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The impact of women above the political glass ceiling: Evidence from a Norwegian executive gender quota reform[☆]

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ABSTRACT

Women have historically been underrepresented in democratic assemblies, particularly in top positions with executive powers. Most gender quota reforms address this by mandating a more equal gender representation on *election lists*. In contrast, a 1992 legislative reform in Norway required parties' candidate lists for the local *executive board* to comprise at least 40% politicians of each gender. This legal change was not only exogenously imposed by a higher-level government, but also generated distinct quota-induced constraints across Norwegian municipalities. We exploit the resulting variation in 'quota shocks' using a difference-in-differences design to identify the quota's effect on women's political representation as well as local public policies. We find that more women enter the executive board after the reform, though spill-overs on women's representation in the local council and on the probability of a female mayor or top administrator are weak. We also find no consistent evidence for shifts in public policies due to increased representation of women in positions with executive powers.

"After a 35-year career in Icelandic politics, I have concluded that women are generally better than men at ensuring fairness in society. The world would truly be a better place if equal numbers of women and men were at the helm."

Johanna Sigurdardottir (New York Times, 16/09/2018)

"I think empowering more women on the continent, that right away is going to, I think, lead to some better policies."

Barack Obama, Speech at Johannesburg town hall, 19/07/2018)

1. Introduction

Women have historically been severely underrepresented in democratic assemblies, particularly in top positions with executive powers. Although the situation has changed over the last generation, women's underrepresentation remains commonplace at all levels of government (Sundström, 2013). This is not only important for normative and

symbolic reasons. Since women tend to be more egalitarian and favourable towards higher welfare spending (Lott and Kenny, 1999; Edlund and Pande, 2002; Ågren et al., 2006; Svaleryd, 2009; Funk and Gathmann, 2015; for an overview, Croson and Gneezy, 2009), persistent gender imbalance in the world's political assemblies might also have important policy implications.¹ Barack Obama (former US president) and Johanna Sigurdardottir (former Icelandic prime minister) make this point forcefully in the quotes above by arguing that different policy outcomes would arise with more women in positions of power.

One common approach to stimulate more equal gender representation in the political sphere has been the adoption of gender quotas within countries' electoral systems. A large empirical literature has subsequently developed to assess their implications in terms of women's representation at different levels of government or in positions with legislative/executive power (e.g., Jones, 2009; Krook, 2009; Franceschet et al., 2012; O'Brien and Rickne, 2016), public policies (e.g., Chattopadhyay and Duflo, 2004; Besley and Case, 2003; Shea and

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¹ The term 'sex' is generally used to refer to the binary categorisation (female vs. male) according to biological attributes, while 'gender' is used in contexts where feminine or masculine roles, characteristics, behaviour or values are attributed by society to the sexes. Nonetheless, to maintain consistency with the 'gender quota' terminology, we will consistently refer to 'gender' rather than 'sex' throughout the analysis below.

Christian, 2017; Campa and Bagues, 2018; Weeks, 2018) and elected politicians' characteristics (e.g., Baltrunaite et al., 2014; Weeks and Baldez, 2015; Besley et al., 2017). Overall, the evidence suggests that election list quotas work well to increase the number of women standing for and obtaining elected office, have a much smaller impact in terms of promoting women into positions of actual political power, and do not consistently lead to observable shifts in public policies (O'Brien and Piscopo, 2019).

We contribute to this literature by studying a gender quota reform in Norway, which explicitly intended to parachute women into top political positions with executive powers at the local government level. Rather than imposing gender representation on election lists, the Local Government Act of 25 September 1992 (*Kommuneloven*) required parties' candidate lists for their representatives in the local executive board to comprise at least 40% politicians of each gender. This regulation first took effect with the local elections of 1995. As the executive board represents a key decision-making body in Norwegian local politics, this reform explicitly aimed at – and, as we will show, was successful in – increasing the appointment of women to higher political office.² The characteristics of the reform (discussed in more detail below) allow us to address the following main research questions. First, does a shift in the representation of women in the executive board spill over to other elected political bodies (e.g., local councils or the mayor)? Second, does a shift in the representation of women in the executive board affect public policy outcomes?

Important for our identification strategy, the legal change under consideration was exogenously imposed by a higher-level government, and also generated distinct quota-induced constraints across Norwegian municipalities. As a result, it provoked larger 'quota shocks' in the share of women in the executive boards of some municipalities compared to others. Following O'Brien and Rickne (2016) and Besley et al. (2017), we exploit these varying quota shocks in a difference-in-differences design to assess the quota's effect. It should be noted that much of the observed post-reform increases in women's representation in executive boards are effectively due to the quota reform, which allows us to explore these shifts' causal impact on our outcome variables.

Our main findings indicate that the executive quota reform induced a substantively very modest increase in the representation of women in the local councils (statistically significant primarily in the first election after the quota's introduction). We also find no evidence suggesting that the quota heightened the probability of selecting female mayors or Chief Municipal Officers (CMO; the top administrative position in Norwegian municipalities). Hence, overall, there is little evidence of important spill-over effects to other elected political bodies or positions of power in the Norwegian municipalities. The empowering effects of the reform on female politicians thus appear to have been minimal in our Norwegian setting. Similar results have been observed in different institutional frameworks by, for instance, Broockman (2014) and Bertrand et al. (2019). For contrasting findings using German and Indian data, see Beaman et al. (2009), Bhavnani (2009), Baskaran and Hessami (2018), and Bhalotra et al. (2018).

