

Quota Shocks: Electoral Gender Quotas and Government Spending Priorities Worldwide

Amanda Clayton, Vanderbilt University
Pär Zetterberg, Uppsala University

The rapid expansion of electoral gender quotas in the past few decades has been met with considerable scholarly and public attention. Despite this, there has been little empirical work examining the global legislative consequences of gender quotas over time. Developing a unique time-series cross-sectional data set from 139 states during the peak period of quota adoption and implementation (1995–2012), we test whether and how quotas are associated with subsequent changes in government spending priorities. We find that substantial quota shocks—those associated with a large increase in women’s parliamentary representation—are followed by increased government expenditures toward public health. Further, we find that increases in health spending are offset by relative decreases in military spending and other spending categories. Our findings provide strong evidence that quota policies influence government priorities in historically feminized policy areas but principally when they are complied with and have substantial numerical consequences.

One of the most significant institutional developments in representative democracy in the last 20 years is the recent, rapid, and global diffusion of electoral quotas for women in politics. Over 70 countries have implemented legally mandated parliamentary gender quotas, either reserving seats for women in legislative houses or requiring parties to have a certain percentage of women candidates on party lists. Over 60 political parties in more than 30 additional countries have also voluntarily put in place quota measures to increase women’s inclusion (International IDEA 2017). Taken together, these policies have deeply transformed the composition of legislative bodies worldwide. Indeed, women’s average share of parliamentary membership doubled between 1995 and 2015, moving from 11.3% to 22.6% during this time (IPU 2015). Responding to this phenomenon, studies related to the causes and consequences of electoral gender quotas have become one of the fastest growing subfields in gender and politics research (Krook 2009). Yet despite what has developed into a rich and substantial literature, still relatively

little work has attempted to ascertain the substantive effects of quotas from a comparative perspective.¹ This lack of cross-national research is a result, in part, of the difficulty in comparing whether and how quota policies change decision-making outcomes in a way that is comparable across cases and over time.

Here we make at least three contributions to this literature: First, by developing a unique time-series cross-sectional data set (between 1995 and 2012) from a global sample of countries, we present the most comprehensive comparative analysis to date of the substantive effects of gender quotas worldwide. Second, we bring together disparate literatures as we build an innovative theory to investigate when in the policy-making process quotas affect legislative decision making. We hypothesize that quotas may affect decision-making outcomes when quotas are first adopted as policy, when they are first implemented (i.e., used for the first time as new electoral rules), or when they result in significant increases in women’s descriptive (numeric) representation. During the

Amanda Clayton (Amanda.clayton@vanderbilt.edu) is an assistant professor in the Department of Political Science, Vanderbilt University, Nashville, TN 37203. Pär Zetterberg (Par.Zetterberg@statsvet.uu.se) is an associate professor in the Government Department, Uppsala University, Uppsala, Sweden. Pär Zetterberg received financial support for this research from the Swedish Research Council (grant 2015-00955).

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1. “Substantive effects” refers to those effects that are related to policy makers’ activities in the legislature. Throughout the analysis, we use “substantive effects,” “legislative effects,” and “policy-related effects” synonymously.

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adoption or implementation stages, quotas may send signals or cues about the importance of particular policy areas to existing or incoming legislators. In this scenario, quotas act as a heuristic device about changing legislative priorities to both quota- and non-quota-elected representatives. Alternatively, quotas may affect decision-making outcomes when they result in substantial increases in the number of newly elected women representatives. Quota policies have had varying levels of effectiveness in their intended outcome to increase women's numeric representation (Paxton and Hughes 2015; Tripp and Kang 2008). Indeed, the descriptive changes in women's representation following quotas—what we call here “quota shocks”—can range from essentially nonexistent (very marginal increases in women's numeric representation usually owing to limited quota compliance) to dramatic (women's numbers increasing severalfold).

Taking advantage of variation in the dates of quota adoption and quota implementation also allows us to address important endogeneity concerns when estimating quota effects. We theorize that if quotas are endogenous to a national sentiment or political climate that is also conducive to certain political outcomes, we are most likely to observe the legislative effects of quotas following quota adoption—and not necessarily following implementation (often several years later) or as a function of the number of women who gain office through quotas. To our knowledge, this is the first study of quota outcomes that has made this distinction explicit.

As a final contribution, we examine a set of outcome variables rarely used in the quota literature: changes in government spending priorities. Most studies that focus on potential substantive effects of quotas look for changes in policy outcomes, specifically whether quotas are followed by greater legislative attention to policy areas concerning women's rights or women's welfare (see, e.g., Franceschet, Krook, and Piscopo 2012; Franceschet and Piscopo 2008; Goetz and Hassim 2003). These types of outcomes are inherently difficult to study comparatively, however, because their occurrence is not particularly frequent across cases. Examining changes in governments' budgetary priorities has several advantages. First, budget setting is an essential government function that all states must accomplish each year, rather than a rare event. Additionally, there are relatively consistent and comparable annual data available worldwide during the period in which the majority of quota adoptions and implementations have occurred. Finally, budgetary allocations represent the distribution of somewhat finite resources and therefore represent trade-offs that, at least to some degree, reflect politicians' priorities in government investments. Examining changes in government expenditures represents a new approach in the quota literature—and, at the same time, examining the as-

criptive composition of legislatures is a fairly unexplored dimension in research on the determinants of government spending (see, however, Bolzendahl 2009).

Our empirical approach takes advantage of the rich temporal and spatial variation in gender quota adoption in the post-1995 period to examine how quota policies are followed by subsequent changes in government spending priorities. To preview our results, we find that the depth of quota shocks—that is, the degree to which quotas change the gender composition of legislatures—is associated with subsequent increases in government spending in one policy area: health. We do not, however, find significant changes in the two other sectors we examine: education or military spending. Using a modeling approach to explicitly examine trade-offs between budget categories, we find that increases in health spending are offset by *relative* decreases in military spending as well as other residual spending categories—but not by changes in education spending. Taken together, our findings provide strong evidence that quota policies influence government spending in an area that previous research suggests is generally prioritized by women, both citizens and elites. But, quotas appear most meaningful in this regard when they have their intended numerical consequences and thus substantially disrupt previous patterns of male overrepresentation. Putting the findings in a broader context, our analysis contributes to research on the role of the legislator identity—and other reforms targeting historically underrepresented groups—in reshaping government spending priorities.

GENDER QUOTAS AND LEGISLATIVE PRIORITIES: EXISTING RESEARCH

Quotas and women's substantive representation

Empirical research on the legislative effects of gender quotas is usually situated within the framework of women's substantive representation (e.g., Franceschet et al. 2012). Within this literature, most scholars have examined whether quotas have been followed by subsequent changes in gender-related public policy. For instance, in the first edited volume examining the policy-related impacts of quotas, Franceschet et al. (2012, 12) refer to work on quotas and women's substantive representation as studies “seeking to establish whether quota introduction increases the number of policies proposed, debated, and passed on behalf of women as a group.” Just like research on the process of representation more generally, research on whether quotas have been associated with advances in policy passages has, to date, been mixed. Some work has found that women legislators are more likely to sponsor or cosponsor bills related to women's rights (Barnes 2012; Franceschet and Piscopo 2008; Kerevel and Atkeson 2013) and that quota-elected women have been instrumental in the

successful passage of these bills (Kerevel and Atkeson 2013). Other work, however, reports mixed findings (Devlin and Elgie 2008) or a general lack of success in advancements in gender-egalitarian legislation following quota implementation (Htun, Lacalle, and Micozzi 2013).

