

Representative Budgeting: Women Mayors and the Composition of Spending in Local Governments

Last updated: April 13, 2018
Forthcoming at *Political Research Quarterly*

Kendall D. Funk
Assistant Professor
School of Social and Behavioral Sciences
Arizona State University
4701 W. Thunderbird Road Glendale, AZ 85306
Email: kendall.funk@asu.edu

Andrew Q. Philips
Assistant Professor
Department of Political Science
University of Colorado Boulder
333 UCB
Boulder, CO 80023
Email: andrew.philips@colorado.edu

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Abstract: One potential consequence of increasing women's numeric representation is that women elected officials will behave differently than their men counterparts and improve women's substantive representation. This study examines whether electing women to local offices changes how local government expenditures are allocated in ways that benefit women. Using compositional expenditure data from over 5,400 Brazilian municipalities over eight years, we find significant differences in the ways men and women mayors allocate government expenditures. Our findings indicate that women mayors spend more on traditionally feminine issues, and less on traditionally masculine issues, relative to men mayors. In regards to specific policy areas, we find that women spend more on women's issues, including education, healthcare, and social assistance, and less on masculine issues, including transportation and urban development, relative to men mayors. We further find that women's legislative representation significantly influences the allocation of expenditures as a larger percentage of women councilors increases spending on traditionally feminine issues, as well as education, healthcare, and social assistance, relative to other policy issues. These findings indicate that women local elected officials improve women's substantive representation by allocating a larger percentage of expenditures to issues that have historically and continue to concern women in Brazil.

Key Words: women's representation; gender; expenditures; Brazil; municipal; finance

Word Count: Approx. 9570 (manuscript), 199 (abstract)

Women remain underrepresented in nearly all countries and all levels of government around the world.¹ However, women's representation has increased in recent years. Over the past two decades, the percentage of women in national legislatures has nearly doubled, from an average of 12% in 1997 to 23% in 2017 (Interparliamentary Union 2017). Women's representation as presidents and prime ministers is improving as well (Jalalzai 2013), as is women's representation in subnational governments, though the evidence is more limited (Escobar-Lemmon and Funk 2018; Sundström and Stockemer 2015; Vengroff, Nyiri and Fugiero 2003). Women's presence in these political institutions is vital for achieving the democratic ideals of fairness and equality. Even if women do not behave differently than men, their presence matters. Women's presence can have symbolic consequences and shape important perceptions, such as views of women (Alexander 2012; Kerevel and Atkeson 2015), satisfaction with democracy (Schwindt-Bayer 2010), or trust in government (Hinojosa, Fridkin and Kittilson 2017). Yet, recent increases in women's political presence beg the question of whether increasing numbers of women in political institutions has consequences for both policy and women's substantive representation. If women *do* behave differently than men, the case for improving women's numeric representation only strengthens, as electing women will result in different outcomes than electing men.

The implications of increasing women's numeric representation extend beyond the national level of government. At the local level, increasing women's representation could fundamentally reshape important outcomes including, but not limited to, the quality of women's substantive representation. Local governments, especially those in decentralized countries, are responsible for important functions such as allocating government expenditures, collecting taxes, delivering public services, managing land usage, maintaining city infrastructure, and creating and implementing public policies. Given the role of local governments in overseeing these important

functions and their potential to shape policies that matter to women, it is important to study the consequences of women's representation within the local context.

This study offers several new innovations. First, we contribute to the growing body of knowledge about the consequences of women's representation by examining whether increasing women's local representation changes the spending priorities of local governments. We use panel data from Brazilian municipalities to examine whether women mayors allocate government expenditures differently than men mayors, and specifically whether women mayors spend more in policy areas that concern women citizens. Second, we argue that budget allocations reflect policy priorities. Given the constraints of local government budgets, allocating more money to one area often requires a decrease in another. If women mayors allocate more expenditures to policy areas that disproportionately affect women, this indicates that they are prioritizing the needs of women *above* other issues, and also engaging in substantive representation.

Using recent innovations in modeling compositional variables, we analyze expenditures in multiple policy areas simultaneously. The findings indicate that women mayors allocate a larger proportion of expenditures to traditionally feminine issues and a smaller proportion to traditionally masculine issues overall compared to men mayors. Further, these differences persist when analyzing more specific policy areas. Women mayors allocate more to education, healthcare, and social assistance, compared to men mayors, by decreasing the proportion of spending in areas such as transportation and urban development. We also find that the percent women city councilors impacts expenditure decisions, despite the fact that the council has little direct influence over municipal budgets. A larger percentage of women councilors results in greater expenditures in traditionally feminine areas overall, as well as increases in education,

healthcare, and social assistance spending at the expense of spending on administration and other areas. These findings suggest that increasing women's representation as mayors and city councilors in Brazil will likely improve women's substantive representation since women local officials are more likely to prioritize spending in areas that continue to disproportionately concern Brazilian women.

The Consequences of Women's Representation

Whether electing women results in different consequences than electing men is the subject of a growing body of research. On the one hand, there might not be any significant consequences. The equality view of women's representation suggests that if women are equal participants in the political process, there will not be observable differences in the policies enacted by men and women (Lovenduski 2005). Under conditions of full equality, women would not be sidelined to working in certain areas (Heath, Schwindt-Bayer and Taylor-Robinson 2005), but instead able to focus on a diverse set of policy issues, as do men representatives, and participate equally in the governing process. This type of equality would result in no observable differences in the types of policies adopted by men and women policymakers.

On the other hand, research shows that political institutions are *gendered* institutions (Acker 1992), meaning that women elected officials often do not operate under conditions of full gender equality. Furthermore, a large body of evidence shows that women typically have different preferences and behaviors than men, and that women elected officials are more likely to act in the interests of women citizens.² In terms of preferences, women state legislators in the U.S. are more likely to prioritize issues that have traditionally concerned women, such as healthcare, social services, family and children's issues, and the environment (Little, Dunn and

Deen 2001). Studies of Latin American legislators also indicate that women place greater priority on issues related to women, children, and families (Schwindt-Bayer 2010).

In terms of behaviors, research finds that women legislators participate more in debates about policy issues that concern women (Funk, Morales and Taylor-Robinson 2017; Osborn and Mendez 2010; Taylor-Robinson and Heath 2003). They are also more likely to initiate bills related to women's rights, children, and families (Jones 1997; Schwindt-Bayer 2010; Taylor-Robinson and Heath 2003) and social issues, including education, healthcare, and welfare (Swers 2014; Schwindt-Bayer 2010). Women chief executives are more likely to appoint women to top bureaucratic positions, such as cabinet ministers at the national level (Reyes-Housholder 2016) and public managers at the local level (Funk, Silva and Escobar-Lemmon Forthcoming). A number of additional studies find that increasing women's representation results in the adoption of policy programs that favor women's substantive interests. Examples include the provision of childcare in Norwegian municipalities (Bratton and Ray 2002), the implementation of women-friendly policies in Brazil (Meier and Funk 2017), greater gender equality in Sweden (Wängnerud and Sundell 2012), and the adoption of family leave policies in developed democracies (Kittilson 2008). All these studies provide evidence that women represent women.