Furthermore, we find *no* consistent evidence for shifts in public policies due to quota-induced increases in the representation of women in political positions with executive power. Since we are the first to identify such effects using an executive quota reform as a source of exogenous variation, this is an important result. Interestingly, this

² The executive board consists of 5–23 members selected from among the local councillors, and is headed by the mayor. Unlike in a parliamentary system, its membership reflects the partisan composition of the council. According to the Local Government Act, the executive board prepares the municipality's financial plan, budget and tax proposals for final discussion and decision by the council. In practice, the board also has extensive delegated powers on a wide range of other issues and – as long as these policy issues are not legally granted to another decision-making body – then constitutes the final decision-making arena in the municipality.

arises *despite* survey-based evidence highlighting that female representatives have a stronger preference than male representatives for prioritizing government spending on social policy issues such as elderly care, childcare, healthcare, education and culture (in line with previous work by, for instance, Svaleryd, 2009; Childs and Webb, 2012; Slegten and Heyndels, 2018). As discussed in more detail below, our results thus highlight that there are likely to be institutional, organizational and/or structural constraints at work impacting upon “the process through which women's descriptive representation translates into their substantive representation” (Slegten et al., 2018, p. 25; see also Celis and Childs, 2012; O'Brien and Piscopo, 2019).

The remainder of the paper is structured as follows. In the next section, we review the existing literature and derive our main hypotheses. Section 3 then describes the Norwegian institutional framework and the gender quota reform under study, while section 4 looks at survey data to assess whether there is a gender gap in policy preferences among Norwegian local politicians. Then, in section 5, we set out our empirical strategy to estimate the impact of the quota reform. Sections 6 and 7 bring together our main findings on women's political representation and public policies, respectively. Finally, section 8 concludes.

2. Related research and hypotheses

With the gradual reduction of women's under-representation in politics (often at least in part stimulated by quota regulations), a persistent question has been whether increases in the number and share of female politicians effectively work to empower women. Two aspects of this translation of descriptive representation into substantive representation have thereby attracted particular attention.

A first aspect of women's empowerment is related to their access to positions of political power. The central question is whether increases in the political representation of women or the appointment of a female leader act as a pathbreaker for more women in politics (Beaman et al., 2009; Bhavnani, 2009; Broockman, 2014; Baskaran and Hessami, 2018; Bhalotra et al., 2018). Several mechanisms might explain such effects. A first mechanism is that exposure to female politicians and leaders affects voter attitudes. Beaman et al. (2009: 1497), for instance, show that Indian villages randomly allocated a female chief councillor show improved “perceptions of female leader effectiveness” and reduced “stereotypes about gender roles in the public and domestic spheres”. Another mechanism is linked to changes in party behaviour. Bhavnani (2009: 29), for instance, illustrates that when parties learn that “women can win elections”, their willingness to nominate more women on electoral lists increases. A third and final mechanism links to women themselves. Broockman (2014: 190) indeed argues that female office-holders may encourage “other women to vote or run for office themselves”. Although identifying the exact causal contributions of these various mechanisms is extremely challenging, empirical evidence appears supportive of the presence of ‘pathbreaker’ effects in India (Beaman et al., 2009; Bhavnani, 2009; Bhalotra et al., 2018) and Germany (Baskaran and Hessami, 2018), but not in the US (Broockman, 2014).

One interesting aspect of this developing literature is that these studies often implicitly involve spill-over effects across distinct political offices. The presence of a female mayor or chief councillor is indeed expected to increase the number of female council members (or candidates for such positions) rather than the number of female mayors per se. This strongly suggests that quota laws imposed on one particular political office may have spill-over effects onto other political offices by triggering changes in voter, party and politician behaviour. We therefore hypothesize that a quota law on executive boards – as in our empirical setting – may induce observable effects on women's representation in local councils or key positions of political and/or administrative power.

A second aspect of women's empowerment from increased

descriptive representation is linked to differences in observed policy outcomes. Such policy effects of the representation of women require several important conditions to be met. First, female politicians should share other women's policy preferences. Although survey-based evidence often indicates that female representatives' preferences are geared more strongly towards social policy issues such as elderly care, childcare, healthcare, education and culture (e.g., Svaleryd, 2009; Childs and Webb, 2012; Slegten and Heyndels, 2018), Ågren et al. (2006) provide some evidence that this need not always be the case. Second, though closely related, politicians should not just attempt to represent the median voter (Downs, 1957), which would make their gender uninformative for their policy choices (Slegten et al., 2018). In citizen-candidate models (Osborne and Slivinski, 1996; Besley and Coate, 1997), women's representation will matter for policy whenever differences in policy preferences exist across genders. The latter perspective appears to gain more empirical support as "female legislators are associated with increases in 'women-friendly' policy proposals, sponsorship, and debate" (Weeks, 2019, p. 5; see also Ban et al., 2018). Third, descriptive representation of women is more likely to lead to substantive policy representation when the institutional and organizational framework allows elected women to sway decisions in their preferred direction (Koch and Fulton, 2011; O'Brien and Piscopo, 2019). The likely presence of such institutional and organizational constraints in most real-world settings makes it less than straightforward that more women in office generates changes in observed public policies.

Bratton and Ray (2002) provide an early empirical study of the policy effects of increased representation of women. Using data covering five Norwegian local elections (1975–1991), they show that higher representation of women is associated with greater provision of child care services – particularly at more elevated levels of women's representation. Similar cross-sectional evidence is provided in, for instance, Svaleryd (2009) and Koch and Fulton (2011), though the latter also argue for a relevant mediating role of the institutional environment (i.e. the degree of party control over the political system). Clearly, however, simply comparing jurisdictions with varying shares of female representatives ignores that *both* women's representation *and* public policies may derive from unobserved heterogeneity across jurisdictions' electorates. This critical endogeneity issue may induce biased inferences.

