Gender parity regulation and the changing faces of women's executive power in Mexico

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Abstract

Mexico approved a major constitutional reform in 2014 which resulted in a gender parity requirement at the municipal executive level. We exploit time and spatial variation to analyze the extent to which this reform impacted the probability of female municipal presidents being elected. Using a differences-in-differences methodology, we show that parity rules had immediate significant positive effects; moreover, our further analyses demonstrate that the effects are lasting. We also explore whether this new legal environment affected various measures of municipal spending and tax collection. We find that the parity rules are associated with more fiscally conservative municipal budgeting. This is consistent with the entry of fiscally conservative women after the introduction of the gender parity rules, which could be explained by parties with fiscally liberal views nominating women relatively more often prior to the reform.

Keywords: Public finance, Gender quotas, Women in politics, Development

1 Introduction

Involving women in politics is a key goal of many activists and policymakers, not only for the explicit purpose of achieving gender parity in the political realm but also because women lawmakers bring unique perspectives and focuses to their lawmaking. As such, research has shown that female politicians zero in on issues most likely to affect women (Pande, 2003); (Chattopadhyay & Duflo, 2004). Many countries have implemented electoral laws regarding gender parity as part of an effort to increase women's political participation. [1] In the case of Mexico, the gender equality movement has made significant reforms to advance this goal at the national and sub-national levels.

In this paper, we will document the successes – and shortcomings – of the gender parity reforms in Mexican electoral law at the municipal level. We focus on the effects of the imposition of political gender quotas and the consequences of these rules on women in politics and their actions compared to those of their male colleagues. In an important addition to the literature, we look specifically at *local* executives, who have their ears closest to the ground and make budget decisions most likely to affect residents' daily lives.

Previous research has mainly focused on the effects of gender quotas on national legislative policies, but there has been less investigation into their impact on local government executive positions. Even with quotas in place, women are still underrepresented in leadership roles within local government. Despite progress in political representation, women continue to face obstacles in achieving higher positions of power. The United Nations reports that women are less likely to hold influential positions compared to their representation in deliberative bodies. For example, in Europe in 2019, the percentage of women serving as municipal mayors was only half that of women serving as councilors - 15% versus 30%.

Furthermore, to what extent gender quotas are effective is still an unsettled research question. For instance, Krook (2016) shows that after a quota introduction, there is a significant gap between the quota requirements and electoral outcomes. Similarly, Hughes et al. (2019) find that despite quotas increasing women's participation, there is a substantial delay between gender quota adoption and gender quota implementation.

In contrast, Clayton and Zetterberg (2018) use a time-series cross-sectional data set from 139 countries and find that during the first election cycle, on average, women's participation nearly doubled. Along the same lines, Paxton and Hughes (2015) use data on 145 countries from 1990 to 2010 and conclude that there is a path of increasing effectiveness of gender quotas, which can be explained by countries learning which policies are most effective.

Schwindt-Bayer (2009) explains that initial evidence suggests that many gender quota laws have had little effect. However, the author concludes that the most effective gender quotas are the ones that require more women candidates to be on party ballots, independent of placement mandates and enforcement mechanisms, suggesting that the implementation mechanism matters. This is particularly important in our context because, as we will explain

[1] According to the International Institute for Democracy and Electoral Assistance, there are 70 countries with legislated candidate quotas in the lower or single house.

later, Mexican municipalities have different gender parity implementation mechanisms.

By discussing the evolution and specificity of gender quotas in Mexico, our paper will shed light on whether gender quota adoption effectively increases female participation in differing contexts. Additionally, our findings will contribute to a better understanding of how specific implementation mechanisms can produce different results. For example, we will show that "horizontal" gender quotas, requiring parity across municipalities in nominated candidates, do significantly better than "vertical" quotas, which require parity only within a municipality.

Besides the numeric efficiency of gender quotas, another strain of literature has focused on how gender quotas can affect or influence specific policies. Some studies have found that female politicians report more concern about particular outcomes. For instance, Chattopadhyay and Duflo (2004) find potable water is a priority for women in rural India, and village councils where women have reservation seats increased their investment in access to this public good. Furthermore, Bhalotra and Clots-Figueras (2014) use representative data samples from India and find that higher women's political representation in state legislatures improves the public provision of antenatal and childhood health services.

In contrast to most research on the influence of female leadership, Ferreira and Gyourko (2014) find no effect of the gender of the mayor on policy outcomes related to the size of local government, the composition of municipal spending and employment, or crime rates. Furthermore, Brulé (2020) examines the effect of reservations for women council leaders on the likelihood that daughters will inherit family land, and she finds a negative effect. Reservations decreased daughters' inheritance because male heirs now fought their married sisters' claims more often in reserved villages anticipating that women councilors would be more likely to enforce female legal rights to inherit the land.

In this regard, our research will contribute to this literature by evaluating similar outcomes and adding new policy areas that women prefer. With detailed budget data, we can look at the evolution of municipal spending patterns as new presidents are inaugurated. We can focus on specific areas of spending that may matter more to women, like public lighting, transit, or safety. With additional data, we hope to study also effects like sexual assault prevention and awareness and femicides.

Other strains of literature have examined the different ways women develop their careers in politics. In this sense, O'Brien and Rickne (2016) argue that places where gender quotas for legislators have a significant impact, have a higher likelihood of selecting female executives. That is, gender quotas may both get women into the office and start them on a long political career.

Women also interact differently as politicians. For example, Clayton (2021) cites different papers that find that women are more likely to co-sponsor legislation with other women than with men and that quotas may increase the likelihood of cross-party alliances between women. The author also states that women politicians engage more with feminist civil society.

Our paper contributes to these strains of literature in multiple ways. First, many of the aforementioned studies have focused on *legislators* at the *federal* level. Our study differs as it focuses on *executives* at the *local* level – those politicians with the most power to affect

daily life. Our study adds to the literature studying the impact of gender quotas on women's political participation and economic outcomes. To our knowledge, our paper is the first such paper in the economics literature to study this in the Mexican context. Finally, we add to previous literature describing the way women interact with the political system, with our study providing additional detail on the interaction between federal, state, and local governments.