Consequences for Government Spending

Gender differences in policy priorities and behaviors can also result in significant differences in the ways that women and men policymakers choose to allocate government resources. Indeed, there is evidence that women's representation influences the distribution of government expenditures. Cross-national studies find that the percent women in national legislatures is associated with increases in social spending (Bolzendahl 2009), spending on family benefits

(Bolzendahl 2011; Ennsner-Jedenastik 2017), and spending on health and social welfare (Chen 2010), but associated with decreases in defense spending (Koch and Fulton 2011).³

Women's representation has been shown to shape subnational government expenditures as well. There is evidence that increasing women's presence in U.S. state legislatures results in more spending on healthcare (Courtemanche and Green 2017; Rehavi 2007) and less on corrections (Rehavi 2007). U.S. cities with women mayors are more likely to fund social welfare programs (Holman 2014) and allocate federal grants to issues like childcare centers and services for children, youth, and abused spouses (Smith 2014). In India, increasing the representation of women from lower castes leads state legislatures to invest more in health and early education (Clots-Figueras 2011; Halim et al. 2016), and increasing women's representation as village council heads results in greater investments in public goods that matter to women (Chattopadhyay and Duflo 2004). Further studies indicate that increasing women's representation in local councils increases spending on childcare and education in Sweden (Svaleryd 2009), social welfare spending in Taiwan (Chen 2013), and healthcare spending in Switzerland (Braendle and Colombier 2016).⁴

Yet, findings from other studies suggest that gender representation does not significantly influence government spending. Studies of local governments in the U.S. (Ferreira and Gyourko 2014), Spain (Campa 2011), Italy (Rigon and Tanzi 2012), and Bavaria (Schild 2013) find that women's representation in local governments has no impact on the composition of expenditures. Moreover, many studies that do find significant gender effects highlight the importance of factors that condition the relationship between gender representation and spending; for example, the power of representatives to act unilaterally (Holman 2014; Koch and Fulton 2011; Smith 2014), citizen spending demands (Courtemanche and Green 2017), intersecting identities such as

social class (Clots-Figueras 2011; Halim et al. 2016), or the extent of women's representation in other political offices (Holman 2014; Koch and Fulton 2011).

In sum, the literature suggests that women's representation may significantly impact the way governments allocate resources, with greater representation yielding more spending in favor of women's interests. However, the relationship between women's representation and government spending may be conditional on other factors. Below, we develop theoretical expectations about the relationship between women's representation in executive offices and expenditure allocations within the context of Brazilian municipalities. We explain why women mayors may—or may not—be more inclined than men mayors to allocate expenditures to certain policy functions, particularly those that benefit women as a group.

Representative Budgeting Theory

Government expenditures reflect policy priorities. If women's representation significantly alters how expenditures are allocated, this indicates that women also change the priority that governments place on certain policy issues. In addition, modifying the allocation of expenditures often requires trade-offs since governments do not have unlimited funds to distribute. Thus, increasing expenditures in one area nearly always requires a decrease (at least as a proportion of the budget) in another area.

The distribution of government spending is also a form of representation. As opposed to other forms of representation that are rarer—e.g., bill initiatives, political speeches, policy adoptions—spending is an essential government function that occurs regularly. Government expenditures also matter for policy outcomes. Whereas some forms of representation may be purely symbolic or contingent on the availability of resources for proper implementation and

enforcement, expenditures are likely to have a substantive impact across policy areas. Furthermore, small changes in allocations can have large effects over time, since government budgets often change incrementally (Wildavsky 1986). If women policymakers shift expenditures in one year, this change is likely to persist over time. Thus, the allocation of expenditures can provide a meaningful form of long-term representation for various groups in society, including women. This leads back to the question: when women are in power, do they allocate expenditures differently than their men counterparts? Do they prioritize issues that women care about? Prior research on gender representation and government spending offers mixed findings, with most studies concluding that the relationship is context-dependent. In the context of Brazil, there are competing expectations about whether women policymakers will act differently than men.

First, less than 10% of mayoralities in Brazil are held by women, and the average city council has just 12% women, meaning that Brazilian local politics are still dominated by men. Thus, local governments may very well be “gendered institutions” (Acker 1992). Under conditions of gendered institutions, women representatives may desire to represent women, but may be constrained by the gendered rules and norms of the political office. The gendered nature of executive offices, in particular, might incentivize women executives to act “like men.” Whereas men are assumed to possess the qualities traditionally associated with a chief executive, such as assertiveness and competence (Eagly and Karau 2002; Stivers 2002), women must work to counteract stereotypes and combat credibility challenges associated with their gender (Funk 2015; Koch and Fulton 2011). Thus, the gendered nature of Brazilian local governments, and the local executive office in particular, may cause women mayors to behave similarly to men, resulting in no differences in expenditure allocations.

Second, there may be no observable differences in the distribution of expenditures because men and women mayors actually have similar spending preferences. The equality view of women's representation posits that if women are truly equal participants in politics, they will not be sidelined to particular policy areas, but able to initiate changes across diverse areas (Lovenduski 2005). The few women who are successfully elected as mayors in Brazil—having won the most powerful position in local government—may have achieved equality and thus are able to work on a diverse set of issues similar to men. Women mayors might value women's issues, but also aspire to represent all constituents, so they prioritize spending in both women's and non-women's policy issues (Schwindt-Bayer 2010), resulting in no notable differences in the ways men and women mayors allocate expenditures.

Null Hypothesis: There is no difference in the way men and women mayors allocate expenditures.

However, research still frequently finds significant gender differences in representatives' attitudes toward women's rights and equality issues (Taylor-Robinson and Heath 2003; SchwindtBayer 2010) and that women representatives are more likely to view women as an important constituency in need of representation (Childs 2004; Reingold 1992). Further studies find evidence that women prioritize issues have traditionally concerned women, such as family and children's issues, healthcare, social services, and the environment (Jones 1997; Little, Dunn and Deen 2001; Poggione 2004; Swers 2014). Women representatives are also more active in traditionally feminine issues (e.g., healthcare, education, welfare), for example, by participating in debates (Funk, Morales and Taylor-Robinson 2017; Osborn and Mendez 2010), initiating

legislation (Schwindt-Bayer 2010), serving on committees (Baekgaard and Kjaer 2012; Barnes 2016; Heath, Schwindt-Bayer and Taylor-Robinson 2005), and initiating policy programs (Bratton and Ray 2002; Meier and Funk 2017) in these areas.