In a path-breaking contribution, Chattopadhyay and Duflo (2004) address this concern by exploiting a natural experiment in India, in which Village Council Head positions in a random selection of villages were reserved for women. Clots-Figueras (2011, 2012), Ferreira and Gyourko (2014) and Campa and Bagues (2018) instead tackle the identification problem by relying on the inherent randomness of very close elections, whereas Chen (2010), Rigon and Tanzi (2012) and Clayton and Zetterberg (2018) exploit temporal variation in the presence/absence of gender quotas. Assuming that gender quotas have no direct effect on policy outcomes and are imposed exogenously, they generate higher representation of women even controlling for temporal trends and changing cultural attitudes (De Paola et al., 2010; Campa and Bagues, 2018; Paxton and Hughes, 2016). Across the distinct identification strategies, findings are generally mixed. Chattopadhyay and Duflo (2004), Clots-Figueras (2011, 2012), Chen (2010) and Clayton and Zetterberg (2018) find a significant impact of women's representation on specific policy outcomes, while Rigon and Tanzi (2012), Ferreira and Gyourko (2014) and Campa and Bagues (2018) provide counter-points finding no statistically significant policy effects of increased women's representation. Halse (2009) finds some effects on policy outcomes (particularly childcare and administrative spending), but these remain substantively very small. These mixed findings across time and space suggest that an important mediating role might be played by the exact institutional and organizational framework under which increases in the representation of women take place (e.g., Koch and Fulton, 2011; O'Brien and Piscopo, 2019). We revisit this link

between women's representation and public policy outcomes using a quota law on municipal executive boards in Norway.

3. Institutional setting

The local government level in Norway currently comprises 428 municipalities distributed across 19 counties, and constitutes a key part of the Norwegian economy. Municipalities take spending decisions accounting for approximately 15% of GDP, while employment in the local government sector comprises about 20% of total employment. As in most other European countries, municipalities play a central role in the provision of services including elderly care (ca. 28% of total municipal spending in 2015), primary and lower secondary education (ca. 21%), primary healthcare (ca. 14%), childcare (ca. 10%), and several infrastructure services (ca. 8%). They furthermore hold several key regulatory responsibilities, particularly in facilitating business development, planning of area utilization and the development of (social) housing (Fiva et al., 2018; Geys and Sørensen, 2018). On the revenue side, three main revenue sources can be distinguished. Tax revenues cover roughly 50% of municipal revenues, and are collected in large part via a proportional income tax and to a lesser extent via property taxation. While local governments in practice have little discretion over income tax rates, they do have considerable discretion when it comes to local property taxes. Grant revenues cover approximately 30% of revenues, and derive predominantly from a general purpose grant. Finally, less than 20% of revenues derives from user charges for kindergartens, old-age care and various infrastructure services.

Municipal elections are organized every four years in September to select the 11 to 85 members of the local council (depending on the size of the municipal population) using an open-list Proportional Representation electoral system (Fiva and Folke, 2016). This municipal council is responsible for all aspects of the municipality's activity (i.e. service provision, regulatory decision-making and related fiscal policies). The council also elects an executive board of minimum five individuals from among its members, and with a maximum size of 23 members in the period under study. This board represents a key decision-making body in Norwegian local politics and is also responsible for the preparation of the annual budget (to be formally approved by the council). Its composition is proportional to the partisan composition of the council, such that most political parties with sufficient seats on the council are also represented within the executive board.

The Local Government Act of 25 September 1992 introduced important changes in the procedural rules concerning gender representation in all elected decision-making bodies at the municipality level – including the *executive board* and municipal committees.³ Articles 36 and 37 of this law deal with the election of members to the executive board by the municipal council. They state that each party can put forward a list of candidates for the board including up to twice the number of names relative to the number of positions to be filled (e.g. ten candidates if the executive board has five members). Crucially, each list can only include elected council members (not deputy representatives nor unelected individuals), and should cover at least 40% candidates of each gender "as far as possible". The caveat included at the end is important. It implies that parties with few women (or men) among their elected councillors are exempted, and thus do not lose positions on the executive board because they lack council representatives of the 'right' gender to fill them; party representation thus retains priority over gender representation in the executive boards. This caveat also entails that the share of each gender in the final composition of the executive boards may remain (substantially) below 40%,

³ 'Elected bodies' should here be understood as boards and committees for which the members are (s)elected by local politicians rather than the municipal population. As such, the municipal council – which is directly elected by the municipal population – is *not* covered by these rules.

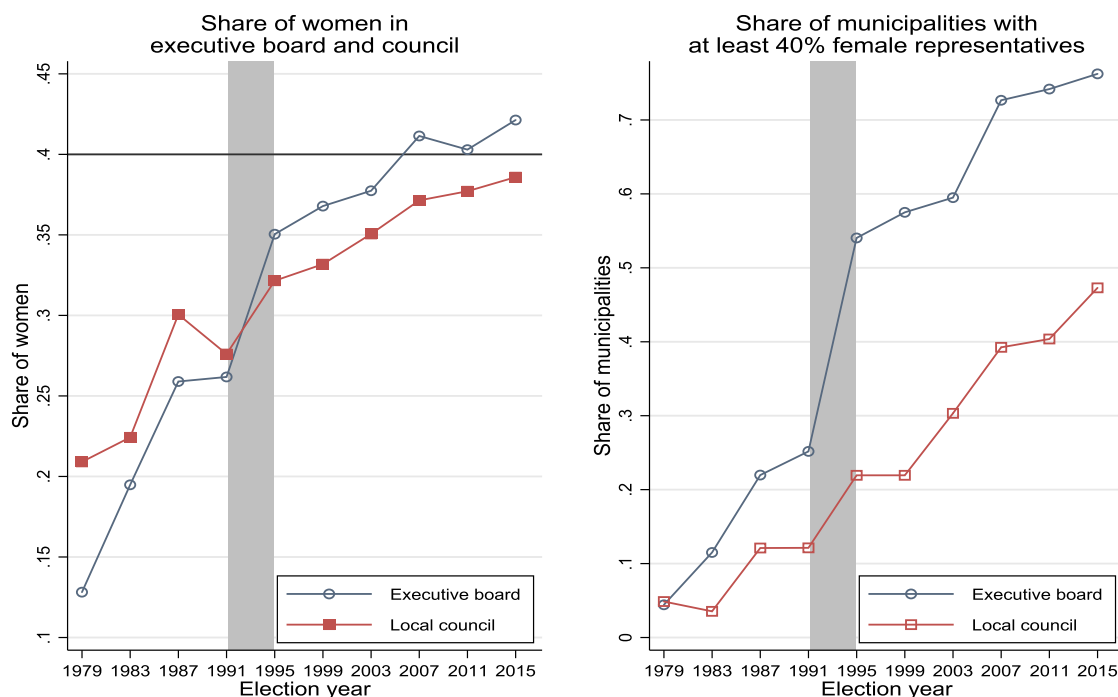


Fig. 1. Women's representation in municipal executive boards and councils. Note. The figure displays the evolution of the share of women in the local council and executive boards (left-hand diagram) as well as the fraction of municipalities with at least 40% women in the local council and executive boards (right-hand diagram). We include every local election since 1979, and the shaded area highlights the shift in women's representation between the last election prior to the reform (1991) and the first election following the reform (1995).