2 Background

Mexico has spent at least three decades exploring methods to increase gender parity in political representation. Notably, a significant constitutional reform occurred in February 2014, when Mexico adopted a gender parity principle –50% rule– for all state and federal legislative candidates. This change intended to alleviate the problem of underrepresentation of women during previous quota systems and to correct some loopholes; for instance, this time, parties were not allowed to nominate women exclusively to losing districts.

Importantly, this reform did not explicitly impose gender quotas or specific rules for municipality elections. However, given that it included rules for state legislators, each state was required to modify its electoral laws. While doing this, state congresses added different local regulations to implement gender parity during municipal elections. It was the first time gender parity was formally discussed at the municipality level.

2.1 The gender quota system (1993-2014)

Even though 2014 was unprecedented, achieving electoral gender parity has been a long and not always linear historical process. Gender parity at the municipal level was not part of the main reforms until 2014; the main debate was about federal gender quotas.

Mexico formally introduced gender quotas for the first time in 1996. During this time, the Mexican electoral law recommended that all political parties nominate women for at least 30% of their candidates for the federal Congress. However, this was a mere recommendation with no effective sanctions. Furthermore, political parties managed to comply by nominating women in positions nearly impossible to win and listing women as alternates rather than primary candidates (Beer & Camp, 2016).

Six years later, this legal recommendation became a constitutional mandate. In 2002, the 30% quota was mandatory, and, to combat previous loopholes, congresswomen fought to include more specific rules, e.g., preventing the nomination of alternates from counting towards the quota. However, political parties agreed on this reform mainly because it had a significant loophole: positions in single-member districts were exempt from the gender parity principle.

The parties compete for a 500-seat Chamber of Deputies at the federal level. The Chamber of Deputies renews every three years, with 300 deputies elected from single-member districts and 200 deputies selected from five multi-state districts employing closed-list proportional representation. The 2002 reform meant that the 300 deputy positions would not need to fill the 30% quota. Not surprisingly, the under-representation of women continued to be a problem (Kerevel, 2019).

In 2008, even as the 30% quota was increased to 40% for the federal Congress, political parties continued exploiting every possible loophole. The election of 2009 was not an exception: while political parties "complied" by nominating female primary candidates, numerous female winners resigned, giving their seats to their male alternates after the election.

These changes, while not particularly effective during this time, were crucial groundwork for improving women's political involvement. The experience gained formed the basis for future reforms, which eventually would trickle down to the local level.

2.2 The gender parity system (2014-2023)

Despite attempts by some party leaders to limit its effectiveness, the gender quota systems have been expanded, with various loopholes eliminated, thanks to successful advocacy by women activists. In 2012, a group of influential women leaders called *Mujeres en Plural* – including politicians, journalists, academics, activists, and policymakers – brought a class-action lawsuit before Mexico's federal electoral court, which has the final say over election law. The court ruled that gender parity must be implemented without exception, meaning single-member districts could no longer be an exception to the gender quotas. The court also required proportional representation lists to alternate one woman per one man and primary candidates and alternates to be of the same sex. These rules were later included in an electoral reform in 2014.

In 2014, a constitution reform replaced the 40% gender quota with gender parity – 50% rule – for the federal Congress and the state legislatures. This reform was unique because it included the state level and forbade parties to nominate women in losing districts. Since this involved state legislators, each state needed to adapt its local constitutions and electoral laws to the new constitutional mandate.

As part of the legal modifications to comply with the federal Constitution, states require municipal elections to adhere to the gender parity principle. However, unlike the national and local Congress, municipal governments have unique organizational structures. The 2014 constitutional reform did not provide specific rules for local governments, which we will explore further in the next section.

Most recently, a constitutional reform in Mexico was passed in June 2019, with legislators unanimously approving a constitutional amendment mandating gender parity in "everything" – something unprecedented in Latin America. The "parity in everything" rule requires gender parity for all candidates for elected office (at least 50% should be women) at the national, state, and municipal levels. Beyond candidates, the effects of the legislation encompass positions in the judicial, legislative, and executive branches, independent government agencies, and political parties' leadership structures. Although this reform is not included in our analyses, it is a significant step toward better representation of women in politics. We hope to analyze the effects of this reform more fully as more data from this period becomes available.

2.3 Interpretations of gender parity at the municipal level

Gender parity in politics is just as crucial at the local level as it is at the federal level.

Nonetheless, until the 2014 reform, gender parity was discussed mainly at the federal level. This includes the 2014 reform itself, which only included federal and state legislators. That is, municipal governments were not explicitly included in the reform. However, in the new legal framework, states needed to adapt their laws to incorporate the gender parity principle at the legislative level. When doing it, states mimicked the federal Constitution and stated that municipal elections were also subject to gender parity rules. However, exactly how to apply these rules at the local executive level was open to state-by-state interpretation.

Municipal governments have a unique political structure that consists of a deliberative council called a *cabildo*. The *cabildo* is composed of a municipal president (similar to a mayor), a *síndico* who oversees the budget and provides counsel to the president, and several *regidores* who hold legislative power. The number of *regidores* and the extent of the *cabildo's* power vary by municipality. The *cabildo* is typically elected every three years.[2] The method for electing *cabildos* differs by state, with some states using a unified ballot for municipal presidents, *síndicos*, and *regidores*. In contrast, others have proportional rules that assign *regidores* based on each political party's share of votes (Piscopo & Waylen, 2017).

With this complex and varied political structure, the exact gender parity rules that had been used for federal and state legislative positions could not be directly applied to local executive elections. Two concepts were introduced: "vertical" and "horizontal" parity. Vertical parity means that candidates in a single ballot must alternate between genders. For instance, if the municipal president is male, the *síndico* must be female, the first *regidor* male, second *regidor* female, and so on. While this increased women's participation, most parties nominated only men for all municipal presidents, leaving women out of the most critical positions in the *cabildo*. On the other hand, horizontal parity means that each political party in a state must nominate 50% of women for each position, i.e., 50% of municipal president candidates of a given state must be women.

According to a court ruling, states could choose to enforce horizontal parity in their laws, but the Constitution does not require it. Thus, each state's legislative body can choose whether or not to implement horizontal parity in their statutes. On the other hand, the court stated that vertical parity is a constitutional mandate for municipal elections and must be adopted. Therefore, some states have both horizontal and vertical parity rules, while others only have vertical parity in their local laws.