Based on these findings from previous research, we might expect women mayors in Brazil to change the way government expenditures are allocated by providing greater funds to policy areas that disproportionately affect women. Women elected officials share the same gender identity as women in the general population; thus, they are likely to share similar socialization experiences, interests, and policy concerns as other women. Women mayors, like other women in Brazil, have experienced living in a gender-structured society that disadvantages women. As a consequence, women mayors may be more likely than men mayors to identify with women constituents as an underrepresented group and desire to represent their interests. One way they might do so is by allocating a greater proportion of expenditures to areas that concern women.

Hypothesis 1: Women mayors allocate more expenditures to women's policy issues, relative to men mayors.

Yet, previous research also suggests that women executives' ability to represent women's interests through the allocation of government spending may be conditional on the representation of women in the legislative branch (Holman 2014; Koch and Fulton 2011). In other words, women mayors might need a "critical mass" (Childs and Krook 2008; Kanter 1977) of women on the city council in order to enact any meaningful changes to local expenditures. As discussed in greater detail below, the city council is responsible for approving the mayor's proposed budget

and can directly and indirectly influence the mayor's decisions (within certain limitations). If women mayors are considered to be "tokens," and lack the support of the city council, they may find it difficult to initiate budgetary changes. However, if there are many women in government, it may be easier for women mayors to propose changes that favor of women's policy interests. Thus, we add nuance to our theory in the second hypothesis by proposing that the effect of women mayors may be conditional on the presence of women city councilors.

Hypothesis 2: Women mayors allocate more expenditures to women's policy issues, relative to men mayors, when the percent women on the city council is sufficiently large.

Measuring Women's Policy Issues

Research has defined "women's issues" in various ways. The narrowest version defines women's issues as those related to women's rights and equality (Baldez 2011). Others use a broader definition that incorporates children and family issues, or pro-poor policies (Escobar-Lemmon, Schwindt-Bayer and Taylor-Robinson 2014; Funk, Morales and Taylor-Robinson 2017). The broadest definition incorporates issues that correspond to women's traditional social roles and has been used to study gender differences in cabinet portfolio allocations (Escobar-Lemmon and Taylor-Robinson 2009; Krook and O'Brien 2012), legislative activities (Reingold 2000; Schwindt-Bayer 2010; Swers 2002), and committee assignments (Baekgaard and Kjaer 2012; Barnes 2016; Heath, Schwindt-Bayer and Taylor-Robinson 2005).

There is a growing consensus that what counts as a women's issue is context-dependent and varies across time and space. Policy areas can be considered gendered if they disproportionately affect (i.e., benefit or harm) women as a group or can become gendered

through the political process (Holman 2014; Keiser et al. 2002). We measure women's issues in two ways and divide our analyses accordingly. First, we classify expenditure areas based on whether they correspond to women's or men's traditional domains. Second, we highlight three areas that continue to disproportionately affect Brazilian women: education, healthcare, and social assistance.

Traditional Feminine and Masculine Issues

We first classify issues according to whether they correspond to women's or men's domain, or neither. These classifications are rooted in traditional gender roles, with the Brazilian context in mind. Like elsewhere, Brazilian women have been primarily responsible for homemaking and childcare, while men have been responsible for breadwinning and protecting the family. The Brazilian Treasury reports municipal government expenditures in 28 categories. We classify education, healthcare, social assistance, culture, housing, environment, and citizenship rights as feminine issues since these correspond to women's traditional roles in the domestic sphere as caregivers and nurturers.⁵ We classify urban development, transportation, agriculture, social security, sanitation, sports, energy, commerce, public safety, employment, industry, defense, science & technology, agrarian economy, and international relations as masculine issues since these correspond to men's traditional roles in the public sphere as economic providers and defenders. The remaining categories are "unclassified" as they do not clearly correspond to either domain. For robustness, we checked these classifications against the existing literature (e.g., Escobar-Lemmon and Taylor-Robinson 2009; Krook and O'Brien 2012) and asked two scholars of gender in Latin America to independently classify each area, and then compared classifications and reconciled any discrepancies.⁶

It is important to note what we term *feminine* policies should not be mistaken for *feminist* policies; i.e., those aimed at improving women's rights and equality. Spending on feminine (or masculine) issues may incorporate feminist policies, but we cannot make these connections given the way expenditures data are reported.⁷ For example, we do know that spending on public daycares is included under education. Municipal childcare provision provides women with greater opportunity to pursue full-time employment and better balance family and career, thus spending on education does include feminist issues. However, we do not know whether other feminist concerns are incorporated in certain expenditure areas. Healthcare might include services for domestic violence victims or birthing centers. Housing might cover women's shelters. Employment might include municipal initiatives aimed at diminishing wage disparities or sexual harassment. Yet, we are unable to determine this given the limitations of the data. Though these classifications are imperfect, they do allow us to test whether women mayors prioritize spending in areas that have traditionally concerned women.

[Table 1 about here]

Table 1 presents these classifications, the average percent spent in each area, and the difference between men and women mayors. Spending on education, healthcare, administration, urban development, transportation, and social assistance constitute the majority (over 84%) of expenditures. Difference of means tests suggest there are significant gender differences in four of these areas: education, healthcare, social assistance, and transportation. Further, women mayors spend around 2.4 percentage points more on feminine issues overall and 2.5 percentage points less on masculine issues overall, compared to men mayors. However, these significant differences may not hold after controlling for other variables. We address this further below.

Women's Issues in Brazil

The second way we measure women's issues is by accounting for how the Brazilian context affects the gendered nature of certain policy issues. In Brazil, many issues that have traditionally concerned women continue to disproportionately affect women today. We emphasize three areas—education, healthcare, and social assistance—and compare these to the other largest expenditure areas (urban development, administration, transportation, plus all other areas combined) as a second test of whether women mayors prioritize spending on women's issues.

Education, healthcare, and social assistance are considered women's issues in Brazil for multiple reasons. In addition to corresponding to women's traditional roles, these issues continue to affect Brazilian women to a greater extent than they affect men. For example, women constitute the majority of employees in the education, healthcare, and social service sectors in Brazil. While just 1.21 percent of men employed in 2010 worked in education, around 3.5 times as many women held education-related jobs. Likewise, about six times as many women as men are employed in healthcare or social service occupations: 4.38 percent of employed women work in healthcare compared to 0.74 percent of employed men; 4.46 percent of employed women hold jobs related to health and social services compared to 0.75 percent of employed men. (See the Supplementary Materials for tables supporting this section.)

