# Replication Paper: Addressing Violence Against Women: The Effect of Women's Police Stations on Police Legitimacy

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## Introduction

In their paper, "Addressing Violence Against Women: The Effect of Women's Police Stations on Police Legitimacy," Abby Córdova and Helen Kras assess the effectiveness of Women's Police Stations (WPS, *Delegacias Especializadas no Atendimento à Mulher*) in Brazil in generating positive policy feedback concerning Violence Against Women (VAW) (Córdova and Kras, 2020). To achieve this, they employ a quantitative model to evaluate whether the presence of a WPS in a municipality is associated with different gendered perceptions of police legitimacy, measured in terms of both trust in the police and perceptions of police effectiveness. To establish a causal inference, the authors enhance the model by incorporating an instrumental variable, suggesting that the presence of WPS in a city indeed causes positive effects on police legitimacy by altering women's perceptions of safety and the institutional responsiveness of governments.

Violence Against Women is a global issue, with at least one in every three women experiencing physical and/or sexual violence at least once in their lifetime (UN Women, 2022). Among the diverse strategies for prevention and mitigation of such violence, some countries have implemented specialized police services, predominantly staffed by women, to protect, investigate, and prosecute offenders (Jubb et al., 2010). The first Women Police Station in the world was established in São Paulo, Brazil, in 1985, and the country maintains

1

the highest number of operational WPS in the region to date (United Nations Women, 2011). While positive impacts have been documented in an expanding body of literature, most findings are qualitative and often lack empirical evidence due to the inherent challenge of isolating the effect of WPS in reducing Violence Against Women.

A crucial factor for the effectiveness of a Women's Police Station (WPS) in a given municipality is its perception as a strong and trustworthy institution, particularly in addressing the significant issue of under-reporting related to Violence Against Women (VAW). According to the UN's World's Women 2015 Trends and Statistics, less than 40% of VAW victims seek help after an incident, with only 10% reporting it to the police (UN, 2015). Bearing this in mind, the authors assess the intervention's effects in terms of trust in the police and perceptions of police effectiveness. They hypothesize that in the presence of a WPS, women would exhibit more positive perceptions of police legitimacy compared to both men and women in municipalities lacking such an institution.

The primary challenge in making such inferences lies in the possibility that municipalities implementing Women's Police Stations (WPS) may have other underlying variables correlated with both the evaluations of police legitimacy (the outcome variable) and the likelihood of WPS implementation (the independent variable). Disregarding these factors in a simple linear regression could lead to biased estimations, known as the problem of omitted variable bias. To address this, the authors initially introduce controls for direct influencers of the issue, such as femicide and homicide rates in the municipality, along with fixed effects at both municipality and individual levels, including socio-demographic characteristics and economic development. However, to establish causality, the authors employ an instrumental variable, as the assignment of which municipalities would establish a WPS was not random. The chosen instrument is the age of the municipality in 1985, the year of the first WPS implementation. This variable is expected to act as a proxy for the municipal government's capacity to implement such a policy, considering the required resources, trained staff, and political motivation.

In this replication paper, my objective is to reproduce the authors' results by compiling publicly available data from 2013 and 2014, including nationally representative public opinion polls (LAPOP 2014) and municipal data published by the Brazilian Institute of Geography and Statistics (IBGE). I will assess the empirical strategy of using an instrumental variable to verify if the main identifying assumptions hold and if it can be considered a credible instrument for inferring the causality of implementing women's police stations in changing women's perceptions of police legitimacy at the municipal level. Additionally, I extend the paper by introducing two new control variables, taking into account state and municipal government evaluations,

drawing similar conclusions as the original results. The paper is organized into sections covering a brief policy background, followed by segments on data, methods, results, and a concluding section.

## Policy Background

Brazil ranks among the countries with the highest femicide rates globally (ONU Mulheres, 2016), which is considered the ultimate form of gender-based violence. Preventing such extreme cases poses a considerable challenge. A major obstacle in addressing violence against women is the low likelihood of incidents being reported by the victims (O'Leary, 2022). The circumstances surrounding these acts of violence may not always be obvious or easily explained, and a shared distrust among female victims often leads them to believe that reporting may not necessarily resolve the issue—in fact, it might exacerbate it.

Several hypotheses contribute to this distrust. Victims may fear that officers and public officials lack the necessary training to provide appropriate assistance, or that biased and stigmatized behavior based on societal gender norms may perpetuate forms of violence. There's also the concern that victims may be coerced into refraining from reporting due to potential negative impacts on their aggressors, thereby challenging the severity and legitimacy of their victimhood. In an effort to address these issues, various countries worldwide have implemented Women Police Stations (WPS), specialized services tailored for female victims where a notable characteristic is the majority of police officers being women (Gattegno, Wilkins, & Evans, 2016).

