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Leading toward equality: the effect of women mayors on gender equality in local bureaucracies

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**ABSTRACT**
Do women elected officials contribute to the creation of public sector workforces that are more representative of the populations they serve? A more representative bureaucracy is expected to produce better outcomes, and thus understanding the role that elected leadership plays in diversifying the bureaucracy is important. Using data from over 5000 Brazilian municipalities from 2001 to 2012, we examine whether the election of women mayors leads to the formation of municipal executive bureaucracies that are more representative in terms of gender. In addition, we test whether the presence of a woman mayor leads to increased wages for women bureaucrats and smaller wage gaps between men and women bureaucrats. We find that while women mayors do not increase women’s numerical representation in the municipal executive bureaucracy, they do contribute to the creation of bureaucracies with fewer gender inequalities. Electing a woman mayor increases the average wages of women bureaucrats and decreases the gender wage gap in the bureaucracy. These findings suggest that women mayors advocate for the promotion of women to leadership positions and reduce the gap between men’s and women’s ranks in the bureaucracy since the salaries of Brazilian civil servants are linked to their positions.

In 2006, Michelle Bachelet made history by becoming the first woman to be elected as president of Chile.\textsuperscript{1} As president, she subsequently made history by creating the world’s first presidential cabinet composed of half men and half women. Other chief executives, including Evo Morales in Bolivia in 2010 and Justin Trudeau in Canada in 2015, have followed in Bachelet’s footsteps by appointing an equal number of men and women to their executive cabinets. Of course, not all executive appointments are as high profile as the cabinet appointed by the president or prime minister. Yet, the decisions that executives – from the president down to the mayor – make regarding the composition of executive bureaucracies can have important consequences for those represented and the quality of representation they receive. Unfortunately, we know surprisingly little about the role of executives in building bureaucracies that promote gender equality.

On one hand, a robust literature has examined the recruitment, nomination, and election of women mayors and legislatures. Despite this focus, we know surprisingly little about the effect that women in high-level executive positions have had on the composition of the bureaucracies they lead. As the Brazilian case suggests, it is possible that elected executives advocate for the promotion of women to leadership positions and that these efforts reduce gender inequality in the bureaucracy. This article aims to fill this gap in our understanding by examining whether the election of women mayors has any effect on the representation of women in local bureaucracies.

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national, intermediate, and even local levels. This literature has identified the importance of several factors, including electoral systems (Matland 1993), quota laws (Tripp and Kang 2008), and socioeconomic conditions (Inglehart and Norris 2003). Moreover, previous research also identifies the ways in which increased representation of women in political institutions produces better representation of women’s interests (e.g., Schwindt-Bayer 2010). A related literature has explored the conditions under which women are appointed to both presidential (Escobar-Lemmon and Taylor-Robinson 2016) and parliamentary cabinets (Krook and O’Brien 2012).

On the other hand, a separate and voluminous literature has developed on the outcomes produced by a representative bureaucracy. This body of research finds that bureaucracies that are more descriptively representative of the clients they serve produce better outcomes and representation for historically underrepresented groups than bureaucracies that are less representative. For women, this means that increasing gender representation in bureaucracies can lead to better substantive representation, such as increased child support enforcement (Wilkins and Keiser 2006), improvements in female students’ math scores (Keiser et al. 2002), greater attention to women’s issues (Park 2013), and provision of public services and policies that benefit women (Meier and Funk 2017). Surprisingly, though with a few exceptions, this literature has not directly engaged the question of when bureaucracies become more gender representative. Meanwhile, the literature on women’s representation in executive and legislative offices has focused exclusively on the way women represent women in those institutions and not how representation can spill over into other institutions, like the bureaucracy.

In this study, we seek to bring together these two bodies of research to examine whether women executives at the local level contribute to gender equality in municipal executive bureaucracies. Given the scarcity of women chief executives at the national level, we study women in municipal executive offices because women mayors – though still largely underrepresented – are more common than women presidents and prime ministers. Furthermore, studying representation at the local level is important in its own right. In recent decades, the importance of local governments has increased as policymaking authority and responsibility for several important and visible policy areas, such as education, healthcare, infrastructure, and sanitation, have been decentralized to local governments (Eaton 2012; Falleti 2010). Local governments play an ever-increasing role in citizens’ lives. Consequently, women’s representation in local government institutions – both elected and bureaucratic – is important for representing women’s interests.