particularly in municipalities where one gender lacks significant representation in the local council after the municipal elections.⁴

This new legal framework took effect following the 1995 municipal elections. Fig. 1 illustrates its impact on women's representation in the municipal executive boards. In the left-hand diagram, we show how the share of women in the local council (line with full squares) and the executive boards (line with open circles) evolved following every local election since 1979. After the 1979 elections, the average municipality had about 12 (22) percent women in their executive boards (councils). These shares increased up to 26 and 28 percent, respectively, following the 1991 elections. The 1995 elections (marked by the shaded bar) produced a major shift. Women's representation in the executive boards not only jumped to an average of 35%, but for the first time women also were better represented in the executive boards relative to the local councils.⁵ In the right-hand diagram of Fig. 1, we furthermore observe that the fraction of municipalities with at least 40% women in the executive board increased with approximately 30 percentage points following the 1995 elections. Although about 45% of municipalities continue to miss the threshold in 1995 due to insufficient representation of women among parties' council members (see legal caveat above), the very marked increase further corroborates the immediate and strong impact of the quota reform on female politicians' executive board representation. We exploit this shock – and its varying strength across municipalities – for identification purposes in our analysis.

We should note at this point that several Norwegian political parties

⁴ In the unusual case where few men are elected in the local council, parties must also ensure that the minimum fraction of men is nominated for election to the boards “as far as possible”. For example, the 2015 local elections in the municipalities of Solund and Åmot led to the election of 67% and 68% women, respectively, in the municipal council. Women accounted for 60% and 57%, respectively, in these municipalities' executive boards.

⁵ In part as a result of the quota reform, Norway ranks very high with respect to women's representation at the local government level, both in comparison to other European countries and relative to the other Nordic countries (Aars and Christensen, 2012).

already introduced internal quotas for its election lists prior to the quota reform we study. Halse (2009) indeed documents that the Socialist Left Party and the Liberal Party introduced internal quotas in 1975, the Labour Party in 1983, the Center Party in 1989 and the Christian Peoples' Party in 1993. This does not affect our analysis below for two main reasons. First, these internal party quotas were introduced before our quota reform took effect, and hence will not influence analyses of the 1995 reform. Second, the effect of internal party quota on women's representation in the local councils tends to be very weak in Norway (probably due to important self-selection issues; Halse, 2009). This implies that their impact on the executive board are likely to be even smaller, which further mitigates any potential influence of these internal quota on our findings.

4. A gender gap in policy preferences

Before assessing any impact of the quota reform on policy outcomes, it is important to evaluate whether elected male and female politicians differ in their policy preferences. Without such differences, it would be unreasonable to expect changes in policy outcomes from increased representation of women. We therefore first analyse a large-scale survey distributed among 7,843 out of the 10,621 council members elected during the local elections of September 2015 (no valid contact details could be obtained for the remaining councillors). The survey was fielded in May 2016 and obtained responses from 3,607 elected representatives across 417 municipalities by mid-September 2016 (ranging from 1 to 31 answers per municipality). This represents an overall response rate of 46% (municipality-specific response rates vary from 3% to 73%).

The survey includes a set of background characteristics (including respondents' party, sex, age, education level, marital status, and so on) as well as three questions relevant to politicians' policy preferences, which we use as dependent variables in this section. The first of these questions relates to politicians' position on an ideological left-right scale, and asks respondents to locate themselves on an 11-point scale



Fig. 2. Ideological positions and preferences of increasing property taxes. Notes. The upper diagram displays the average left-right self-placement of local council members by party affiliation and gender. The lower diagram shows council members' preferences for increasing property taxes by party affiliation and gender.

from Left (0) to Right (10). Positions on the left-right scale give a *general* indication of politicians' overall policy stance, and tend to have a statistically significant effect on actual budgetary allocations in our Norwegian setting (Fiva et al., 2018). The second policy-related question is more directly targeted towards politicians' spending priorities. It asks: "Starting from the current distribution of municipal revenues, do you believe that the following elements should be allocated a larger or smaller share of total revenues, or do you think the current allocation is appropriate?" The question is presented for nine policy areas including administration, child care, elderly care, healthcare, and education. Answer options are restricted to 'larger share', 'smaller share' and 'appropriate as is' (with the possibility to state 'don't know'). Finally, the third policy-related question enquires about politicians' position in favor (coded as 1) or against (coded as 0) the collection of property taxation in their municipality. The survey was conducted with an explicit guarantee that all individual responses would be treated fully confidentially. This reduces potential self-serving biases in responses and benefits truthful replies (Heinemann et al., 2016).

In Fig. 2, we display representatives' left-right self-placement (left-hand diagram) and position towards property taxation (right-hand diagram) by gender and party (on the X axis). Both diagrams are ordered along the X axis according to women's average responses. In both cases, the within-party gender disparities appear very small. Fig. A2 in the online appendix shows similar results when estimating a regression model with gender as the central independent variable and adding controls for party affiliation and municipality fixed effects. Yet, although the point estimates remain fairly small (i.e. less than 0.4 on the 11-point left-right scale and less than 0.1 on the one-point scale for property taxation), the coefficient for the gender dummy is statistically significant for both variables. Female council members thus do differ at least to some extent from their male counterparts in the same party and municipality.

