Gender Quota Laws and Women in Cabinets [*][†]

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Abstract

Do legislative gender quotas increase women's presence in executive cabinets? Women are underrepresented in politics, especially in leadership roles. As a remedy, quotas, requiring women to be nominated as candidates or elected in reserved seats, have been adopted for national parliaments in over 80 countries. But, can quotas work beyond the positions to which they apply? We argue that legislative quotas increase women in the executive by augmenting the supply of women ministers. Using a difference-in-differences approach, we analyze the impact of quotas on the gender composition of cabinets worldwide (1990-2021). We find quotas increase women in cabinets by 2.2 percentage points. Consistent with our supply-side argument, effects are concentrated in parliamentary democracies, countries sustaining a high 'shock' to women in parliament post-quota implementation, and low-prestige portfolios. Our findings suggest quotas for parliaments have important spillover effects in governments, while leaving male dominance in the most powerful roles largely intact.

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In 2011, liberal party politician Annemie Turtelboom became the first woman Minister of Justice in Belgium. In an interview about the role in 2013, she attributed her political success to Belgium's gender quota law. She said, "I am the product of quotas, and I feel good about that. Without quotas in politics, women would never have been able to break through certain boundaries."[1] This example suggests that quota laws, which mandate women's inclusion on candidate slates or in office, might help chip away at some of the most intractable gender gaps in top leadership roles. Yet, quotas are controversial policies which can cause backlash against women and lead to their 'tokenization.' This raises an open question that has important implications for the representation of women and the quality of democracies: Can gender quotas work beyond the positions to which they apply?

A majority of countries worldwide now use electoral gender quota to elect representatives to their national parliament. Gender quotas require that women make up a specified share of candidates or members of parliament (Hughes et al. 2019; Paxton & Hughes 2015; Krook 2010), thus fundamentally changing the gender composition of the legislature. As countries across the globe adopted legislative gender quotas, many parliaments went from having only superficial numbers of women to women holding a substantial share of seats overnight. Although advocates of quotas laud their success in "fast-tracking" women into some of the most powerful decision-making bodies in the world (Dahlerup & Freidenvall 2005; Tripp & Kang 2008), skeptics worry that quotas are insufficient to transform politics (Verge & Claveria 2018). When designed properly, it is clear that quotas are effective at increasing women's numeric representation in office (Schwindt-Bayer 2009; Paxton & Hughes 2015; Tripp & Kang 2008). But, it is less clear if quotas have 'spillover' effects beyond the positions to which they directly apply, and existing evidence from single country cases

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[1]Door, Joel de Ceular and Walter Pauli. "Als Minister Moet Je Soms Drie Dagen Geen Krant Lezen'; Minister van Justitie Annemie Turtelboom (Open VLD)." 16 October 2013. *Knack Magazine.* Translation by Google Translate.

reports mixed results (O'Brien & Rickne 2016; Kerevel 2019). In this paper we investigate whether quotas have the ability to transform who has political power by increasing women's access to the highest echelon of politics – the executive cabinet.

We argue that quotas increase the supply of potential women ministers. Quotas bolster the pool of women 'ministrables' (Annesley, Beckwith & Franceschet 2019) by creating a larger pipeline of women who have the valuable political experience that is often necessary for selection. Quotas fast-track women's inclusion in parliaments, and the share of women in parliaments tracks closely with the share of women in governments (e.g., Krook & O'Brien 2012; Stockemer 2017). In addition, we investigate potential demand-side effects. By elevating the issue of gender equality in politics to the national stage, quotas could lead to the expectation that not only parliaments but also governments should incorporate more women. As these laws are implemented, both the public and party elites are exposed to new conceptions of what politicians can look like (Taylor-Robinson & Geva 2023; Barnes & Holman 2020).

To test this argument, we employ a difference-in-differences approach on a global sample of 169 countries from 1990 to 2021. In line with our main argument, we find that gender quota laws increase the share of women in cabinets by 2.2 percentage points, representing a 15 percent increase on the mean share of women in cabinet. This effect is driven by low-prestige cabinet posts, including for example the portfolios for Women, Children, & Family, and Youth, with no significant effects observed for higher-prestige posts. Our analysis reports strong and consistent effects for supply-side arguments. For example, the effects are stronger in the context of parliamentary democracies where ministers are often selected from parliaments, are larger in countries which see a high "shock' to women in parliament post-quota implementation, and the effects tend to increase over time. We find little evidence for demand-side explanations alone. Taken together, our results suggest that gender

quota laws have political importance beyond the immediate positions to which they apply, and that this occurs due to the quota's positive impact on the pipeline of women "ministrables." But, women's access to the most powerful leadership roles, such as the inner cabinet, remains elusive (Armstrong et al. 2023; Barnes & O'Brien 2018; Claveria & Lavezzolo 2024; Kroeber & Dingler 2023; Krook & O'Brien 2012). Quotas thus have significant spillover effects under certain conditions, while still maintaining the entrenched male advantage in the most powerful ministerial positions.

Women in Parliaments, Quotas, and Access to Executive Power

The executive branch was once considered the last bastion of male political power. Today it is "internationally understood that cabinets should contain women," and women are present in almost every cabinet across the globe (Paxton, Hughes & Barnes 2020, 171). Women's inclusion in the cabinet is important because the executive branch is both the face of government (Annesley & Franceschet 2015, 613) and it wields the most policy making authority (Atchison 2015; Atchison & Down 2019; Escobar-Lemmon & Taylor-Robinson 2016; Homola 2022, 2019; Kroeber 2022; Nwankwor 2021). Indeed women's presence in the executive branch, represents both the "most significant venue for achieving the substantive representation of women" (Annesley & Gains 2010, 909), and the potential to shape citizens' evaluations of both government and women's ability to lead (Alexander & Jalalzai 2020; Barnes & Taylor-Robinson 2018; Morgan & Buice 2013).

How do women gain access to the most powerful decision making positions in government? A large body of research examines women's access to the executive branch (e.g., Bauer & Tremblay 2011; Bauer & Darkwah 2022; Escobar-Lemmon & Taylor-Robinson

2005, 2016; Field 2021; Goddard 2019; Kerevel 2019; Kroeber & Hüffelmann 2022; Kroeger & Kang 2022; Krook & O'Brien 2012; Nyrup, Yamagishi & Bramwell 2023; Stockemer 2017). Women's inclusion is best explained by political factors, rather than "slower-moving processes of women's social and economic empowerment" (Krook & O'Brien 2012, 850). Though some autocratic leaders include women in their cabinets (Kroeger & Kang 2022), democratic leaders are more likely to do so, and this difference is becoming more pronounced over time (Nyrup, Yamagishi & Bramwell 2023). Left-leaning governments also have a track-record of appointing more women to their cabinets (Claveria 2014; Escobar-Lemmon & Taylor-Robinson 2005; O'Brien et al. 2015; Goddard 2021), although this relationship may be dissipating over time (Stockemer & Sundström 2018*b*). In addition to institutional factors, selectors have strategic motivations for appointing women, including electoral competition (Escobar-Lemmon & Taylor-Robinson 2005), patronage-based alliances (Arriola & Johnson 2014), and signaling their administrative priorities to domestic and international audiences (Armstrong et al. 2023; Barnes & O'Brien 2018; Bego 2014; Kroeger & Kang 2022).

Perhaps one of the strongest and most consistent findings in the literature is that the share of women in parliament correlates with women's numeric representation in cabinets. Using data from 194 countries from 1965 to 2014, Stockemer (2017) observes a strong positive relationship between women in parliament and women in cabinets. Global analyses from a single point in time likewise shows that women's numeric representation is a strong and consistent predictor of women in cabinet (Krook & O'Brien 2012). As with these global analyses, the relationship between women in parliament and women in cabinets has been documented in studies focused on specific regions. For example, the pattern appears in studies focusing on Western Europe (Claveria 2014; O'Brien et al. 2015), Africa (Arriola & Johnson 2014; Kroeger & Kang 2022), and Latin America (Escobar-Lemmon & Taylor-Robinson 2005). And, although the relationship tends to be especially strong in parliamentary systems—e.g., in their study of 76 countries in 1996, Whitford, Wilkins & Ball

(2007) find the relationship between women's presence in parliament and women in cabinet exists in parliamentary systems but not presidential systems—others find the relationship holds in presidential systems as well. For example, both studies using a global sample with time series data (Stockemer 2017), and studies focused specifically on presidential regimes (Escobar-Lemmon & Taylor-Robinson 2005) observe that women in parliament is a strong predictor of women in cabinets in presidential regimes. Women's numeric representation in parliament also predicts women's access to high-prestige and masculine portfolios from which women are typically excluded (Armstrong et al. 2023; Barnes & O'Brien 2018; Claveria & Lavezzolo 2024; Kroeber & Dingler 2023; Krook & O'Brien 2012).