Measuring outcomes and defining women's interests

Just like research on gender and political representation in general, work investigating whether and how quota policies have affected outcomes related to women's substantive representation often builds on the expectation that men and women citizens have different social experiences, which lead to divergent political interests, priorities, and preferences (Sapiro 1981; see also Young 2000). However, the extant literature has not reached an agreement on how to conceptualize and measure these differences. Some studies that connect gendered differences in political priorities to the legislative activities of women politicians first specify women's interests through predefined issue areas that objectively and disproportionately affect women's welfare, such as maternal health or combating domestic violence (Clayton, Josefsson, and Wang 2017; Schwindt-Bayer 2006). Other work measures women's interests in areas that may also indirectly affect women given traditional gender roles, such as investments in child health (Miller 2008).

Rather than examining prespecified interests, yet another group of scholars has attempted to first ascertain gendered differences in citizens' policy priorities and then measure the extent to which women's presence in political bodies affects attention to these priorities (see, e.g., Clayton et al. 2018). Importantly, this work reveals that gender differences in legislative and spending priorities are not uniform. Even in the same setting, there are disparate claims. For instance, while examining evidence from India, Chattopadhyay and Duflo (2004) find that men citizens prioritize investments in education, whereas Clots-Figueras (2012) finds that education is a women-preferred policy area.

Quota effects on state spending

Here we focus on government spending priorities, a highly relevant but less researched outcome in the literature on the substantive effects of quotas. Although there is variation across countries, spending priorities reflect, at least to some degree, MPs' (members of parliament) preferences and influence. Despite the potential budgetary implications of electoral gender quotas, most work on women legislators' influence on spending priorities has either excluded the role of quotas (Bolzendahl 2009; Swiss, Fallon, and Burgos 2012) or included quotas as a methodological tool to address issues of

endogeneity (e.g., Chattopadhyay and Duflo 2004; Chen 2010). Further, research on the global determinants of government spending typically prioritizes explanations related more to broader political contexts, such as the depth of democracy (Albertus and Menaldo 2014) and constituent preferences and issue definition (Soroka and Wlezien 2005), or to macroeconomic variables, such as the effects of globalization (Wibbels 2006), foreign direct investment (Avelino, Brown, and Hunter 2005), and trade (Wibbels and Ahlquist 2011), and less to ascriptive characteristics within legislatures.

For a final relevant literature, we also draw on work that examines the microdeterminants of legislators' ability to affect budgetary decisions as they work within different institutional constraints. A rich body of work examines how political institutions affect the size, priorities, and changing levels of government spending (see, e.g., Besley and Case 2003) related to, for instance, legislature and ruling coalition nature and size (Martin and Vanberg 2013), level of bureaucracy (Ting 2012), and executive control in presidential versus parliamentary systems (Lienert 2005). Although our empirical strategy holds time-invariant county-specific variables constant and thus holds political contexts relatively fixed, an extension of this work would seek to understand how quotas are associated with budgetary outcomes when they are embedded within different types of political systems.

HOW QUOTAS AFFECT BUDGETARY PRIORITIES: THEORY AND HYPOTHESES

Here we develop a theory to test when in the policy-making process quotas affect MP preferences and behavior, both at the individual level and in the aggregate. Whereas the sequential model we develop is likely applicable across a range of policy-making processes, we focus our discussion here to the ways in which gender quotas may affect budgetary decisions made within national legislatures. In creating our hypotheses, we make the assumption that legislatures—and legislators—affect how governments allocate public spending to different policy areas. Jones et al. (2009, 856) provide a useful definition on this point, noting that “budgets quantify collective political decisions made in response to incoming information, the preference of decision makers, and the institutions that structure how decisions are made.” By analyzing changes within countries, we keep the third component of this process relatively fixed and focus on the ways that quotas may affect the first two dimensions: incoming information and collective legislator preference.

We propose that quotas have the potential to change legislative funding priorities in at least two broad ways. First, quotas may affect priorities when they are first adopted or implemented (i.e., used for the first time as new electoral

rules) by sending specific policy-generated cues to officeholders, prompting changes in legislative behavior among both quota- and non-quota-elected MPs alike. Second, by altering the gender composition of legislative bodies (in some cases dramatically) quotas may also influence governments' budgetary priorities by bringing more women into legislatures, which may change aggregate legislator preferences, as well as increase women's ability to collectively affect legislative decisions.

We begin by developing the argument of quotas as a potential signaling mechanism in either the adoption or implementation phases. In such instances, the very act of quota adoption or implementation may provide legislators new information about changing legislative priorities. First, during the policy adoption process, quotas may send policy cues to both men and women policy makers about women's policy priorities (see, e.g., Zetterberg 2009). All legislators that have made decisions about adopting gender quotas have been exposed to, and participated in, quota debates, often with women's organizations, women party activists, and other quota advocates. As a consequence, the introduction of quota policies may draw attention to gender equality issues more broadly and thus to issues prioritized by women citizens. Increased awareness about gender-related issues may generate a reorientation of all MPs' priorities toward areas that they believe better reflect women's preferences (cf. Miller 2008). If the propositions about policy-generated cues and awareness raising of gender equality issues are true, we should find that the mere adoption of quotas into constitutional or electoral law or the voluntary adoption by political parties causes a reorientation of spending priorities among both men and women MPs.

In addition, quotas may be adopted in times of general progressive policy change, particularly in postconflict settings. In this scenario, parliaments may adopt quotas as part of a bundle of progressive measures meant to remedy previous social grievances, of which a reprioritization of public finances may also be one. Further, when parties adopt quotas voluntarily, they may be doing so as part of a larger party strategy to appeal to women voters, which may also include commitments to historically feminized issue areas. We note that this raises the issue of attempting to disentangle the impact of quotas from a scenario in which changing attitudes toward spending priorities in general (for either historic or strategic reasons) only correspond with, and are not caused by, the introduction of quotas. In such instances, we expect to observe subsequent changes in budgetary priorities following quota adoption, when the policy is most directly a part of public discourse and most likely to reflect public sentiment. If either of these competing scenarios is at play

(quota adoption as a policy cue or quotas as a part of a host of progressive reforms), we hypothesize that:

H1. Quota policies will be followed by changes in government spending priorities after their initial adoption.

Quotas may also send policy cues when they are first implemented during elections and a new cohort of legislators, including the newly quota-elected representatives, takes office. Previous work suggests that quotas can change dynamics within parliaments and affect legislators' priorities and behavior—regardless of the number of women who achieve office through the policy. Under the condition that any women enter parliament once quotas are applied in an election, quota implementation may politicize gender in politics, and women legislators may perceive an obligation to act on behalf of women (Franceschet and Piscopo 2008). In this scenario, a perceived mandate for gender equality may prompt changes in women MPs' priorities, regardless of whether the quota policy generates a large leap in the number of women legislators. Additionally, even small numbers of quota-elected women may serve as critical actors (Childs and Krook 2009) and work through formal channels or engage in informal discussions and negotiations to affect budget decisions. These expectations lead us to hypothesize that:

H2. Quota policies will be followed by changes in government spending priorities once they are first implemented, regardless of the number of women they bring into office.