Using data from Brazilian municipalities over a 12-year period, we examine whether women chief executives are more likely to improve gender equality in local executive bureaucracies. Gender inequality in public sector representation can manifest in several ways. There may be an underrepresentation of women employees in the bureaucracy overall. Or women may be equally represented in the bureaucracy numerically, but gaps may persist in terms of the types of jobs (e.g., high versus low prestige) or compensation they receive. Thus, we focus on gender equality in three areas: (1) the overall percentage of women in the bureaucracy, (2) the presence of women in bureaucratic leadership roles, and (3) the gap in men’s and women’s ranks in the bureaucracy. We use salary as a proxy for rank in the bureaucracy as discussed in greater detail below. Additionally, we examine whether the effects of women executives on gender equality in the bureaucracy are short-lived or longer lasting.
Our results suggest that while women mayors do not increase the (already high) numeric representation of women in municipal executive bureaucracies, they do facilitate greater gender equality within the bureaucracy. Women mayors increase the average wages of women bureaucrats and decrease the wage gap between men and women. Since the wages of civil servants in Brazil are linked to their positions in the bureaucracy, these findings also indicate that women mayors contribute to the promotion of women to leadership roles and lessen the gap between women’s and men’s ranks within local bureaucracies. Further, our results indicate that these effects may persist even after a woman mayor leaves office, though they do diminish over time. These findings have important implications for the representation of women’s interests. Increasing women’s representation in local elected offices can result in an increase in women’s representation in the upper levels of bureaucracies. By increasing women’s representation in important bureaucratic posts, the interests of women are likely better represented.

We begin by discussing the context of our study and the distinct research advantages offered by Brazilian municipal bureaucracies. We then discuss how our study fits within the larger literature on women’s representation in local governments, followed by a discussion of the theoretical links between gender representation in elected institutions and representation in bureaucracies. Next, we present our data and report the results of the empirical analyses. We conclude with a discussion of the implications of our findings for research on women’s representation across various contexts.

**Gender (in)equality and the civil service in Brazilian local governments**

Gender inequality is pervasive throughout Brazil. Despite electing a woman president in 2010, women’s representation is still far from parity. In 2016, the Inter-Parliamentary Union ranked Brazil 154th out of 185 countries for its low levels of women’s representation in the national legislature (10% of the Chamber of Deputies and 16% of the Senate) (Inter-Parliamentary Union 2016). Women’s representation is low in subnational governments as well. In 2016, only one state, Roraima, was governed by a woman and only 12% of mayors were women. Local city councils varied from 0% to 86% women, averaging 12% women.

The lack of women (and other historically marginalized groups) in political institutions is problematic for Brazilian democracy. Without women’s presence, the democratic goals of representation, fairness, and equality cannot be met. In addition, given the robust finding that women representatives are more likely to advocate for women’s interests (Escobar-Lemmon and Taylor-Robinson 2014; Schwindt-Bayer 2010) and often differ in the ways they lead organizations (Funk 2015; Jacobson, Palus, and Bowling 2010), the underrepresentation of women means that women’s views and policy preferences are not being represented. Brazil, like many other countries, has been marked by patriarchal institutions and criticized for the marginalization of women in society. Women in Brazil are more likely than men to experience violence (Waiselfisz 2015) and live in poverty (Barros, Fox, and Mendoça 1997). For these reasons, it is important that women are represented in both the institutions that make policy and the bureaucracies that implement it.

Brazil is a large, decentralized country with 5570 municipalities and 26 states (plus a federal district). Local governments in Brazil are important political units and local chief executives have substantial decision-making powers and authority (Samuels 2004). Further, local governments are responsible for delivering important public services including...
healthcare, education, and sanitation (Falleti 2010). This combination of factors means that, in terms of size and federal structure, Brazil is highly comparable to the U.S.A. Brazil is also similar to the U.S.A. in that women are underrepresented at all levels of government. In 2016, just 12% of Brazilian cities and 18.9% of U.S. cities with populations over 30,000 had women mayors (Rutgers, Center for American Women and Politics 2016). Thus, women in politics in Brazil are likely to have experienced the same kinds of gender discrimination that women politicians confront in the U.S.A. This makes gender a salient (and inescapable) identity for women, even if they choose to downplay it in their campaigns. At the same time, Brazil differs from the U.S.A. in several ways. Brazilian local governments vary greatly in size, level of development, and resources. Some parts of Brazil resemble major cities in the U.S.A. or Western Europe. However, other parts – such as rural and indigenous areas – lack basic necessities like access to clean water and adequate housing (Arretche 2015).

Brazil is also a useful case in which to study our research question because mayors have discretion over appointments to municipal executive bureaucracies, and can thus improve gender equality in local bureaucracies if they so desire. Rules governing civil service make these jobs desirable, but also may mean that a positive (or negative) change can have a lasting impact. Reforms to professionalize the civil service, begun in the 1988 constitution and continued in 1995, increased qualification requirements and introduced salaries based on performance and qualification metrics (Pacheco 2010a, 194). The civil service is comprised of permanent (career) civil servants and temporary civil servants (appointed by elected politicians). A (career) civil service job is highly desirable as these positions come with competitive salaries, job stability, the possibility of tenure, and generous pensions. Moreover, Marconi (2010, 250) notes that in recent years, the real wages of municipal employees have risen substantially and salaries in the municipal public sector are comparable to those in the private sector.