This relationship is so strong and consistent that it leads Krook and O'Brien (2012, 853) to conclude:

> "Perhaps the most striking finding was that in a majority of cases women's cabinet appointments were explained by the presence of more women among political elites — something that can be promoted through concrete political strategies like gender quotas — rather than by variables that are far more difficult to change, like the existence of favorable political institutions, changes in the status of ordinary women, or evolution of attitudes towards gender equality."

Yet despite this policy recommendation, based on consistent evidence that women's numeric representation in parliament predicts women's access to the cabinet, we know relatively little about how quotas affect the appointment of women to executive office (Kerevel 2019). Indeed, no study has looked across space and time to systematically examine whether quotas predict women's access to cabinets.

Do Gender Quotas Explain Women's Access to the Cabinet?

Gender quotas offer substantial promise for increasing women in the executive branch worldwide. Gender quotas are one of the most common electoral reforms to emerge in the past half century (Hughes et al. 2019). And today, a majority of countries across the globe have adopted some form of legislative gender quota. Gender quotas are designed explicitly to increase women's presence in the legislative branch by requiring that women occupy a specific share of positions on the ballot or seats in office (Hughes 2011; Krook 2010). Well-designed quotas have changed the face of legislative politics in governments worldwide (Schwindt-Bayer 2009). As quotas diffused across the globe, women's presence in parliaments has increased more than three fold, moving from only 8.3 percent in 1990 to 27 percent in 2024. As Clayton (2021), describes it: "many quota-adopting countries have made remarkable leaps in very short periods of time, doubling or even tripling women's legislative representation in the first post-quota election." Given the power of quotas to increase women's presence in the legislature, it stands to reason that if the share of women in parliament predicts women's access to cabinets, then gender quotas should also increase the share of women in cabinets.

Nonetheless, there are reasons to believe that quotas could undermine women's access to cabinets. Women elected via quotas can be viewed as mere tokens, resulting in women being sidelined in politics rather than promoted to executive power (Bauer & Britton 2006; Clayton, Josefsson & Wang 2014; Hassim 2003). Some studies find that women in legislatures are marginalized and have fewer leadership opportunities than their male counterparts (O'Brien et al. 2015). Others suggest that the women who come to power via quotas might be substantially different than the women who come to power absent quotas: for example, they might be party 'loyalists' and lack broad political networks (Bjarnegård & Zetterberg 2016; Tamale 2018; Franceschet & Piscopo 2014). If this is the case, then we may not expect them

to be incorporated into the cabinet. As Lee and Park put it: "While adopting gender quotas in Indonesia, South Korea, and Taiwan has helped to boost the electability of women candidates, it has not necessarily led to the increasing supply of female political elites equipped with the power resources and political connections needed for other political positions" (Lee & Park 2018, 166). Quotas can also cause backlash against the women in political office (Clayton 2015; Krook 2015), leading people to scrutinize their qualifications (Murray 2014) and eschew their leadership, ultimately limiting women's access to cabinets. This may be particularly likely among male elites "who attribute women's underrepresentation to choices made by individual women, rather than structural discrimination" (Franceschet, Krook & Piscopo 2012, 12).

Previous research thus leaves room for doubt about whether quotas lead to more women in cabinet. And, studies examining the 'spillover' effects of quotas find mixed evidence regarding the extent to which quotas can have positive effects on women's leadership positions beyond those to which they directly apply. Some report positive effects, wherein quotas increase women's access to leadership posts (Basabe-Serrano & Perez 2022; O'Brien & Rickne 2016). For example, O'Brien & Rickne (2016) examined quota adoption in Swedish municipalities and found women were more likely to be appointed to leadership posts in municipalities where quotas had a larger effect. Similarly, focusing on Ecuador, Basabe-Serrano & Perez (2022) show that the likelihood of electing a woman mayor almost doubles in the aftermath of quota adoption.

Still, other studies find no such evidence (Bagues & Campa 2021; Kerevel 2019; Lassébie 2020; Spaziani 2022; Weeks & Masala 2023). For instance, tracing the career trajectories of individual women elected via the quota in Mexico, Kerevel (2019) shows that quotas have not increased women's ascension to the executive branch. Using a most similar case design to compare Italian regions with and without quotas Weeks & Masala (2023) find

little evidence that quotas had a spillover effect resulting in more women in leadership in the regional councils. Research exploiting variation in quotas in Italy (Spaziani 2022), Spain (Bagues & Campa 2021), and France (Lassébie 2020) found no evidence that quotas resulted in the election of more women mayors. Similarly, a careful examination of subnational politics in Sweden finds evidence of discriminatory promotion patterns such that women move up the political hierarchy at lower rates than equally qualified men, resulting in fewer women in top positions (Folke & Rickne 2016).

Despite a growing body of research focusing on the spillover effects of quotas, and a detailed tracing of individual women's career trajectories in Mexico, previous research has not directly evaluated the relationship between quotas and the share of women in cabinets. We contribute to this growing body of research by systematically examining the link between quotas and women in cabinets across countries and over time. Specifically, based on the strength of the relationship between women in parliaments and women in cabinets, we evaluate the following hypothesis:

H1 (Main effect): Gender quota laws increase the share of women in cabinets.

Quotas and Cabinets: A Supply-Side Explanation

Our first expectation examines whether quotas increase women's representation in cabinets. In addition to providing a systematic analysis of the relationship between quotas and women in cabinets, a second contribution of this study is to make progress on understanding the mechanism through which quotas work. Our main argument is perhaps the most intuitive one, that quotas increase the share of women in cabinet by increasing the number of women in parliament – i.e., by increasing the supply of women who have the relevant experience to become ministers. Indeed, one of the most long-standing explanations for women's exclusion from political power is a supply side argument (Norris 1993; Paxton 1997). Scholars contend

that women are more likely to be represented in office when there is a healthy supply of qualified women who are willing and capable of overseeing cabinet portfolios. In many countries, cabinet members are drawn from current or former members of parliament. Once in office, members of parliament can gain legislative experience, establish networks, grow their public image, and develop policy expertise–all important consideration for ministerial appointees. Consequently, gender quotas can increase the share of women in cabinet by growing the pool of eligible appointees, the share of women in legislative office.

In the following sections, we consider the main observable implications of our supply-side argument, including variation in cabinet prestige, regime type, the impact of quotas over time, and quota effectiveness. Following this, we also address potential demand-side effects.

Cabinet Prestige

Cabinets vary substantially in their level of importance and prestige. Whereas a few portfolios are very prestigious and powerful—offering greater access to the head of government, high visibility and media attention, more resources such as budget and staff, and lucrative career opportunities upon leaving office—other portfolios are less desirable (Armstrong et al. 2023; Barnes & O'Brien 2018; Krook & O'Brien 2012). When politicians first access the cabinet, they often enter in a low-prestige post (Lee & McClean 2022). Appointment to high-prestige portfolios, by contrast, typically requires a successful a track-record in national politics. Thus, if quotas increase women's access to cabinet by growing the pool of eligible appointees, it would be unlikely that women would be appointed to the most prestigious positions – at least, not initially. Rather, we anticipate quotas (still a relatively recent reform) may be associated with a larger share of women in low-prestige, 'entry-level' portfolios.

H2: If quotas increase women in cabinet by increasing supply, we expect to observe

an increase in the share of women in low-prestige portfolios.

Regime Type

A defining feature of regime types is the relationship between parliament and the executive branch. In Westminster style parliamentary governments, cabinet ministers are "drawn from (and remain) members of the legislature" (Stockemer 2017, 441). This means that parliament is the primary supply pool for ministers. Outside of Westminster style parliamentary governments it is not required that prime ministers select appointees from parliament. Nonetheless, doing so allows prime ministers to use appointments to develop broader coalitions of support within parliament. This is important since they rely on parliament to stay in power. Thus, although there are some exceptions, most cabinet nominees in parliamentary systems are typically drawn from parliament (Stockemer 2017, 442).

This is generally not the case for presidential systems or authoritarian regimes. In presidential systems, cabinet ministers rarely hail from the legislatures, and when legislators are tapped to oversee a cabinet portfolio they are typically required to resign their legislative post. Instead, cabinet ministers are drawn from a wide range of experts and bureaucrats beyond the legislature (Lee & McClean 2022). In authoritarian systems the cabinet is drawn from the executive's inner circle of trusted advisors. The legislature does not serve as a supply pool of potential nominees. Thus, if quotas lead to more women in cabinet by increasing the supply of eligible appointees, we should only observe the relationship in parliamentary systems, and not in presidential systems or authoritarian regimes.

H3: If quotas increase women in cabinet by increasing supply, we only expect to observe a larger share of women ministers in parliamentary systems.