Turning to politicians' spending priorities in Fig. 3 yields a very similar pattern (detailed results from regression models including party affiliation and municipality fixed effects are provided in Fig. A1 in the online appendix). Relative to their male counterparts in the same party

and municipality, female council members have a significantly stronger preference for increasing budgetary allocations to most policy areas (except administration, infrastructure and economic development programs). This includes key local policy areas of elderly care, childcare, healthcare, education and culture (in line with previous work by, for instance, Svaleryd, 2009; Childs and Webb, 2012; Slegten and Heyndels, 2018). Again, however, the point estimates remain fairly small, and generally hover around a 0.1 unit difference on a two-point scale.

5. Effects of the quota shock: research design

Our results in the previous section highlight that female representatives have statistically significantly stronger preferences for prioritizing government spending in social policy areas and increasing property taxation. To study the political and policy impact of the executive gender quota reform, we employ a difference-in-differences strategy comparing the period before and after the reform across municipalities with larger/smaller 'quota shocks'. Our research design thereby follows O'Brien and Rickne (2016) and Besley et al. (2017) in identifying causal effects via the differential effect of the reform on women's representation across municipalities. Specifically, we define the quota shock as the change in the proportion of female representatives in the executive boards in the 1991–95 period *minus the average representational change in local elections over the 1979–91 period* (i.e. calculated as the 1991 to 1995 difference minus one third of the 1979 to 1991 difference).⁶ Subtracting the historical trend in changes in

⁶ The development of women's representation in 1987–1991 in Fig. 1 appears atypical compared to previous years, and might have played a role in discussions on the need for a quota system. Consequently, we implemented a robustness check defining our quota shock as the change in the proportion of female representatives in the executive boards in the 1991–95 period minus the average representational change over the 1979–87 period (i.e. calculated as the 1991 to 1995 difference minus one half of the 1979 to 1987 difference). All results and inferences reported below remain unaffected by this change.

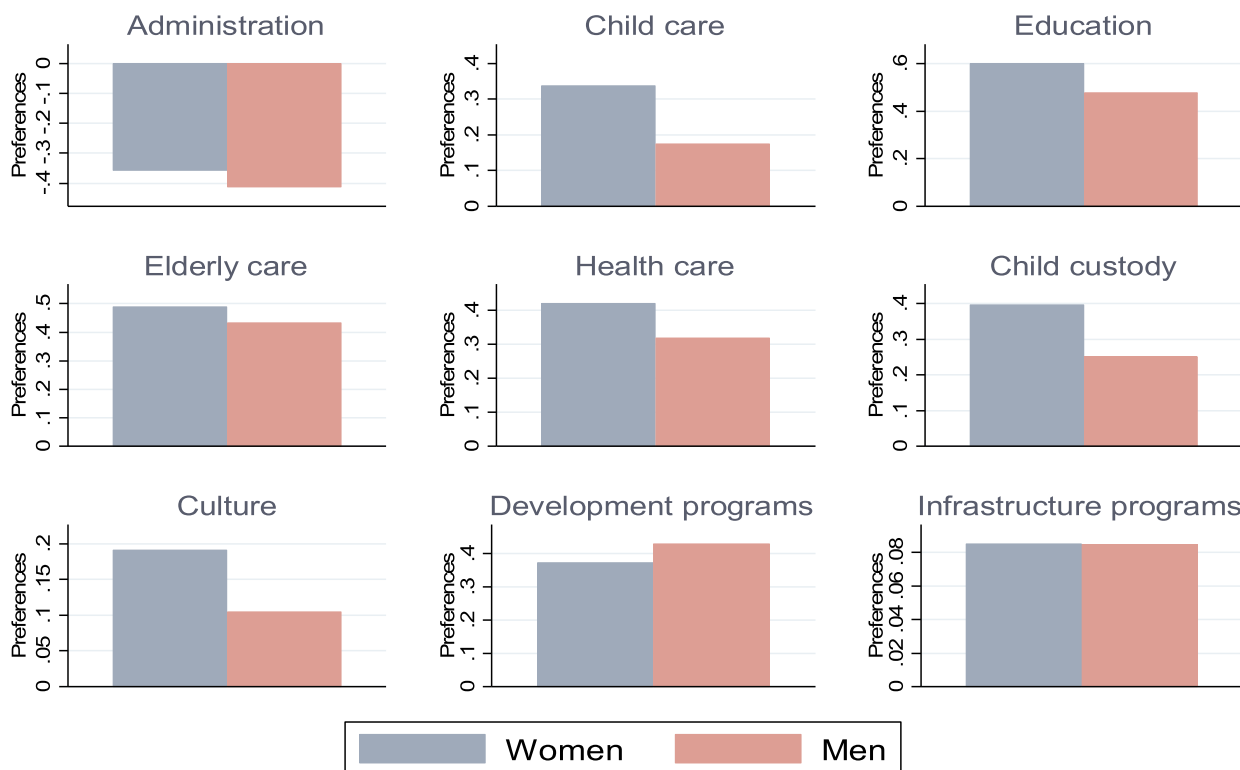


Fig. 3. Preferences for spending allocation.

Notes. The figure indicates local councilors' preferences for increasing or decreasing the share of local public spending for various spending programs, classified by gender. The main text outlines additional details on the data and the survey questions.

women's representation from the shift observed following the quota reform “captures the inflow of female politicians attributable to the quota policy” (O'Brien and Rickne, 2016: 118). In Fig. 4, we display the frequency distribution of the resulting trend-adjusted shift in women's representation (i.e. our quota shock). This highlights that about 62% of all municipalities witnessed an increase in women's representation in their executive boards following the quota reform that was at least as fast as the trend growth in the 1979–91 period.