Brazil holds the distinction of being the first country to implement the Women Police Stations (WPS) policy solution and currently takes the lead in the ranking of WPS in Latin America. The initiative gained traction after vigorous lobbying and advocacy by feminist movements in the 1980s. São Paulo, in response to this activism, established its first WPS in 1985, paving the way for subsequent implementations in various municipalities (Perova & Reynolds, 2017). Presently, there are 492 Women Police Stations in Brazil, reaching only 8% of the total 5,570 municipalities (Agência Brasil, 2019). However, there are no explicit federal guidelines dictating which municipalities should offer such services, making the policy highly contingent on the political will of states and municipalities, as well as the availability of staff and resources. A comparison of municipalities with and without WPS reveals significant differences. Those providing specialized services, on average, have larger populations, a greater presence of civil police stations, and a higher mean GDP per capita, as detailed in the Balance Table 1 in the Appendix—where all differences are statistically significant. Additionally, studies indicate that municipalities with more conservative voters are less likely to adopt anti-VAW policies (Araújo and Gatto, 2021).

Essentially, despite over 80% of Brazilians considering it the most effective government policy to address domestic violence in Brazil, and more than 50% of citizens in cities with Women Police Stations (WPS) being able to identify their locations, the effectiveness of WPS is heavily contingent on perceptions of police legitimacy to encourage reporting (Instituto Patrícia Galvão, 2021). The authors argue that, irrespective of the quality of service provided, the mere presence of a WPS in a municipality is likely to generate positive feedback effects on gendered perceptions of police legitimacy. This is because WPS is a visible and easily locatable policy aimed at preventing Violence Against Women (VAW). Drawing from policy feedback theory, the authors posit that women residing in these cities are more likely to be aware of the existence of such specialized services, potentially leading to a shift in their perceptions of police activity (Sorelle, 2018).

Measuring such an effect and proving its causal relationship is not as straightforward. The implementation of a Women Police Station is not random and likely influenced by various factors, including demographic conditions, resource availability, political motivations, and the severity of the issue in each municipality, such as homicide and femicide rates. With the presence of multiple confounding factors and the challenge of including all potential omitted variables in a simple linear model, the authors have decided to use an instrumental variable to assess the gendered effects of the presence of WPS on police legitimacy through a proxy for municipal government's capacity: the age of a given municipality in 1985, year the first WPS was implemented. The authors are able to define this instrumental variable due to the creation of hundreds of new municipalities following Brazil's new Constitution in 1988. The number of municipalities surged from 4,040 in 1985 to 5,570 in 2023 (Brandt, 2010). These new administrative bodies were primarily established for political reasons, creating jobs and local influence, without having significant power in tax collection and policy implementation. The smallest municipality, for instance, comprises as few as 833 constituents (IBGE, 2014).

# Data

To conduct their analysis, the authors used two main sources of data. The first one was the publicly available report on municipalities, published by the Brazilian Institute of Geography and Statistics (IBGE) in 2014. This database offers comprehensive and detailed information at the municipal and state levels in Brazil, focusing on human resources, communications, education, health, human rights, public safety, food security, sanitary surveillance, and demographics. It comprises information for the 5,570 municipalities and the 27 units of the federation (states). Specifically for this analysis, the variables extracted were: WPS, which is an indicator variable for whether the municipality has such a type of policy implemented; civil police,

an indicator of whether the municipality has at least one civil police station; population size, presented in ranges; an indicator of whether there is violence against women legislation at the municipality; the share of female officers in military and civil police departments at the state level; as well as the GDP per capita.

The second main source of information was the LAPOP Results for Brazil, 2014, which is a nationally representative survey conducted in 107 municipalities (chosen using the probability proportional to size (PPS) method), with 1500 respondents. The Latin American Public Opinion Project (LAPOP) has conducted a periodic study called "The AmericasBarometer" since 2004/05, now covering 34 countries. It follows public opinion trends on democratic values and behaviors, covering topics such as the economy, state capacity, trust in institutions, values, corruption, law, and security (Vanderbilt, 2023). One of the benefits of using the 2014 results is that it allowed the authors to cross its individual-level data on perceptions around police legitimacy with the recently published data from IBGE on municipalities. From this database, they extracted the two main dependent variables: trust in the police and perceptions of police effectiveness.

For the replication paper, I was able to access both datasets and generate most of the necessary variables to conduct the quantitative analysis, as observed in the summary statistics in Tables 2 and 3 in the Appendix, except for two controls they use in their model: homicide rates in 2013 and the average femicide rate between 2009 and 2013. The main reason for this is that the publicly available data published by IBGE differs from the data reported by the authors in their paper, which they extracted from private reports from two studies called "Mapa da Violência" and another report from Instituto Igarapé. Since these variables are only used as controls, in which they use femicide rates in a model and homicide rates for robustness tests, I decided to simply replicate the same data they reported in their paper to maintain consistency and aim for the same results.