The Impact of Quotas Over Time

Another important source of variation that can help us understand the mechanism driving quota effects is the quota timeline. Once quotas are in place it can take time for women newcomers to gain the experience, clout, and expertise they need to get a political promotion to cabinet (Kroeber & Hüffelmann, 2022; Lee & McClean, 2022). First-term members of parliament are rarely viewed as having the skills, knowledge, and networks necessary to oversee a cabinet portfolio (Claveria, 2014; Verge & Claveria, 2018). Instead, coveted cabinet appointments are more likely to go to senior members of parliament with established reputations. Appointments may be doled out as prizes for individuals who have shown loyalty to the party leader (Arriola & Johnson, 2014; Goddard, 2019; O'Brien et al., 2015) or given to MPs with strong electoral followings and/or adept political skills to boost popular support for the government (Davis, 1997). In specialist systems in particular, cabinet appointments are granted in recognition of someone's policy prowess (Claveria, 2014; Bauer & Okpotor, 2013). If the pool of potential ministers is comprised of loyal MPs with established reputations and known expertise, newcomers are less likely to be viewed as eligible. Consequently, although newly adopted gender quotas may infuse the parliament with a new pipeline of women, they are less likely to be viewed as viable cabinet appointees early on. Instead, the longer quotas are in place, the more likely they are to result in women's presence on cabinets.

H4: If quotas increase women in cabinet by increasing supply, we expect to observe a positive relationship between the years since quota implementation and the share of women in cabinets.

Quota Effectiveness

Quotas vary considerably in their effectiveness at increasing women's numeric representation in parliament (Schwindt-Bayer 2009). Some quotas yield large gains for women in parliament,

whereas others only moderately increase women's presence. If quotas work by increasing the supply of women for cabinet, than we expect to observe a strong link between the size of the quota shock and women's presence in cabinets. The more quotas increase the share of women in office, the larger the eligibility pool of potential women ministers. Consistent with this logic, for example, O'Brien and Rickne's (2016) analysis of the Swedish social democratic party finds that the quota law had an 'acceleration effect' on the selection of women in local leadership roles that was prominent especially when the quota worked well to increase the pool of women candidates for the posts. But, when quotas are less successful at transforming the composition of parliament, and result in only small increases, this in turn limits the supply of women. Thus, to the extent that quotas increase women's presence in cabinet via supply side factors, we anticipate the relationship will be larger in countries with bigger quota 'shocks.'

H5a: If quotas increase women in cabinet by increasing supply, we expect the positive relationship between quotas and women in cabinet will be stronger where quota shocks are larger.

H5b: If quotas increase women in cabinet by increasing supply, we expect the relationship between quotas and women in cabinets will be explained (mediated) by the share of women in parliament.

Isolating Potential Demand-Side Effects

Legislative gender quotas might also work by increasing the demand for women in cabinet. Quotas could change citizens' and elites' expectations of who should hold office. Simply seeing more women in politics can alter citizen's "mental template" of what a leader looks like (Taylor-Robinson & Geva, 2023). Research shows that exposure to women in politics may reduce bias against women in leadership (Beaman et al. 2009) and lead citizens to

develop more gender egalitarian attitudes (Alexander 2012), which Goddard (2019) shows is key to inciting leaders to appoint more women ministers. The increase of women in office associated with quota adoption can also foster more demand for women in office among elites. As Davis (1997) explains it, increases in women's legislative representation contributes to an "irreversible process of change" that feminizes politics, reshapes the institutional culture, and creates demand for more women in cabinets (p. 64). To this end, women may form "strategic coalitions" (Claveria 2014, 1163) to lobby party leaders to incorporate more women into the cabinet (Krook & O'Brien 2012, 948).

However, as the case of "strategic coalitions" of women MPs suggests, it is very difficult to disentangle potential demand-side effects from the added supply of women MPs. We acknowledge that as the supply of women 'ministrables' increases, so might demand for women in senior cabinet roles. We cannot rule out these demand-side effects operating simultaneously with the supply-side mechanism we theorize. Testing for demand-side effects is thus an empirical challenge. Here, we offer one way to test for potential demand-side effects, operating separately from the supply of women MPs. As previously discussed, supply side arguments can help explain the link between quotas and women in cabinets in parliamentary systems. However, only demand side arguments can explain the link within presidential systems and authoritarian regimes – where cabinet ministers are rarely drawn from parliaments.

A growing body of work indicates that leaders respond to external demands when forming their cabinets (Bego 2014; Kroeger & Kang 2022; Escobar-Lemmon & Taylor-Robinson 2005), and presidents and authoritarian leaders are better positioned than prime ministers to do so. Presidents and authoritarian leaders do not have to allocate cabinet portfolios to other political parties to form a government, nor do they need to maintain the confidence of the parliament to govern, giving them, "more freedom in making cabinet

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appointments" (Escobar-Lemmon & Taylor-Robinson 2005, 830). For this reason, presidents and authoritarian leaders can more readily incorporate new groups—such as women—into their cabinets to respond to external demands (Krook & O'Brien 2012). If gender quotas increase the demand for more women in cabinets, we anticipate that presidential and authoritarian leaders can easily respond to these demands. We thus expect:

H6: If quotas increase women in cabinet by increasing demand, we expect to observe an effect within presidential systems and authoritarian regimes.

Empirical Strategy

In order to determine if gender quota laws increase the presence of women in cabinets, we employ a difference-in-differences approach. We compare the share of women in the executive before and after a quota law was implemented, relative to countries where no quota was implemented. This strategy has the advantage of controlling for any country-specific omitted variables that are constant over time, such as historical gender norms, institutional context, and religious context, as well as any group-invariant trends over time, such as global economic conditions. This design thus helps address key endogeneity concerns, given that the parallel-trends assumption holds. In our case, this key assumption is that trends in the share of women in cabinets should have been the same across countries that do and do not implement a quota law, before the quota was implemented. We provide tests of the parallel-trends assumption by performing a difference-in-difference event study analysis which visualizes yearly treatment effects in the pre- and post-quota periods (see Figure 4 and associated discussion below). Because estimates are based on average differences between treated (quota) and control groups, the event study gives valuable graphical evidence of parallel trends before treatment, as well as post-treatment effects. Additionally, given the negative weights issue identified in two-way fixed effects estimation, we provide models using

the robust estimator proposed by Callaway & Sant'Anna (2021) as a robustness check.[2]

The baseline model with country and year fixed effects can be written as:

$$Y_{it} = \beta_1 \, Quota \; Law + \beta_2 Z_{it} + \alpha_i + \eta_t + \mu_{it}$$

where Y_{it} is the outcome of interest and measures the share of women in cabinet in country i in the year t; *Quota Law* is a dummy variable equal to 1 after the implementation of a quota law and 0 otherwise, and β_1 is the coefficient for this main independent variable; Z_{it} represents a vector of covariates, and β_2 the coefficients for these covariates; α_i and η_t are country and year fixed effects, respectively; and μ_{it} is the error term. Standard errors are clustered by country.

Our analysis proceeds in three stages. First, we present descriptive figures of the data, before and after quota adoption, for visual inspection of trends. Second, we present the difference-in-difference event study and difference-in-differences analysis, including regression models which investigate the impact of quotas in different contexts to test our theorized mechanisms. At the third stage we proceed to causal mediation analysis. This final step enables us to formally assess the role of women in the parliament as a mediator driving the relationship between gender quota laws and women in cabinet.

Data and Variables

We build a comprehensive, global dataset on the share of women in cabinets and gender quota laws by merging cabinet data from WhoGov (2020) with data on quota laws from QAROT (2019), which we extended and updated from 2015 to 2021.[3] We restrict the data

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[2]The results are in the Supplementary Material, Table A7.

[3]We updated the dataset using information obtained from the Gender Quota Database (International IDEA, 2023). The following countries adopted quotas between 2015 and 2021: United Arab Emirates,

to begin in the year 1990, because before this gender quota laws are very rare. The final sample consists of 5,246 country-year observations, from 169 unique countries from 1990 to 2021.

The main dependent variable measures the share of women appointed to the cabinet. Following Nyrup, Yamagishi and Bramwell (2023), our measure includes all full-ranking cabinet members. Additionally, to test H2, we measure the share of women appointed to cabinets of low, medium, and high prestige. These variables measure the share of women among portfolios that are categorized as low prestige (e.g., youth, tourism, women's affairs), medium prestige (e.g., agriculture, labour, justice) and high prestige (e.g., defence, finance, foreign affairs). The prestige typology we use was developed by Krook and O'Brien (2012) and operationalized by Nyrup and Bramwell (2020) in the WhoGov data. Our key independent variable is quota law, coded as a binary variable equalling 1 for each country-year after implementation of a quota law, and 0 otherwise.

To test hypotheses about the presence of effects by regime type, we use data from Bjørnskov and Rode's (2020) updated version of Cheibub, Gandhi and Vreeland's Democracy-Dictatorship dataset (2010). Authoritarian regimes include autocracies with no parties in government, one party in government, or multiple parties in government; parliamentary democracies are those democracies where the government is responsible to the legislative assembly (including parliamentary and mixed democratic or semi-presidential systems), while presidential democracies are not.