Survey data also indicate that Brazilian men and women are affected differently by and have different attitudes towards these issues.⁸ With respect to healthcare, women report their health is worse than men on average and they frequently lacked medications. Women are also more likely to identify lack of health services as the most important problem in Brazil and believe healthcare should be a government spending priority. In contrast, men are more likely to agree with the statement “government should offer less public services, like health and

education, to reduce taxes.” Regarding education, Brazilian women continue to be primarily responsible for childcare and ensuring their children are educated. Women report they have more children than men and they worry about their children’s education. Women support increasing taxes to facilitate spending on secondary and higher education, and more often identify lack of quality education as Brazil’s most important problem. Women also attend more parent-teacher meetings and disagree that a “university education is more important for a boy than a girl.”

Women are also disproportionately affected by social assistance spending. In Brazil, “[f]emale-headed households are more likely to be in poverty at any point in time than male-headed households” (Barros, Fox and Mendonça 1997, 231). Women report lower household and personal incomes, express dissatisfaction with their financial situation, and self-identify into a lower social class than men. Women are more likely to believe government does not do enough to combat poverty, report receiving *Bolsa Família* benefits, and favor expanding *Bolsa Família*. Women also frequently identify poverty, slums, or hunger as the most important problems in Brazil, and believe government should prioritize spending on “helping the poor.”

Thus, in Brazil, education, healthcare, and social assistance not only fall under women’s traditional domain, but also continue to be important to women today. Women are more likely than men to be employed in these sectors, place greater priority on these issues, and are more affected by policy changes in these areas. Given these realities, increases in municipal spending on education, healthcare, or social assistance should benefit Brazilian women as a group, and consequently, these areas can be classified as women’s policy issues in the context of Brazil.

Local Government Budgeting in Brazil

Brazil is highly decentralized with 5,570 municipal governments (nested within 26 states plus a

federal district). The 1988 Constitution deems municipalities autonomous political units with legislative and executive powers. While some municipalities have large populations, the vast majority (95% in 2010) have less than 100,000 residents, and around 50% have less than 11,000. Each municipality has a mayor and city council that are elected concurrently every four years. Voting is mandatory in Brazil, so voter turnout tends to be very high. Mayors are limited to one immediate reelection but can compete again after sitting out one term. Municipalities have a “strong mayor, weak council” form of government, known as *executivismo*, which is common throughout Latin America. This means mayors have significant policymaking powers and discretion. Federal legislation dating before the military coup and subsequent re-democratization gives mayors nearly complete control over local budgetary decisions (Federal legislation 4.320, March 1964).

The city council acts as an oversight body and must approve the mayor’s proposed budget by two-thirds vote (1988 Constitution, Art. 31, Paragraph 2). However, the council is limited in its ability to alter the mayor’s proposed budget (Wampler 2007, 50-51). Councilors are prohibited from introducing legislation that would require spending additional funds. They can pass budgetary amendments, but amendments cannot increase the budget’s size (they must reallocate from one area to another) and can be vetoed by the mayor. Moreover, amendments that are approved often alter a very small portion of the budget and may not actually be implemented. Furthermore, the mayor can increase spending between 5 and 40 percent on any budget item without prior council approval (Wampler 2007, 50).⁹ If the council fails to approve the mayor’s proposed budget, the budget from the previous year is reinstated.

Crafting the municipal budget is a very technical process. Transfers received from higher levels of government must be spent appropriately and the Constitution also sets spending floors

for education and healthcare, and a spending ceiling for city councilors' salaries. Municipalities must spend at least 25% of tax revenues in the maintenance and development of education (Art. 212), and at least 15% of all revenues on healthcare (Art. 198; Temporary Constitutional Provisions Act: Art. 77, Item III). The distribution of responsibility for different policy areas is also specified in the Constitution. All levels of government are jointly responsible for disability services; access to culture, education, and science; the environment; agriculture and food supply; housing and sanitation; and combating poverty (Art. 23, Item II). Municipalities are primarily responsible for infant and elementary education, health services, urban development, and preserving local historic and cultural heritage (Art. 30). Beyond these functions, municipalities also allocate expenditures to other areas, such as social assistance, energy, or public safety (see Table 1).

While the Constitution places some limits on municipal expenditures and specifies which policy areas municipalities should prioritize, mayors still have much control over discretionary expenditures. Mayors decide, with few limitations, which policy areas should receive more or less discretionary funds. "Institutional rules encourage mayors to initiate reform efforts and policies that reflect their interests; the rules concentrate legislative, budgetary, and administrative authority in the mayor's office, which gives the mayor great flexibility to govern" (Wampler 2007, 48). Even in municipalities with participatory budgeting, mayors can manipulate the budget to advance their agenda (Wampler 2007, 65). Thus, if a mayor prioritizes a particular issue, s/he should be able to allocate expenditures to reflect this prioritization, so long as the constitutional and legal requirements are met.

Data, Variables, and Methods

We use data covering two electoral terms (2005-2012) for over 5,400 municipalities.¹⁰ The dependent variable we use is also known as a compositional variable, since each category in the composition (e.g., the proportion spent on masculine, feminine, and unclassified areas) sums to one. This means that increasing the share of expenditures in one category requires decreasing expenditures in at least one other category (the sum of the proportions must always equal one), which can make models of compositional dependent variables relatively complicated to estimate. The most common strategy is to model one category as a proportion of the total. However, using this method would prevent us from obtaining valuable information about trade-offs that occur simultaneously between policy areas; for example, the (1) feminine and masculine, (2) feminine and unclassified, and (3) masculine and unclassified categories.

To capture these trade-offs, we use a modeling strategy similar to the one proposed by Philips, Rutherford and Whitten (2016a), which has been previously used to analyze budgets (e.g., Lipsmeyer, Philips and Whitten 2017). Such estimation strategies are gaining popularity since they allow all components of a composition to be modeled simultaneously, meet standard regression assumptions by “unbounding” the compositions (which are naturally bounded between 0-100%), and lend themselves to graphical presentations. We use the additive log-ratio transformation to express each category relative to the others. This involves estimating the log-ratio of feminine and unclassified expenditures relative to the reference category (masculine) via the following models:

$$\ln \left(\frac{Feminine}{Masculine} \right)_{it} = f(\text{Woman Mayor, Controls, Year Fixed-Effects}) \quad (1)$$

$$\ln \left(\frac{Unclassified}{Masculine} \right)_{it} = f(\text{Woman Mayor, Controls, Year Fixed-Effects}) \quad (2)$$

Above, the log-ratio of the feminine (Equation 1) or unclassified (Equation 2) proportions of total expenditures (relative to the masculine proportion) for municipality i in year t is a

function of a dichotomous indicator for woman mayor, a set of controls, and year dummies. By taking the log-ratio transformation, we can estimate all three categories using the standard multivariate normal distribution (Philips, Rutherford and Whitten 2016a). We also estimate seemingly unrelated regressions to account for contemporaneously correlated errors between models. Year fixed effects account for unobservable shocks common to all municipalities.