The flexibility mayors have in bureaucratic hiring can be used to distribute patronage, but also to increase the incorporation of women. Marconi (2010, 231) shows that the recruitment of municipal bureaucrats by means other than the public examination (concurso público) grew significantly between 1993 and 2007. This growth is attributed to a need for flexible hiring procedures to fill municipal positions and meet demands for public services (Marconi 2010, 232), as well as the politicization of public administration and its use for patronage politics (Pacheco 2010b, 278). Thus, although Brazilian mayors have legal restrictions on their ability to remove civil servants who have tenure, mayors can appoint and remove temporary civil servants and promote career civil servants to higher positions. The presence of legal loopholes, variation in subnational laws, ability to make temporary appointments, flexibility in salary negotiations, and discretion in determining civil servants’ salaries indicate that municipal elected officials, particularly mayors, have more sway over the municipal executive administration than do elected officials at the federal level of government. This discretion means that mayors with a strong interest in building a more gender representative and egalitarian bureaucracy can actually do so, making Brazil an interesting case in which to test our hypotheses.

**Women’s representation in local governments**

Previous research suggests that many of the determinants of women’s representation in national governments also shape women’s local level representation (Escobar-Lemmon
Like at the national level, electoral institutions, gender quotas, political parties, and societal norms affect the extent to which women are represented in local governments. Women candidates for local offices frequently do better under proportional representation systems (Hinojosa and Franceschet 2012) and in the presence of effective gender quota laws (Schmidt and Saunders 2004). There is also evidence that parties’ candidate selection procedures affect women’s chances of attaining representation in local governments (Hinojosa 2012). Women’s local representation is also shaped by socioeconomic and cultural factors — such as women’s labor force participation or urbanization (Sundström and Stockemer 2015).

Less is known about the consequences of women’s local level representation — especially in the context of Latin America. Once women succeed in gaining representation at the local level, do they produce different outcomes than men or improve women’s substantive representation? The limited research suggests that women local elected officials, like women at the national level, are more likely to represent women’s interests. In Brazil, for example, improving women’s descriptive representation in local elected and bureaucratic offices results in municipalities adopting more policies and services that benefit women (Meier and Funk 2017). In India and the U.S.A., women local elected officials are more likely to allocate government expenditures in ways that favor women (Chattopadhyay and Duflo 2004; Holman 2014). Additional research finds that women’s presence on city councils is related to improvements in child care coverage in Norway (Bratton and Ray 2002) and increasing women’s local representation in Sweden results in more spending on childcare and education (Svaleryd 2009), and greater gender equality more broadly (Wängnerud and Sundell 2012).

Another potential consequence of women’s local representation is that women will transform the structure and functioning of local institutions, both elected and bureaucratic. First, increasing women’s representation in local offices might change views of women or encourage more women to enter politics, which can lead to even greater representation at the local level (Kerevel and Atkeson 2015; Shair-Rosenfield and Hinojosa 2014). Women might also utilize different leadership styles than men, resulting in less corruption (Brollo and Troiano 2016), more government transparency (Araujo and Tejedor-Romero 2016), or greater citizen participation (Weikart et al. 2007, but see Funk 2015). Additionally, women elected officials may initiate changes in the structure and gender composition of local bureaucracies (Kerr, Miller, and Reid 1998; Saltzstein 1986). Relatively little scholarly attention has been devoted to the determinants of gender equality in bureaucracies, and specifically whether women elected officials improve gender equality in bureaucratic organizations. The research that does exist suggests that women are more likely to hold lower-level positions and are underrepresented in many sectors of public organizations, especially traditionally male-dominated sectors (Kelly and Newman 2001; Miller, Kerr, and Reid 2010). In addition to gender disparities in leadership status and occupational sector, research finds that women public administrators receive lower compensation than their men colleagues across a number of contexts (Choi 2015; Meier and Wilkins 2002), including the public sector in Latin America (Panizza and Qiang 2005). Do women elected officials help close these gender gaps in public organizations? Below, we theorize why women elected officials may be more likely than men to promote women to leadership positions and work to close gender gaps in local bureaucracies.
Why women mayors promote gender equality in the bureaucracy

While mayors of all genders in Brazil have the ability to increase women’s representation in the municipal executive bureaucracy, we expect that women mayors have a special interest in doing so. First, as women, women mayors share a common gender identity with other women in Brazil. This means that women mayors likely share similar life experiences, interests, and policy preferences as women in the general public. Women mayors are more likely to have experienced gender discrimination themselves and thus may be more likely to recognize gender disparities that exist in the public sector and have an interest in closing these gender gaps. Significant research has demonstrated that women do more to represent women’s interests (see Beckwith 2014 for a summary) and thus, women mayors might promote the interests of other women more than men mayors do. This could manifest in several ways including the possibility that – having been paid less than men during their own careers – women mayors might be more conscious of wage gaps and work to reduce wage inequalities.