More formally, we use this quota shock to estimate the following regression model:

$$Outcome_{k,t} = \beta \cdot Shock_k \cdot E_{t,t \geq 1995} + Controls_{k,t} + \theta_k + \gamma_t + \varepsilon_{k,t} \quad (1)$$

where $Outcome_{k,t}$ denotes an indicator of women's representation in municipality k in election year t (e.g., share of women in executive board, council or on electoral lists, or dummy variables for female mayor and female CMO). $Shock_k$ is the quota shock affecting municipality k . The model specification allows us to estimate separate effects for distinct election years following the quota reform. This is captured by $E_{t,t \geq 1995}$, which is a set of dummy variables indexed from election year $t = 1995$ to 2015 ($E_{1995}, E_{1999}, \dots, E_{2015}$). These indicators equal 0 in all election years prior to quota implementation (1979–1991); E_{1995} equals 1 in the 1995 election only, and 0 otherwise; E_{1999} equals 1 in the 1999 election only, and 0 otherwise, and so on. As such, the respective coefficients on their interaction with the quota shock indicate the effect of the executive quota reform in 1995, 1999, 2001, ...— thereby creating a set of estimates that characterize the reform impact over time. The model also includes municipality fixed effects (θ_k), election year (γ_t) fixed effects, and an error term capturing idiosyncratic influences ($\varepsilon_{k,t}$). The municipality fixed effects are particularly important in our setting since they account for any (un)observed stable location-specific characteristics that might simultaneously affect our left- and right-hand side variables. As such, our analysis captures the effect of quota-induced variation in women's representation *within a specific municipality over*

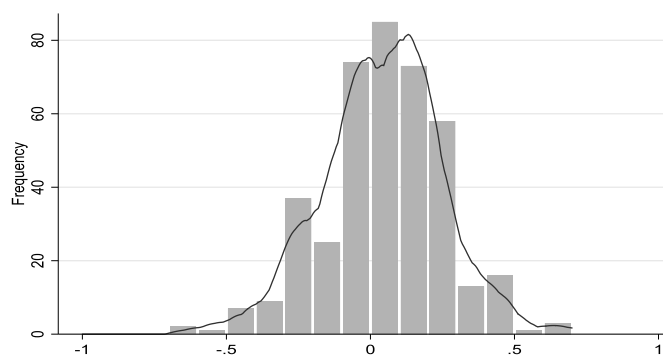


Fig. 4. Frequency distribution of quota shock variable.

Notes. The diagram shows a histogram of the trend-adjusted shift in women's representation generated by the gender quota reform (i.e. the 'quota shock'). The line plots kernel density estimates for the same variable.

time (O'Brien and Rickne, 2016; Besley et al., 2017).

Before turning to the results, we should note that we assess the robustness of our baseline specification in a number of ways. First, we extend the model with a set of time-varying controls: i.e. population size, share of women, share of children at pre-school age (under 6 years), share of youngsters at school age (between 6 and 18 years), and share of elderly over 65 years. Second, we estimate effects *prior* to quota implementation, naturally expecting these effects to be zero. Third, we experiment with the inclusion of municipality-specific time trends. None of these auxiliary models affect the central inferences of our analysis (full details available upon request).

6. The quota effect on women's political representation

We start our analysis by looking at the effect of the executive quota

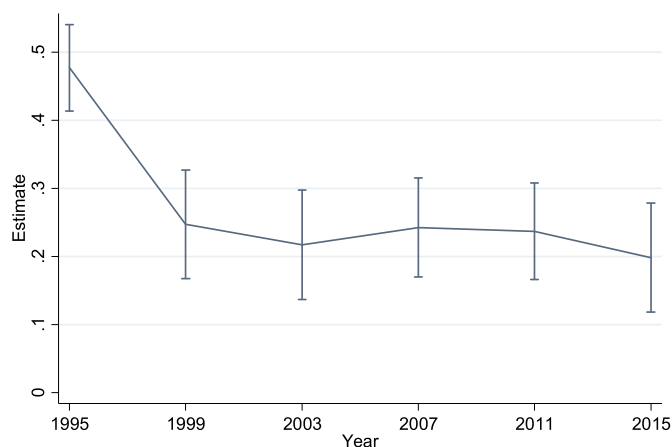


Fig. 5. Effect of the quota reform on the share of women in executive boards. Notes. The diagram displays marginal effects estimates (with corresponding 95% confidence intervals) of the quota reform on women's executive board representation using fractional logit models. All models include a full set of municipality fixed effects and election year fixed effects. See Table A3 for corresponding results presented in tabular format.

reform on several indicators of women's political representation. Fig. 5 summarizes the results of estimating equation (1) using as dependent variable the share of women in municipal executive boards. Fig. 6 summarizes the results of estimating equation (1) using as dependent variables the share of women in municipal councils (top left panel), on the list of candidates standing for election (top right panel), among mayors (bottom left panel), and among top administrators (CMOs; bottom right panel). Although the estimation sample starts with the 1979 municipal elections, each diagram displays the estimated marginal effects (with corresponding 95% confidence intervals) of the quota reform on women's representation since 1995. Table A3 in the online appendix provides the detailed estimation results in tabular form, and also includes findings for one further dependent variable (i.e. share of women receiving an electoral "pre-advantage" from their party).⁷

Our results in Fig. 5 confirm that the executive quota reform induced a statistically significant upward shift in women's representation in municipal executive boards. In terms of effect size, we find that a one standard deviation increase in the quota shock is linked to an increase in board membership of women with 9.27 percentage points in the first election (1995) and roughly half that size in subsequent elections. This represents a substantively meaningful enhancement in women's representation. These results indicate that substantial progress was made towards reaching the core intention of the reform – an increase to minimally 40% women (and men).

Our results in Fig. 6 also suggest that the quota-induced increase in women's executive board representation generally induced substantively and statistically weak effects on various measures of women's political representation. The top left panel, for instance, shows the impact of the quota reform on the representation of women in municipal councils. This is statistically significant in the elections of 1995, 1999 and 2007. In terms of effect size, a one standard deviation increase in the quota shock is linked to an increase in women's council membership with just over 2 percentage points in the first election (1995) after the reform. Again, the size of the effect roughly halves in

the 1999 and 2007 elections, and completely dissipates afterwards. Turning to the top right diagram, we find no statistically significant effect on the share of women included on party lists, and the point estimates for this variable even tend to be negative. The two bottom panels show that the reform had no statistically significant effect on the probability of selecting a female mayor or a female CMO. Table A3 in the online appendix furthermore highlights no statistically significant effect of the quota reform on the share of women receiving an electoral "pre-advantage" from their party.