In terms of controls, we include the mayor's age (logged), level of schooling (none=1, graduate=7), and whether the mayor's party is left-leaning (from Power and Zucco 2009, 2012) since younger, better educated, and leftist mayors are more likely to care about gender equality (Inglehart and Norris 2003).¹¹ We also control for the mayor's term in office (1=second, 0=first) and the mayor's margin of victory since popular mayors may more easily implement changes. We control for the percent city councilors from the mayor's party and percent women councilors, which also likely affect the mayor's decisions. In addition, mayors with greater revenues per capita and more own-source revenue (versus transfers) may have greater flexibility in modifying expenditures. Finally, we account for demands for spending in certain areas by controlling for municipal population size (logged), percent of the population in rural areas, percent women in the population, municipal human development index, percent living in poverty, average life expectancy, average years of schooling, average income per capita, percent with access to clean water and toilets, percent of women age 15-17 with children, and the illiteracy rate.¹²

Analyses and Results

We first present results for the aggregated feminine, masculine, and unclassified areas, and then present results for individual policy areas and women councilors.

Results for Feminine, Masculine, and Unclassified Areas

Results for the aggregate categories are presented in Table 2. Model 1 presents spending on feminine issues relative to masculine issues. Model 2 presents spending on unclassified issues relative to masculine issues. A positive (negative) coefficient indicates that the variable increases (decreases) the proportion of expenditures allocated to the numerator category at the cost of the denominator category. Thus, the positive and statistically significant coefficient on the woman mayor variable in Model 1 suggests that women allocate more to feminine policy issues compared to masculine issues. Yet, Model 2 suggests that a woman mayor does not significantly affect the proportion of expenditures allocated to unclassified areas, relative to masculine ones. These findings lend support to our first hypothesis and suggest that women mayors allocate more to women's issues at the expense of traditionally masculine issues.¹³

[Table 2 about here]

Since interpreting the substantive significance of the log-ratio results presented in Table 2 is not straightforward, we turn to calculating the expected proportion of expenditures allocated to feminine, masculine, and unclassified areas by women and men mayors, setting all control variables to their means. To do so, we estimate stochastic simulations using CLARIFY (Tomz et al. 2003), then “un-transform” the resulting compositional predictions back into proportions as done by Philips, Rutherford and Whitten (2016b).¹⁴ We then plot the predicted average percent spent in each area by men and women mayors and include 95% confidence intervals.

[Figure 1 about here]

Figure 1 suggests women mayors allocate about one percentage point more to feminine issues than do men mayors, all else equal. This increase comes almost exclusively at the cost of masculine issues, since, while women mayors spend statistically significantly less on masculine

areas relative to men mayors, there is no statistically significant difference with respect to spending on unclassified areas. This can also be seen in the middle plot presented in Figure 1, which shows that women mayors allocate less to masculine areas, while there is no statistically significant difference in men and women mayors' allocations to unclassified areas. Overall, Figure 1 supports the hypothesis that women mayors allocate a larger portion of expenditures to areas that have traditionally concerned women compared to men mayors.

To further grasp the substantive effects of mayoral gender on expenditures, consider a typical municipality in our sample: Ibiassucê, a municipality in the state of Bahia with around 10,000 inhabitants. It is typical in that all control covariates for this municipality fall within 0.75 standard deviations of the sample mean. Our estimates suggest that if Ibiassucê had a woman mayor instead of a man, there would be an increase in spending of around R\$86,700 (Brazilian Reals) in feminine policy areas and a decrease of around R\$75,400 and R\$11,300 in masculine and unclassified areas, respectively, per year.¹⁵ Although relatively small in per capita terms, these differences can have notable impacts, especially in smaller municipalities where changes in investments or public works projects are very noticeable. Further, these changes can add up to large differences over time given that budgets usually change incrementally from year to year.

Results for Individual Policy Areas

Next, we disaggregate expenditures to examine whether gender differences persist in specific policy areas. We examine seven areas: education, health, social assistance, transportation, urban development, administration, and an “other” category comprised of the remaining areas. We hypothesize that women mayors allocate a larger proportion of expenditures to the women’s policy issues identified above—education, healthcare, and social assistance—compared to men

mayors, which may result in significant decreases in the percent allocated to traditionally masculine (urban development, transportation) and/or unclassified (administration, other) areas. For brevity, we plot the predicted average percent spent in each area, although the full table of log-ratio coefficients is available in Table S2 in the Supplemental Materials. The proportions allocated to education, health, and social assistance are shown in Figure 2, while the proportions allocated to transportation, urban development, administration, and other issues are shown in Figure 3.

[Figure 2 about here]

In terms of spending on women's issues, Figure 2 shows that women mayors allocate a larger portion of expenditures to education. Specifically, women mayors allocate about one percentage point more to education than do men mayors. Table S7 in the Supplemental Materials shows that this increase in education expenditures is the result of decreases in spending on transportation, urban development, healthcare, and "other" areas. Figure 2 also suggests there is not a statistically significant difference for spending on social assistance or healthcare *as a percent of total expenditures*, as the 95% confidence intervals for men and women mayors overlap. However, there are important gender differences when considering the *trade-offs between different areas*. Results suggest women mayors increase healthcare expenditures by decreasing expenditures to transportation, but they also decrease healthcare spending to increase education and social assistance spending, compared to men mayors (see Table S8 in the Supplemental Materials). Furthermore, women mayors increase spending on social assistance by decreasing spending on transportation, urban development, healthcare, and "other" areas (see Table S9 in the Supplemental Materials).

Figure 3 shows women mayors spend less on transportation compared to men mayors,

but there are not statistically significant differences for urban development, administration, or other issues when analyzed as a proportion of total expenditures. Estimates suggest women mayors allocate around 0.1 percentage points less to transportation compared to men mayors. These findings all support our hypothesis that women mayors will allocate more expenditures to women's policy issues and also suggest these increases often come at the expense of spending on traditionally masculine issues, such as urban development and especially transportation.

To better understand the size of these effects, consider these results in the context of Mirante da Serra, another typical municipality in the state of Rondônia with 14,000 residents. If Mirante da Serra had a woman mayor rather than a man, our estimates suggest education expenditures would increase nearly R\$130,000 and transportation expenditures would decrease about R\$55,050. Additionally, the estimates predict increases of around R\$17,900 in social assistance and R\$40,700 in administration; and decreases of around R\$35,400 in healthcare, R\$36,600 in urban development, and R\$61,550 in other expenditures. Again, while these amounts may seem small in per capita terms, they could result in very noticeable differences in outcomes.