In the process of compiling the data to replicate the initial results, I came across some inconsistencies. The first one was that there was a mismatch between the original databases and the authors' merged data. From my investigation, the municipality of Embu das Artes was named after its shorter name, Embu, on the LAPOP results. Due to this naming difference, the authors' final data contained missing values for all municipal-level controls for the answers collected in that municipality. The authors have also decided to transform the negative values of the instrument into zeros, in cases where municipalities were created after 1985. Finally, for the descriptive statistics table presented in their online appendix (Table A2), it seems like municipalities have been merged only by their names and not by their corresponding state. Since there are homonymous cities in Brazil, the data provided is not correctly demonstrating the municipality's information for six cities: Belém - originally from the state of PA but displayed as PB; Campo Grande - originally from

the state of MT but displayed as AL; Conde - from the state of PB but displayed as BA; Itabaiana - from the state of SE but displayed as PB; Rio Branco - from the state of AC but displayed as MT; and Vera Cruz - from the state of BA but displayed as RS.

For replication purposes, I reproduced the same conditions described to generate the same database as the authors originally used to run their models. Once I guaranteed I could get the same outputs, I decided to address the inconsistencies found, only maintaining the decision on converting negative age values of the instrument into 0.

## Methods

In their original paper, Córdova and Kras evaluate three main hypotheses; however, in this replication, I decided to address only the first one since the other two involve a Bayesian mediation analysis that goes beyond the scope of the course. The hypothesis is that having a WPS in a municipality leads to more positive evaluations of police legitimacy among women compared to men and compared to other women where there aren't WPS. To test it, they define two outcome variables: trust in the police and perceptions of police effectiveness. Since both are ordinal variables derived from survey responses on a Likert scale, the authors employ ordered-logistic multilevel models with random effects, accounting for clustering effects at the municipal level and fixed effects at the state level. The following equation demonstrates what the authors would like to measure, in which $Y_{ij}$ is either trust in police or perception on police effectiveness, $WPS_j$ indicates whether there is a WPS in a given municipality $(_j)$, $Gender_i$ indicates whether the individual is a woman, and $X_{ij}$ is a set of controls at the individual and municipal level:

$$Y_{ij} = \beta_0 + \beta_1 WPS_j + \beta_2 Gender_i + \beta_3 WPS_j \times Gender_i + X_{ij} + \epsilon_{ij}$$

As I mentioned previously, estimating this equation leads to an endogeneity issue. Since there might be other factors that both affect gendered perceptions of police legitimacy and the likelihood of a municipality having a WPS, simply running this model leads to incorrect estimates that suffer from omitted variable bias (Clarke, 2005). The first way the authors try to address it is by adding controls to the equation, mostly individual-level demographics, municipal-level data, state fixed effects, and femicide rates (after conducting robustness checks with homicide rates as well).

As an estimation model, the authors chose a two-level ordered logistic multilevel model, accounting for the fact that the outcome variable is ordinal, with trust ranging from 1 to 7 and police effectiveness from 1

to 4. Nevertheless, the main issue of such an approach is that there might still be other observable and unobservable characteristics that affect both the outcome and the independent variable that are missing in the model, biasing the results. To be able to infer a causal relationship for the effect of such a policy, given that the intervention is not assigned randomly to municipalities, it would be necessary to find another source of exogenous variation to explain the implementation of WPS. By doing so, the authors would also rule out the possibility of inverted causality, in which the dependent variable would impact the independent variable. Since they identified that WPS's implementation highly depends on a municipality's political will, the availability of resources, and the provision of specialized training, they hypothesize that local government's institutional capacity can be an important predictor of a municipality having a WPS. Given this assumption, Córdova and Krás decided to use an instrumental variable as a proxy, which is the age of the municipality in 1985- the year when the first WPS was implemented.

The first underlying assumption for this quasi-experimental estimation model is that the instrument must be a strong predictor for the endogenous variable, known as having a strong first stage (Angrist and Krueger, 2001). Given the proliferation of new municipalities in the 1980s in Brazil, with the creation of multiple smaller cities, the authors argue that the older a municipality was in 1985, the higher its likelihood of having implemented a WPS by 2014, since "younger" municipalities are less likely to have the institutional capacity to implement such a policy. Although the authors don't report the F-test for regressing the endogenous variable on the instrument, they report a statistically significant correlation in their appendix. With their regression results, together with the historical context of Brazil, and the specifics of this policy implementation, I argue that it is plausible to assume that the condition of a strong first stage sustains ($corr(X, Y \neq 0)$).

$$PredictedWPS_j = \alpha_0 + \alpha_1 MunicipalityAge1985_{1j} + \alpha_2 Population_{2j} + \alpha_3 GDPpercapita_{3j} + \alpha_4 FemicideRate_{4j} + \delta_j$$

