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PASSING ON THE BATON: POSITIVE SPILLOVERS FROM THE OLYMPICS TO FEMALE REPRESENTATION IN US POLITICS

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Passing on the Baton: Positive Spillovers from the Olympics to Female Representation in US Politics*

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Abstract

Female representation in politics may be influenced by positive spillovers from the success of women in other professions. I exploit the timing of the Olympic games to isolate the spillover effect of female Olympic medallists on demand for female representation in US state elections a few months after the Olympics. I estimate that the female medals effect is around a 1 per cent increase in female candidate vote shares in the Olympian's state of birth. This is driven entirely by the 3.8 per cent increase for female Democrat candidates, exacerbating existing polarisation between parties. I do not find evidence of voters changing their attitudes about women in politics in response to female Olympic success, but find evidence consistent with female representation becoming a more important issue for Democrat voters. I estimate a 2.7 per cent decrease in female representation associated with the postponement of the 2020 Olympics.

Keywords: Female Representation, Political Representation, Elections, Gender Inequality, Sport

JEL Classifications: D72, D91, J16

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1 Introduction

This year marks a hundred years of women voting in presidential elections in the United States. However, female representation in US politics remains low, even by international standards. In 2018, only a quarter of elected US state politicians were women ([Center for American Women and Politics 2018](#)) with around the same representation in the US Congress. Furthermore, women are under represented in other professions, such as in business ([Matsa & Miller 2011](#)). One potential factor that may positively influence female representation in one profession may be spillover effects from female representation in other professions or areas of public life. However, these are generally difficult to measure.

For example, an increase in female representation in academia, law or business may have a positive spillover effect on female representation in politics. Such spillovers may influence both demand (from voters or parties) and supply (from parties or candidates) of female representation. This effect may occur through a supply-side channel, for example through the increased presence of women in professions that legislators often originate from (such as law). This may also occur through a demand-side channel, where parties and voters' perceptions of gender roles may change as a result of observing women succeeding in other arenas. Identifying these spillover effects from one arena to another is therefore non-trivial, although fundamentally important: evidence of a social multiplier effect across professions may have implications for policies encouraging more female representation. I estimate a demand-side spillover effect by exploiting the event of US women winning medals at the Summer Olympic Games (henceforth the Olympics or Olympic Games¹).

I estimate the effect of a woman winning an Olympic medal on the vote shares of female candidates in her home state legislature, and find that the total effect is an increase of around 1 per cent, and 3.8 per cent for female Democrat candidates. I exploit several aspects of this setting. The first is the increase in attention to female athletes and female participation in sport during the Olympic Games, which is a relative anomaly within a sports media that is usually dominated by male athletes ([Courtney et al. 2020](#)). The second is the timing of the Summer Olympic Games, which lies between state primary and state general elections. I can therefore disentangle the decisions of political parties and the decisions of voters, focusing on how a woman winning an Olympic medal impacts the voters' choice at the ballot box. The third is the localised media attention on a woman winning an Olympic medal in the state of her birth, which allows me to exploit variation between states in the number of medals won by women who were born in a given state. The fourth is the non-political nature of the event, which reduces concerns about potential reverse causality. Controlling for the number of women competing at the Olympic from each state (as well as district and year fixed effects), I argue that the conditional independence assumption is plausible in identifying the female medals effect. I use state electoral and Olympic data concerning over 261,842 candidate-election pairs spanning almost fifty years between 1968 and 2016, as well as 6,187 athlete-Olympic pairs which includes 1,314 medals won by women.

I also find that this positive female medals effect increases polarisation in female representation between

¹I do not include Winter Olympic Games as they are often held during or even before primary elections, which does not allow for clean identification of effects on voters' decisions rather than on both political parties' and voters' decisions.

political parties. The effect is an increase of around 3.8 per cent for female Democrat candidates, yet is not significantly different to zero for their Republican counterparts in the same state. This widens the gulf in female representation between the two parties, where the proportion of state Democrat politicians who are women is almost double that of state Republicans. This has implications for other positive shocks to female representation (and to other political movements) - the same shock may be observed, yet may have heterogeneous effects on different groups.