[Figure 3 about here]

Results for Women Councilors

Though mayors have significant control over expenditures, the city council is responsible for approving the mayor's proposed budget and may influence the mayor's decisions directly or indirectly. Thus, if there are many women on the city council, we might expect mayors (both men and women) to be more likely to prioritize women's issues. Estimates presented in Table 2 suggest that increasing the percent women councilors increases expenditures in feminine issues

at the expense of masculine issues; however, women councilors do not significantly impact expenditures to unclassified issues. This finding suggests the presence of women councilors, like women mayors, leads to spending increases on issues that have traditionally concerned women. Disaggregating expenditures further, we see similar results. More women councilors increase spending in all three women's policy issues, education, healthcare, and social assistance, at the expense of spending on administration and "other" issues (see the Supplemental Materials). These findings provide further evidence that increasing the presence of women councilors significantly increases the proportion of expenditures devoted to women's issues. These are especially notable findings given that the council does not have substantial control over expenditures and lacks power relative to the mayor.

Results for Women Councilors and Women Mayors

We also theorized that the effect of women mayors might be conditional on the percent women city councilors. We test this by interacting the women mayor variable with the percentage of women on the city council. For brevity, the results are summarized here but reported more fully in the Supplemental Materials. Across all our measures of women's policy issues, we see that the effect of women mayors is not conditional on the percent women councilors. In other words, women mayors do not appear to need a "critical mass" of women on the city council before they are able to change the distribution of expenditures. However, we do find a significant conditional effect for *men* mayors. As the percent women councilors increases, men mayors become more likely to spend on feminine issues in general and on education in particular. In fact, when the percent women councilors is sufficiently large (around 28.57%), men mayors' spending becomes statistically indistinguishable from women mayors' spending. Overall, these findings suggest that

women councilors do not have a significant effect on women mayors' allocation decisions but may push men mayors to spend more on women's policy issues, like education.

Discussion and Conclusions

This study adds to the growing body of research about the consequences of women's representation by examining whether women's presence in local elected offices influences the allocation of government expenditures in ways that favor women's interests. Overall, our findings echo those of numerous studies illustrating the link between women's descriptive and substantive representation. Our analysis of spending on traditional feminine and masculine policy issues reveals women mayors allocate a larger proportion of expenditures to traditionally feminine issues and a smaller proportion to traditionally masculine issues, compared to men. We also find that allocations to feminine issues increase as the percent women councilors increases. Second, disaggregating expenditures into specific policy areas, we find women mayors allocate more to women's issues including education, healthcare, and social assistance by decreasing expenditures in masculine areas like urban development and transportation, and that increasing the percent women councilors also increases the proportions allocated to education, healthcare, and social assistance.

Furthermore, we show that women represent women even in a context where representation is difficult to achieve. The municipal budgeting process is highly technical and constrained by legal and practical considerations. Women city councilors, in particular, have little formal say over budgeting decisions. In addition, the context of our analysis should be one in which men mayors are also inclined to spend on women's issues since Brazilian municipalities are responsible for education and healthcare provision. Yet, even in this constrained context, we

find that women elected officials better represent the interests of women.

Regarding our particular findings, we see that women mayors allocate even more to education than they do to either healthcare or social assistance. One potential explanation for these findings is the distribution of policy responsibilities among levels of government. While municipalities are primarily responsible for elementary education, the state and federal levels take on a larger share of responsibilities for healthcare and social assistance. Thus, women mayors may view education as a higher spending priority than other women's issues that might be funded by higher levels of government. A second potential explanation is that women mayors, especially those with more "feminine" backgrounds (e.g., careers as homemakers or caregivers), may hesitate to prioritize social assistance and healthcare because it feeds into traditional stereotypes of women as softhearted, whereas spending on education is seen as an investment in human capital. There is not much evidence for this explanation, however, given that a woman mayor's employment background does not appear to affect her spending decisions (as shown in the Supplemental Materials). A third explanation is that mayors are motivated by election concerns and so women mayors allocate more to education because they expect women voters to reward them electorally for doing so. Finally, one of the most plausible explanations for our results is that women mayors spend more on education (and also healthcare and social assistance relative to masculine issues) because they desire to represent women's interests.

These findings also suggest that women elected officials have effects beyond the "rising tide" of gender equality that comes with slow-moving societal changes (Inglehart and Norris 2003). In a large way, women's elected representation itself is a result of the rising tide, as changes in cultural attitudes and socioeconomics contribute to women's elections. Yet, it seems that women elected officials make "the tide rise faster," as it were, since they improve gender

equality in the representation of interests. Women mayors and city councilors promote more spending in areas that matter and can have direct consequences for the lives of women. In the context of education, for example, increasing spending on early childhood education helps women shoulder the responsibility of childcare, which increases their employment options (Bratton and Ray 2002; Wängnerud and Sundell 2012). These results also underscore the importance of improving women's numeric representation in Brazil and elsewhere since this study shows that electing women *will* result in different outcomes than electing men, and that women's substantive interests will be better represented when women are present in governing bodies.

Notes

1. The data used in this study, replication code, and the Supplemental Materials are available at: www.kendallfunk.com and www.andyphilips.com. A previous version of this article was awarded the 2015 Marian Irish Award for Best Paper on Women and Politics presented at the Annual Meeting of the Southern Political Science Association in 2014. The authors thank numerous colleagues and the anonymous reviewers for useful feedback on earlier drafts. All remaining errors are, of course, our own.
2. See Iversen and Rosenbluth (2006) for a theory on the origins of these divergent preferences.
3. However, women *executives* are associated with increases in defense spending, though this finding dissipates as the percent women legislators increases (Koch and Fulton 2011).
4. See also Funk and Gathmann (2015) on the gendered implications of direct democracy for government expenditures in Switzerland.
5. Citizenship rights includes assistance to indigenous groups, collective rights, and social reintegration programs.
6. We thank Maria Escobar-Lemmon and Michelle Taylor-Robinson.
7. See the Supplemental Materials for expenditure sub-functions.
8. Reported differences are significant at 90% based on two-tailed *t*-tests. Data are from the AmericasBarometer and World Values Survey. See the Supplemental Materials for details.
9. This threshold varies by municipality and can be changed by municipal legislation.
10. Some of Brazil's 5,570 municipalities are omitted due to missing expenditures data.

