausible.

T_{mt} is a dummy, equal to 1 if there was a DEAM in municipality m in year t . α_m and γ_t are municipality and year fixed effects. X_{mt} is an extensive set of time variant municipal controls.

⁷ This work was supported through the World Bank Policy and Social Impact Analysis grant.

⁸ Available from the authors upon request.

Each municipality is weighted by the female population in our age group of interest and standard errors are clustered at municipality level. Unweighted estimations yield similar results.

Due to the inclusion of municipality and year fixed effects, the main threats to causal identification of the effects of DEAMs are the possibility of time variant unobserved heterogeneity in the error term ε_{mt} . This is likely to happen, if: (1) the rollout of the interventions is driven by changes in the domestic violence; (2) the error term reflects municipal level changes that were correlated with the roll-out of interventions and could have affected the outcome variable.

To rule out the first possibility, which is highly relevant given that the roll out of DEAMs has not been randomized, we check if the lagged homicide rate predicts where the services are implemented. Table 3 shows the results on the sample of municipalities who added a DEAM during the time period of interest. Results are robust to including municipalities who never had a DEAM. We find no statistically significant relationship suggesting that previous levels of homicides—of either men or women—influenced the implementation of the DEAMs. To decrease the likelihood of the second possibility, an extensive set of control variables, described in the previous section, is included into the regression specification.

5. Results & Heterogeneity Analysis

Table 4 reports our main findings. Our first specification includes the year and municipal fixed effects only, while the second includes the control variables. We find no effect of DEAMs on the homicide rate of females aged 15 to 49. We do not find any effect on male homicide rate either; which suggests that DEAMs do not affect crime against men: they neither reduce it through greater police presence, nor increase it through substitution of male police officers for female police officers.

The lack of significance in the impacts on the overall population leads us to explore heterogeneities. Carrying out the analysis on sub-groups depending on the location, size of a municipality and age, suggest that DEAMs trigger reduction in domestic violence among subgroups of women.

Table 5 suggests that establishing a DEAM in a municipality located in a state capital or metropolitan area is associated with a reduction in the homicide rate by 1.23 deaths for 100,000 women. This roughly amounts to a 17 percent reduction in average female homicide rate in capital

cities and metropolitan areas, equal to 7.33 in 2004. DEAMs appear to have no effect on female homicides in small cities and rural areas, which have a slightly smaller average female homicide rate of 4.9; the analysis also does not detect any impact on men either in metropolitan areas or in small cities.

We then turn to replicate our analysis on different age groups: 15 to 24 and 25 to 49. With neither group do we see any effects of DEAMs. However, if disaggregation by age is overlaid with disaggregation by the size of municipality, we detect impacts in the younger group in capital cities and metropolitan areas (Table 6). For this group, a reduction in homicide rate is higher than overall effect in larger cities: 5.57 deaths per 100,000 women. In both Capitals and Metropolitan areas and smaller cities, younger women face a slightly higher homicide rate than older women.

As mentioned in the empirical strategy section, we employ controls to account for observed heterogeneity. Unobserved heterogeneity is still a concern, however, because we rely upon a wide selection of controls rooted in theory, we consider an assessment of the importance of omitted variables compared to the variables we can control for, following a methodology proposed by Altonji et al. (2005) and modified by (Bellows and Miguel (2009)). We derive the estimate of the importance of omitted variables compared to observed controls by examining the changes in the magnitude of β , the effect of the DEAMS in (1), as the controls are added. In the case of the young women in larger cities, this unobservables would have to account for at least 3.25 times as much as the observables. While we acquiesce that there are surely unobservables we cannot account for, we do not expect these to have so great an impact as our large selection of controls.

We rely on qualitative research in Pernambuco, a state in the North East of Brazil, to hypothesize which may be the channels behind these differences in impacts across groups. Qualitative interviews with victims and service providers in both a large city and three smaller ones reveal a number of primary barriers faced by women in breaking the cycle of violence. We summarize findings here; more detail can be found in the official report (Muller et al., 2013).