In order to strengthen support for a causal interpretation of our results, we carefully identify and control for potential confounding variables. Countries where women are better represented in the cabinet may share other factors that influence both the likelihood of adopting a gender quota and women's presence in the cabinet. First, thinking about political

Benin, Gabon, Guinea-Bissau, Kazakhstan, Luxembourg, Moldova, Mali, Malta, and Ukraine.

institutions, women's political inclusion–and consequently the adoption of gender quotas–are often justified by core principles of democracy such as political inclusion and fairness (Franceschet & Piscopo, 2013). Cross-national studies of women's access to cabinets, likewise find that democracy is a consistent predictor of women's access to cabinets (Krook & O'Brien, 2012; Nyrup, Yamagishi & Bramwell, 2023). Following Nyrup, Yamagishi and Bramwell (2023), we use a stock variable to measure history of democracy.[4] The stock of democracy ranges from 0 to 1, where 0 represents the least democratic history and 1 the most democratic history.

Next, turning to selectors, owing to their more inclusive political ideologies, left-leaning selectors are often associated with the appointment of more women to cabinet (Claveria, 2014; Escobar-Lemmon & Taylor-Robinson, 2005; O'Brien et al., 2015; Goddard, 2021; Reyes-Housholder, 2016), and they may also be more inclined to oversee the adoption of a gender quota. We use the Database of Political Institutions to identify whether the chief executive hails from a left-wing party—i.e., a communist, socialist, social democratic, or other leftist parties (Beck et al., 2001). Women selectors are likewise sometimes shown to tap more women for their cabinets (Jacob, Scherpereel & Adams, 2014; Reyes-Housholder, 2016); and, women leaders may be more likely to adopt gender quotas. We thus account for the presence of a women leader using the variable Female Leader derived from the WhoGov data (2020).[5]

Finally, we consider the broader socio-economic context. Historically, women were better represented in wealthier countries, and thus may access the cabinet with greater frequency. At the same time, research shows that developing countries may be more likely

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[4]Democracy scores from the V-Dem project's Polyarchy measure are summed from 1900 (or, if the country gained independence after the year 1900, the first year) to the given year, applying a 95% annual depreciation rate.

[5]WhoGov relies on the Archigos dataset to code leadership, which identifies the effective leader as the person that de facto exercised power in a country(Goemans, Gleditsch & Chiozza 2009).

to adopt gender quotas in an effort to signal their commitment to democratic norms, to the international community (Bush, 2011). To account for the fact that wealth may influence both cabinet formation and quota adoption, we use the log of GDP per capita to control for wealth. Related, women's labor force participation is likely associated with a larger supply of women cabinet appointees and potentially a bigger demand for the adoption of gender quotas. Following Krook and O'Brien (2012) we incorporate a measure of female labor force participation from the World Bank. Research generally finds that corruption is negatively associated with advancement of women's political careers (Bjarnegård, 2013; Stockemer & Sundström, 2018a), although in the wake of corruption scandals, leaders sometimes advance more women–e.g., appointing them to cabinets or adopting gender quotas–to signal they are cleaning up (Armstrong et al., 2022; Valdini, 2019). Lastly, conflict termination can prompt the adoption of gender quotas (Hughes, Krook & Paxton, 2015) and accelerate women's access to the cabinet (Arriola & Johnson, 2014). Thus, armed conflict may confound the relationship. Following Hughes and Tripp (2015), we use data from the Uppsala Conflict Data Program to account for whether there was a major armed conflict that resulted in 1,000 fatalities or more during the previous year. Summary statistics of all variables included in analysis can be found in Table A1 of the Online Appendix.

Results: Gender Quotas Increase Women in Cabinets

We start with a descriptive overview of quota implementation and the share of women in cabinets. Figure 1 depicts the share of women in cabinets among those countries that ever implement a quota law. The data is centered at 0, the first year of quota implementation, and data points show individual country-year observations. Before a quota law is implemented, the share of women in cabinets slowly increases over time. The mean rate of change (slope) over the twenty-year period before quota laws are implemented is an increase of 0.26% per

year. On implementing a quota law, the share of women in cabinets jumps by nearly 2 percentage points, and the slope of the trend line also increases. The mean rate of change in the twenty years post-quota implementation is 0.36%, representing an increase of nearly 40% on the pre-quota trend.
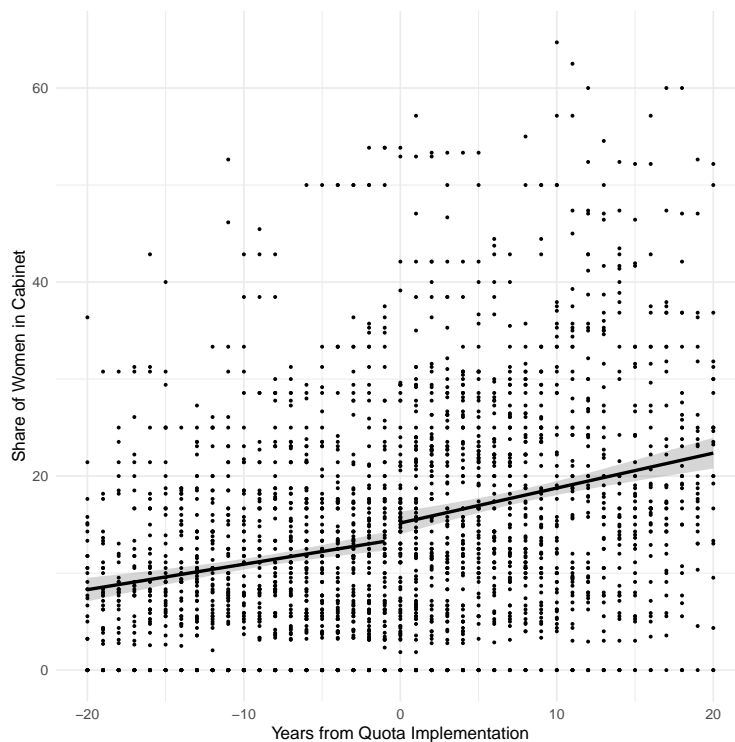

Figure 1: Mean share of women in cabinet before and after quota implementation

We argue that quota laws will improve women's representation in cabinets especially when the quota works well to increase the share of women in parliaments. Figure 2 provides descriptive evidence in favor of this argument by dividing countries into those that see a large 'shock' to women in parliament on implementation of the law, versus those that do not. High shock countries are those with an above-average change in the first election post-quota, and low shock countries are those with a below-average change in the first election post-quota.[6] The figure shows that trends in the share of women in cabinets are very similar pre-quota law implementation for low and high shock countries. However, on implementation a large jump in the share of women in cabinets is observed for high shock, but not low shock, countries. The mean share of women in cabinets increases from 11.4 to 15.3 percentage points on quota implementation, and the rate of change (slope) is also higher (0.59%, compared to 0.21% pre-quota). Considering low shock countries, there is a smaller bump to the share of women in cabinets on quota implementation (increase of 0.8 percentage points), and the slope of the line remains similar across pre- and post-quota periods.

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[6]The mean change to share women in parliament on quota implementation is an increase of 5.02 percentage points.
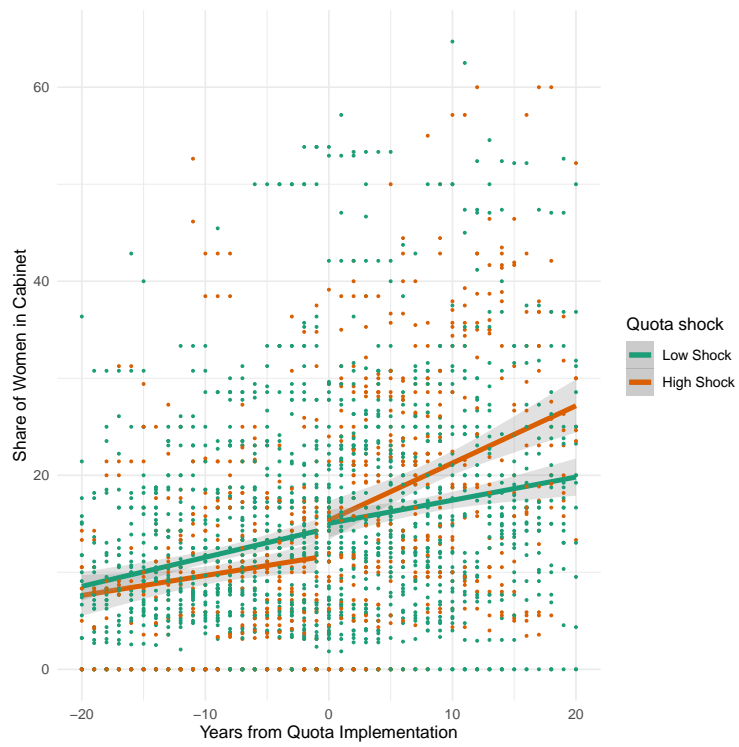
Figure 2: Mean share of women in cabinet before and after quota implementation, high vs low quota 'shock'