Gender quotas may also affect public spending if they bring in women representatives who, for personal or constituency-related reasons, prioritize and pursue issues different from those held by current parliamentarians. In this argument, quotas must not only be adopted and implemented during elections, but they must also be effective in their intended aim of increasing women's numbers. Experiences from a large number of countries show that quotas do not uniformly result in this outcome. For instance, when legally mandated quotas target candidate lists in proportional systems, party gatekeepers have commonly chosen not to comply with the quota law unless they are sanctioned for not doing so, or parties comply with the letter of the law but choose to put women in nonelectable positions (Bjarnegård and Zetterberg 2016; Hinojosa 2012).

Exactly how women "make a difference" is still a pending issue in the literature on gender and political representation (Childs and Krook 2008). Here we theorize that a quota-

related increase in the number of women in parliament may serve to change both formal and informal parliamentary institutions and thus affect public spending patterns during at least three different stages of the budgetary process. First, quota-elected legislators may affect government spending priorities when budget proposals are first formulated, through (informal) negotiations and bargaining with other legislators or members of the executive—particularly if quotas increase the likelihood that women gain leadership positions within their parties (see O'Brien and Rickne 2016). If MPs' policy preferences are gendered, we expect women's bargaining power in informal lobbying scenarios to increase as their numbers grow. Second, women legislators may influence government spending priorities during the legislature's review of the budget proposal. This work usually takes place within committees, and as recent analyses suggest, as more women enter parliament through quotas, the likelihood that women are able to enter relevant sectoral (e.g., education, labor, health, defense; Kerevel and Atkeson 2013) or budget-setting committees (Barnes 2014; Heath, Schwindt-Bayer, and Taylor-Robinson 2005) is likely to increase. Finally, quota-elected representatives may influence the budget during chamber-wide legislative procedures to approve, reject, or amend the executive's budget proposal. Again, assuming men and women MPs—for personal or constituency-related reasons—have different legislative priorities, women's increased presence in political bodies will cause an aggregate preference shift in the legislature and, *ceteris paribus*, will affect collective legislative decision-making outcomes.

If our expectations about women's numerical representation are true, we should find that an increased number of women legislators following quota implementation is associated with subsequent changes in government spending priorities. Whereas in this work we are not able to test at which stage or combination of stages quota-elected representatives exert the most influence in budgetary allocations, if women newcomers act in any of the above ways, we expect that the budgetary effects of gender quotas will be most visible when quotas generate significant leaps in the number of women elected to legislative bodies. This leads to our final hypothesis:

H3. Quota policies will affect within-country changes in government spending priorities by increasing women's presence in legislative decision making.

We have yet to specify which policy areas we expect quota policies to affect. Here we rely on previous literatures and make no strong *a priori* expectations that might risk essentializing women's interests or priorities. We select three areas

of the budget where we expect gender gaps in political priorities to vary: health, education, and military spending. Although, of course, not all topics related to health are exclusively of women's interest (see, e.g., Murray 2014), we do see strong evidence that women citizens and women MPs support increased funding for public health, particularly maternal and child health care (Bhalotra and Clots-Figueras 2014; Clayton et al. 2018; Miller 2008; Schwindt-Bayer 2006; Swiss et al. 2012; Westfall and Chantiles 2016). As for education, we see less evidence of a consistent gender gap (Chattopadhyay and Duflo 2004; Clots-Figueras 2012; Gottlieb, Grossman, and Robinson 2016), and there is some evidence that military spending is associated with male dominance in parliaments (Koch and Fulton 2011). We therefore expect budgetary changes following quotas to be most associated with increased public health expenditures, unrelated to education spending, and marginally associated with decreased military spending.

Finally, it is theoretically important to understand whether any changes in government spending priorities are (mainly) the result of a redistribution of funds from one area of the budget to another or whether quota policies contribute to a recognition of new policy priorities by (also) adding funds and increasing total spending (see Fraser 1998). Our expectations here are mixed. Some research suggests that women's legislative presence mainly affects the redirection of funds between budgetary categories rather than changes to total spending (Bolzendahl 2009). However, work on gender differences in citizens' political preferences in advanced industrialized settings indicates that women favor larger public service sectors and more redistributive spending than men in general and thus presumably tolerate greater levels of government spending (Catalano Weeks 2015; Inglehart and Norris 2003; Iversen and Rosenbluth 2010). We therefore are agnostic as to whether quotas will affect state budgets mainly by reorienting spending priorities within existing constraints or also by increasing total spending levels.

DATA AND METHODOLOGY

Dependent variables:

Government spending priorities

We use time-series cross-sectional data from 139 countries between 1995 and 2012 to measure how gender quotas relate to subsequent changes in government spending priorities.²

2. Our sample includes most countries with a population over 1 million. We drop the few cases with a population over 1 million for which there is complete missingness across a wide range of our covariates, such as Somalia and South Sudan. The 10 cases we drop that adopted quotas before 1995 are Argentina, Austria, Canada, Germany, Mozambique, Netherlands, Norway, South Africa, Sweden, and Uganda.

Aside from relative data completeness, the post-1995 period is ideal for testing the potential impacts of quotas across a range of outcomes, as the vast majority of quota adoptions and implementations have occurred during this period.³ We drop the 10 cases in which countries adopted quotas prior to this time period, given that our models exploit variation in the timing of quota policies to assess subsequent changes in spending priorities. Our main dependent variables consist of expenditure data by sector for health, education, and military spending.⁴ Using data from the World Bank's World Development Indicator (WDI) data set, we measure sectoral spending as the percentage each category contributes to total government expenditures.

Key independent variables: Operationalizing quotas

Across models, we run three primary specifications each operationalizing different quota policy dimensions. These are all labeled as "Quota" in the regression tables that follow; operationalization is indicated in each model's column. To test hypothesis 1, we use a simple dichotomous measure of quota "adoption," coded 0 for each country-year before quota adoption (in the single or lower house of parliament) and 1 for the adoption year and each year subsequent. Whereas relatively accurate and up-to-date data on quota policies by country are publicly available by International IDEA through the Quota Project, current data on years of quota adoption and implementation are not widely available (but see Hughes et al., forthcoming). Building on information from the Quota Project, in addition to data compiled by Bush (2011), Hughes, Krook, and Paxton (2015), Krook (2006), and other secondary sources, including academic books and articles, expert interviews, and news coverage of quota adoption in specific cases, we construct our own coding of quota adoption by year. This measure includes all quota laws that specify gender requirements for positions on candidate lists or reserve parliamentary seats for women. We also include voluntary party quotas, but only those that meet a fairly strict criterion: the total number of adopting parties must hold at least 30% of seats in the lower parliamentary house at the time of adoption. Our data include 15 cases of reserved seat quota adoption, 43 cases of candidate list quota adoption, and 7 cases of voluntary political party quota adoption.