First, as posited in the theoretical discussion at the beginning of the paper, many victims are economically dependent on the perpetrators. In the situation of the lack of economic opportunities and an income of their own – or at least an income of their own that would suffice to bring up their children – they do not see a viable outside of marriage option. This economic disempowerment and lack of alternatives makes them endure the situation. Many women, particularly in more

remote areas, are confined to the private sphere and lack income that would suffice to bring up their children. Service providers add that not only the income plays an important role but also are many of the victims afraid they would lose other assets such as squatting rights to their house or inheritance privileges.

Another key barrier identified in the interviews but less assessed within the economic literature is social norms. Brazilians indicated that norms approve of a toleration of abusive relationships and to not separate from a husband once married; searching for an option outside marriage is carried with social stigma. Women victims feel ashamed for their situation oftentimes, and some even declare themselves to be partially responsible for the abuse. Culture can promote a separation of private conflicts from the public space, as in the common saying “In a fight between husband and wife, no one should introduce a spoon,”⁹ meaning not to get involved. At times, family and friends can even play an active role in convincing women to endure abusive relationships. Upon revealing sexual abuse to her sister-in-law a woman was informed that sex is a duty, the nature of marriage; the sister-in-law herself had been in the same situation. One woman’s family trivialized her abuse and appealed to her role as mother as justification to return home to her husband. Several service providers indicated this is a common experience. Victims might perceive the abuser as a bad husband but at the same time as an excellent father and they do not want to be responsible for a potential separation of their children from him.

Finally, there remains a fear of retaliation. It is particularly strong in communities that are economically strained; budget for the police force is thin, and trust in it is already weak (e.g. some victims have indicated the ineffectiveness of restraining orders). One woman’s partner had already been taken in twice by the police, once when he was breaking things in the house and the second for almost killing her with a knife. However the first time he was released after two days and the second time after four days when his mother paid the bond. As mentioned early in the paper, effective implementation of the police services and coordination with the justice system is crucial to their success.

All these barriers are harder to overcome outside of metropolitan areas, where economic opportunities tend to be more scant, social norms are more traditional, public financial resources are not as ample, and distances to service centers are often farther. Similarly, these barriers may

⁹ *Em briga de marido e mulher, ninguém deve meter a colher*

be lower for younger women, whose circles of friends may adhere less to traditional social norms, who may not yet have children or have fewer children, thus needing lower income to survive, or possibly even have more energy for finding employment or engaging in entrepreneurial activities.

6. Policy discussion and conclusions

This paper attempts to estimate the impact of women's police stations in Brazil – DEAMs – on one of the manifestations of domestic violence – homicide rate among women aged 15 to 49. The high fraction of deaths in this age group due to domestic violence makes this indicator the best available proxy for domestic violence. Given that police stations staffed by women are becoming an increasingly popular element in the national anti-domestic policy programs in a number of countries, the authors hope to provide useful and relevant inputs into the policy discussions.

We hope one of the first policy goals will be to work to improve data on domestic violence. First, as we rely on the data on homicides only, we are unable to say anything about the effectiveness of the women police stations with respect to lesser aggressions. We are testing an impact on only the most violent form of domestic violence and are not be able to provide any evidence of DEAM's effectiveness (or lack thereof) in managing non-fatal forms of domestic violence. The homicide variable is a noisy outcome, as well, as we cannot distinguish intra-familial violence from violence outside the home. Likewise, homicide reporting is an issue. We recall that our sample covers only 35% of the country, those with best practices in data reporting. We cannot say if our results would be applicable to the rest of the country; we are agnostic about how homicide data administration and DEAM effectiveness may be related.

In spite of these data challenges, while we do not find an association between female homicide and establishment of DEAMs on average, DEAMs appear to have strong effects in some groups of women: among women living in larger metropolitan areas and among younger women (aged 15 to 24). Notably, the effects are the highest among young women living in metropolitan areas: establishment of a DEAM triggers a reduction in homicide rate roughly amounting to 70 percent of average homicide rate in that group.

A combination of a heterogeneity analysis with qualitative interviews suggests a number of potential areas of improvement in the administration of DEAMs and anti-Domestic Violence policy more generally. To make DEAMs as effective for overall populations as they are for young urban women, measures addressing social stigma and facilitating women's economic autonomy

may be needed, as well as making DEAMs more accessible outside urban settings. There are a number of policy options that could be used to reach this end. Policies and programs facilitating economic autonomy of women, such as trainings and productive inclusion programs, as economic dependence has been sited among the dominant barriers for breaking the cycle of violence.