Additionally, we expect that gender quota laws will improve women's representation especially in the lowest-tier portfolios. That is, if quotas can help redistribute power to women, we expect to observe this first in those positions that are least desired and prestigious. Figure 3 maps the share of women in low, medium, and high prestige cabinet portfolios before and after quota law implementation. Taking the share of women in low prestige portfolios first, Figure 3 shows a large increase of 10 percentage points to the share of women on quota implementation, and the slope of the line also increases pre- to post-quota (increase of 0.20 in the slope, from slightly negative pre-quota to positive post-quota implementation). We also note that the confidence intervals around low prestige are relatively large compare to medium and low prestige. This is because not all cabinets include any low-prestige portfolios at all – a point we return to in subsequent analysis. Turning to the other categories, the impact of quota implementation on medium and high-level portfolios is much more subdued, although the rate of change in women's representation in cabinets increases post-quota for both categories. In summary, the descriptive evidence strongly supports our expectations.
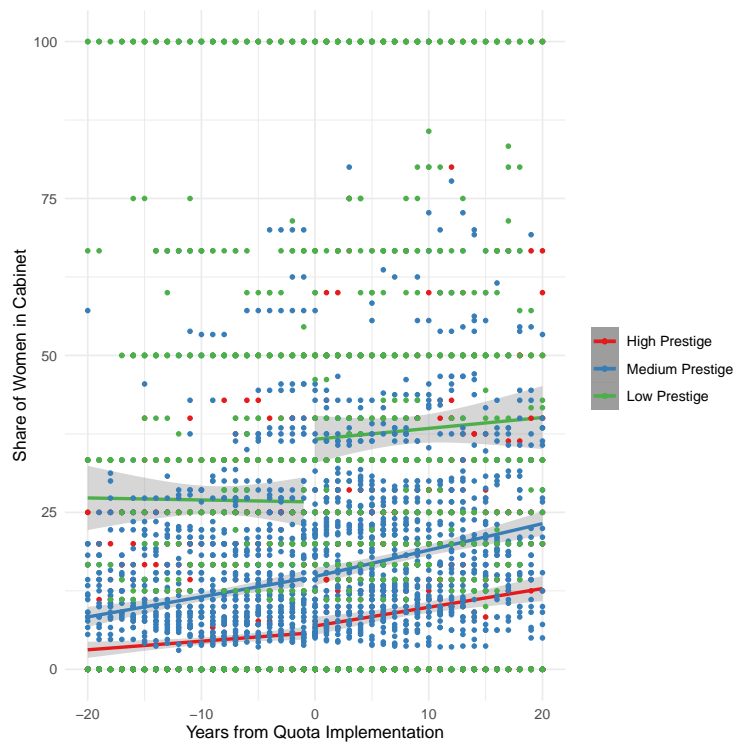
Figure 3: Mean share of women in cabinet before and after quota implementation, by prestige of portfolio

Table 1 reports the regression results showing the effects of gender quota law implementation on the share of women in cabinets worldwide. Specification 1 of Table 1 includes country and year fixed effects, with no controls. Specification 2 includes controls, country fixed effects, and a linear time trend as another way of controlling for the impact of time. Specification 3 includes controls and country and year fixed effects. The results consistently demonstrate that quota laws are associated with significant gains for women in cabinet. The coefficients indicate that quota laws are associated with a 2.2 to 2.5 percentage point increase in the share of women in cabinets. While this might not seem large in absolute terms, the mean share of women in cabinets in our data is only 14%. Quota laws thus lead to an increase of 15% relative to the average share of women in cabinets. Thus, we find evidence to support Hypothesis 1: gender quotas increase the share of women in cabinets.

Since we use a difference-in-differences approach, our results hinge on the parallel trends assumption that there are no pre-trends in the data. We run a difference-in-difference event study in Figure 4 to investigate if the assumption holds in our data. The event study is particularly useful since the countries in our dataset follow a staggered adoption, in which different countries implement quotas in different years. Through the event study, we can compare the treatment effects between countries. Figure 4 shows two versions of the event study: one based on two-way fixed effects, and one based on the unbiased method of Sun and Abraham (2021). The Sun and Abraham (2021) estimator was developed to account for potential problems related to staggered treatment across units (in our data, the fact that quotas are implemented in different years by different countries), and it does so by estimating the shares of cohort as weights. The x-axis is centered at 0, the time of quota implementation, and the y-axis contains the share of women in cabinet at the time of treatment, in the 20 years before treatment, and the 20 years after quota implementation.

Both of these event study results show that the no-pre-trend assumption holds:

Table 1: Gender Quota Laws and Share of Women in Cabinet

	Dependent variable:		
	% women in cabinet		
	(1)	(2)	
Quota law	2.543***	2.208***	2.221***
	(0.791)	(0.797)	(0.801)
Stock of polyarchy (95%)$_{(t-1)}$		16.872***	16.663***
		(4.776)	(4.792)
Log of GDP per capita$_{(t-1)}$		−0.878	−0.965
		(1.151)	(1.198)
Political corruption$_{(t-1)}$		2.503	2.311
		(3.867)	(3.897)
Women's labor force$_{(t-1)}$		0.205***	0.205***
		(0.074)	(0.075)
Woman leader$_{(t-1)}$		0.645	0.762
		(1.402)	(1.386)
Left executive		2.114**	2.146**
		(0.827)	(0.840)
Any war		−0.893	−0.843
		(0.873)	(0.870)
Constant	−2.058**	−873.133***	−2.296
	(0.806)	(86.524)	(8.454)
Country FE	Yes	Yes	Yes
Year FE	Yes	No	Yes
Observations	5,246	4,866	4,866
R^2	0.680	0.695	0.697
Adjusted R^2	0.667	0.683	0.684

Note: *p<0.1; **p<0.05; ***p<0.01

Robust standard errors clustered around country in parentheses.

the estimates are close to 0 in all of the years before implementation, and all of the 95% confidence intervals include 0. Further, we see a positive trend in the years post-quota implementation: the treatment successfully increases the number of women in cabinets. It is important to note that all CIs post-treatment don't need to be different from zero: often, quotas are more successful in increasing women in cabinets in the electoral cycles after implementation, which the event study shows. Moreover, the increase in the size of the CIs, the further away from the time of quota implementation is also expected: what the event study model does is compare countries that had quotas for at least 1, 2, 3, or more years with relevant control units, and there are few countries in the treatment groups of 15 years post-implementation and over. Overall, the visual results show in Figure 4 reassure us that the 'treatment' behaves as expected: there are no pre-trends, and there is a positive effect of implementing quotas on the share of women in cabinets for the years post-implementation.[7]
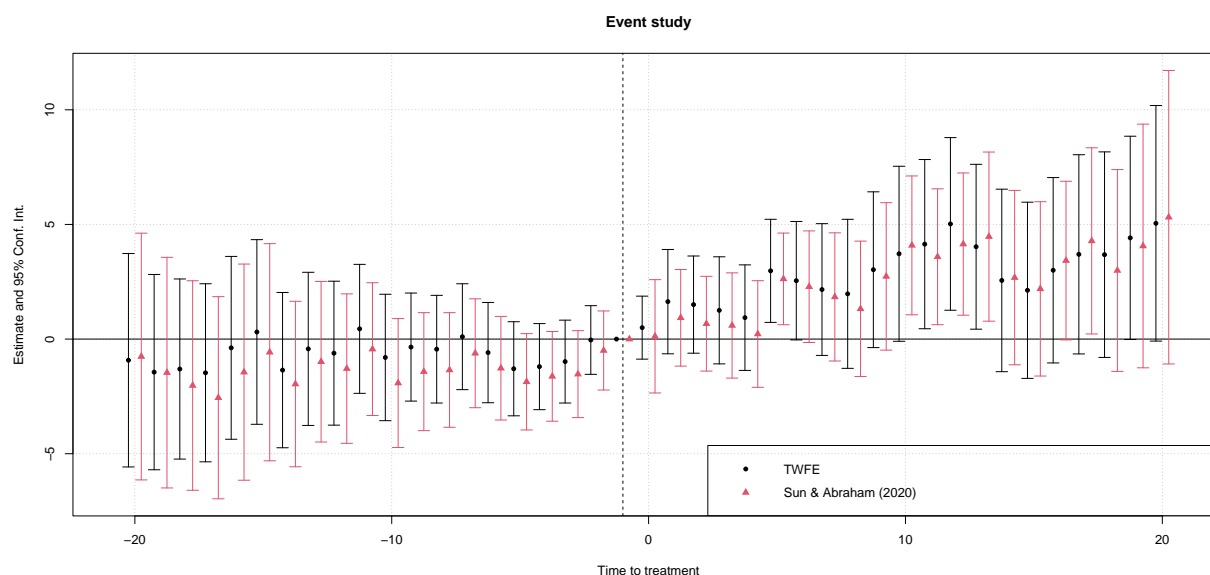

Figure 4: Event Study, Share Women in Cabinets Centered on Quota Implementation
Note: Difference-in-difference event studies estimated using the fixest package in R. Both models (TWFE and Sun-Abraham estimator) include all controls and standard errors clustered by country.