This distinction between horizontal and vertical parity was especially relevant in the 2015 municipal elections, the first round to include the newly mandated parity rules. While all states had added vertical parity to their laws, only some included the horizontal parity principle. Moreover, political parties were unwilling to comply in those states mandating horizontal parity. In these states, political parties challenged the new parity laws before local electoral courts right before the 2015 elections. At that time, Mexico City and 16 states [3] (comprising 1,009 municipalities) were having elections. Of the 16 states, only 7 had horizontal parity in their

[2] A small subset of municipalities use two- or four-year terms

[3] Baja California Sur, Campeche, Chiapas, Colima, Guanajuato, Guerrero, Jalisco, México, Michoacán, Morelos, Nuevo León, Querétaro, San Luis Potosí, Sonora, Tabasco and the Yucatán

laws.

Finally, the electoral authority's ruling stated that political parties must comply with the laws in each state as given. In states with horizontal parity on the books, this implied that some political candidates had to replace their male candidates with female ones for the upcoming election. However, for three states with horizontal parity, elections were close enough to the decision that the court decided that political parties did not need to modify their candidates, and could wait to comply with the horizontal parity rule until the next election in 2018. Therefore, for the 2015 elections, out of 17 states holding elections, three postponed the implementation of horizontal parity, five implemented it, and nine did not have it.

2.4 Municipal gender parity by the numbers

Within this context, this paper focuses on municipal governments – and specifically municipal presidents, the executive arm of the local ("municipal") government. Municipal presidents are perhaps most intimately connected to the day-to-day life of residents. They control the municipality budget and can implement and propose new laws to the municipal legislative body. Additionally, municipal governments spend their budget on public services such as water and sewerage, street lighting, public safety, and traffic. They are also in charge of collecting property taxes and public service user fees.

Yet betterment of female representation at the state and local levels was happening more slowly than at the federal level. That is, the 2014 reform was sorely needed. And, just looking at the raw numbers, it appears to have helped women gain ground, at least somewhat. Between 2011 and 2021, the proportion of female municipal presidents quadrupled (but still remains depressed). In 2019, municipal presidents were still majority male, with women holding only 23% of all these officeships.

Below, figure (1) displays the municipalities with a female president in 2021 (six years after the reform) compared to 2011. Figure (2) shows that while parity varies widely across states, female representation has drastically increased in all states over the time period. Nonetheless, states with even just 40% of female municipal presidents are still the exception. For completeness, Figure (3) provides necessary context by displaying the proportion of the population in a state represented by a female municipal president. [4]

[4]The number of municipalities varies widely by state and is not perfectly correlated with population. For example, Oaxaca state was the tenth-most populous state in 2021, with 568 municipalities. The state of Mexico, on the other hand, was the most populous but only had 125 municipalities.