3. This is due, in large part, to the momentum gained in global quota adoption after the United Nation's 4th World Conference on Women held in Beijing in 1995.

4. In addition to being of theoretical interest, these are the only spending categories for which there are consistent longitudinal data.

To test hypothesis 2, we model quota policy "implementation" as a second specification of our key independent variable. As with our adoption specification, we code implementation dichotomously, coded 0 for each country-year before quota implementation and 1 for the year in which a functioning quota was first used during a parliamentary election and each year subsequent. In most instances, quota implementation does not occur until the subsequent electoral cycle, typically a year or more after adoption. In other instances, countries will adopt gender quotas but will take several electoral cycles to properly enforce the policy in elections (e.g., Armenia), will fail to hold proper elections at all (e.g., Eritrea), or will implement the policy after our 2012 end date (e.g., Ireland and Saudi Arabia). We code quota implementation as involving at least minimal compliance to the letter and spirit of the law, which often requires enforcement mechanisms such as minimum sanctions for non-compliance or placement mandates for women candidates on party lists. For instance, we code Brazil as having adopted a candidate list quota in 1997 but never as functionally implementing the law. We code 12 countries that adopted but did not implement quotas during the 1995–2012 period. Figure 1 maps our cases; we include our complete coding of quota adoption and implementation dates in the appendix, available online.

Finally, to test hypothesis 3, we construct a variable that measures quota policy depth. Here we measure the level of change in women's descriptive representation that was initiated by the first quota shock. Similar to our coding of adoption and implementation, we code quota shocks as 0 for each country-year before quota implementation and as the percentage point change in women's representation induced by the quota for the year of implementation and each year subsequent.⁵ Quotas are intended to increase the numeric representation of women in politics, and there are varying degrees of the strength of this treatment across countries. The greatest quota shock in our data is Angola's candidate list quota in 2008, which resulted in a 27.8 percentage point increase in women's numeric representation; moving from 9.5% to 37.3% in one election cycle. Kyrgyzstan, Algeria, Senegal, Afghanistan, Rwanda, and Burundi all also experienced quota shocks that increased women's parliamentary representation by over 20 percentage points. On the other end of this spectrum, some states have adopted quotas that impose requirements that are similar to current levels of women's parliamentary representation. For instance, when China enforced

5. Across specifications, all non-quota-adopting countries are coded 0 for each country-year.

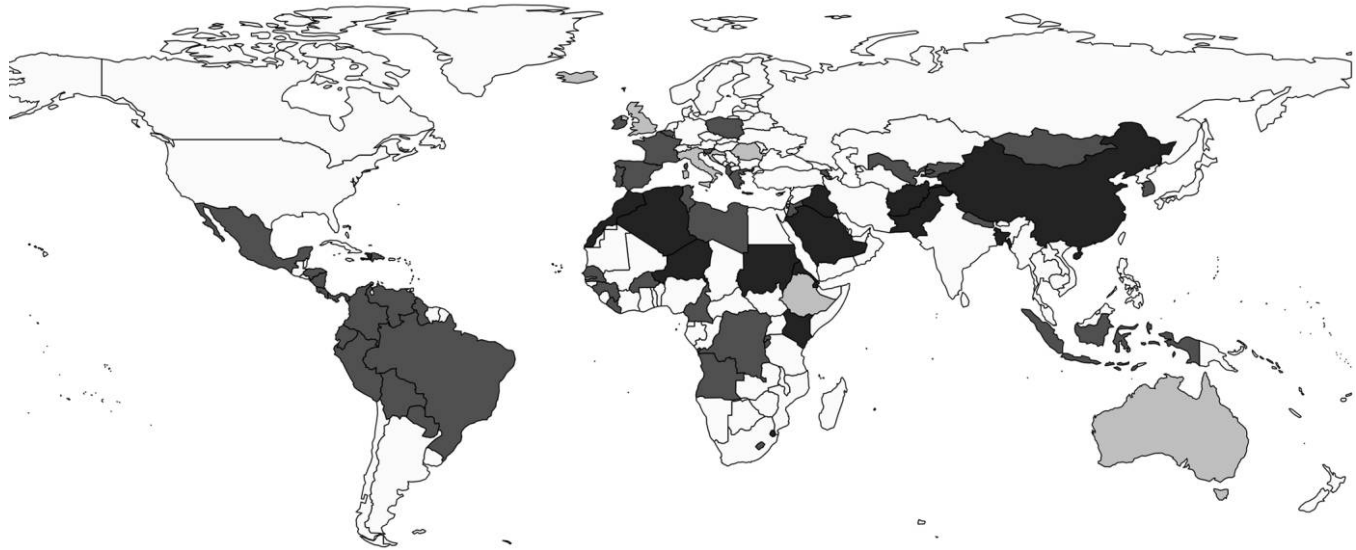


Figure 1. Cases of countries that adopted quotas between 1995 and 2012. Reserved seat quotas in black, candidate list quotas in dark gray, and voluntary political party quotas in light gray.

a reserved seat quota in 2007, women's representation in parliament only increased from 20.6% to 21.3%. The mean quota shock in our data is a 9.9 percentage point increase. Women's mean parliamentary representation in the year preceding a quota shock in our data is 10.9%, meaning that, on average, quotas nearly double women's parliamentary representation in the first election cycle.

Figure 2 plots women's parliamentary representation centered on the year of quota implementation for each of the 53 quota-implementing cases included in our sample and reveals the degree to which quota shocks have transformed the composition of parliamentary bodies worldwide in the past two decades. We label these changes in women's representation following quota implementation as "shocks," in large part because they represent clear breaks in women's numbers between the pre- and postquota implementation periods. Figure 2 shows the semiexogenous nature of quota shocks; the strong breaking pattern around the pre- and postquota periods indicates that these dramatic jumps in women's numbers would not have occurred without specific policy interventions. It is also important to note that whereas some quotas are adopted by party elites for strategic reasons—for instance, to appeal to women voters—quotas are often adopted as a result of pressure from international organizations (Bush 2011) or transnational feminist activists (Hughes et al. 2015), in which case the sudden increase in women's numbers following quota implementation occurs in spite of—rather than because of—domestic conditions.⁶

6. The significant results we present below maintain statistical significance (of at least $p < .10$) when we exclude the seven cases of voluntary

Control variables

As with all observational analyses, we cannot completely rule out the possibility of an endogenous relationship between quota adoption and subsequent changes in government spending priorities. We attempt to address this possibility through sequentially modeling different stages and features of the quota adoption and implementation process. Further, in the ordinary least squares regressions that follow, we include country fixed effects to account for time-invariant country-specific features, and we include a host of political, social, and economic covariates that vary within countries over time that previous literatures suggest may affect both government spending choices and gender quota adoption. We include a dichotomous measure of democracy (a score of 6 or higher) and autocracy (a score of -6 or lower) from the Polity IV data.⁷ We also include an index of cumulative democracy, measured as the total number of years a country has experienced democracy from 1945 to the observation year. We include the most recent Beck et al. (2001) data on political institutions to record whether a country currently has a leftist ruling party, as well as a measure of the cumulative

political party quotas (i.e., the cases where we have less reason to believe that quotas are of a semiexogenous nature). Table OA3 (tables OA1–OA4 are available online in the appendix) replicates the results presented in table 1 excluding these cases.