The second identifying assumption is the exclusion restriction, in which the authors argue that, conditional on control variables, the age of a municipality in 1985 can only have gender effects on perceptions of police legitimacy through the probability of a municipality having a WPS. This assumption depends on the understanding that the instrument is an exogenous variable, and its covariance with the error term is zero. Once the instrument is used to predict the likelihood of a municipality having a WPS (first stage), the causal effects can be estimated by the second-stage least squares, in which the independent variable becomes these predicted values instead of the initial endogenous variable. As a result, the coefficients of the following equation would give us the local average treatment effect. It is important to highlight that the gendered

effects on police legitimacy are depicted by the coefficient $\gamma_1$:

$$Y_{ij} = \beta_0 + \beta_1 PredictedWPS_j + \beta_2 Gender_i + \beta_3 PredictedWPS \times Gender_i + X_{ij} + \epsilon_{ij}$$

Although the authors don't elaborate much on the validity of the IV, from the elements mentioned above, it does seem like the age of the municipality in 1985 can be a plausible instrument to assess the gendered effects on police legitimacy through the likelihood of having a WPS, as long as the municipal and state-level controls are contained in the model. The main differences between the municipalities from the survey that contain WPS and the ones that don't can be seen in the Balance Table 4 in the Appendix.

## Estimation and Results

Table 5 in the Appendix reproduces the same results as the summary statistics from the original paper to demonstrate that the assembled data is essentially identical to the data compiled by the authors. First looking at the two-level ordered logistic multilevel models with fixed effects, the authors suggest that although gender doesn't seem to have a statistically significant correlation with trust in police (Model 1), the results indicate that women had, on average, lower levels of perception of police effectiveness (Model 3). Even more importantly, when evaluating the gendered effects of the presence of the WPS, both models reported a statistically significant coefficient on the interaction term, reporting a log-odds of 0.414 for trust in police and 0.453 for perceptions of police effectiveness. Hence, as shown in Table 6 in the Appendix, and reinforced in the replicated results (Table 7), both coefficients suggest a positive and statistically significant relationship (at a 5% significance level) between higher perceptions of police legitimacy for women in municipalities with a WPS.

Looking at the models incorporating the IV, similar, however slightly smaller effects can be observed (Tables 8 and 9 in the Appendix). The coefficient on the interaction term is now 0.391 for trust in the police and 0.450 for perceptions of police effectiveness, both statistically significant at a 5% significance level. The main takeaway is that the causal relationship identified is similar to the one observed from the model with controls and fixed effects. Nevertheless, such a complex model leads to a tricky interpretation of such results and understanding of magnitude, leading the authors to include an analysis in the differences of probabilities of men and women reporting high levels of police legitimacy, comparing municipalities with and without the presence of a WPS. To conclude, they observe that in both dependent variables, having a WPS increases a woman's probability of reporting high levels of police legitimacy by approximately 11 percentage points,

which is a substantial increase.

## Additional Contribution

In their original paper, the authors posited the hypothesis that perceptions of political institutions might exert an influence on perceptions of police legitimacy. To control for it, they introduced presidential approval as a covariate at the individual level, utilizing data derived from the survey results. While the variable exhibits a positive and statistically significant association in all models, I contend that assessing the federal government's evaluation alone may not sufficiently capture the nuanced gendered effects on police legitimacy, as it overlooks the localized impacts of evaluations pertaining to state and municipal governments. In response to this methodological consideration, To address this issue, I conclude that controlling perceptions on local governments could lead us to more precise and unbiased estimates.

As an additional contribution, I propose the inclusion of two variables as controls in the model. First, I opted to utilize a proxy for state government evaluation by exploring the timing of the survey in relation to the electoral run for state government in all states in the same year. In terms of Women's Police Stations (WPS) and public policies, numerous municipalities in Brazil rely on allocated funds from their state governments, which has been a notable factor in the implementation of various specialized women's services in the country (Nelson, 1996). Leveraging data from the Supreme Electoral Court of Brazil (TSE), I assess whether the elected governor represents a continuation of the current government (at the time of the survey) or if they are challenging the incumbent from a different party or coalition (TSE, 2023). This stems from the understanding that a continuation of government could serve as a proxy for positive, or at least neutral, approval ratings at the state level.

Secondly, from the LAPOP Survey results, I also incorporate into the control model fixed effects a variable indicating individual trust in the municipal government, the institution responsible for implementing the Women's Police Stations (WPS) and ensuring citizens are aware of the existence of these services. Instead of using the ordinal variable (ranging from 1 for low trust to 7 for high trust), I created a binary variable designating high trust when values are equal to or greater than 5. While the interpretation of results could potentially benefit from a simpler model, such as a logit or probit estimation method, I chose to maintain the same model as the original authors used for the sake of comparability.