11. We code the PT, PDT, PSTU, PCB, PPS, PSB, PV, PSOL, and PC do B as leftist. See the Supplemental Materials.
12. Some variables are interpolated since data are only collected in decennial censuses.
13. Note we would not observe these simultaneous trade-offs using conventional methods.
14. The un-transformation is $Feminine = \frac{\exp(F\hat{e}m.)}{1+\exp(F\hat{e}m.)+\exp(U\hat{n}cl.)}$, $Unclassified = \frac{\exp(U\hat{n}cl.)}{1+\exp(F\hat{e}m.)+\exp(U\hat{n}cl.)}$, and $Masculine = \frac{1}{1+\exp(F\hat{e}m.)+\exp(U\hat{n}cl.)}$.
15. As of February 2018, one Brazilian real is approximately 0.31 US dollars.

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Table 1: Average Expenditures in Each Policy Area and Difference of Means by Mayoral Gender

Expenditure Function	Traditionally	Avg. %	Women	Men	Difference
<i>Aggregate Feminine Issues</i>		57.122	59.328	56.914	2.414*
<i>Education</i>	Feminine	29.399	30.852	29.261	1.591*
<i>Healthcare</i>	Feminine	21.820	22.164	21.787	0.377*
<i>Social Assistance</i>	Feminine	3.883	4.127	3.860	0.267*
<i>Culture</i>	Feminine	1.124	1.222	1.114	0.108*
<i>Housing</i>	Feminine	0.462	0.491	0.459	0.032
<i>Environmental Management</i>	Feminine	0.396	0.432	0.393	0.040*
<i>Citizenship Rights</i>	Feminine	0.039	0.0392	0.0394	-0.0002
<i>Aggregate Masculine Issues</i>		20.888	18.592	21.105	-2.513*
<i>Urban Development</i>	Masculine	8.718	8.818	8.709	0.109
<i>Transportation</i>	Masculine	4.475	3.389	4.577	-1.189*
<i>Agriculture</i>	Masculine	1.966	1.601	2.001	-0.400*
<i>Social Security</i>	Masculine	1.865	1.625	1.887	-0.263*
<i>Sanitation</i>	Masculine	1.600	1.254	1.632	-0.379*
<i>Sports & Leisure</i>	Masculine	0.996	0.892	1.005	-0.113*
<i>Energy & Natural Resources</i>	Masculine	0.375	0.293	0.382	-0.089*
<i>Commerce & Services</i>	Masculine	0.337	0.258	0.345	-0.087*
<i>Public Safety</i>	Masculine	0.213	0.166	0.218	-0.052*
<i>Employment</i>	Masculine	0.161	0.144	0.163	-0.019
<i>Industry</i>	Masculine	0.157	0.126	0.159	-0.033*
<i>National Defense</i>	Masculine	0.010	0.008	0.010	-0.002
<i>Science & Technology</i>	Masculine	0.009	0.014	0.009	0.005*
<i>Agrarian Economy</i>	Masculine	0.005	0.004	0.005	-0.001
<i>International Relations</i>	Masculine	0.002	0.0013	0.0017	-0.0004
<i>Aggregate Unclassified Issues</i>		21.990	22.080	21.981	0.099
<i>Administration</i>	Unclassified	16.414	16.560	16.400	0.160
<i>Legislative Functions</i>	Unclassified	3.253	3.291	3.249	0.042
<i>Debt Obligations</i>	Unclassified	2.023	1.964	2.029	-0.064
<i>Judiciary Functions</i>	Unclassified	0.172	0.161	0.173	-0.012
<i>Communications</i>	Unclassified	0.066	0.045	0.068	-0.023*
<i>Essential to Justice</i>	Unclassified	0.063	0.060	0.063	-0.003

Notes: N=43,318. *Difference* = *Women expenditures* - *Men expenditures*. *p < 0.05.

Table 2: Women Mayors Prioritize Spending in Traditionally Feminine Areas

	Model 1		Model 2	
	$\ln\left(\frac{Feminine}{Masculine}\right)$		$\ln\left(\frac{Unclassified}{Masculine}\right)$	
	Coefficient	Std. Error	Coefficient	Std. Error
Woman Mayor	0.0493***	(0.0131)	0.0322	(0.0208)
% Women Councilors	0.0007**	(0.0003)	0.00001	(0.0005)
% Councilors Mayor's Party	0.0001	(0.0002)	-0.0003	(0.0004)
Left Party	0.0455***	(0.0086)	0.0754***	(0.0137)
Second Term	-0.0273***	(0.0080)	-0.0359***	(0.0126)
ln(Age)	0.0394**	(0.0188)	0.0443	(0.0298)
Schooling	0.0028	(0.0023)	0.0028	(0.0037)
Win Margin	-0.0008***	(0.0003)	-0.0016***	(0.0004)
ln(Population)	0.1160***	(0.0051)	-0.0138*	(0.0082)
Revenues per Capita	-0.00002***	(0.000003)	-0.000003	(0.000005)
% Transfers	0.0076***	(0.0005)	0.0039***	(0.0007)
% Rural Population	-0.0020***	(0.0003)	-0.0026***	(0.0004)
% Women Population	-0.0028	(0.0030)	0.0004	(0.0047)
Human Development Index	0.0757	(0.240)	-0.421	(0.379)
% Poverty	0.0025***	(0.0008)	0.0025*	(0.0013)
Life Expectancy	-0.0177***	(0.0029)	-0.0215***	(0.0046)
Ave. Schooling	-0.0019	(0.0055)	-0.0482***	(0.0088)
Income per Capita	-0.0004***	(0.00004)	-0.0002***	(0.0001)
% Clean Water	-0.0050***	(0.0004)	-0.0017***	(0.0006)
% Young Mothers	0.0063***	(0.0009)	0.0066***	(0.0015)
Illiteracy Rate	0.0081***	(0.0009)	0.00005	(0.0014)
Constant	0.944***	(0.266)	2.309***	(0.422)
Obs.	41858		41858	
Municipalities	5,407		5,407	
R-squared	0.23		0.05	
Chi-squared	12363.8***		2337.8***	

Seemingly-unrelated regression with standard errors in parentheses
Year intercepts included but not shown. * p < 0.10, ** p < 0.05, *** p < 0.01

Figure 1: Predicted Allocations to Traditional Feminine, Masculine, and Unclassified Issues