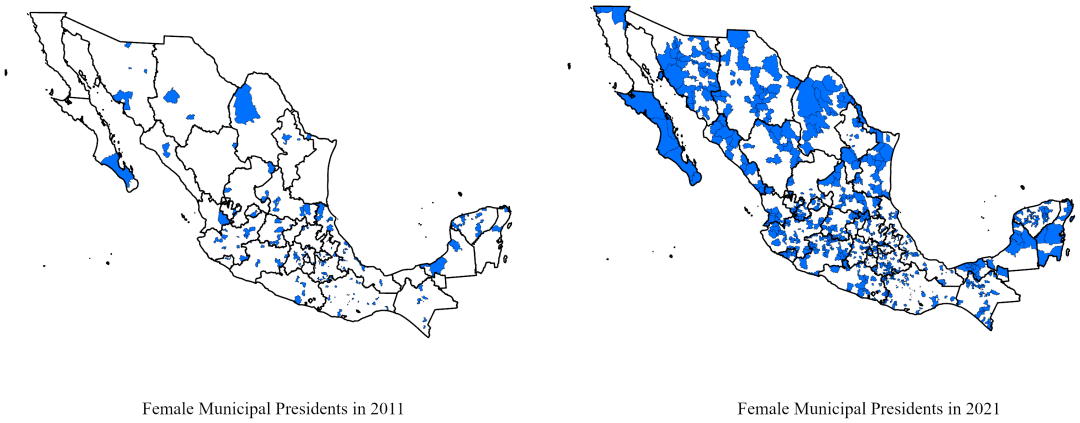

Figure 1: Municipalities with female presidents, 2011 vs 2021

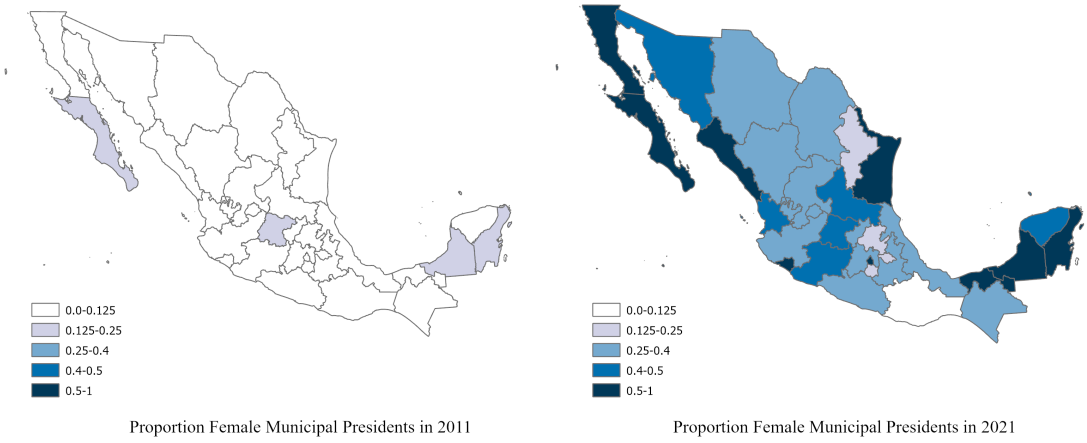

Figure 2: Proportion of female municipal presidents, 2011 vs 2021

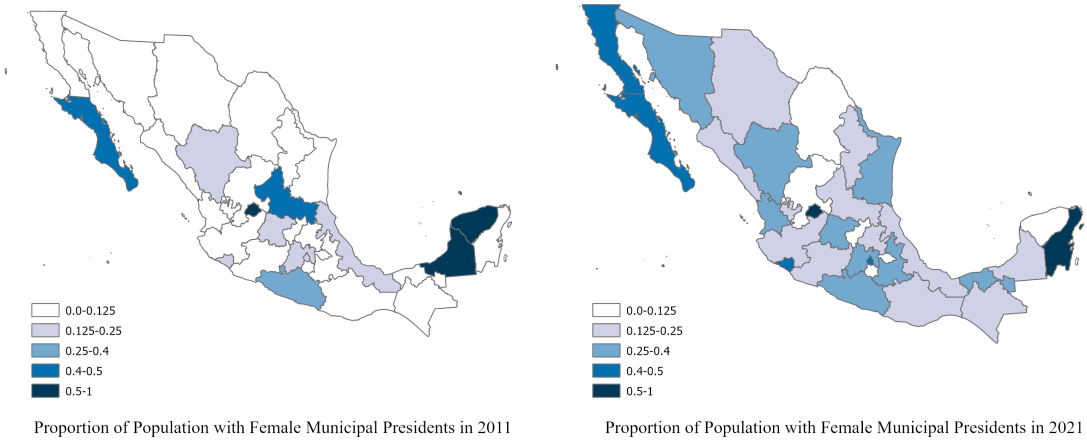

Figure 3: Proportion of population represented by female municipal president, 2011 vs 2021

Key to the increases shown in the maps above was the 2014 reform discussed above. Figure (4) shows the proportion of female municipal presidents over time, and displays a large increase coinciding with the 2014 electoral reform. The proportion of the population with a female municipal president follows this same pattern, indicating that the increase in female representation is not necessarily limited to smaller municipalities.

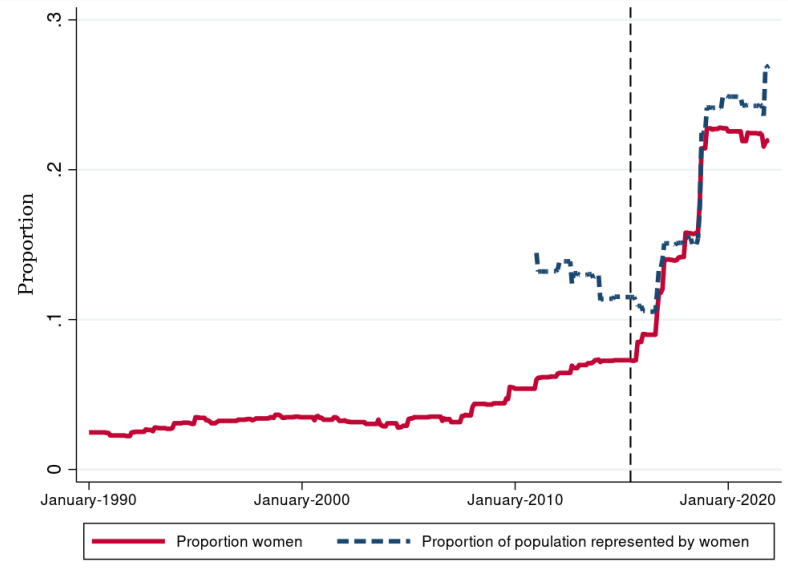

Figure 4: Women as municipal presidents

In this paper, we analyze the effects of this specific reform on municipal elections, as well as other economic outcomes at the municipal level. First, we analyze to what extent this reform impacted the number of female municipal presidents elected. Next, we explore whether this new legal environment affected municipal spending and tax collection.

To implement these analyses, we exploit spatial and time variation to identify these effects (particularly to identify the change in spending and tax collection decisions). The primary spatial variation we will use is the variation in implementation of the horizontal quotas, which we will show are more successful at vaulting women into executive office. For timing variation, we will compare election cycles where some states were effected by the reform and others not, which varies simply by which year the election cycle of a state happens to start on.

3 Description of Data

3.1 Sistema Nacional de Información Municipal (SNIM)

We use data on the history of municipal presidents from SNIM.[5] This data includes municipality, name, gender, and years in office; for portions of the data, exact dates of the term and political party are included. The full data covers the past century, much more than we require for our study.

[5] http://www.snim.rami.gob.mx/

3.2 National Institute of Statistics and Geography (INEGI)

We obtain detailed municipal-level budget data from INEGI, available starting in 1989.[6] This data breaks down the both sides of the municipal balance sheet into various detailed categories. We observe the breakdown of expenses between personnel, capital upkeep, etc.; on the other side of things, we observe (e.g.) revenues gained from the use of services in the public domain, like drinking water, drivers licenses, sanitation, and graveyards.

We also use the "National Municipal Census" provided through INEGI, which contains detailed information on the gender makeup of municipal workers on a biennial basis since 2011.[7]

Finally, we also use demographic and geographic data from INEGI.[8] These data provide important controls for our empirical work, like population and the location, area, and density of municipalities.

3.3 Other data

We also collect the exact dates of both scheduled and special elections from the Instituto Nacional Electoral (INE). INE publishes for every year from 2011 to 2023 the exact days of elections at the national and sub-nacional level, specyfying the number of municipalities that hold elections within each state. [9]

4 Empirical Strategy

4.1 Women's political representation

The initial question in this study is: did decisions regarding gender parity at the municipal level affect women's representation at the highest level of municipal executive power, the president? To study this, we both compare outcomes before and after the implementation of the 2015 rules, and use spatial variation in the ways that the rules were implemented after 2015. The empirical strategies used are presented below, and the results follow in section 5.1.

4.1.1 Event-studies

First, we perform an event study examining the effect of the 2015 court ruling on municipal gender parity. We implement specifications of the following type:

$$Y_{mt} = \beta \, post\_reform + \gamma X_m t + \tau_m + \epsilon_{mt}. \tag{1}$$

In this specification, t represents time (year) and m a municipality. The outcome Y_{mt} is an indicator variable representing whether or not municipality m has a female president in

[6] https://www.inegi.org.mx/programas/finanzas/

[7] In Spanish, the "Censo Nacional de Gobiernos Municipales y Demarcaciones Territoriales de la Ciudad de Mexico". See e.g. the data for 2021 here: https://www.inegi.org.mx/programas/cngmd/2021/

[8] https://www.inegi.org.mx

[9] https://www.ine.mx/voto-y-elecciones/calendario-electoral/

time t. We include controls (e.g. an intercept, population and population density) X with corresponding coefficient vector *gamma*. Finally we include municipality fixed effects τ_m.