Another aspect I would like to discuss is the similarity between the results from the model with controls and fixed effects and the IV estimation method. Following their analysis, the authors opted to employ the

instrumental approach only as a robustness check, asserting that it serves to demonstrate that the effects obtained in the initial model were not endogenous. The rationale behind the selection of the age of the municipality in 1985 as their instrument was somewhat convincing, as it assessed the validity of the IV assumptions. However, it might still not be as robust as necessary for it to serve as a plausible inference. Hence, it could be the case that using this estimation method makes it more complicated to evaluate the results of an already complex model without significantly contributing to the causal claim. For this reason, to simplify the interpretation, I did not replicate the results using the IV, limiting the model to the two-level ordered logistic multilevel model with controls and fixed effects.

Table 10 in the Appendix displays the results from the inclusion of the two proxy variables for state and municipal government perceptions, using the database addressing the inconsistencies explained in the Data section. In the new model, the interaction between having a Women's Police Station (WPS) and gender remains positive and statistically significant at a 5% significance level, slightly exceeding the previous co-efficients for trust in the police (now 0.43) and remaining unchanged for perceptions of police effectiveness (0.45). These results affirm the conclusion regarding gendered effects of the presence of WPS on both forms of police legitimacy. The variable on high trust in municipal government is also positive and statistically significant (0.823 for trust and 0.48 for police effectiveness), both surpassing the coefficients on presidential approval ratings, which still remains a positive and statistically significant variable. Nevertheless, the new variable on state government continuation post-elections is not statistically significant. A more effective measure could involve incorporating an individual-level variable on governor's evaluation, but such data wasn't collected in the survey.

## Conclusion

This replication paper aims to reproduce and extend the findings of Córdova and Kras in their study on the effect of Women's Police Stations (WPS) on gendered perceptions of police legitimacy in Brazil (Córdova and Kras, 2020). It delves into the urgent need for public policies to prevent and reduce Violence Against Women around the world and explores the potential solution of specialized services provided for women who are under violent circumstances. It addresses the pressing need for global public policies to prevent and mitigate Violence Against Women, exploring specialized services as potential solutions for women facing violent circumstances. Focusing on Brazil, the authors employ the timing of the first WPS implementation alongside the proliferation of municipalities after the 1988 Constitution as an instrument to assess the services' impact on police legitimacy.

By assembling the data the authors used in the original paper and evaluating their premises for their models, I concluded that, while the rationale behind the choice of the instrument, the age of the municipality in 1985, satisfies the identifying assumptions of an Instrumental Variable (IV) method, it lacks full plausibility. Nevertheless, it corroborates with the regression control and fixed effects results, suggesting that the presence of WPS in a given municipality is expected to generate positive feedback effects in women's perceptions of police legitimacy. If this effect holds, increasing the prevalence of WPS across states and municipalities could potentially enhance female trust in police institutions, leading to higher reporting of Violence Against Women cases.

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# Appendix

**Balance Table 1: Differences Between Municipalities With and Without WPS (IBGE total 5,570 municipalities)**

| Variable | Mean Diff. | Mean No WPS | Mean WPS | P-value |
|---|---|---|---|---|
| Pop in 2014 | -244783.195 | 17032.939 | 261816.134 | 0 |
| Civil Police Station | -0.248 | 0.750 | 0.998 | 0 |
| Share Women Military Police | -0.004 | 0.095 | 0.099 | 0 |
| Share Women Civil Police | -0.013 | 0.257 | 0.270 | 0 |
| GDP per Capita in 2010 | -8397.900 | 12126.843 | 20524.743 | 0 |

**Table 2: Summary Statistics with Author's Data on Municipalities from LAPOP Survey per State**

| State | Municipality | Women's Police Station | VAW Legislation | Population Size (2014) | Gross Domestic Product Per Capita (2010) |
|---|---|---|---|---|---|
| Alagoas | 2 | 0 | 0 | 11443.5 | 4015.980 |
| Amapá | 1 | 1 | 0 | 446757.0 | 13106.210 |
| Amazonas | 4 | 2 | 0 | 542434.2 | 12249.810 |
| Bahia | 4 | 2 | 1 | 894052.5 | 8970.442 |
| Ceará | 4 | 2 | 1 | 704581.8 | 10890.825 |
| Distrito Federal | 1 | 1 | 0 | 2852372.0 | 58489.460 |
| Espírito Santo | 2 | 1 | 0 | 188508.5 | 42580.975 |
| Goiás | 8 | 3 | 0 | 259668.8 | 13327.350 |
| Maranhão | 3 | 2 | 1 | 449480.0 | 10071.213 |
| Mato Grosso | 4 | 2 | 0 | 199097.8 | 16788.490 |
| Mato Grosso do Sul | 2 | 2 | 1 | 77504.0 | 21478.070 |
| Minas Gerais | 11 | 5 | 0 | 324919.2 | 22423.988 |
| Paraná | 4 | 2 | 1 | 608730.5 | 19733.235 |
| Paraíba | 5 | 1 | 0 | 169795.8 | 8255.818 |
| Pará | 5 | 2 | 1 | 159607.4 | 7354.218 |
| Pernambuco | 5 | 4 | 3 | 599775.8 | 11941.586 |
| Rio Grande do Norte | 2 | 2 | 0 | 549013.5 | 13269.175 |
| Rio Grande do Sul | 11 | 4 | 3 | 224626.8 | 21141.909 |
| Rio de Janeiro | 7 | 4 | 0 | 1190778.1 | 19726.941 |
| Rondônia | 2 | 1 | 0 | 265610.0 | 14529.835 |
| Roraima | 1 | 1 | 0 | 314900.0 | 16393.480 |
| Santa Catarina | 4 | 2 | 1 | 179544.2 | 21620.710 |
| Sergipe | 2 | 0 | 0 | 20399.0 | 20958.685 |
| São Paulo | 12 | 9 | 2 | 1310357.5 | 26182.216 |