Most service providers to women victims of domestic violence interviewed in the study emphasize the importance of education as a long term solution. In addition to helping adults to cope with and overcome prejudices, education can diminish the problem in the future if it is addressed to children as well. At this point, these are just ideas of directions for possible follow-up policies that women and service providers have identified as potentially useful in reducing domestic violence. That these insights come from those intimately involved in the battle against domestic violence, however, gives them weight. More research, including improving data on domestic violence, needs to be done to evaluate the feasibility and effectiveness of such interventions before an implementation strategy can be developed.

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Table 1

SUMMARY STATISTICS - 2009	mean	sd	min	max	Correlation with	
					Female Homicide Rate	Male Homicide Rate
Female Homicide Rate per 100,000 women 15-49	7.94	9.31	0	270.51		
Male Homicide Rate per 100,000 men 15-49	99.85	69.11	0	459.09		
Women Police Stations	0.61		0	1	0.0436*	0.189***
% Population Female Age 15-49	0.51	0.02	0.3	0.55	0.0646**	0.156***
Population Density	0.05	0.21	0	5.32	-0.0199	-0.0460*
Ratio of % of women voters who finished primary to % of men voters who finished primary	1.14	0.15	0.79	2.13	-0.0132	-0.00250
Per Capita GDP	14.76	11.36	2.05	187.4	-0.0243	-0.0307
Per Capita GDP from Agriculture	0.86	1.74	0	62.09	-0.0619**	-0.150***
Per Capita GDP from industry	3.7	4.74	0.16	77.16	-0.0104	0.0192
Has a Human Rights Council	0.12		0	1	0.0207	0.0622**
Has a Health Council	0.98		0	1	-0.0151	-0.0528*
Has Public Safety Council	0.35		0	1	0.0801***	0.164***
Has Municipal Guard	0.5		0	1	0.0315	0.142***
Per Capita Expenditure on Civil Defense	3.5	20.31	0	279.77	-0.00110	-0.00645
Per Capita Expenditure on Public Security, Information and Intelligence	126.08	122.92	0	1377.11	0.00396	-0.0103
Per Capita Expenditure on other Defense Functions	0.25	2.05	0	31.65	0.00325	0.0182
Per Capita Expenditure for Hospital Assitance	3.18	8.38	0	87.48	0.0118	0.0757***
Per Capita Expenditure on Basic Health	133.61	104.59	0	1303.49	-0.0679**	-0.194***
Per Capita Expenditure on General Health	663.57	299.73	0	3552.61	-0.0821***	-0.182***
Per Capita Expenditure on Other Health	65.4	93.18	0	881.77	-0.0211	0.0677**
Per Capita Expenditure on Social Communication	3.73	6.98	0	106.38	0.000957	0.0472*
Per Capita Expenditure on Human Rights	0.37	2.08	0	72.64	-0.0133	0.0114
Per Capita Municipal Federal Transfer	659.31	303.2	263.68	5244.33	-0.107***	-0.251***
Reais per woman from Bolsa Familia	257.84	197.79	2.62	1134.4	0.0148	0.0475*
Percent of women (15-49) receiving Bolsa Familia	0.26	0.17	0	0.93	0.0211	0.0546*

Summary statistics are for the 2074 Brazilian municipalities with high quality mortality data in every year from 2004-2009 & complete controls in 2009

significant at *5%, ** 1% *** .1%

statistics are weighted by the female population ages 15-49

Table 2: Reverse Causality Check

Women's Police Station Established			
Year & Municipality Fixed Effects		Y	Y
Controls		N	Y
Lagged Female Homicide Rate	Coefficient	0.0032	0.0045
	SE	(0.0070)	(0.0073)
	Adj R2	0.711	0.705
	N	117	117
Lagged Male Homicide Rate	Coefficient	-0.0012	-0.0011
	SE	(0.0009)	(0.0014)
	Adj R2	0.719	0.708
	N	117	117

Municipal-year observations after the first appearance of a DEAM are omitted

Significance levels: +.1 *.05 **.01

All regressions weighted by population, with standard errors clustered by municipality

Sample limited to the 39 municipalities with high quality mortality data who established DEAMS within 2005 & 2009