Even if women mayors do not explicitly strive to help women, they might share common preferences with other women, and may be more likely to promote women to leadership positions in their executive bureaucracies for this reason. If women mayors see women bureaucrats as sharing the same interests and policy preferences as themselves, they may also view women bureaucrats as better at executing their policy agenda than men bureaucrats. In other words, women mayors may promote women in the bureaucracy as one way to reduce the principal-agent problem associated with bureaucracies (i.e., elected officials’ inability to oversee all decisions and actions made by bureaucratic actors).

Women elected to the mayor’s office may also see themselves as needing to represent women. Eisinger (1982) and Mladenka (1989) suggest that as electoral bodies become more representative of the population (in terms of demographics), elected officials pressure bureaucratic institutions to also become more representative. This idea of “top-down” representation suggests that the executive leadership plays an important role in setting the tone for bureaucratic representation (both in descriptive and substantive terms). Elected executives, in this case mayors, not only set the agenda and vision for the executive branch, but also often exert direct control over day-to-day activities and bureaucratic processes, such as the hiring, firing, or repositioning of bureaucrats (with some limitations). Thus, women mayors may directly, or indirectly, work to improve the status of women in the bureaucracy.

We consider whether women are more evenly distributed across all bureaucratic ranks and leadership positions when women are elected as local chief executives. To capture several dimensions of gender equality we consider three measures. First is the gender balance of the bureaucracy overall. Second, we account for the fact that not all positions within the bureaucracy are equally powerful or well remunerated. If women are hired predominantly as secretaries and assistants and men are hired predominantly as managers and administrators, those responsible for making decisions and providing leadership are not representative of the population they serve. When this occurs, even with balanced numbers overall, gaps in the equality of men and women exist within the bureaucracy. If women are in lower prestige positions, they are less able to influence policy outcomes. Thus, we also examine the average wages of women bureaucrats as a proxy for women in positions of leadership. Finally, we consider whether women are equally distributed
throughout the bureaucracy by examining the difference in the average wages of men and women bureaucrats. Thus, we expect:

H1: The presence of a woman mayor will increase women’s overall representation in the municipal executive bureaucracy.

H2: The presence of a woman mayor will increase women’s representation in leadership positions in the municipal executive bureaucracy.

H3: The presence of a woman mayor will reduce the gap between men’s and women’s ranks within the municipal executive bureaucracy.

Effects over time

One way that mayors are able to affect the composition of the municipal bureaucracy is by short circuiting the civil service process through temporary appointments. If women are hired into these temporary positions by a woman mayor and then removed from office when a new mayor is elected, changes in the gender composition of the bureaucracy might be short-lived. Similarly wage increases for women and wage gap reductions might also be transient. On the other hand, there are three reasons why a reduction in gender inequality under a woman mayor might persist beyond the mayor’s term in office. First, not all temporary appointments will go to women; some will go to men. Additionally, some women will be hired in career civil service positions. Thus, even with 100% turnover in temporary posts, it is unclear that a priori this will only affect women. Second, gaining work experience in top bureaucratic posts increases women’s qualifications, making it harder to exclude women in the future because they lack experience. Third, if promotions or wage increases are given to career bureaucrats, Brazilian civil service laws make it hard to demote or decrease wages of career civil servants. Thus, gains for women in the bureaucracy may be harder to undo. This generates two competing expectations as to whether the women’s gains in equality will persist beyond the woman mayor’s term:

H4a: The effect of a woman mayor will be short-lived, resulting in increases in women’s representation only during the woman mayor’s term in office.

H4b: The effect of a woman mayor will be long-term, resulting in increases in women’s representation even after the woman mayor has left office.

Modeling gender equality in the bureaucracy

We use 12 years of data for 5570 Brazilian municipalities, covering three electoral periods (2001–2004, 2005–2008, 2009–2012). Since we theorize that the construction of a representative bureaucracy is a multi-faceted process and that representational gaps beyond the simple numeric representation of women may exist, we use three dependent variables to measure different aspects of gender equality in the bureaucracy.

First is the percent women in the municipal executive bureaucracy. Overall, women’s representation in the bureaucracy is very high, but there is variation. On average, 62% of municipal bureaucrats were women during 2001–2012. Just around 10% of municipalities had less than 50% women. A handful of small municipalities had no women or
all women bureaucrats. The second dependent variable is the average real wages (in 2012 constant Brazilian Reais) of women bureaucrats. We use average real wages as a proxy for women’s ranks within the municipal executive bureaucracy. High-status positions in Brazilian civil service are usually accompanied by higher pay. Thus, examining women’s average wages provides a useful way to assess whether women hold leadership positions within the bureaucracy. The third dependent variable is the gap between men’s and women’s average real wages in the bureaucracy. Given numerical equality, and assuming that equal pay is a good way to judge equal treatment, this variable allows us to examine the extent to which women are employed in positions similar to men throughout the executive bureaucracy.