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[7]The lack of pre-trends in the event study in Figure 5 also suggests little evidence for demand-side effects.

Table 2 reports regression results showing the effects of quotas on the share of women in low, medium, and high prestige cabinet portfolios. Note that the number of observations for low prestige posts is smaller than medium or high prestige. This is because while virtually every country has high and medium-prestige portfolios in their cabinets, low prestige portfolios are optional. Approximately 20 percent of country-years do not appoint any ministers to those portfolios coded as low prestige (these are: Ageing & Elderly, Children & Family, Immigration & Emigration, Minorities, Science, Technology & Research, Sports, Tourism, Veterans, Without Portfolio, Women, and Youth). Table 2 shows that the effects of quotas are driven by boosts to women's appointment in low prestige portfolios. The coefficient on low prestige indicates that quota laws increase the share of women in these posts by 9.3 percentage points. This is consistent with the pattern observed in the raw data (Figure 3), supporting Hypothesis H2. We note that the average number of ministers in high, medium, and low prestige portfolios is 5, 14, and 2, respectively. Thus, while the effect size is larger for low-prestige portfolios compared to the main results shown in Table 1, it relates to a smaller pool of posts on average.[8]

Table 3 reports the regression results showing the effects of quota laws by regime type (specifications 1-3), over time (specification 4), and by extent of quota 'shock' to women in parliament (specification 5). Beginning with results by regime type, if the effect of quotas operates primarily through increasing the pipeline of women 'ministrables,' then we would not expect to find significant effects within presidential systems, where ministers are not selected from the parliament, or authoritarian countries, where selection is entirely in the hands of a strong leader. In line with H3, we find that quota laws are associated with a 3.4 percentage point increase in the share of women in cabinets within parliamentary democracies

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[8]One might argue that to understand whether quotas can increase women's presence in higher positions of cabinet power, we need to consider trends over time. Yet, additional analyses finds no evidence that years of quota implementation is linked to more women in medium- or high-prestige posts.

Table 2: Quota Laws and Share of Women in Cabinets, by Prestige of Cabinet Post

	Dependent variable:		
	% women		
	Low prestige	Medium prestige	High prestige
	(1)	(2)	(3)
Quota law	9.305**	0.820	0.995
	(3.752)	(1.004)	(1.326)
Stock of polyarchy $(95\%)_{(t-1)}$	19.241	17.495***	23.313***
	(18.293)	(4.963)	(8.475)
Log of GDP per capita$_{(t-1)}$	3.570	−0.580	−1.010
	(4.135)	(1.381)	(1.702)
Political corruption$_{(t-1)}$	−2.994	4.970	−0.315
	(12.176)	(4.723)	(4.565)
Women's labor force$_{(t-1)}$	0.347	0.175*	0.142
	(0.214)	(0.094)	(0.092)
Woman leader$_{(t-1)}$	−2.112	2.197	−0.597
	(3.683)	(2.228)	(1.620)
Left executive	2.356	1.788	2.348**
	(2.578)	(1.088)	(1.107)
Any war	−3.253	−0.843	−0.874
	(2.427)	(1.109)	(1.446)
Constant	−14.239	−7.689	−2.905
	(29.013)	(9.312)	(12.480)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	3,863	4,862	4,864
R^2	0.398	0.615	0.354
Adjusted R^2	0.366	0.599	0.326

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors clustered around country in parentheses.

(p<0.05). While the coefficients on quota remain positive across regime type, the effect is no longer significant at conventional levels for presidential democracies or authoritarian regimes (contrary to H6). Since there are several approaches to measuring dictatorship and democracy, we confirm that the results also hold using Polity (Marshall, Gurr & Jaggers 2016), as well as Boix, Miller and Rosato's (2013) binary indicator (see Appendix Table A6). The fact that our findings are limited to parliamentary democracies provides further evidence that the positive quota spillover effects we observe operate through raising the supply of women who have the potential to take up positions of power in cabinet.

Specification 4 of Table 3 turns to the effects of quotas over time. The coefficient of 0.17 on *Years quota implemented* in specification 4 is significant at the 0.1 level and indicates that for each additional year of quota implementation, the share of women in the cabinet increases by roughly one-fifth of a percentage point. That is, after 10 years of quota implementation (the mean number of years implemented for quota adopters) the share of women in cabinet is associated with a 1.7 percentage-point increase, after 20 years, 3.4 percentage points. This provides weak evidence in favor of H4, and we note that the same pattern of slowly increasing effects can be observed in the event study visualization shown in Figure 4.[9]

Specification 5 of Table 3 reports the results where quota law is operationalized as the size of the quota "shock" to women in parliament in the first year of implementation. Following Clayton and Zetterberg (2018) and Latura and Weeks (2023), we code high shock countries as those experiencing above-average change to women in parliament (the mean is a 5 percentage point increase), while low shock countries experience below-average change. In line with H5a, we find that effects in cabinets are larger when quotas are more effective at increasing women's inclusion in parliaments. A Wald test of the difference between low

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[9]We also run the analysis investigating the impact of quotas over time by regime type. The results are not significant in any of the three regime types.

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Table 3: Quota Laws and Share of Women in Cabinets: Results by Regime Type, Time, Quota Shock

	Dependent variable:				
	% women				
	Parliament-ary	President-ial	Authoritar-ian	Over time	By shock
	(1)	(2)	(3)	(4)	(5)
Quota law	3.421**	2.654	1.587		
	(1.457)	(1.805)	(1.154)		
Years quota implemented				0.170*	
				(0.096)	
Quota shock high					3.875**
					(1.572)
Quota shock low					1.273
					(0.838)
Stock polyarchy (95%)$_{(t-1)}$	3.400	4.756	28.380***	17.049***	17.235***
	(8.701)	(12.656)	(9.203)	(4.822)	(4.791)
Log of GDP per capita$_{(t-1)}$	−0.006	−4.542	0.179	−1.186	−0.984
	(3.105)	(3.915)	(1.366)	(1.189)	(1.173)
Political corruption$_{(t-1)}$	−4.775	11.734	2.536	2.276	1.968
	(5.529)	(10.472)	(7.095)	(3.869)	(3.827)
Women's labor force$_{(t-1)}$	−0.022	0.422**	0.254**	0.199***	0.204***
	(0.132)	(0.170)	(0.115)	(0.077)	(0.075)
Woman leader$_{(t-1)}$	−0.958	2.851	3.146	0.747	0.727
	(1.500)	(2.079)	(2.496)	(1.403)	(1.392)
Left executive	1.932**	2.536	1.575	2.028**	2.093**
	(0.963)	(1.592)	(1.985)	(0.852)	(0.846)
Any war	0.496	2.010	−1.543*	−0.876	−0.689
	(2.969)	(1.588)	(0.897)	(0.864)	(0.854)
Constant	8.370	12.852	−9.066	−0.321	−1.393
	(24.109)	(35.629)	(10.461)	(8.407)	(8.385)
Observations	1,751	1,002	2,113	4,866	4,866
R^2	0.718	0.591	0.708	0.697	0.698
Adjusted R^2	0.700	0.555	0.688	0.684	0.685

Note: *p<0.1; **p<0.05; ***p<0.01

Robust standard errors clustered around country in parentheses.

and high shock coefficients confirms that it is significant at conventional levels.