Each municipality's time series stops at the first year of a DEAM's existence

Table 3: Overall Impact of Women's Police Stations on Homicide Rates

	Female Homicide Rate		Male Homicide Rate	
Year & Municipality FE	Y	Y	Y	Y
Controls	N	Y	N	Y
Coefficient	-0.9369+	-0.8543	-6.6753	-4.3686
Women's SE	(0.5442)	(0.5776)	(8.1455)	(6.8975)
Police Station Adj R2	0.193	0.193	0.776	0.784
N	12059	12059	12059	12059

Significance levels: +.1 *.05 **.01

All regressions weighted by population, male or female ages 15-49, with standard errors clustered by municipality

Sample limited to the 2,126 Brazilian municipalities with high quality mortality data

697 municipal-year observations have been dropped due to incomplete controls

Table 4: Heterogeneous Effects - City Size

	CAPITALS & METROPOLITAIN AREAS				SMALLER CITIES			
	Female Homicide Rate		Male Homicide Rate		Female Homicide Rate		Male Homicide Rate	
Year & Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	N	Y	N	Y	N	Y	N	Y
Coefficient	-2.1125**	-1.3042+	-4.7136	-4.0506	-0.0642	0.1288	-7.9965	-4.8808
SE	(0.6564)	(0.6804)	(11.5390)	(9.7065)	(0.7494)	(0.9227)	(11.0874)	(8.2175)
Adj R2	0.532	0.546	0.843	0.859	0.113	0.114	0.703	0.71
N	916	916	916	916	11143	11143	11143	11143

Significance levels: +.1 *.05 **.01

All regressions weighted by population, male or female ages 15-49, with standard errors clustered by municipality

Sample limited to the 2,126 Brazilian municipalities with high quality mortality data

697 municipal-year observations have been dropped due to incomplete controls

Table 5: Heterogeneous Effects - Ages

	AGE 15-24				Age 25-49			
	Female Homicide Rate		Male Homicide Rate		Female Homicide Rate		Male Homicide Rate	
Year & Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	N	Y	N	Y	N	Y	N	Y
Coefficient	-1.9648	-1.9978	-4.2472	-1.3119	-0.3516	-0.221	-8.2149	-7.2211
Women's SE	(1.6020)	(1.5428)	(11.9428)	(11.3873)	(0.8167)	(0.8540)	(7.4090)	(6.1286)
Police Station Adj R2	0.116	0.118	0.775	0.782	0.122	0.124	0.674	0.683
N	12059	12059	12059	12059	12059	12059	12059	12059

Significance levels: +.1 *.05 **.01

All regressions weighted by population of that age, male or female, with standard errors clustered by municipality

Sample limited to the 2,126 Brazilian municipalities with high quality mortality data

697 municipal-year observations have been dropped due to incomplete controls

Table 6: Heterogeneous Effects - City Size & Ages

Women's Police Station		AGE 15-24				Age 25-49			
		Female Homicide Rate		Male Homicide Rate		Female Homicide Rate		Male Homicide Rate	
Year & Municipality FE		Y	Y	Y	Y	Y	Y	Y	Y
Controls		N	Y	N	Y	N	Y	N	Y
Capitals & Large Met. Areas	Coefficient	-7.2424**	-5.5173**	-3.7888	-1.9491	0.8408	1.3012	-6.9316	-8.4395
	SE	(1.4635)	(1.8944)	(17.4971)	(16.7862)	(0.9423)	(1.1043)	(10.2220)	(8.3609)
	Adj R2	0.389	0.408	0.826	0.841	0.382	0.395	0.794	0.815
	N	916	916	916	916	916	916	916	916
Smaller Cities	Coefficient	1.9568	2.2974	-4.9189	-4.0121	-1.0605	-0.9339	-8.9841	-5.8135
	SE	(1.8920)	-1.9902	(16.0349)	(13.4823)	(1.0409)	(1.0872)	(10.1875)	(7.7675)
	Adj R2	0.059	0.06	0.651	0.657	0.079	0.081	0.602	0.607
	N	11143	11143	11143	11143	11143	11143	11143	11143

Significance levels: +.1 *.05 **.01

All regressions weighted by population, with standard errors clustered by municipality

Sample limited to the 2,126 Brazilian municipalities with high quality mortality data

697 municipal-year observations have been dropped due to incomplete controls