We plot the average values for our dependent variables over time in Appendix 2. Data for these variables were obtained from the *Relação Anual de Informações Sociais* (RAIS; Annual Social Information Report). RAIS is an annual census of the formal labor market conducted by the Brazilian Ministry of Labor and Employment that contains comprehensive information about employers (establishments) and employees. We aggregate the employee-level RAIS data to the municipal level to generate statistics for municipal executive bureaucracies and several control variables.

Although municipal executive bureaucracies in Brazil are majority women, women are underrepresented in important positions and thus limited in their ability to meaningfully shape bureaucratic outcomes. On average, women bureaucrats’ monthly real wages are R$139 (Brazilian Reais) less than men’s salaries.³ Over the course of a year, this difference (R$1668/year) amounts to more than three times the legal minimum wage (R$510 per month in 2010). This means that the annual difference between men’s and women’s wages is equivalent to men receiving more than three extra month’s pay (in minimum wages) compared to women. Furthermore, since civil servants’ salaries are highly correlated with the prestige and importance of their position in the bureaucracy (Marconi 2010), this wage gap signals that women are relegated to lower ranks of the bureaucracy and lack access to positions that have the most potential to impact policy and provide representation for citizens’ interests.

**Women mayors in Brazil and control variables**

To test our hypotheses that women elected executives will help reduce gaps in women’s bureaucratic representation, we include a variable for whether the mayor (*prefeito*) is a woman using data from the *Instituto Brasileiro de Geografia e Estatística* (IBGE; Brazilian Institute of Geography and Statistics). Between 2001 and 2012, around 7% of municipalities were governed by women mayors. In 2001, 6% of municipalities had women mayors, and this percentage grew to just 8% in 2005, and 9% in 2009 (see Appendix 2).

Studies of Brazilian local legislatures (i.e., city councils) often describe the weak influence city councilors have over the mayor’s executive power (Couto and Abrucio 1995; Kerbauy 2005). Nevertheless, the city council may play a role in overseeing the mayor and his/her executive bureaucracy. Thus, women’s participation in other elected bodies – such as the city council – might also influence the extent to which women are represented in municipal bureaucracies. For this reason, we control for the percent women city councilors.
We also control for other characteristics of the mayor, including partisanship, level of education, and age. Left-leaning parties have traditionally been friendlier toward women’s interests (Bryson and Heppell 2010; Rule 1987), and have made strides to increase women’s representation in politics by adopting gender quotas and through the promise of “women friendly” policies (Clemens 1993; Matland and Studlar 1996). Thus, mayors from left-leaning parties may have extra incentives to advance women’s equality. We classified party ideologies as left, center, or right based on surveys and roll-call vote studies of Brazilian legislators (Power and Zucco 2009, 2012; Saiegh 2015; Samuels and Zucco 2014; Zucco and Lauderdale 2011). We also expect that more educated mayors will hold more egalitarian attitudes about gender equality. We measure the mayor’s education using a categorical variable, where 0 = no formal education, 1 = incomplete primary, 2 = complete primary, 3 = incomplete high school, 4 = complete high school, 5 = incomplete college, and 6 = college degree. We also control for the mayor’s age since we expect younger mayors to hold more egalitarian attitudes than older mayors.

Brazilian municipalities vary greatly in terms of size, wealth, and composition of the local labor market. To account for this variation and its potential effect on gender equality in the executive bureaucracy (i.e., supply and demand factors), we control for municipal population, gross domestic product (GDP) per capita, size of the bureaucracy, and the percentage of workers employed by the municipal executive (patronage). Both population and GDP per capita were log transformed to normalize the distributions. The size of the bureaucracy is a count of the number of bureaucrats per 1000 residents, and ranges from less than 1 to 531.16 bureaucrats per 1000 residents, with an average of 40.4. 

Patronage is measured by dividing the number of employees in the bureaucracy by the total number of workers in the formal labor force (including private and public sectors). A value close to one indicates that the municipal executive is the largest employer in the municipality, while a value close to zero indicates that the majority of jobs are outside of the executive branch.

We capture the effects of time in three ways. First, we include lagged dependent variables in all of our models since our dependent variables have high serial correlation, as current values largely depend on past values. Second, we include a variable indicating which year in a mayor’s term we observe (1, 2, 3, or 4). This allows us to examine whether gender equality improves the longer a mayor is in office. Third, we include a variable for whether the mayor is serving their first or second term, as those in their second term will have had more time to shape the bureaucracy. Brazilian mayors can serve a maximum of two consecutive 4-year terms and then must sit out one election before competing again. A summary statistics table for all variables is included in Appendix 1.