Important in this strategy is the choice of time variable. Municipal elections are generally every three years, and happen at the same time within each state. However, states do not have municipal elections in the same year. For example, Coahuila state had municipal elections in 2014 and 2017, whereas Campeche state had municipal elections in 2015 and 2018.

As equation (1) does not account for trends, we also run specifications with trends instead of a dummy variable, as well as the post-reform period interacting with trends.

Finally, we implement an event study that tracks women's representation over the years. The specification is:

$$Y_{mt} = \sum_{i=2011}^{2019} \beta_t \, \mathbb{1}(t = i)_{mt} + \gamma X_{mt} + \tau_m + \epsilon_{mt}. \tag{2}$$

4.1.2 Differences-in-differences - election cycle

We implement two differences in differences strategies to study the immediate effect of the gender quota after or during the 2015 elections. First, recognizing that municipalities across states vote every three years, but in a staggered manner, we compare the municipal elections in 2013 and 2014, which were not affected by the gender parity rule, with the elections in 2015, which were. The specification is equation (3) below:

$$Y_{mc} = \beta \, \mathbb{1}(c = 2013 - 2015)_{mc} \times \mathbb{1}(m \text{ has elections in } 2015)_{mc} + \gamma X_{mc} + \tau_m + \tau_c + \epsilon_{mc}. \tag{3}$$

We run a linear probability differences-in-differences model where the outcome variable is whether a municipality elects a female president. In equation (3), the "pre" and "post" periods of the differences-in-differences specification are the three-year election cycles: 2010-2012 for the pre-period, and 2013-2015 for the post-period. The "treatment" variable is having elections in 2015, when the parity rules were in effect for municipalities. Thus, the differences-in-differences variable is the interaction of the post-period and treatment group variables, attached to the coefficient β in equation (3). We include a vector of control variables (population etc. and a constant) and related coefficients (represented by γX_{mc}, as well as municipality and election cycle fixed effects (τ_m and τ_c).

4.1.3 Differences-in-differences - horizontal vs. vertical parity

We also leverage the differences across states in interpretations of the gender quota rules to explore the outcomes above. As described in the background section, two interpretations of parity exist in Mexican jurisprudence: "vertical" parity, mandating that *within* a jurisdiction there must be an equal number of men and women in office, and "horizontal" parity, mandating that there must be an equal number of men and women in positions *across* jurisdictions. In the 2015 elections, all states implemented vertical parity, but not all implemented horizontal parity, allowing us to compare these two implementations, again using a differences-in-differences

framework and comparing against the previous elections. The specification is equation (4) below:

$$Y_{mt} = \beta \, \mathbb{1}(t = 2015)_{mt} \times \mathbb{1}(m \text{ has horizontal parity rule})_{mt} + \gamma X_{mt} + \tau_m + \tau_t + \epsilon_{mt}. \quad (4)$$

Again, we use a linear probability differences-in-differences model, where the outcome variable is whether a municipality elects a female president. The post-period is the 2015 elections, and treatment is being a municipality in a state that implemented a horizontal parity rule. The relevant coefficient in β in equation (4). We also include a vector of control variables and related coefficients (γX_{mt}), as well as municipality and year fixed effects (τ_m and τ_t).

4.2 Women in executive power and municipal policy decisions

Another important question we attempt to answer is how quotas, and women in politics generally, may change municipal spending patterns. First, we ask if having a woman as municipal president have an effect on municipal policies. Second, we ask if the implementation of the gender parity rules had an effect on municipal policies. Third, we ask if the implementation of the gender parity rules had an effect on how women make policies at the municipal level. With the first question, we explore the classic result that women focus on different policy areas than men. With the second, we hypothesize that increased competition from or exposure to female executives changes policy outcomes regardless of gender. With the final question, we hypothesize that female executives may act differently, or be different themselves, after the implementation of the gender quotas. We explore these interlocking ideas with the empirical strategies below, and report our results in section 5.2.

4.2.1 Differences-in-differences

We use the same framework as in the differences-in-differences specifications introduced above in sections 4.1.2 and 4.1.3. Namely, we leverage the differential treatment introduced by the timing of municipal elections or the spatial variation in horizontal parity rules to investigate the effect of increased presence of female executives on municipal policy outcomes. The specifications are the same as in equation (3) and equation (4), but the outcome variable Y_{mc} or Y_{mt} are a measure of budget or some other policy variable. In this way, these regressions focus on the second question introduced above – does increased competition from and exposure to female politicians and executives affect municipal policy outcomes.

4.2.2 Effect of women executives over time

Our next empirical strategy addresses the first and third questions introduced above, namely the effect of female executive power and how that may have changed after the imposition of the gender quota rules. First, we explore whether having a female executive changes policy decisions in the specification below:

$$Y_{mt} = \beta \, \mathbb{1}(\text{executive in } m \text{ is female})_{mt} + \gamma X_{mt} + \tau_m + \tau_t + \epsilon_{mt}. \quad (5)$$

The outcome variable in equation (5) is again some measure of policy outcomes like portions of the municipal budget. The coefficient of interest, β, is connected to an indicator variable

for whether a municipality m has a female executive in year t. We also include a vector of municipality-time level controls and corresponding coefficients γX_{mt}, as well as municipality and year fixed effects τ_m and τ_t.

We next run a similar specification that explores whether the effect of a female executive changes after the imposition of the gender quota rules. The specification is as follows:

$$\begin{aligned} Y_{mt} = \beta_1 \, \mathbb{1}(\text{executive in } m \text{ is female})_{mt} \times \mathbb{1}(t \geq 2015)_{mt} \\ + \; \beta_2 \, \mathbb{1}(\text{executive in } m \text{ is female})_{mt} \\ + \; \gamma X_{mt} + \tau_m + \tau_t + \epsilon_{mt}. \end{aligned} \quad (6)$$

As before, the outcome variable in equation (6) is a policy variable like a portion of the municipal budget. The setup of the equation is largely similar to equation (5); however, the key coefficient of interest (β_1) is on the interaction of the executive being female with the year being after the imposition of gender parity rules in 2015. We also include municipality-year level controls and corresponding coefficients (γX_{mt}) as well as municipal and year fixed effects τ_m and τ_t.