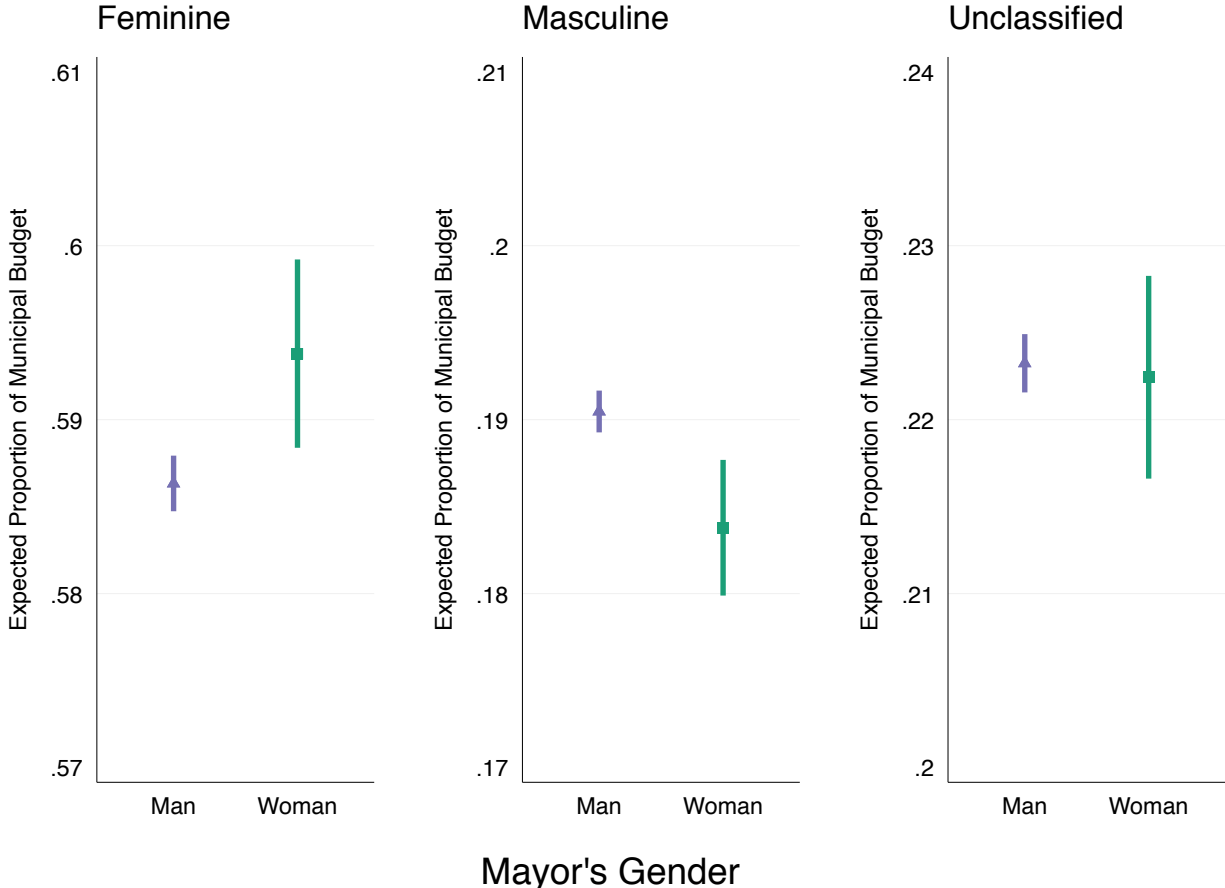


Figure 2: Predicted Allocations to Women's Policy Issues

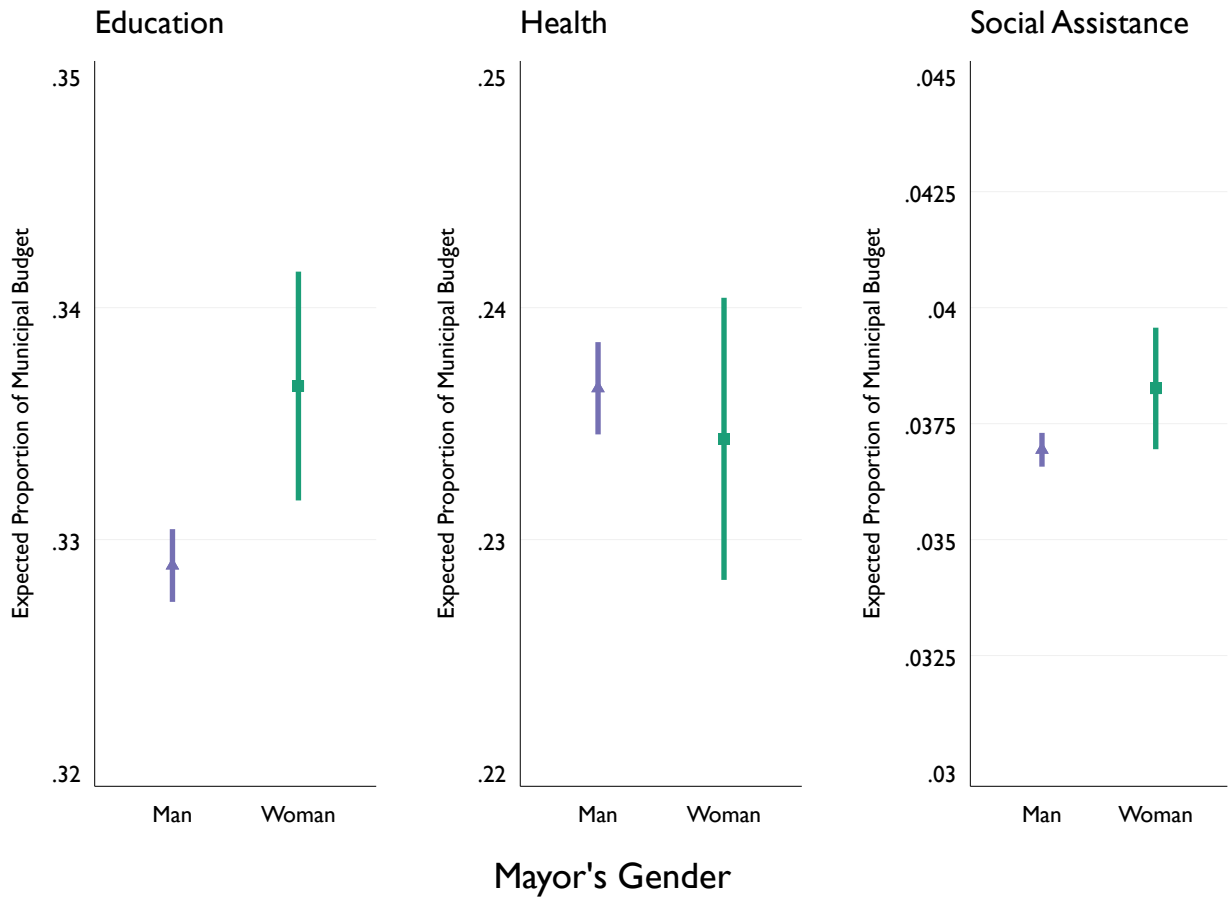


Figure 3: Predicted Allocations to Other Policy Issues