**Table 3: Summary Statistics with Replicated Data on Municipalities from LAPOP Survey per State**

| State | Municipality | Women's Police Station | VAW Legislation | Population Size (2014) | Gross Domestic Product Per Capita (2010) |
|---|---|---|---|---|---|
| Alagoas | 2 | 0 | 0 | 11443.5 | 4015.980 |
| Amapá | 1 | 1 | 0 | 446757.0 | 13106.210 |
| Amazonas | 4 | 2 | 0 | 542434.2 | 12249.810 |
| Bahia | 4 | 2 | 1 | 894052.5 | 8970.442 |
| Ceará | 4 | 2 | 1 | 704581.8 | 10890.825 |
| Distrito Federal | 1 | 1 | 0 | 2852372.0 | 58489.460 |
| Espírito Santo | 2 | 1 | 0 | 188508.5 | 42580.975 |
| Goiás | 8 | 3 | 0 | 259668.8 | 13327.350 |
| Maranhão | 3 | 2 | 1 | 449480.0 | 10071.213 |
| Mato Grosso | 4 | 2 | 0 | 199097.8 | 16788.490 |
| Mato Grosso do Sul | 2 | 2 | 1 | 77504.0 | 21478.070 |
| Minas Gerais | 11 | 5 | 0 | 324919.2 | 22423.988 |
| Paraná | 4 | 2 | 1 | 608730.5 | 19733.235 |
| Paraíba | 5 | 1 | 0 | 169795.8 | 8255.818 |
| Pará | 5 | 2 | 1 | 159607.4 | 7354.218 |
| Pernambuco | 5 | 4 | 3 | 599775.8 | 11941.586 |
| Rio Grande do Norte | 2 | 2 | 0 | 549013.5 | 13269.175 |
| Rio Grande do Sul | 11 | 4 | 3 | 224626.8 | 21141.909 |
| Rio de Janeiro | 7 | 4 | 0 | 1190778.1 | 19726.941 |
| Rondônia | 2 | 1 | 0 | 265610.0 | 14529.835 |
| Roraima | 1 | 1 | 0 | 314900.0 | 16393.480 |
| Santa Catarina | 4 | 2 | 1 | 179544.2 | 21620.710 |
| Sergipe | 2 | 0 | 0 | 20399.0 | 20958.685 |
| São Paulo | 12 | 9 | 2 | 1310357.5 | 26182.216 |

**Balance Table 4: Differences Between Municipalities With and Without WPS (LAPOP Survey)**

| Variable | Mean Diff. | Mean No WPS | Mean WPS | P-value |
|---|---|---|---|---|
| Population | -2030603.111 | 36806.250 | 2067409.361 | 0.000 |
| Civil Police Station | -0.077 | 0.923 | 1.000 | 0.000 |
| Share Women Military Police | -0.002 | 0.096 | 0.098 | 0.124 |
| Share Women Civil Police | 0.000 | 0.274 | 0.274 | 0.965 |
| GDP per Capita in 2010 | -14307.877 | 11538.753 | 25846.630 | 0.000 |
| Femicide Rate | 0.174 | 4.940 | 4.766 | 0.369 |

**Table 5: Comparative Summary Statistics**

| Variables | Original Results | Results Replication |
|---|---|---|
| Mean trust in the military police | 3.8 | 3.7553476 |
| Level of trust lower or equal to 4 points | Above 50% | 0.6250000 |
| Trust higher or equal to 5 points | 0.375 | 0.3750000 |
| Trust equal to 7 points | 0.12 | 0.1203209 |
| Mean perception of Police Effectiveness | 2.3 | 2.3351315 |
| Dissatisfaction with Police Performance | 0.41 | 0.4093333 |