Hence, overall, the absence of important spill-over effects to other elected political bodies or positions of power in the Norwegian municipalities suggests that female politicians – or women more generally – did not become more empowered politically in the aftermath of the reform (beyond their increased presence on the executive boards themselves). The same has also been observed in other political settings as well as outside the political sphere. Broockman (2014: 190), for instance, shows that additional female candidates and officeholders in the US fails to mitigate persistent gender gaps "by empowering other women to vote or run for office themselves". Bertrand et al. (2019: 191) study a gender quota for the boards of private-sector firms in Norway, and likewise find that this reform had "very little discernible impact on women in business beyond its direct effect on the women who made it into boardrooms". In contrast, analyses of Indian and German data suggest that women in political leadership roles can in some cases act as pathbreakers stimulating a subsequent increase in women's political participation (Beaman et al., 2009; Bhavnani, 2009; Baskaran and Hessami, 2018; Bhalotra et al., 2018). The institutional, political and cultural drivers behind these opposing findings are an important avenue for further research (Koch and Fulton, 2011; O'Brien and Piscopo, 2019).

7. The quota effect on fiscal policy

Although the reform failed to generate important political spill-overs for female politicians, it did meet its prime target to boost women's representation in municipal executive boards (see Figs. 1 and 5). In this section, we assess whether this increased representation of women in political positions with executive power caused noticeable shifts in local public policies. Fig. 7 summarizes the results of estimating equation (1) using as dependent variables the level of property tax revenues per capita (top left panel) and the share of public spending on childcare, education, healthcare, elderly care and culture. Table A4 in the online appendix provides the detailed estimation results in tabular form for the entire post-reform period, and also includes additional findings for spending on the municipal public administration, transport and 'other' purposes.

Looking first at the revenue side of the budget, the increase in women's executive board representation due to the quota appears to have had a small negative impact on property tax revenues. Nonetheless, while this effect is fairly precisely estimated in the immediate aftermath of the reform, it fails to reach statistical significance at conventional levels. While the precision of the estimate goes down in subsequent years, we cannot reject null effects for any year during the post-reform period. Similar non-significant results are likewise observed for every spending category included in the analysis for every year under analysis. This is not because we are looking at unimportant policy areas. In fact, the spending categories included in Fig. 7 cover all major local spending categories and together account for more than 75% of total municipal expenditures.

Table A4 in the online appendix presents the average policy effects across post-reform years, and shows similar statistically insignificant results across all categories of the local expenditure budget. This table also allows us to be more detailed about the precision of our estimates. Table A4 indicates, for instance, that the quota shock on child care yields a point estimate of -0.181 with a standard error of 0.355 . This gives a 95% confidence interval of -0.88 to 0.51 . Child care accounts

⁷ A particular feature of Norwegian electoral politics is that parties can allocate an increased share of their party list votes to specific candidates. Candidates with such a "pre-advantage" are listed at the top of the ballot paper in boldface, and obtain "25% of the total number of votes received by their party" (Fiva and Røhr, 2018: 144). Clearly, this pre-advantage constitutes a very significant boost towards obtaining elected office by this candidate.

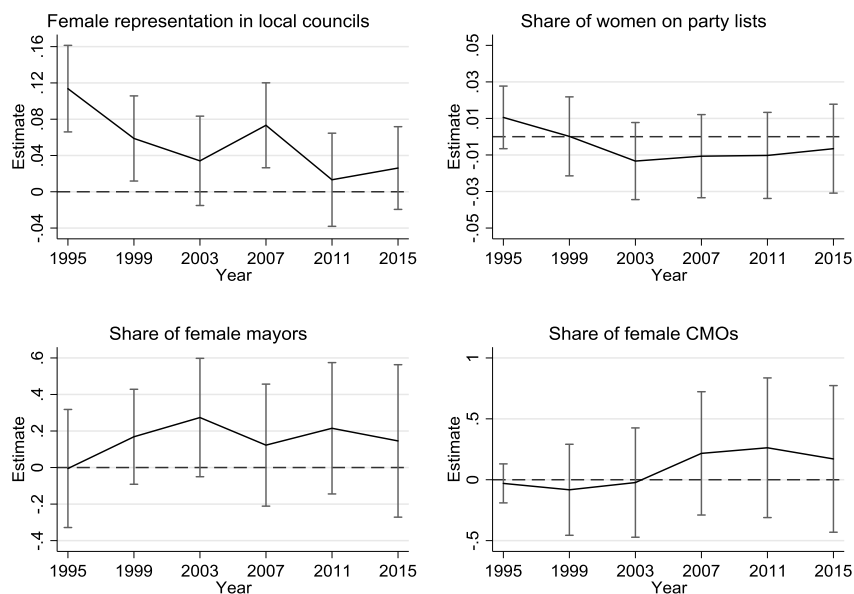


Fig. 6. Spillover effects of the quota reform on other indicators of women's representation.
 Notes. The diagrams display marginal effects estimates (with corresponding 95% confidence intervals) of the quota reform on women's representation using fractional logit models. The top panels analyse municipal councils and party lists, while the bottom panel analyse probability of a female mayor or CMO. All models include a full set of municipality fixed effects and election year fixed effects. See Table A3 for corresponding results presented in tabular format.