7. Our results are robust to inclusion of the standard polity score, as well as different transformations of this indicator. Our results also hold when we include a slate of demographic controls such as the percentage of the population that is elderly (over 65) and young (under 15)—but we exclude these variables from our main models as they are unlikely to be related to gender quota adoption/implementation.

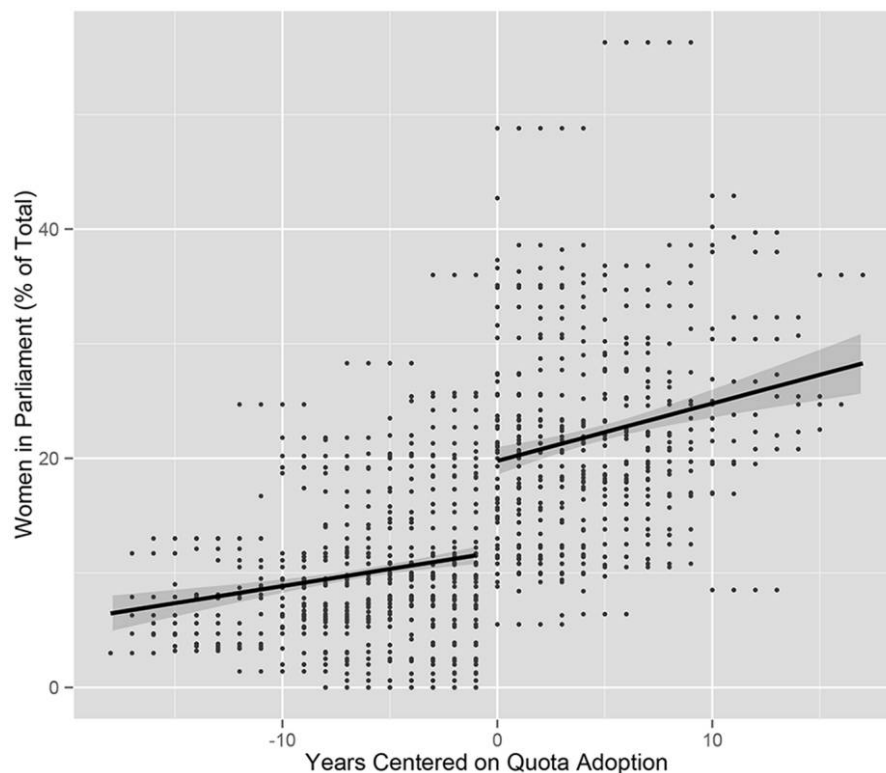


Figure 2. Quota shocks: increase in women’s parliamentary representation before and after the quota policy’s adoption

years of leftist party rule in the postwar period. This is a particularly relevant potential confounder, as leftist rule may be a crucial determinant of both gender quota adoption (particularly for voluntary party quotas) and patterns of social spending (see Dahlerup 2007).

We also include a host of economic variables from the World Bank’s WDI database, which previous research has indicated affect different dimensions of government spending: official development assistance (ODA), oil rents, total trade (sum of exports and imports of goods and services), and foreign direct investment (FDI; all variables are logged, lagged one year, and taken as a percentage of gross domestic product [GDP]). These variables also indicate the extent to which states are embedded within global networks, likely making them more receptive to global norms of gender equality and more receptive to pressure from international organizations to adopt gender quotas (see Bush 2011). Thus, we consider them important potential confounders of our relationship of interest. Finally, to address the possibility that a potential reduction in military spending is a function of an ending conflict rather than from the role of quotas adopted during postconflict transitions, we include two measures of conflict in our models of military expenditures: the number of battle

deaths and the presence of a peacekeeping mission in each country-year.

Descriptive statistics

Figures 3 and 4 display descriptive country-level spending patterns over the 1995–2012 period among quota-adopting countries centered on the year of adoption (each budget sector is measured as a percentage of total government expenditures).⁸ Whereas there do not appear to be great differences before and after quota adoption related to education spending (fig. 3, *left*), we see a downward trend related to military spending (fig. 3, *right*), although this appears, in part, to be driven by a handful of high-expenditure countries prior to quota adoption, likely relating to cases in which quotas were adopted in postconflict transitions. Figure 4 (*left*) indicates that health spending is increasing across cases before quota adoption, and the intercept and rate of change appear to increase slightly in the postadoption period. Figure 4 (*right*) descriptively pre-

8. We center on adoption here rather than implementation to include the broader of the two measures and to speak to the first hypothesis we theorized above.

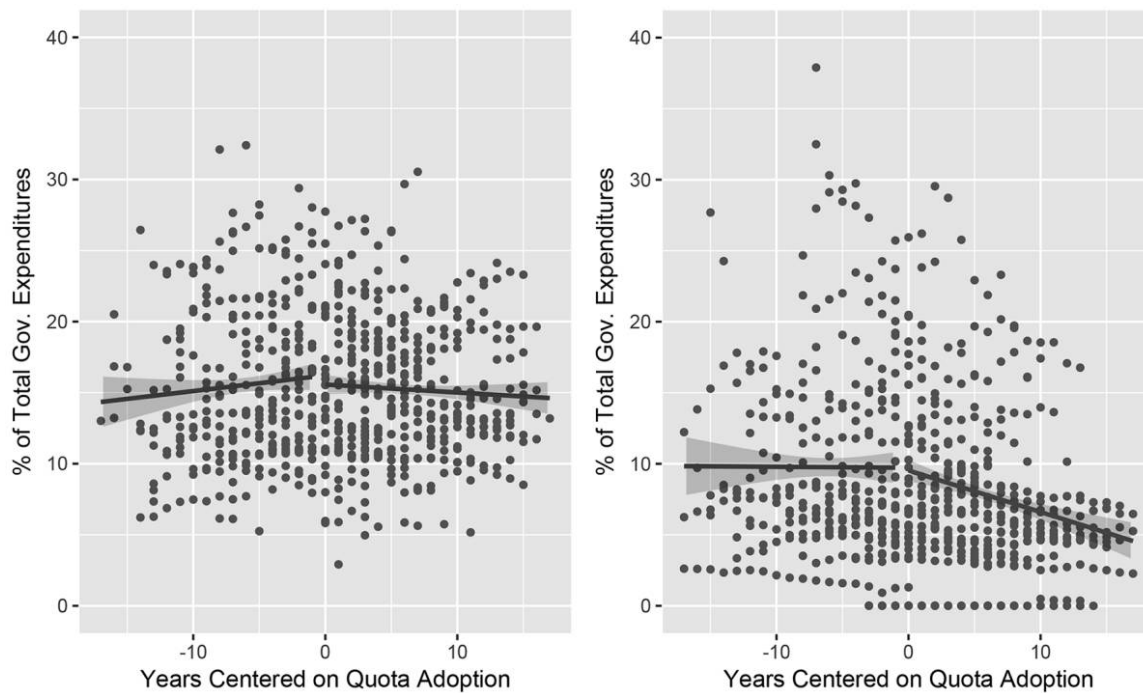


Figure 3. Education (*left*) and military (*right*) spending as percentage of total government expenditures among quota cases, centered on adoption year

views our main finding and displays health-spending trends centered on quota adoption within the sample of high quota shock cases, those with a mean shock above a 9.9 percentage point increase in women's parliamentary representation. Among the high quota shock cases, the average rate of change in the percentage of government expenditures dedicated to public health increases substantially in the postquota period.