5 Results

5.1 Results – Women's Representation

Initial results for women's representation are displayed in Table (1), corresponding to equation (1) above. From columns (1) and (2), we see that the probability of a woman being in municipal executive office increased by an average of 6.5% after the imposition of the gender quotas in 2015.

	(1)	(2)	(3)	(4)	(5)	(6)
Post-reform	0.0653***	0.0653***				
	(0.00101)	(0.00103)				
Trend			0.00160***	0.00167***	0.00221***	0.00231***
			(1.77e-05)	(1.84e-05)	(6.50e-05)	(6.52e-05)
Trend * Post-reform					-0.000518***	-0.000540***
					(5.17e-05)	(5.17e-05)
Population		-3.45e-07**		-1.55e-06***		-1.57e-06***
		(1.38e-07)		(1.41e-07)		(1.41e-07)
Population Density		6.54e-05***		1.05e-05		9.27e-06
		(1.92e-05)		(1.92e-05)		(1.92e-05)
Constant	0.0664***	0.0639***	0.0246***	0.0935***	0.0166***	0.0863***
	(0.000774)	(0.00623)	(0.000948)	(0.00630)	(0.00128)	(0.00634)
Municipality FEs	X	X	X	X	X	X
Observations	265,032	265,032	265,032	265,032	265,032	265,032
R-squared	0.321	0.321	0.336	0.337	0.337	0.337

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 1: Probability of having a female executive after parity reform

However, when we look at trends in columns (3)-(6), we see that the post-reform period was not necessarily associated with an increase in the rate of change of the probability of seeing women in office. This is not necessarily surprising given the design of the regression.

Next, we implement the event study described by equation (2), the results of which are displayed in Figure (5). We see that the quota rules have an immediate positive effect on the probability of having a female executive, which grows as the rules are implemented in further rounds of elections each year.

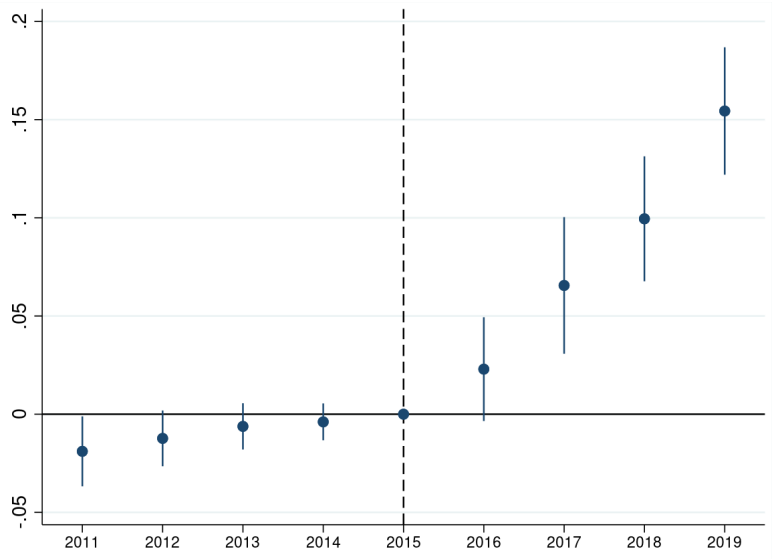

Figure 5: Women as municipal presidents

We then implement the two representation-related differences-in-differences strategies. First, in Table (2) we display the results of the regression that considers treatment status as the timing of the elections. This corresponds to equation (3). We see that in elections treated by the gender parity laws in 2015, the probability of a female winner goes up by around 4% .

	(1)	(2)
2013-15 election cycle * 2015 election	0.0380**	0.0424**
	-0.0162	-0.0174
Logarithm of Population		0.257
		-0.282
Population Density		-0.000393*
		-0.000227
Constant	0.0731***	-2.213
	-0.00531	-2.632
Municipality FEs	X	X
Election Cycle FEs	X	X
Observations	4,624	4,196
R-squared	0.505	0.506

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Probability of having a female executive (timing D.i.d.)

Finally, we implement the specification that looks within the elections that happened in 2015, and considers treatment as imposing horizontal parity rules on top of vertical parity rules. This specification is describe in equation (4) above. Results are displayed in Table (3). We see that municipalities with the horizontal parity rule in 2015 were about 22% more likely to elect a female president than municipalities with only the vertical parity rule in 2015.

	(1)	(2)
Horizontal Parity * 2015 election	0.222***	0.225***
	-0.0456	-0.0457
Logarithm of Population		0.837
		-0.678
Population Density		-0.000169
		-0.000546
Constant	0.0946***	-8.12
	-0.00808	-6.657
Municipality FEs	X	X
Year FEs	X	X
Observations	3,926	3,926
R-squared	0.518	0.518

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Probability of having a female executive (spatial D.i.d.)

5.2 Results – Policy outcomes

The differences-in-differences specifications for policy outcomes are displayed below in Tables (4) and (5). These regressions have the same strategy as the representation regressions described by equations (3) and (4), but consider the natural logarithm of various parts of the municipal budget as outcome variables.

In the results reported in Table (4), we see that being treated (i.e. electing a municipal president in 2015 rather than 2014 or 2013, and hence being subject to the gender parity laws) is generally associated both with lower spending numbers and lower funding numbers. On the spending side, being treated is associated with lower total budgets, lower spending on public debt, and lower spending on public investment. On the funding side, being treated is associated with lower fees collected (e.g. parking fees), lower federal funding and lower state funding, perhaps balanced by higher tax collecting. One outlier is school spending. For this, we think sample composition might be driving the results.[10]

In Table (5), which compares outcomes *only for those municipalities having elections in 2015*, with treatment being that a horizontal parity rule was in force in that municipality, we see somewhat different results. Indeed, many results are insignificant, and those that are significant tend to have different signs than the regressions in Table (4). We do not, however, take these results as necessarily contradictory The key difference between these regressions is

[10]Not every budget category is available in every year for every municipality. Thus, we can only include observations where the municipality reported school spending as a separate line item. Moreover, this funding may be very lumpy, e.g. building a new school.

the samples we are comparing. For Table (4), the subset of municipalities considered "treated" make up the universe of municipalities in Table (5).