**Do women mayors have more egalitarian bureaucracies?**

Since we have panel data, we use generalized least squares random-effects estimators. We estimate three models, one for each of our dependent variables, and present the results in Table 1. We find that while the presence of a woman mayor increases women bureaucrat’s average real wages and reduces the gender wage gap, the mayor’s gender is not statistically significant in explaining the percent women in the bureaucracy overall. Given that, on average, municipal executive bureaucracies have more women than men (mean = 62%), and only about 10% of municipalities have less than 50% women, it is not too surprising...
that women mayors do not increase women’s (already high) numerical representation in the executive bureaucracy.

However, women mayors do increase women’s representation in the upper echelons of the bureaucracy and reduce representational and wage gaps between men and women bureaucrats. Results from model 2 suggest that having a woman mayor increases the average monthly salary of women bureaucrats by almost R$18.00 per month. Since increases in civil servants’ wages are usually tied to a promotion, this finding implies that women bureaucrats are more likely to receive promotions when there is a woman mayor. Results presented in model 3 suggest that the presence of a woman mayor decreases the difference between the average wages of men and women bureaucrats by R$9.36 per month. This finding indicates that women mayors contribute to reducing the wage gap – and likely the status gap – between men and women in the executive bureaucracy.

To better understand the long-term effects of electing women mayors, we estimate dynamic simulations of our results (Williams and Whitten 2012) and plot these simulations

| Table 1. Do women mayors increase women’s equality in the executive bureaucracy? |
|-----------------|-----------------|-----------------|
| (Model 1)       | (Model 2)       | (Model 3)       |
| % Women bureaucrats | Avg. women salary | Wage gap |
| Woman mayor     | 0.041           | 17.934***       | −9.364*** |
| % Women councilors | 0.003           | 0.166           | −0.322*** |
| Left Party      | −0.117*         | 27.841***       | 0.944    |
| Right Party     | 0.077           | −1.251          | 1.153    |
| Mayor’s education | −0.021          | 3.602***        | −1.521** |
| Mayor’s age     | −0.001          | 0.384**         | 0.055    |
| Population (log)| 0.523***        | 41.045***       | −4.745*** |
| GDP per capita (log)| 0.158***    | 188.886***      | 53.570*** |
| Patronage       | 0.911***        | 138.283***      | −33.122*** |
| Bureaucracy size | −0.009***       | −0.359***       | −0.340*** |
| Year in term    | 0.064***        | −69.816***      | −19.347*** |
| Incumbent       | 0.126***        | −1.316          | −5.834*** |
| % Women bureaucrats (lagged) | 0.777*** | 0.614*** |
| Avg. women salary (lagged) | 0.002 | (0.003) |
| Wage gap (lagged) | 0.591***       | (0.004) |
| Intercept       | 8.666***        | −266.737***     | 94.826*** |
| N               | 58.798          | 58.682          | 58.583    |
| R²              | 0.700           | 0.621           | 0.442     |

Note: Standard errors in parentheses.

*p < .05.

**p < .01.

***p < .001.
in Figures 1–3. The fact that wages and employment patterns are autoregressive matters for the interpretation of our results. Small yearly changes can manifest into much larger differences over time or may have diminishing marginal returns. Thus, it is important to examine more than just the instantaneous effect that women mayors have on the bureaucracy. The figures illustrate how each of our dependent variables is expected to change given the election of a man or woman mayor in the future, all else being equal. The figures show simulated values for a municipality starting with a leftist man mayor in his first term in year \( t = 0 \). We set all other variables to their overall mean values except for the lagged dependent variable, which we set to its mean value in 2012. We estimate simulations for a 12-year period corresponding to three electoral terms of four years each. We present four scenarios for each of our dependent variables to demonstrate how the predicted values change if the mayor (1) is always a man, (2) switches to a woman after a man is in office for two terms, (3) switches from a man to a woman back to a man, and (4) switches from a man to a woman for two terms.

Figure 1 presents simulated values from our first model. The figure suggests that the percent women in the executive bureaucracy is expected to decrease slightly (from roughly 62.5% to 61.8%), regardless of the gender of future mayors. However, the slope is roughly the same for all scenarios, suggesting that factors other than the mayor’s gender are driving this small decline. The lack of an effect for the mayor’s gender over time reinforces the null finding presented in model 1 in Table 1.

**Figure 1.** Dynamic simulations of the effects of mayor’s gender on percent women in the municipal executive bureaucracy.

Notes: Years with a woman mayor are presented in bold. Simulated values are shown for a leftist mayor in the first term, starting with a man mayor and 62.74% women bureaucrats (average of the lagged dependent variable in 2012), with all other variables at their means. Predicted values generated using the dynsim package in Stata 13.
Figure 2 presents the predicted average real wages of women bureaucrats. When the municipality remains controlled by men, there is a very minor increase in the real wages of women bureaucrats. After 12 years, women’s wages are expected to increase from approximately R$1050 per month to R$1060. However, when a woman mayor is elected, women’s wages increase significantly. Comparing predicted values for the final year of each simulation (T12) shows that women’s average wages are higher in all three cases where a woman mayor was elected at some point in time than in the case where only men were elected and the differences are statistically significant. Women’s wages are highest when a municipality has a woman mayor for two consecutive terms, as might occur if a mayor is re-elected. Even more interesting is the finding that the effect of a woman mayor can outlast her term in office. Looking at the plot where a man is elected in the first term, a woman in the second, and a man in the third (M-W-M), we see that women’s average wages are higher – and remain higher – when a man mayor comes to office following a woman mayor, than when a man is elected after another man mayor. Moreover, even four years after a woman left office, women’s wages are still higher than before she entered. However, women’s average wages continue to decline throughout the man mayor’s term in office.