**Table 6: Original Results for Model with Controls**

**Table 1.** Gendered Effects of Women's Police Stations (WPS) on Police Legitimacy.

| | Trust in the police | | Perception of police effectiveness | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Gender (1 = female; 0 = male) | 0.103 | −0.141 | −0.219* | −0.322 |
| | (0.097) | (0.204) | (0.110) | (0.235) |
| WPS (1 = yes; 0 = no) | 0.324 | 0.115 | 0.332 | 0.108 |
| | (0.222) | (0.241) | (0.334) | (0.353) |
| WPS × Gender | | 0.414* | | 0.453* |
| | | (0.191) | | (0.219) |
| Femicide rate | −0.003 | −0.002 | 0.015 | 0.036 |
| | (0.024) | (0.028) | (0.037) | (0.042) |
| Femicide rate × Gender | | −0.001 | | −0.037 |
| | | (0.029) | | (0.034) |
| *Municipal-level controls* | | | | |
| Regular police station (1 = yes; 0 = no) | −0.177 | −0.198 | 0.644 | 0.673 |
| | (0.452) | (0.451) | (0.651) | (0.652) |
| Population size | −0.121[†] | −0.122[†] | −0.190[†] | −0.194[†] |
| | (0.066) | (0.066) | (0.102) | (0.102) |
| Log (Gross Domestic Product per capita) | −0.200 | −0.194 | −0.236 | −0.236 |
| | (0.131) | (0.131) | (0.195) | (0.196) |
| *Individual-level controls* | | | | |
| Crime victimization (1 = yes; 0 = no) | −0.314* | −0.319* | −0.789*** | −0.806*** |
| | (0.131) | (0.132) | (0.149) | (0.149) |
| Presidential approval | 0.364*** | 0.367*** | 0.360*** | 0.363*** |
| | (0.051) | (0.051) | (0.057) | (0.057) |
| Police officer asked for a bribe | −1.066*** | −1.058*** | −0.624* | −0.618* |
| | (0.244) | (0.244) | (0.263) | (0.263) |
| Educational level | −0.037* | −0.036* | −0.024 | −0.020 |
| | (0.015) | (0.015) | (0.018) | (0.018) |
| Household wealth | 0.027 | 0.023 | 0.009 | 0.003 |
| | (0.042) | (0.042) | (0.049) | (0.049) |
| Age | 0.007[†] | 0.007[†] | 0.005 | 0.005 |
| | (0.004) | (0.004) | (0.005) | (0.005) |
| No. of children | 0.022 | 0.025 | 0.078* | 0.084* |
| | (0.031) | (0.031) | (0.037) | (0.037) |

*(continued)*

**Table 6: Original Results for Model with Controls - cont.**

17

**Table 1. (continued)**

| | Trust in the police | | Perception of police effectiveness | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Married or with partner (= 1; 0 = single) | −0.202 | −0.202 | −0.133 | −0.138 |
| | (0.123) | (0.123) | (0.140) | (0.140) |
| Divorced, separated, or widow | −0.052 | −0.059 | 0.245 | 0.239 |
| | (0.201) | (0.202) | (0.235) | (0.235) |
| Urban (= 1; 0 = rural) | −0.246 | −0.252 | 0.199 | 0.193 |
| | (0.192) | (0.192) | (0.280) | (0.281) |
| Indigenous (= 1; 0 = White) | 0.131 | 0.134 | −0.455 | −0.440 |
| | (0.314) | (0.314) | (0.375) | (0.376) |
| Black (= 1; 0 = White) | 0.060 | 0.058 | 0.038 | 0.036 |
| | (0.168) | (0.168) | (0.192) | (0.192) |
| Mulato (*Pardo*) | −0.040 | −0.034 | −0.091 | −0.089 |
| | (0.121) | (0.121) | (0.140) | (0.141) |
| Other (= 1; 0 = White) | 0.079 | 0.085 | −0.412 | −0.433 |
| | (0.272) | (0.270) | (0.315) | (0.315) |
| No. of municipalities | 106 | 106 | 106 | 106 |
| No. of Observations | 1,439 | 1,439 | 1,427 | 1,427 |

Two-level ordered logistic multilevel models. Fixed effects at the state level included.
†$p < .10$. *$p < .05$. ***$p < .001$ (standard errors in parenthesis).