Finally, we employ a causal mediation framework (Imai et al. 2011) to provide a formal test of whether the effect of quota laws on women in cabinets operates through the share of women in parliaments. We estimate the causal relationships using the mediation package in R, which produces average total effects, and further decomposes these into average causal mediation effects and average direct effects. We first fit the mediator model (regressing the share of women in parliament, our mediator, on the share of women in cabinets, including the full list of controls) and the outcome model (regressing quota law and the share of women in legislators on the share of women in cabinets, including controls). Then, the package computes the estimated causal mediation and other estimates using the algorithm specified by Imai et al. (2010).
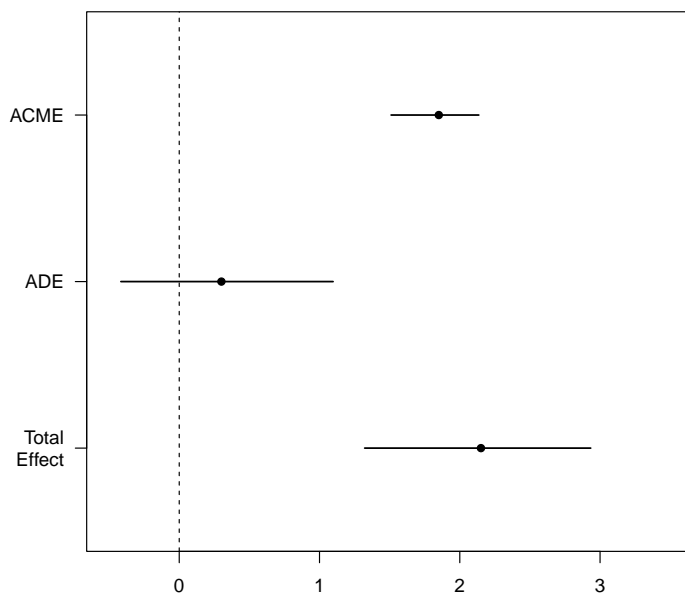

Figure 5: Causal Mediation Analysis

Figure 5 shows the results of the causal mediation analysis, with 95% confidence intervals. The total effect of a 2.2 percentage point increase in share of women in cabinets is plotted on the bottom row of Figure 5. The top two rows of the plot decompose the total effect into the average causal mediation effect (ACME, shown in the top row) and the average direct effect (ADE, shown in the middle row). The ACME is a 1.85 percentage point increase in the share of women in parliament, significant at conventional levels, while the ADE is 0.30, and not significant. The analysis reports that 87% of the direct effect of quota laws on the share of women in cabinets is mediated by the share of women in parliaments. This offers strong evidence for the supply-side mechanism, in line with H5b. Quotas increase the share of women in cabinets by boosting the share of women in the pipeline to power.

Sensitivity checks

We conduct a number of sensitivity checks. First, we investigated whether our main results on the effects of quotas in parliamentary democracies (Table 3 model 1) apply equally to regions around the world (see Table A2 of the Online Appendix). We find significant effects for quota laws in parliamentary democracies in both Africa and Europe, while in Asia the coefficient is positive but not significant.[10] We believe that these differences relate to the differential effectiveness of the quota laws across these contexts. For example, Tan (2016) reports that the effects of quotas have been, "slow and uneven" in East Asia. Empirically, in our data we find that within African and European parliamentary democracies quotas are associated with significant 9- and 7-percentage point increases to the share of women elected, respectively, while in Asian parliamentary democracies quota laws are associated with a smaller 4-percentage point increase which does not reach statistical significance (see Appendix Table A3). In other words, the pipeline mechanism we propose is stronger in those

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[10]No parliamentary democracies in Oceania or the Americas have implemented quotas, so we cannot investigate effects in these regions.

parliamentary democracies where quotas work more effectively to increase women's numbers in office.

Second, one potential way that governments could react to the increased supply of women in politics after a quota law is to increase the number of cabinet members. In this scenario, women can be included without men losing their seats – and while we would still track an increase in the share of women in cabinets in our main analysis, it might not reveal the full story. Women's power is diluted if it is gained by adding seats to the table rather than taking up existing positions. Using negative binomial regression models shown in Table A4 of the Online Appendix, we find that quotas are associated with an increase in the number of cabinet seats, but this is not significant at conventional levels. Quota laws are linked to a significant increase of 0.2 women ministers, on average. However, we note that quotas are also *not* significantly associated with a decrease in the number of men appointed to cabinets (in fact, the sign of the coefficient for quota is positive in this model). Our findings thus suggest that quotas increase the numbers of women in positions of cabinet power without significantly threatening the numbers of men in power.

Third, one potential confounder that we do not control for in the main analysis is the adoption of party-level quotas. Many political parties, especially those on the left, have already adopted a quota or target for women before quota laws are implemented. Could it be that these party-level institutions are driving the changes we observe to both quota implementation and the share of women in cabinets? To address this, we collected data on political party quota adoption from a variety of sources (Weeks 2016; Funk, Hinojosa & Piscopo 2017; International IDEA 2023). The data available often do not include a specific starting time for the party quota; nonetheless, this still provides valuable information about party-level support for women's inclusion. Therefore, we take a conservative approach and replicate our analyses controlling for governments headed by parties that adopted a

political party quota law at any time. Even using this conservative approach, we find similar patterns to those observed in the main analysis (see Appendix Table A5). Quota laws remain positively associated with the share of women in cabinets, and the coefficient of 2.26 on quota law is very similar to the result obtained in model 3 of Table 2 (2.22). Party quota laws are also associated with more women in cabinets (coefficient = 3.42, $p < 0.05$; an important finding in itself), but controlling for this does not decrease the impact of quota laws. This test provides reassurance that our findings are not confounded by party quotas. Fourth, we confirm that our results also consistent across alternative definitions of democracy; we continue to find no significant evidence of quota impacts when using measures of authoritarianism from Polity (Marshall, Gurr & Jaggers 2016), or Boix, Miller and Rosato (2013) (see Appendix Table A6).

Fifth, we replicate our analysis using the robust Difference-in-Differences estimator proposed by Callaway and Sant'Anna (2021). The robust estimator solves any potential bias that arises when using TWFE models. Further, the Callaway and Sant'Anna estimator directly allows the parallel trend assumption to hold conditional on covariates and is modeled directly within the estimator. The results in Table A7 in the Appendix show that our main results in Table 1 hold using the robust Difference-in-Differences estimator.[11]

Conclusion

Most countries around the world now apply some form of electoral gender quota as a policy lever to boost numbers of women in parliaments. Until now, we have yet to understand the potential follow-on impacts of these popular quota policies on the appointment of women

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[11]The C-S estimator requires that the data does not contain proper treatment reversal - i.e., once a country is treated, it must remain treated for the rest of the analysis. There is one exception in our data: Italy implemented a quota in 1994, dropped it, and re-implemented it in 2018. We run our robust analyses dropping Italy, to comply with the estimator requirements. Further, we run our main analyses with and without including Italy in the analysis. The results are robust and consistent in both samples.

to even higher positions of power – cabinet posts. To address this important question, we use a difference-in-difference approach in a global sample of countries from 1990 to 2021. Our study finds that, on average, quota laws are associated with a 2.2 percentage point gain in the share of women in cabinets. The results offer further evidence that quotas can have positive spillover effects on women's promotion to subsequent leadership roles (O'Brien & Rickne 2016).

Our study shows that quotas work by boosting the supply of women in the ministerial candidate pool, and this translates into more women in executive office especially in parliamentary systems, where cabinets are often selected from the parliament, over time, and in countries where the quota leads to a large 'shock' of women in parliament. We find little evidence to support the demand-side mechanism *alone* – that quotas work by raising the salience of gender equality in the public eye and to party leaders, even when parliament is not a pipeline to cabinet (i.e., presidential and authoritarian systems).

The effects we find are concentrated in low-prestige portfolios, such as Youth, Women, Children & Family, and even appointments Without Portfolio. While this is consistent with a supply-side explanation, whereby any newcomer to politics has to work their way up to more senior cabinet posts, we do not find that quotas raise the share of women in medium- or high-prestige cabinet posts even over time. With additional data on the length of cabinet members' political careers, future studies could test whether the trajectories of women newcomers are significantly different from men newcomers and whether women and men have the same opportunities to ascend to more prestigious cabinet portfolios over time. For now, our evidence suggests that quotas facilitate women's empowerment in the ways that are least threatening to men. Indeed, quotas increase the numbers of women in cabinets without significantly decreasing the numbers of men. And they do so by increasing women's presence in those positions that are least desired and prestigious. These findings

are congruent with previous studies showing that some governments only adopt quotas in the first place if they can add seats to parliament at the same time or implement them very gradually, so as not to put incumbent men's seats at risk (Krook 2016; Weeks 2018; Zetterberg et al. 2022).

While we find little evidence that quotas increase women's representation in the most prestigious cabinet portfolios, women's added numbers in those posts considered less important are nonetheless likely to be consequential for policy decisions on matters disproportionately affecting women. For example, ministers for women and family are responsible for a range of gender equality and work-family conciliation issues. A fruitful direction for future research is to investigate how gender quotas and their associated boosts to women in cabinet influence the substantive representation of women's interests, from child care and parental leave policy (see Atchison & Down 2009 and Weeks 2022 for studies of OECD countries) to violence against women, the gender pay gap, reproductive rights, and other equality issues. Further studies should also investigate the extent to which seeing women in visible cabinet posts can impact the symbolic representation of women, increasing for example women's political engagement and ambition (Liu & Banaszak 2017). Finally, taking a cue from research on workplace diversity (e.g., Comi et al. 2020; Gomez & Bernet 2019), there is much room for further study of how the added diversity that gender quotas bring to cabinets affects government performance and stability. Through implementing quotas, governments can set into motion a range of potential cascade effects with important implications for gender equality.