Empirical strategy

In the models that follow, we employ a difference-in-difference approach. To use the causal language often associated with this strategy, countries that adopt quotas (or implement quotas, depending on the specification) during the 1995–2012 period are our treatment group, whereas non-quota-adopting countries make up the control group. The inclusion of country and year fixed effects allows for the difference-in-difference approach. The resulting coefficient estimates then measure how quotas are associated with within-country changes in government spending relative to the non-quota-control countries. Because health spending may also increase in non-quota-adopting countries during our period of observation, using the nonquota countries as a counterfactual set of cases allows us to compare the difference in quota-adopting countries with nonquota cases over the same years. The inclusion of country and year fixed effects means that only trend changes in spending that coin-

cide precisely with the timing of quota adoption (or implementation) are captured by our Quota variable.

RESULTS

Quotas and changes in government spending patterns

We begin with an examination of how quota policies are associated with changes in the percentage of government spending dedicated to public health. Both previous literature and the descriptive patterns presented in figures 3 and 4 suggest that this is an area likely affected by quotas. Table 1 shows the first series of model results. Starting with our test of hypothesis 1, model 1 indicates that, controlling for potential confounding variables, quota adoption is associated with increased health spending in adopting countries relative to nonadopting countries in the same period. The unstandardized coefficient associated with this model (0.718) can be interpreted as the average percentage point increase in health spending in adopting countries in the postquota period relative to nonadopters.⁹ Related to hypothesis 2, on the other hand, model 2 suggests that the implementation of a functioning quota in a parliamentary election is not associ-

9. Across all cases and country-years, the average amount spent on public health is 10.8% of total government expenditures, with a standard deviation of 4.3 percentage points.

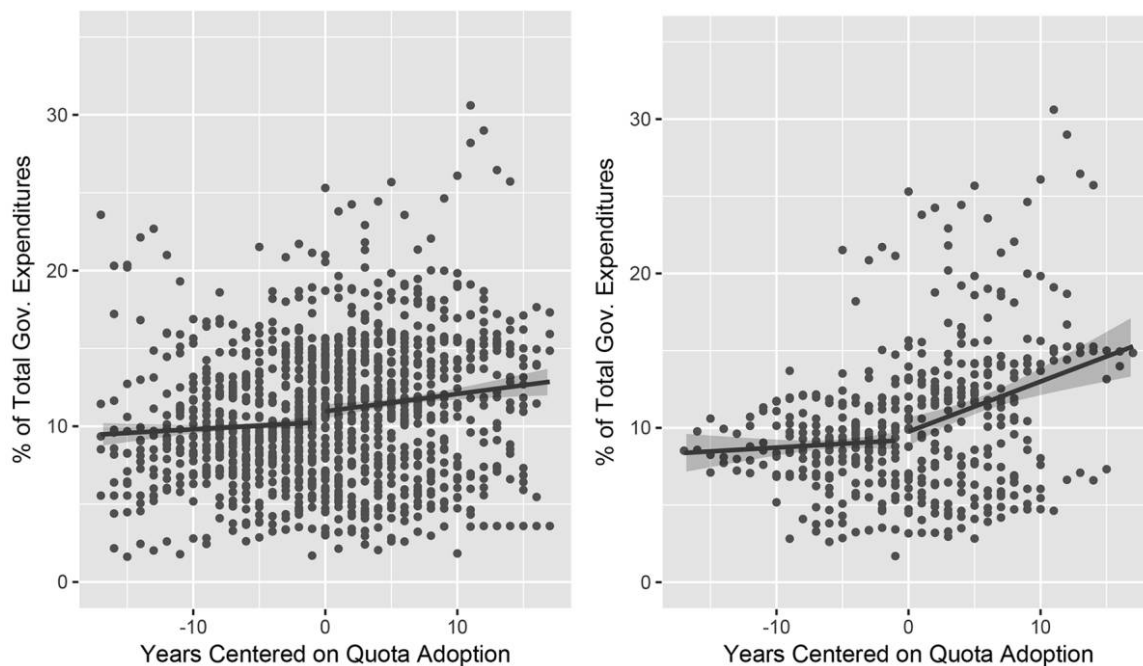


Figure 4. Health spending as percentage of total government expenditures among all quota cases (*left*) and high quota shock cases (*right*), centered on adoption year.

ated with subsequent changes in health spending. The regression coefficient is positive, but the relationship is not statistically significant. However, when we test hypothesis 3 in model 3 and operationalize the Quota variable as the initial depth of the quota shock (i.e., the change in women's numeric representation after quotas are first applied in an election), we detect a statistically significant increase in subsequent health spending. The coefficient in model 3 (0.056) is the percentage point change in health spending associated with each percentage point increase in women's representation following the initial quota shock. That is, a country that sees women's representation increase by 10 percentage points following quota implementation is followed, on average, by a 0.56 percentage point increase in health spending in the postquota period compared to non-quota-implementing countries.¹⁰

These findings provide support for hypothesis 1 and hypothesis 3 but not for hypothesis 2. Related to hypothesis 1, we hypothesized that significant changes in spending priorities following quota adoption would indicate that adoption sends cues to legislators about changing national priorities or that our findings are driven by the general tendency

for quota adoption to occur during times of general progressive policy change. Our concurrent finding in support of hypothesis 3—that health spending increases as the number of quota-elected women increases—suggests that solely the latter interpretation is less likely: if quotas were only endogenous to a national sentiment that is conducive to certain political outcomes, we would not expect substantial increases in women's numbers to also be associated with increased health spending. Further, our finding that increased health spending does not also follow quota implementation suggests that the political climates that may have surrounded quota adoption seem to dissipate by the time quotas are implemented in elections. This strengthens our confidence in hypothesis 3: increases in health spending are driven by an increase in women legislators who enter through quotas.¹¹

To further understand the relationships between the different quota policy dimensions, we construct a measure that splits the quota adoption cases into those that resulted in high quota shocks (those greater than the mean, 9.9 percentage points) and those that resulted in low quota shocks

10. The results from model 1 include the 12 cases in which countries adopted but did not implement quotas during the 1995–2012 period. When we exclude these cases, the coefficient is reduced in magnitude. This provides additional evidence of adoption effects that are distinct from our results related to quota shocks, which we discuss below.

11. In the appendix, we also include an analysis that uses women's parliamentary representation, rather than quota features, as the key independent variable. Our results are very robust to this specification (see table OA4).