How, then, to interpret? Our results on representation above suggest that the treated groups in both the regressions are more likely to elect female executives. Across all municipalities treated in 2015, the treatment is generally associated with fiscal conservatism (lower spending etc.). Within those municipalities, however, being treated with horizontal parity is generally associated with fiscal liberalism. Generally, though, it is difficult to draw conclusions based solely on municipal budgets – which may be largely inflexible. We hope to address different municipal-level outcome variables in future research.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outcome variable (in logs):	Total Budget	Total Budget	Taxes Collected	Taxes Collected	School Spending	School Spending	Spending on Public Debt	Spending on Public Debt	Spending on Public Investment	Spending on Public Investment
2013-15 election cycle * 2015 election	-0.0557***	-0.0579***	0.103***	0.143***	0.885***	0.963***	-0.0943	-0.520***	-0.0897**	-0.121**
	-0.013	-0.0143	-0.0333	-0.0371	-0.22	-0.236	-0.158	-0.187	-0.0444	-0.0485
Logarithm of Population		2.59E-06		2.90E-04		0.0013		-0.00014		-3.47E-05
		-0.000177		-0.000439		-0.0052		-0.00144		-0.00059
Population Density		0.362		1.184*		8.652**		-4.397		0.683
		-0.239		-0.63		-4.067		-2.952		-0.821
Constant	18.00***	14.50***	14.10***	2.386	13.64***	-70.41*	14.77***	61.18**	16.70***	10.15
	-0.00472	-2.279	-0.0123	-6.093	-0.0594	-39.2	-0.0636	-30.92	-0.016	-7.832
Municipality FEs	X	X	X	X	X	X	X	X	X	X
Election Cycle FEs	X	X	X	X	X	X	X	X	X	X
Observations	2,936	2,668	2,750	2,486	846	730	1,124	996	2,834	2,580
R-squared	0.993	0.992	0.986	0.985	0.698	0.701	0.844	0.846	0.924	0.922
Unique Municipalities	1468	1468	1375	1375	423	423	562	562	1417	1417

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Outcome variable (in logs):	Federal and State Funding	Federal and State Funding	Federal Funding	Federal Funding	Funding for Public Lighting	Funding for Public Lighting	Fees Collected	Fees Collected	Funding for Drinking Water	Funding for Drinking Water
2013-15 election cycle * 2015 election	-0.0327	-0.0507*	-0.0303***	-0.0200**	-0.303	0.156	-0.189*	-0.124	0.0113	0.0298
	-0.0255	-0.0275	-0.00857	-0.00929	-0.211	-1.039	-0.108	-0.121	-0.0954	-0.0976
Logarithm of Population		-0.000475		0.000253**		-0.00196		-0.00428***		0.000906
		-0.00034		-0.000115		-0.00219		-0.0014		-0.00185
Population Density		1.217***		-0.0954		3.072		-0.0625		-3.942**
		-0.459		-0.155		-7.231		-1.992		-1.79
Constant	17.10***	5.571	17.02***	17.81***	13.85***	-16.73	12.68***	14.59	11.49***	47.24***
	-0.00926	-4.376	-0.00311	-1.479	-0.0879	-74.77	-0.0396	-19.52	-0.032	-16.18
Municipality FEs	X	X	X	X	X	X	X	X	X	X
Election Cycle FEs	X	X	X	X	X	X	X	X	X	X
Observations	2,934	2,666	2,936	2,668	326	230	2,432	2,174	908	852
R-squared	0.974	0.973	0.997	0.996	0.916	0.892	0.877	0.871	0.95	0.952
Unique Municipalities	1467	1467	1468	1468	163	163	1216	1216	454	454

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Budget outcomes (timing D.i.d.)

Outcome variable (in logs):	(1) Total Budget	(2) Total Budget	(3) Taxes Collected	(4) Taxes Collected	(5) School Spending	(6) School Spending	(7) Spending on Public Debt	(8) Spending on Public Debt	(9) Spending on Public Investment	(10) Spending on Public Investment
Horizontal Parity * 2015 election	0.0913**	0.0838*	0.192	0.198	-1.330	-1.670*	-0.510	-0.787	-0.0813	-0.0676
	(0.0422)	(0.0433)	(0.128)	(0.132)	(0.896)	(0.934)	(0.492)	(0.598)	(0.175)	(0.177)
Logarithm of Population		-0.000403		0.000474		-0.00237		-0.00516		-0.00198
		(0.000546)		(0.00164)		(0.0113)		(0.00360)		(0.00216)
Population Density		0.350		-0.265		12.27		3.694		-0.732
		(0.435)		(1.312)		(9.373)		(4.272)		(1.761)
Constant	18.28***	14.90***	14.38***	16.92	13.79***	-110.5	14.60***	-22.27	16.84***	24.33
	(0.00504)	(4.268)	(0.0153)	(12.90)	(0.118)	(94.90)	(0.0477)	(43.95)	(0.0202)	(17.22)
Municipality FEs	X	X	X	X	X	X	X	X	X	X
Election Cycle FEs	X	X	X	X	X	X	X	X	X	X
Observations	1,222	1,222	1,192	1,192	232	232	532	532	1,162	1,162
R-squared	0.991	0.991	0.977	0.977	0.652	0.658	0.892	0.893	0.889	0.890
Unique Municipalities	611	611	596	596	116	116	266	266	581	581

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Outcome variable (in logs):	(11) Federal and State Funding	(12) Federal and State Funding	(13) Federal Funding	(14) Federal Funding	(15) Fees Collected	(16) Fees Collected	(17) Funding for Drinking Water	(18) Funding for Drinking Water
Horizontal Parity * 2015 election	0.125	0.0497	0.0720***	0.0786***	0.620*	0.423	0.477	0.388
	(0.0898)	(0.0914)	(0.0272)	(0.0280)	(0.336)	(0.347)	(0.725)	(0.733)
Logarithm of Population		-0.00147		0.000103		-0.000916		0.0359
		(0.00115)		(0.000353)		(0.00422)		(0.0405)
Population Density		3.342***		-0.290		7.484**		-5.507
		(0.918)		(0.281)		(3.529)		(6.520)
Constant	17.35***	-15.35*	17.34***	20.18***	13.14***	-61.90*	11.76***	62.02
	(0.0108)	(9.004)	(0.00326)	(2.758)	(0.0430)	(35.29)	(0.0453)	(61.33)
Municipality FEs	X	X	X	X	X	X	X	X
Election Cycle FEs	X	X	X	X	X	X	X	X
Observations	1,220	1,220	1,222	1,222	1,004	1,004	256	256
R-squared	0.966	0.966	0.995	0.995	0.867	0.868	0.943	0.943
Unique Municipalities	610	610	611	611	502	502	128	128

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Budget outcomes (spatial D.i.d.)