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Supplemental Material for 'Gender Quota Laws and Women in Cabinets'

Contents

A Summary Statistics

Table A1: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Share women in cabinet	5,246	14.306	12.468	0.000	64.706
Share women in cabinet, low prestige	4,129	29.049	35.354	0.000	100.000
Share women in cabinet, medium prestige	5,239	14.958	15.009	0.000	100.000
Share women in cabinet, high prestige	5,244	7.564	14.300	0.000	100.000
Quota law	5,259	0.238	0.426	0	1
Stock of polyarchy $(95\%)_{(t-1)}$	5,203	0.452	0.269	0.019	1.000
Log of GDP per capita$_{(t-1)}$	5,124	8.300	1.516	4.753	11.630
Political corruption$_{(t-1)}$	5,187	0.514	0.301	0.002	0.966
Women's labor force$_{(t-1)}$	5,114	49.050	15.738	5.922	90.466
Woman leader$_{(t-1)}$	5,224	0.050	0.219	0	1
Left executive	5,259	0.263	0.440	0	1
Any war	5,227	0.047	0.212	0	1
Year	5,259	2005.740	9.160	1990	2021

B   Analysis by Continent, Parliamentary Democracies

Table A2: Gender Quota Laws and Share of Women in Cabinet, by Continent
(Parliamentary Democracies)

	Dependent variable:		
	% women		
	(1)	(2)	(3)
	Africa	Europe	Asia
Quota law	7.704***	3.740**	2.616
	(1.783)	(1.868)	(2.222)
Stock polyarchy (95%)$_{(t-1)}$	56.638***	−6.284	−3.925
	(14.900)	(13.383)	(12.573)
Log of GDP per capita$_{(t-1)}$	0.660	2.926	−1.387
	(4.073)	(5.047)	(2.480)
Political corruption$_{(t-1)}$	28.158**	−3.079	−0.421
	(13.059)	(8.433)	(5.185)
Women's labor force$_{(t-1)}$	0.911***	−0.242	−0.201
	(0.229)	(0.152)	(0.202)
Woman leader$_{(t-1)}$	12.491***	−3.370*	2.768**
	(1.705)	(1.719)	(1.331)
Left executive	2.557*	2.122*	−0.109
	(1.521)	(1.117)	(1.429)
Any war	−3.233	−4.706**	0.959
	(2.443)	(2.079)	(1.328)
Constant	−73.308**	−4.648	22.020
	(30.505)	(39.448)	(24.111)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	248	969	339
R^2	0.662	0.719	0.518
Adjusted R^2	0.574	0.698	0.431
Note:			*p<0.1; **p<0.05; ***p<0.01

C Effects of Quotas on Women in Parliament, by Continent (Parliamentary Democracies)

Table A3: Quota Laws and Women in Parliament, by Continent (Parliamentary Democracies)

	Dependent variable:		
	% women in parliament		
	(1)	(2)	(3)
	Africa	Europe	Asia
Quota law	8.623**	7.335***	3.973
	(3.874)	(1.505)	(3.100)
Constant	5.368***	2.263*	0.188
	(0.199)	(1.193)	(1.512)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	248	1,047	344
R^2	0.816	0.875	0.814
Adjusted R^2	0.775	0.866	0.785
Note:			*p<0.1; **p<0.05; ***p<0.01

D Analysis of Effects of Quotas on Number of Ministers

Table A4: Gender Quota Laws and the Number of Ministers

	Dependent variable:		
	No. ministers	No. women ministers	No. men ministers
	(1)	(2)	(3)
Quota law	0.030	0.196***	0.004
	(0.023)	(0.053)	(0.025)
Stock of polyarchy $(95\%)_{(t-1)}$	−0.046	0.628	−0.275**
	(0.138)	(0.388)	(0.137)
Log of GDP per capita$_{(t-1)}$	−0.017	0.050	−0.007
	(0.040)	(0.128)	(0.039)
Political corruption$_{(t-1)}$	0.188*	0.110	0.165
	(0.101)	(0.218)	(0.116)
Women's labor force$_{(t-1)}$	0.0005	0.008	−0.002
	(0.002)	(0.006)	(0.002)
Woman leader$_{(t-1)}$	−0.015	−0.010	−0.030
	(0.032)	(0.064)	(0.043)
Left executive	0.008	0.132***	−0.015
	(0.018)	(0.040)	(0.023)
Any war	−0.070*	−0.097	−0.059
	(0.041)	(0.121)	(0.039)
Constant	3.064***	−0.886	3.103***
	(0.268)	(0.810)	(0.277)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	4,872	4,872	4,872
θ	503,961.500	35,736.570	388,729.900
	(1,130,895.000)	(52,268.080)	(882,454.000)
Akaike Inf. Crit.	27,067.060	16,088.550	26,386.770

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors clustered around country in parentheses.

E Analysis Controlling for Governing Parties with Voluntary Quotas

Table A5: Regression Results, Controlling for Governments that Adopt Party Quotas

	Dependent variable:
	% women
Quota law	2.267***
	(0.797)
Stock of polyarchy (95%)$_{(t-1)}$	16.481***
	(4.873)
Log of GDP per capita$_{(t-1)}$	−0.875
	(1.187)
Political corruption$_{(t-1)}$	2.221
	(3.873)
Women's labor force$_{(t-1)}$	0.202***
	(0.074)
Woman leader$_{(t-1)}$	0.859
	(1.338)
Left executive	1.774**
	(0.828)
Any war	−0.717
	(0.879)
Party quota	3.419**
	(1.379)
Constant	−2.708
	(8.346)
Country FE	Yes
Year FE	Yes
Observations	4,866
R^2	0.699
Adjusted R^2	0.686
Note:	*p<0.1; **p<0.05; ***p<0.01

F Analysis, Other Operationalizations of Authoritarian Regime

Table A6: Regression Results, Altnerative Measures of Authoritarian Regimes

	Dependent variable:	
	% women	
	(1)	(2)
	Polity	BMR
Quota Law	2.317	1.797*
	(1.455)	(1.061)
Stock of polyarchy $(95\%)_{(t-1)}$	14.715*	17.379**
	(7.713)	(6.964)
Log of GDP per capita$_{(t-1)}$	−0.458	−0.961
	(1.338)	(1.272)
Political corruption$_{(t-1)}$	4.665	1.909
	(7.671)	(5.542)
Women's labor force$_{(t-1)}$	0.228*	0.197*
	(0.132)	(0.102)
Woman leader$_{(t-1)}$	5.272*	1.747
	(3.147)	(2.650)
Left executive	0.345	0.806
	(1.836)	(1.086)
Any war	−1.404	−1.468
	(0.965)	(0.920)
Constant	−4.407	1.501
	(10.712)	(8.592)
Observations	1,465	2,078
R^2	0.703	0.690
Adjusted R^2	0.677	0.668

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors clustered around country in parentheses.
We use the conventional cutoff of 0.5 for the Polity measure.

G Robust Difference-in-Differences Analysis

We replicated our analysis using the robust Difference-in Differences estimator proposed by Callaway and Sant'Anna (Callaway & Sant'Anna, 2021), which is robust to the potential negative weight issues that arise when using TWFE models. Callaway & Sant'Anna (2021)'s DID method allows for multiple periods and variations in treatment timing. Further, it allows the parallel trends assumption to hold conditional on covariates modeled directly within the estimation. Our data follows a staggered adoption structure without proper treatment reversal, in which countries implement quotas at different points during the time of analysis (1990-2004) and stay treated for the rest of the analysis. The only exception in our sample is Italy, which implemented a quota in 1994, then dropped it, and re-implements it in 2018. The results are robust to excluding Italy from the sample. Some countries implemented quotas before 1990; hence, they are dropped from the analysis. Our control group is the countries that have never implemented quotas and those that have not yet.

Our main results hold using the robust estimator in Table A7: implementing a quota has a strong positive effect on the share of women in the cabinet, both in the full sample and in the subsample of Parliamentary Democracies. Since covariates are nuisance parameters only necessary for conditional parallel trends assumption, the only reported parameter is the quota implementation's Average Treatment Effects on Treated (ATT).[12]

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[12]Note that for issues of multicollinearity in the smaller subsample that includes only Parliamentary Democracies, we use a different set of controls in the two analyses. In the full sample analysis, we use stock poliarchy 95% (t-1), log of GDP per capita (t-1), political corruption (t-1), women's labor force (t-1), woman leader (t-1), left executive, and any war. In the subsample analysis, we use log of GDP per capita (t-1), women's labor force (t-1), woman leader (t-1), left executive.

Table A7: Robust DID analysis

	Dependent variable:			
	% women in cabinet			
	Full Sample		Parliamentary	
	(1)	(2)	(3)	(4)
Implemented quota	2.08**	2.68*	2.77***	4.81***
	(0.89)	(1.60)	(1.06)	(1.73)
Covariates	X	✓	X	✓
Observations	5,246	4,866	1,751	1,751

Note:	*p<0.1; **p<0.05; ***p<0.01

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