Table 1. Effects of Quota Timing on Subsequent Health Spending (1995–2012)

Quota IV Measure	Adopt (1)	Implement (2)	Shock (3)	High Shock (4)	Low Shock (5)
Quota	.718* (.345)	.215 (.394)	.0564* (.027)	1.163* (.549)	.258 (.344)
Democracy	.347 (.451)	.364 (.460)	.339 (.456)	.391 (.459)	.366 (.462)
Aggregate democracy	.0827+ (.046)	.0812+ (.046)	.0854+ (.046)	.0923+ (.047)	.0810+ (.047)
Autocracy	-.378 (.372)	-.467 (.379)	-.410 (.364)	-.402 (.361)	-.472 (.388)
Leftist ruling party	.0367 (.317)	.0117 (.319)	.00595 (.320)	.0339 (.316)	.0218 (.314)
Aggregate leftist party	-.0224 (.055)	-.0225 (.055)	-.0173 (.055)	-.0228 (.054)	-.0242 (.055)
log(ODA)	.0649 (.050)	.0748 (.050)	.0698 (.050)	.0737 (.050)	.0731 (.049)
log(oil rents)	-.118+ (.062)	-.123+ (.065)	-.122+ (.065)	-.117+ (.066)	-.122+ (.064)
log(trade)	.0845 (.233)	.0883 (.240)	.0903 (.234)	.0727 (.234)	.0814 (.240)
log(FDI)	.0241 (.080)	.0335 (.081)	.0263 (.079)	.0141 (.080)	.0366 (.078)
Intercept	-20.86 (44.314)	-34.35 (44.190)	-25.73 (43.942)	-23.87 (43.804)	-34.90 (43.395)
Country and year FEs	✓	✓	✓	✓	✓
Nonlinear time trend	✓	✓	✓	✓	✓
R ²	.772	.771	.772	.773	.771
Bayesian information criterion	9,722.3	9,735.3	9,722.8	9,717.5	9,735.5

Note. Ordinary least squares regression results. Health spending is measured as the percentage of total government expenditures. Standard errors (in parentheses) clustered by country. All covariates lagged one year. $N = 2,227$. Number of countries = 139. IV = independent variable; FDI = foreign direct investment; FEs = fixed effects.

+ $p < .1$.

* $p < .05$.

** $p < .01$.

(those below the mean). The results of these additional analyses are presented in models 4 and 5 in table 1. They indicate that the high quota shock subset of quota adopters remains statistically significant with a much larger coefficient size than that found in model 1 (see table 1, model 4), whereas the low quota shock subset of adopting countries loses statistical significance (see table 1, model 5). These findings suggest that the positive association between quota adoption and subsequent increases in health spending (as shown in model 1) is being driven in part by the cases in which women’s representation increased substantially following quota adoption. The findings provide additional support to hypothesis 3. Substantively, the coefficient associated with high quota shock cases in model 4 (1.163) indicates that countries that implement high-magnitude quotas increase the percentage of

government expenditures dedicated to public health by over 1 percentage point in the postquota period relative to non-quota-adopting countries over the same period of time. As the mean across all country-years is 10.8 percentage points, this represents a nontrivial increase in the postquota period for this subset of high quota shock countries.

Our findings indicate that quotas that substantially increase women’s parliamentary representation are followed by significant increases in the percentage of government expenditures dedicated to public health. We now turn to modeling how our three main quota measures are associated with subsequent changes in education and military spending (again measured as a percentage of total government spending). When controlling for potential confounders, the analysis indicates that quota adoption, quota implementation, and

quota shocks are all positively associated with education expenditures but negatively related with military spending (as a percentage of government spending); however, these results—which we present in table OA1—are statistically insignificant across all model specifications.¹² As a consequence, we conclude that gender quotas are unrelated to education spending and military spending, respectively. Thus, in line with our expectations, the increase in government spending that we identify following quotas is only targeting public health, that is, a policy area that appears to be more prioritized by women, both citizens and elites, than by men.

Where do increases in health spending come from?

So far, we have found evidence that governments that adopt high-impact quotas (those that lead to significant increases in women's representation) subsequently dedicate a larger proportion of their national budgets to public health. This provides evidence that quotas displace funds from other policy areas and redirect them toward the health sector. These results, however, do not tell us where these funds are being redirected from. Nor do they preclude the possibility that governments also dedicate more funding to public health by increasing the size of the national budget. In this section, we qualify our main finding about quota shocks and subsequent increases in health spending by addressing these issues.

To examine which areas of the budget are depleted as the percentage of government expenditures dedicated to public health increases, we examine how quota shocks are associated with changes in health spending relative to other sectoral spending. Specifically, we model how our measure of quota shocks is associated with changes in the ratio of health spending as compared to military, education, and other residual spending categories, respectively. We do this through a series of seemingly unrelated regression (SUR) models. More technically, each SUR model takes as the relevant dependent variable the logged ratio of the percentages of government expenditures dedicated to each spending category pair (see Philips, Rutherford, and Whitten 2016).¹³ By varying the numerator in each pair but maintaining the base category (i.e., health spending), we examine how quota shocks

are associated with the changing composition of health spending relative to each other category. For instance, if a country decreases its military expenditures from 15% of the national budget to 10% and at the same time increases health spending from 10% to 20%, the change in ratios associated with these spending choices moves from 1.5 (15/10) to 0.5 (10/20). An additional advantage of the SUR framework is that it allows us to run all three models simultaneously (education, military, and other spending relative to health spending) to account for the interdependent nature of spending choices. This strategy explicitly allows for the assumption that the choices governments make on military spending (relative to health), for instance, are almost certainly not independent from the choices regarding education spending (relative to health).¹⁴

The results of the SUR analyses are shown in table 2. They reveal that increases in quota shocks are significantly associated with decreases in military spending and other spending categories relative to health spending but not with relative decreases in education spending. The findings here are different from those concerning military spending as a percentage of total government expenditures (in table OA1). To understand this difference and to reconcile the two findings, consider that the latter operationalization of the dependent variable includes a stable denominator (the percentage of military spending out of 100% of government expenditures), whereas the SUR-related operationalization has a changing denominator—the percentage of government expenditures dedicated to health spending—which increases on average after quota adoption. In combination, our results reveal that increases in health spending are offset by simultaneous decreases in military spending but that these decreases are not substantial enough to achieve statistical significance when measured relative to total government expenditures.

Next, we test (albeit indirectly) the possibility that governments also dedicate more funding to public health by increasing the size of their national budgets. More specifically, we examine whether quota shocks are both associated with increases in total health expenditures and followed by increases in total government expenditures (both measured as a percentage of GDP). If quotas also increase government spending on public health by adding to total spending, we should observe that quotas are followed by both increased health spending and increased total spending. However, if quotas only increase health expenditures by reallocating

12. We have a smaller sample size for the models on education and military spending. To address the possibility that the difference in significance is due to sample size, we replicate our health spending finding using only the subset of country-years included in the education and military spending models, respectively. The coefficient for our quota depth specification slightly increases in magnitude and retains significance below the 0.10 level.

13. We use STATA's Clarify package (Tomz, Whittenberg, and King 2003).

14. Data on military and education spending contain about 60% of the observations available for health spending. To compare across budgetary categories, we choose to use Amelia II for R to impute missing values rather than list-wise delete observations with existing health-spending values.