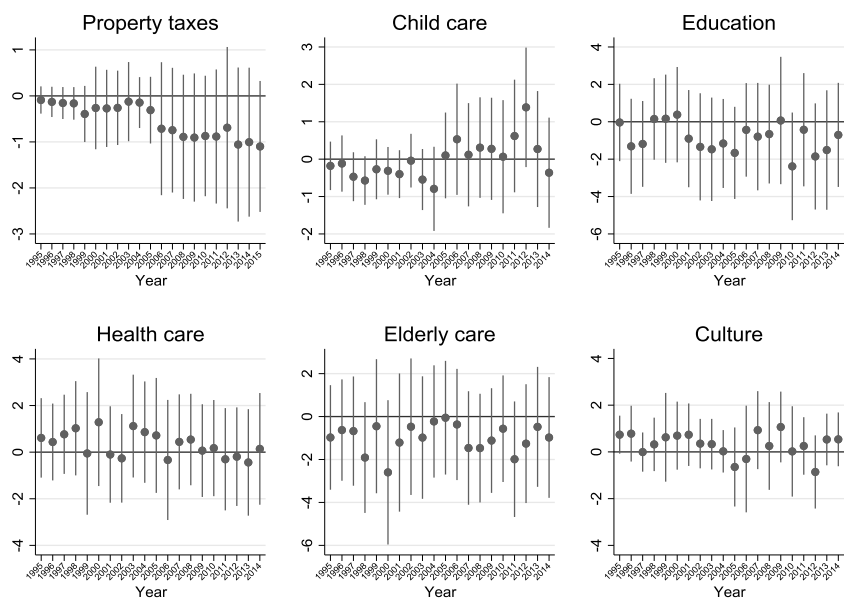


Fig. 7. Effect of the quota reform on fiscal policies.
 Notes. The diagrams display coefficient estimates (with corresponding 95% confidence intervals) reflecting the effects of the quota reform on per capita revenues from property taxes (top left panel), as well as on expenditure allocations for the major local government service sectors. Expenditure allocations are measured as a share of total current spending (%). All models include a full set of municipality fixed effects and election year fixed effects. See Table A4 for corresponding results presented in tabular format.

for 6.08% of total spending, with a standard deviation of 3.51 (within municipalities this standard deviation is 3.20). The upper and lower bound effects of the quota shock thus seem very small relative to the overall dispersion of the child care spending share observed in the data. Similar findings apply also to the other policy areas. Overall, therefore, our results indicate that increased representation of women in political positions with executive power due to the quota yielded *no* significant impact in subsequent years.

Taking these results together with the distinct gender gap in policy preferences (see section 4) suggests the presence of institutional, organizational and/or structural constraints limiting the policy impact of women's increased descriptive representation in the executive boards. One conjecture would be that weak policy effects might arise due to the fact the female politicians promoted to executive positions after the reform lack political experience or gravitas. Still, our long time period would tend to go against such a conjecture, as it should gradually and naturally become resolved over time (even though women might continue to be viewed as benefiting from positive discrimination under the quota). A more likely explanation is that specific institutional aspects of our Norwegian setting prevent women from making use of their

leadership position to sway decisions in their preferred directions. One such element may be the fact that the municipal council in many cases formally approves the executive board's decisions, such that the main jump in increased representation of women does not occur in the political body with the final say. Another element may be the disciplining effect of 'strong' political parties in Norway, where leaders incentivize rank and file politicians to maintain party discipline (and thus express *common* support across genders for policy decisions despite holding distinct *private* policy preferences). Our findings thus do not necessarily imply that the link between descriptive and substantive representation will always be absent, but more likely that any such link can be forcefully and completely undermined in certain institutional contexts. This is consistent with previous studies stressing the importance of context and institutional settings for the link between descriptive and substantive representation (O'Brien and Piscopo, 2019).

8. Conclusion

Over the last decades, many countries have introduced some form of gender quota to improve the gender balance in elected bodies, and

women's representation has increased considerably as a result. The Norwegian case is particularly interesting in this respect since it yields more than 20 years of experience with an *executive* gender quota. Rather than mandate equal gender representation on *electoral lists* and hope this 'trickles up' the political ladder, the Norwegian Local Government Act of 25 September 1992 required parties to include at least 40% individuals of each gender on their candidate lists for executive decision-making bodies at the municipality level – including the *executive board*. In this paper, we exploited the distinct quota-induced shocks in women's executive board representation across Norwegian municipalities due to this reform to identify the quota's effect on women's political representation as well as local public policies.

Although the 1992 executive quota reform significantly raised the share of female representatives in the executive boards, this did not cause a larger presence of women at other governance levels within the Norwegian municipalities. We see only very weak effects on the share of women in the local councils, and no statistically significant effects on the share of female mayors or women in top administrative positions. In another Scandinavian setting, important studies have addressed the effects of a 50-50 quota imposed on the party lists of the Swedish Social Democrats. O'Brien and Rickne (2016) find that this quota increased the propensity to select female leaders, while Besley et al. (2017) find that larger representation of women improved the competence of male politicians. Party list quotas and executive quotas are, however, very different interventions, which makes our estimates difficult to compare to these Swedish results. Even so, the observed increase in the number (and share) of women holding influential political positions in our setting might still have affected actual public policies. Chattopadhyay and Duflo (2004) find such effects for female mayors randomly assigned to Indian villages. In sharp contrast, no similar effects arise in our Norwegian setting. Our survey data show that female representatives prefer to prioritize several social policy programs significantly more than men in the same municipalities and party groups. Yet, our regression estimates yield no support for the proposition that the quota reform affected subsequent fiscal policies. Increased representation of women in the municipal executive boards has no visible effect on property taxes nor on various spending programs (including key social policy areas women profess stronger spending preferences towards).⁸

Further research is needed to account for this pattern. As mentioned, one possible explanation might be that newly 'promoted' female politicians lack political experience or gravitas. If so, this issue does not appear to become resolved over time in our setting. Another conjecture might be that institutional and organizational constraints within which quota reforms are implemented interact with the quota regulation in determining its final outcomes. In our setting, the executive board does not necessarily hold the final word on policy decisions, and party discipline within Norway's strong parties may prevent *private* policy preferences from translating into actions with regards to policy decisions. This conjecture suggests that specific institutional characteristics might work to make any link between descriptive and substantive representation ineffective, and reinforces the call for more attention to the exact role of institutions in future work (e.g., Koch and Fulton, 2011; Clayton and Zetterberg, 2018; O'Brien and Piscopo, 2019).

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.electstud.2019.102050>.

⁸ These results are strikingly similar to the 2003 gender quota in the corporate sector, where Norwegian listed companies were required to have at least 40% women in their boards. Bertrand et al. (2019) find no support that this reform generated any spill-over effects beyond the corporate board, while Eckbo et al. (2018) find no statistically significant effects on firms' operating profitability or stock market valuations.

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