**Table 7: Replicated Results for Model with Controls**

| Indep. Variables | Trust in Police | | Perception of police effectiveness | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Gender (female = 1) | 0.1034 | -0.1415 | -0.2193* | -0.3216 |
| WPS (yes = 1) | 0.3236 | 0.1150 | 0.3319 | 0.1081 |
| WPS x Gender | | 0.4136* | | 0.4530* |
| Femicide rate | -0.0029 | -0.0022 | 0.0148 | 0.0364 |
| Femicide x Gender | | -0.0006 | | -0.0366 |
| Regular police station (yes = 1) | -0.1766 | -0.1976 | 0.6442 | 0.6725 |
| Population Size | -0.1207 | -0.1223 | -0.1903 | -0.1938 |
| Log (GDP per capita) | -0.1999 | -0.1937 | -0.2360 | -0.2355 |
| Crime victimization (yes = 1) | -0.3138* | -0.3195* | -0.7894*** | -0.8060*** |
| Presidential Approval | 0.3643*** | 0.3665*** | 0.3595*** | 0.3629*** |
| Police officer asked for a bribe | -1.0659*** | -1.0581*** | -0.6242* | -0.6184* |
| Education level | -0.0370* | -0.0357* | -0.0235 | -0.0203 |
| Household wealth | 0.0272 | 0.0228 | 0.0089 | 0.0032 |
| Age | 0.0068 | 0.0068 | 0.0049 | 0.0047 |
| No. of children | 0.0219 | 0.0247 | 0.0775* | 0.0835* |
| Married or with partner | -0.2015 | -0.2020 | -0.1329 | -0.1375 |
| Divorced, separated, or widowed | -0.0515 | -0.0585 | 0.2446 | 0.2386 |
| Urban | -0.2461 | -0.2516 | 0.1986 | 0.1931 |
| Indigenous | 0.1307 | 0.1338 | -0.4550 | -0.4399 |
| Black | 0.0595 | 0.05777 | 0.0378 | 0.0362 |
| Pardo | -0.0397 | -0.0339 | -0.0906 | -0.0894 |
| Other | 0.0787 | 0.0851 | -0.4123 | -0.4325 |
| No. of municipalities | 106 | 106 | 106 | 106 |
| No. of Observations | 1,439 | 1,439 | 1,427 | 1,427 |

**Table 8: Original Results for Model with Instrumental Variable**

|  | Dependent Variable: Trust in the Police Model 1 | Dependent Variable: Perception Police Effectiveness Model 2 |
|---|---|---|
| Women Police Station (WPS) (1=Yes; 0=No) | 0.077 | 0.054 |
|  | (0.248) | (0.348) |
| Gender (1=female; 0=male) | -0.117 | -0.447** |
|  | (0.147) | (0.170) |
| WPS x Gender (1=female; 0=male) | 0.391* | 0.450* |
|  | (0.190) | (0.217) |
| Femicide Rate | -0.004 | 0.029 |
|  | (0.020) | (0.029) |
| Population Size | -0.127+ | -0.138 |
|  | (0.068) | (0.099) |
| Log(Gross Domestic Product per capita) | -0.157 | -0.081 |
|  | (0.127) | (0.165) |
| Crime Victimization (1=Yes; 0=No) | -0.329* | -0.790*** |
|  | (0.131) | (0.147) |
| Presidential Approval | 0.373*** | 0.354*** |
|  | (0.051) | (0.056) |
| Police Officer Asked for a Bribe | -1.067*** | -0.598* |
|  | (0.242) | (0.260) |
| Education Level | -0.039** | -0.028 |
|  | (0.015) | (0.017) |
| Household Wealth | 0.031 | 0.004 |
|  | (0.040) | (0.047) |
| Age | 0.006* | 0.010** |
|  | (0.003) | (0.004) |
| Estimation Method | Ordered logit | Ordered logit |

**Table 9: Replicated Results for Model with Instrumental Variable**

| Indep. Variables | Trust in Police Model 1 | Perception of police effectiveness Model 2 |
|---|---|---|
| Predicted WPS (yes = 1) | 0.077 | 0.054 |
| Gender (female = 1) | -0.117 | -0.447** |
| Predicted WPS x Gender | 0.391* | 0.450* |
| Femicide rate | -0.004 | 0.029 |
| Population Size | -0.127 | -0.138 |
| Log (GDP per capita) | -0.157 | -0.081 |
| Crime victimization (yes = 1) | -0.329* | -0.790*** |
| Presidential Approval | 0.373*** | 0.354*** |
| Police officer asked for a bribe | -1.067*** | -0.598* |
| Education level | -0.039** | -0.028 |
| Household wealth | 0.031 | 0.004 |
| Age | 0.006* | 0.010** |

**Table 10: Extended Model Adding Controls for State Government Continuation in 2014 Elections and High Trust in Municipal Government**

| Main Indep. Variables | Trust in Police Model 1 | Perception of police effectiveness Model 2 |
|---|---|---|
| WPS (yes = 1) | 0.0536 | 0.0137 |
| Gender (female = 1) | -0.0176 | -0.3515 |
| WPS x Gender | 0.4292* | 0.4515* |
| Femicide Rate | -0.0074 | 0.0315 |
| Femicide Rate x Gender | -0.0152 | -0.0294 |
| Civil Police Station | -0.1946 | 0.8644 |
| Population Size | -0.1061 | -0.1431 |
| Log (GDP per capita) | -0.1777 | -0.1840 |
| Crime victimization (yes = 1) | -0.2460 | -0.8320* |
| Presidential Approval | 0.2212* | 0.2903* |
| Cont. State Government 2014 Election | -0.1040 | -0.1554 |
| High Trust in Municipal Government | 0.8265* | 0.4787* |
| Police officer asked for a bribe | -1.0346* | -0.5401* |