Table 2. Effects of Quota Shock Depth on Subsequent Compositional Spending (1995–2012)

Variable	Coefficient	SE
DV: log(% education spending / % health spending):		
Quota	.003	.002
Democracy	-.017	.030
Aggregate democracy	-.001	.003
Autocracy	.037	.040
Leftist ruling party	-.010	.024
Aggregate leftist party	.004	.003
log(ODA)	-.002	.005
log(oil rents)	.012*	.005
log(trade)	-.031	.024
log(FDI)	-.009	.007
UN peacekeeping	-.214**	.060
log(battle deaths)	.000**	.000
DV: log(% military spending / % health spending):		
Quota	-.026**	.005
Democracy	.031	.068
Aggregate democracy	-.012 ⁺	.006
Autocracy	-.041	.090
Leftist ruling party	-.060	.055
Aggregate leftist party	.001	.008
log(ODA)	-.005	.011
log(oil rents)	.017	.012
log(trade)	.163**	.054
log(FDI)	-.012	.016
UN peacekeeping	.086	.136
log(battle deaths)	.000*	.000
DV: log(% other spending / % health spending):		
Quota	-.005*	.002
Democracy	-.043	.030
Aggregate democracy	-.012**	.003
Autocracy	.073 ⁺	.040
Leftist ruling party	.020	.024
Aggregate leftist party	.002	.003
log(ODA)	-.013*	.005
log(oil rents)	.005	.005
log(trade)	-.062**	.024
log(FDI)	-.006	.007
UN peacekeeping	-.077	.060
log(battle deaths)	.000**	.000

Note. Seemingly unrelated regression results. Spending categories are measured as the percentage of total government expenditures. All covariates lagged 1 year. Intercepts, country, year fixed effects, and nonlinear time trend calculated but not reported. DV = dependent variable; FDI = foreign direct investment; ODA = official development assistance. $N = 2,206$.

⁺ $p < .1$.

* $p < .05$.

** $p < .01$.

funds to health and away from military spending and other sectors, we should not observe a change in total spending following the adoption of high-impact quotas. Table OA2 displays these results. We find that quota depth is associated with increases in total health spending and with increases in total government spending. As such, we cannot rule out the possibility that quotas serve to increase health spending both through the reprioritization of public finances toward health and through an increase in total spending.

DISCUSSION

Our analysis of electoral gender quotas and government spending priorities worldwide provides a consistent main result: governments that adopt quotas that lead to significant increases in women's representation subsequently dedicate a larger proportion of their national budgets to public health. This finding suggests that quotas are most effective when they most disrupt previous patterns of male overrepresentation, implying that quota-elected women can act as important agents of political reform. In line with our expectations, quotas are most effective in the area of public health, a policy area that has been historically prioritized by women.

We qualify our main finding in important ways: increases in health spending following high-impact quotas appear to be the result of a relative decrease in military spending and other spending categories (but not in education spending) and may also be the result of an increase in total spending. Our finding that quotas redistribute finite financial resources in largely zero-sum budgetary decisions has important theoretical implications. This result suggests that quotas, by diversifying parliaments, can disrupt established power structures in essential legislative functions and redirect funds from an area generally more prioritized by men (defense) to a sector more commonly prioritized by women (public health).

Our work also points to several outstanding questions that we hope will prompt future research. First, our findings support previous work that has connected improvements in health—and increased health spending—to gender equality reforms such as women's enfranchisement (Miller 2008) and increased gender equality in parliaments (e.g., Bhalotra and Clots-Figueras 2014; Chen 2010; Swiss et al. 2012). However, there is less consensus regarding why these patterns consistently emerge. It is possible that our results stem from funds that are being redistributed to areas within the health sector that predominately affect women—such as women's maternal or reproductive health—in which case, our findings would fit well into the framework of women's substantive representation (see, e.g., Westfall and Chantiles 2016). Another possibility is that women legislators prioritize health because it is a relatively uncontentious policy area, one they

can safely claim as political newcomers. Both of these possibilities deserve further investigation.

Second and somewhat relatedly, although our findings support the claim that MPs' priorities are gendered, our analysis is not able to pinpoint at which point in the representative process these preferences are formed and expressed. Previous work on this subject has largely attributed women citizens' prioritization of health to their disproportionate role worldwide as caretakers, both within their households and larger communities (see also Bhalotra and Clots-Figueras 2014; Gottlieb et al. 2016). An important extension of our work then might involve mapping gender differences in MP priorities to gender differences within their electorates, related to both health as well as other potentially gendered priorities (see Clayton et al. 2018).

A third puzzle revealed by our findings relates to the specific mechanisms through which quota-elected representatives are able to influence national budgets. We theorized that women MPs might affect spending decisions during informal negotiations with key decision makers, through the increased supply of women MPs eligible for relevant committees, or during chamber-wide budgetary votes. Our finding that quotas matter for health spending, however, does not tell us when during this process quota-elected representatives have the most impact. Quantitative data on committee membership or cabinet appointments in parliamentary systems before and after quota implementation or process tracing of budgetary procedures in high quota shock cases would certainly provide insight here. In addition, an analysis of mechanisms would also benefit from a focus on the ways men MPs' preferences and priorities may be reoriented by large leaps in women's representation. Quota shocks may "feminize" parliaments, making men better at representing women or by enabling men MPs to speak about issues related to men's social experiences, such as mental health, which were previously discouraged by overly masculinized legislative cultures (Lovenduski 2005; Murray 2014).

Finally, our analysis calls for more theoretical and empirical work on how the rich institutional variation among quotas may moderate their potential legislative consequences. For instance, candidate quotas and voluntary party quotas are typically adopted in proportional representation systems, meaning that quota-elected MPs are not identifiable vis-à-vis other legislators when they are elected through candidate lists. This may grant women in these systems more influence and less stigmatization than "quota women" in reserved seat systems typically adopted in first-past-the-post electoral systems (see Clayton 2015). Alternatively, women in reserved seats who are directly elected by constituencies may have more legislative autonomy to act outside the wishes of party

leaders than women elected through party lists. These countering expectations have yet to be thoroughly examined in the quota literature.¹⁵ Further, other institutional rules and constraints in which quotas are embedded—such as the level of democracy or the strength and nature of the ruling party—almost certainly affect the ability of quota-elected MPs to influence legislative decisions. Our findings here call for more comparative work on the circumstances in which quotas affect parliamentary outcomes.

CONCLUSION

In political debates across the globe, and within the normative literature on gender and political representation, gender quotas are often justified as means to effect policy change by including women's interests and priorities in the policy process (Bacchi 2006). Here we have provided the most comprehensive study to date to theorize and test the legislative consequences of the recent, rapid, and global expansion of electoral gender quotas. Our results suggest that electoral engineering through quota policies may be an effective tool not only to diversify parliaments but also, at least to some extent, to change political priorities in areas favored by historically marginalized groups.

By showing that the identity of legislators is important for governments' spending priorities, our theoretical framework and findings are potentially important for reform processes targeting other historically underrepresented groups, such as ethnic, racial, and sexual minorities. Quotas may be one tool of many to this end, and other efforts, such as electoral financing to support underrepresented groups, may have similar effects if they are able to substantially increase the presence of these groups in legislative bodies. Finally, our analysis has important implications for understanding public health outcomes. Research suggests that below a certain threshold of health expenditures, countries are unable to meet basic health needs (Ghobarah, Huth, and Russett 2004). The implications of women's representation then may extend beyond the political sphere, as greater inclusion of women's preferences in political decision making has the potential to improve other aspects of human development.

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