On the other hand, the strategies introduced in section 4.2.2. and equations (5) and (6), while not necessarily causal, allow for more flexible outcome variables due to the expanded time interval (2011-2019) and more frequent observation level (yearly, rather than every election cycle). Moreover, we can compare these results with our conclusions from the shorter-term differences-in-differences estimates. First, Table (6) displays outcomes corresponding to equation (5). These regressions shows the correlation between having a female municipal president and budget outcomes over the entire time period of 2011-2019. Generally, we see insignificant results, though female executives do appear to be loosely correlated with higher taxes and fees.

However, Table (7) suggests that these insignificant coefficients mask significant changes

that happened around the imposition of the gender parity rules. For example, while over the whole time period we saw insignificant effects on total budget, spending on public investment, federal and state funding, and funding for public lighting, breaking out a separate intercept for post-reform shows a trend reversal. In general, we believe these results are consistent with the entry of fiscally *conservative* women after the introduction of the gender parity rules. Perhaps this makes sense – before the parity rules, parties with fiscally liberal views would tend to nominate women more often, while after the rules parties on both sides nominate women.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome variable (in logs):	Total Budget	Taxes Collected	Spending on Public Debt	Spending on Public Investment	Federal and State Funding	Federal Funding	Funding for Public Lighting	Fees Collected	Funding for Drinking Water
Female	-0.00356	0.0237*	-0.0943	0.0103	0.00694	-0.00665	-0.061	0.0995*	-0.0134
	-0.00638	-0.0144	-0.0692	-0.0247	-0.0121	-0.00605	-0.0829	-0.0509	-0.0492
Logarithm of population	0.431***	1.982***	-0.144	-0.518*	0.00104	0.721***	1.616	-2.156***	-0.413
	-0.0789	-0.187	-0.962	-0.308	-0.15	-0.0746	-1.533	-0.629	-0.492
Constant	13.87***	-5.206***	17.19	21.71***	17.13***	10.08***	-3.013	35.21***	15.53***
	-0.761	-1.841	-10.51	-2.958	-1.442	-0.719	-16.23	-6.404	-4.414
Municipality FEs	X	X	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X	X	X
Observations	13,383	11,970	3,186	11,142	13,194	13,338	369	8,604	2,151
R-squared	0.985	0.977	0.765	0.821	0.95	0.987	0.955	0.785	0.931
Unique Municipalities	1487	1330	354	1238	1466	1482	41	956	239

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Female executive effect on budget outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome variable (in logs):	Total Budget	Taxes Collected	Spending on Public Debt	Spending on Public Investment	Federal and State Funding	Federal Funding	Funding for Public Lighting	Fees Collected	Funding for Drinking Water
Female	0.0162	0.0561**	-0.236**	0.0800*	0.0493**	-0.0314***	0.191	-0.0564	-0.0111
	-0.0106	-0.0238	-0.111	-0.0409	-0.0202	-0.0101	-0.126	-0.158	-0.0876
Female * Post-reform	-0.0289**	-0.0478*	0.221	-0.103**	-0.0619***	0.0361***	-0.411***	0.0962	-0.00324
	-0.0124	-0.0279	-0.135	-0.0479	-0.0236	-0.0118	-0.156	-0.189	-0.103
Logarithm of population	0.436***	1.986***	-0.237	-0.502	0.0115	0.715***	1.821	4.412**	-0.412
	-0.0789	-0.187	-0.964	-0.308	-0.15	-0.0746	-1.52	-1.742	-0.493
Constant	13.82***	-5.249***	18.20*	21.56***	17.03***	10.13***	-5.179	-36.55*	15.52***
	-0.761	-1.841	-10.53	-2.959	-1.442	-0.719	-16.11	-19.51	-4.421
Municipality FEs	X	X	X	X	X	X	X	X	X
Year FEs	X	X	X	X	X	X	X	X	X
Observations	13,383	11,970	3,186	11,142	13,194	13,338	369	864	2,151
R-squared	0.985	0.977	0.765	0.822	0.95	0.987	0.956	0.854	0.931
Unique Municipalities	1487	1330	354	1238	1466	1482	41	96	239

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Female executive effect on budget outcomes after parity rules

6 Conclusion

Our study shows that gender parity rules were successful in bringing more women into executive office at the municipal level in Mexico. Using a causal differences-in-differences methodology, we have shown that these parity rules had immediate significant effects; moreover, our further analyses demonstrate that the effects are lasting.

We also show that the parity reforms appear to have influenced municipal-level budget decisions. Again using a causal framework, we show that the general parity rules appear to have had a conservative effect on municipal budget; additionally, we show that horizontal parity rules causally affect municipal budgets in the opposite direction. These conclusions are irrespective of the gender of the executives themselves, and may be due to the direct effect of having women at the executive level, or the indirect effect of competition from or increased visibility of executive candidates and other leaders who are women. Additionally, we show that certain budgetary movements are associated with female executives, and more importantly these associations appear to have changed significantly after the adoption of the parity rules.

More work is needed in this area. While we have shown that these parity rules indeed do affect outcomes at the local level, our results are mixed and additional data need to be scrutinized. Moreover, the channels driving our results remain murky – for example, we hypothesize but do not show that increased fiscal conservatism may be due to an outsized increase in female candidates on the conservative end of the political spectrum.

We believe this to be a ripe and important area for further research. Women are the most important representatives of women's issues, regardless of their place on the political spectrum. While the Mexican parity rules have made progress in increasing women's representation at the executive level, there is much more progress to be made. And, undoubtedly, the results of this progression must be studied.

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