Figure 3 presents the effects of women mayors on the gender wage gap. In the baseline case (where only men are elected), the gap in wages increases slightly across the 12-year
period. Again, in all instances where the executive changes to a woman, there are prominent decreases in the average wage gap. However, it appears that women mayors need to be in office for at least two terms to have a more lasting impact on the wage gap. When the executive switches back to a man after a woman is in office for just one term (M-W-M), the wage gap returns back to its original levels mid-way through his term. Yet, in the scenario where a woman is in office for two consecutive terms (M-W-W), the gender wage gap decreases and remains at the reduced level. This suggests that women executives have the greatest and most long-term impact on wage inequalities when they are in office for more than one term.

The results of the control variables are fairly consistent across models. However, a few findings merit discussion. First, we find that the gender wage gap decreases as the percent women on the city council increases. Specifically, for every one percentage point increase in women’s council representation, the wage gap decreases by R$0.32. Considering that the average city council is comprised of nine members, a council with just one woman would be composed of 11.11% women. Substantively, this means that electing one more woman to the city council can close the wage gap in the executive bureaucracy by R$3.55/month. Mayors from leftist parties also contribute to increasing gender equality in the bureaucracy by increasing women’s average monthly salaries by R$27.84, but decrease the overall number of women bureaucrats. More educated mayors appear to increase women’s average monthly wages by R$3.60, and decrease the wage gap by R$1.52. Older mayors also appear to increase the average salary of women bureaucrats.

Figure 3. Dynamic simulations of the effects of mayor’s gender on the gender wage gap.
Notes: Years with a woman mayor are presented in bold. Simulated values shown for a leftist mayor in the first term, starting with a man mayor and wage gap of R$149.00/month, with all other variables at their means.
The estimates for year in term and incumbent indicate that mayors who are further along in their terms and incumbent mayors increase the overall percent women in the bureaucracy and also reduce the gender wage gap. However, women’s average salaries are expected to decrease every year the mayor is in office. Municipalities with larger populations and higher GDP per capita, and municipalities where the executive branch is an important employer (patronage), have more women employees and higher salaries for women bureaucrats. However, while larger municipalities and municipalities where the executive is an important employer have smaller wage gaps, municipalities with greater GDP per capita have larger wage gaps. Larger-sized bureaucracies have less women employees, pay women less on average, but also have smaller gender wage gaps. Finally, the statistically significant coefficients for the autoregressive terms indicate that past values of the dependent variables affect the current values.

**Implications of the findings and conclusions**

Representative bureaucracies are desirable as findings from previous research suggest that they produce better outcomes, especially for historically underrepresented groups. There has been less study, however, of the factors that facilitate the development of representative bureaucracies. We theorize that the election of women executives plays a role in increasing women’s representation and equality in bureaucratic institutions. We find that although the presence of women mayors does not change the overall gender composition of the municipal executive bureaucracy, women mayors appear to be more attentive to the compensation of women bureaucrats. In addition, to the extent that salary is a proxy for the prestige of a position, our results indicate that women mayors promote women to higher ranks within the bureaucracy and work to ensure that women’s positions are on par with men’s (or at least that women are given more egalitarian pay). The positive effect that women’s representation in the executive office has for women in the bureaucracy is consistent with demonstrations of how gains in one venue can spill over into other venues as well (Escobar-Lemmon and Taylor-Robinson 2014).

We also find that although the rise in women’s average real wages and the decrease in the gender wage gap begin to diminish once women mayors leave office, the election of women can have long-term positive consequences if women are in office for more than one electoral term. We speculate that this long-term positive effect may result from women bureaucrats being promoted to more prestigious positions and gaining valuable experience under a woman mayor, which allows them to subsequently obtain higher positions that are commensurate with those of men in the future. It may also allow them to enter permanent (career) positions rather than temporary ones making changes more permanent.

Overall, we interpret these findings as a positive sign for Brazilian democracy as increasing the salary and status of women bureaucrats and closing gender gaps may have long-term positive impacts on women in the public sector and women in general. Previous research finds that women’s substantive representation improves as women’s numerical representation increases in municipal executive bureaucracies – both in overall numbers and in top management positions – and that these bureaucratic positions may matter more for the adoption of women-friendly policies and the delivery of public services that benefit women than does representation in local elected offices (Meier and
Funk 2017). Thus, the finding that women mayors enhance women’s representation in the upper ranks of local bureaucracies has important implications for the lives of women citizens.

Equal representation at the highest levels of government is still extremely rare. Our results suggest that inequalities are not only found at the highest levels of national government, but are also present at the local level as well in both elected and bureaucratic institutions. The local level is often thought of as the most responsive level of government and the one closest to the people. Thus, having local bureaucracies that are representative (at all levels and in all sectors) in terms of gender is vital for ensuring that local governments are responsive to all citizens and that women receive full access to the wide range of public services provided by local governments.

This study indicates that electing women mayors can help facilitate the development of representative bureaucracies. Further, these findings matter beyond the Brazilian context. Our theory and findings are generalizable to other contexts in which gender is a salient identity and women representatives have the capacity to act on behalf of other women though the findings are perhaps most generalizable to contexts similar to Brazil (e.g., large, decentralized countries). Hence, the fact that women remain underrepresented in elected positions in local governments around the world (Escobar-Lemmon and Funk 2018; Sundström and Stockemer 2015) should seem problematic to those interested in developing representative bureaucracies and improving women’s substantive representation.

Notes

1. An earlier draft of this paper was presented at the Representative Bureaucracy “mini-conference” at the Midwest Political Science Association meeting in 2016. We thank the conference attendees and two anonymous reviewers for their useful comments on earlier drafts.
2. While racial and ethnic minorities are also underrepresented in Brazil, we do not examine race/ethnicity due to a lack of data. See Kay, Mitchell-Walthour, and White (2015) for a discussion of race in Brazil.
3. During 2001–2012, R$139 Brazilian reais (BRL) was equivalent to between $44.55 and $82.74 US dollars (USD). The exchange rate ranged between 3.12 BRL to 1 USD in 2003 and 1.68 BRL to 1 USD in 2011.
4. The maximum value is due to a small municipality, Israelandia. While this value is an outlier and may be due to misreported data, we opt to keep it in the models. Results are robust to dropping this observation.

Disclosure statement

No potential conflict of interest was reported by the authors.

References


Appendices

Appendix 1

Table A1. Variable names and summary statistics.

<table>
<thead>
<tr>
<th>Variable names</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
<th>N</th>
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<tr>
<td><strong>Dependent variables:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Women bureaucrats</td>
<td>62.057</td>
<td>9.736</td>
<td>0</td>
<td>100</td>
<td>65,143</td>
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<td>Avg. women salary&lt;sup&gt;a&lt;/sup&gt;</td>
<td>811.89</td>
<td>515.01</td>
<td>0</td>
<td>8545.96</td>
<td>65,058</td>
</tr>
<tr>
<td>Wage gap&lt;sup&gt;b&lt;/sup&gt;</td>
<td>138.60</td>
<td>236.55</td>
<td>−4576.02</td>
<td>3437.94</td>
<td>64,985</td>
</tr>
<tr>
<td><strong>Independent variables:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woman mayor</td>
<td>0.078</td>
<td>0.268</td>
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<td>1</td>
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</tr>
<tr>
<td>% Women councilors</td>
<td>12.348</td>
<td>11.013</td>
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<td>77.778</td>
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<td>Left-Leaning Party</td>
<td>0.215</td>
<td>0.410</td>
<td>0</td>
<td>1</td>
<td>66,756</td>
</tr>
<tr>
<td>Right-Leaning Party</td>
<td>0.323</td>
<td>0.468</td>
<td>0</td>
<td>1</td>
<td>66,756</td>
</tr>
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<td>Mayor education</td>
<td>4.473</td>
<td>1.675</td>
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<td>6</td>
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<td>Mayor age</td>
<td>48.585</td>
<td>9.522</td>
<td>19</td>
<td>88</td>
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<td>Population</td>
<td>33,191.982</td>
<td>197,552.799</td>
<td>800</td>
<td>11,376,685</td>
<td>66,765</td>
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<tr>
<td>GDP per capita</td>
<td>9.309</td>
<td>11.553</td>
<td>0.814</td>
<td>511.967</td>
<td>66,755</td>
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<td>Patronage</td>
<td>0.412</td>
<td>0.293</td>
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<tr>
<td>Bureaucracy size</td>
<td>40.899</td>
<td>21.87</td>
<td>0</td>
<td>531.163</td>
<td>66,301</td>
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<tr>
<td>Year in term</td>
<td>2.499</td>
<td>1.118</td>
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<td>4</td>
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<td>Incumbent</td>
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<td>0.483</td>
<td>0</td>
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<td>66,748</td>
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</tbody>
</table>

<sup>a</sup>Accounting for inflation, in constant 2012 Brazilian Reais.

<sup>b</sup>The minimum value is due to one observation (Bonito de Minas, MG). This value may be due to misreported data; however, we opt to keep it because our results are robust to the exclusion of this observation.
Appendix 2

Figure A1. Time series for the dependent and main independent variables.