I explore the potential causal mechanisms. I use text data from over 1,600 different newspapers and find that an increase in the number of articles mentioning female athletes in a state's newspapers is associated with an increase in the number of articles discussing female representation, or lack of, in politics. This provides evidence of a spillover from sports to politics. However, using American National Election Study data, I find no evidence of voters changing their gender role attitudes. This suggests that the increase in female candidate vote shares is not driven by voters updating their beliefs about female candidates and women in politics in response to female success in sport.

Instead, I find evidence consistent with an asymmetric issue salience mechanism: I find that more inclusive representation becomes a higher priority for Democrat voters. More medals won by women, and more articles written about their successes, is associated with an increase in the proportion of Democrat voters who believe that having greater inclusion in political decisions is a priority over other goals. This may explain some of the divergence between parties in female representation among their candidates. The same positive shock may be observed by different groups of voters, but only respondents who are Democrat voters make more equal representation a higher priority, exacerbating the existing gap in female representation in the two main political parties. This evidence highlights a plausible mechanism, although it is not definitive.

Finally, I undertake a back-of-the-envelope estimation of the effect of postponing the Olympic Games to 2021 on the elections in 2020, using Olympic Games from 1968 to 2016. I estimate that between 1 and 4 per cent (average of 2.7 per cent) of female representation is associated with the female medals effect. Although this is relatively small compared to quota interventions ([Chattopadhyay & Duflo 2004](#), [Besley et al. 2017](#)), the impact (and therefore postponement) of the Olympic Games on female political representation is still substantial.

The literature that I primarily contribute to is that of female representation in politics. I contribute to the literature that explore the factors determining female representation, or lack of, in politics: why is female representation so low? Citizen-candidate models, such as those of [Osborne & Slivinski \(1996\)](#) and [Besley & Coate \(1997\)](#), suggest that if the political status quo produces a policy outcome that women broadly disagreed with, they could enter politics and gain sufficient support to contend the status quo. However, the political economy literature suggests several barriers to entry into politics for women.

One potential reason for the under-representation of women in politics may be gender bias, whether among voters or within political parties. The assessment of gender bias in the empirical literature has led to mixed conclusions. For example, the fact that female representation among candidates and

female representation among elected officials are similar does not rule out gender bias - it may be that both parties and voters have similar biases against female candidates. [Bhalotra et al. \(2018\)](#) find evidence of gender bias influencing both the number of female legislators and candidates among socially conservative voters in India. [Fulton \(2012\)](#) finds that women tend to be more qualified than men before running for office. Furthermore, [Kahn \(1996\)](#) and [Sanbonmatsu & Dolan \(2009\)](#) find evidence of gender stereotyping in political campaigning and party selection of candidates, mirrored by their lack of promotion within parties ([Folke & Rickne 2016](#)), even accounting for characteristics such as experience. However, [Anastasopoulos \(2016\)](#) uses close primary elections of women in US House of Representative elections and concludes that women do not receive significantly less of the vote at the general election or less financing through campaign contributions.

This paper adds to this literature with two main contributions. The first is exploiting the timing of US elections and a novel non-political event of the Summer Olympic Games to disentangle the effect on female representation of decisions made by voters and decisions made by political parties (focusing on the former). I therefore do not need to rely on close primary elections, as [Anastasopoulos \(2016\)](#) does. The second contribution is that I find evidence of polarisation in female representation, even in light of the same shock, rather than a homogeneous change across all voters and candidates.

There is also a considerable literature highlighting the impact of female political representation on policy, which motivates the further investigation of the factors that cause the under-representation of women in politics. There is solid empirical evidence that the inclusion of women in politics has a significant impact on policy. For example, evidence from India suggests that the increased inclusion of women in politics, whether through quotas ([Chattopadhyay & Duflo 2004](#)) or through close elections ([Clots-Figueras 2011](#)) leads to more emphasis on policy outcomes concerning early education or increased health spending. There is also evidence to support gender divides on policy preferences, such as increased social spending ([Aidt & Dallal 2008](#), [Bertocchi 2011](#)) or environmental spending ([Funk & Gathmann 2015](#)). This difference in policy preferences appears to have significant effects on outcomes, whether on child mortality in response to female suffrage ([Miller 2008](#)) or female representation in politics ([Bhalotra & Clots-Figueras 2014](#)), or on primary education completion ([Clots-Figueras 2012](#)), as well as less corruption ([Brollo & Troiano 2016](#)). Furthermore, the inclusion of more women in politics appears to have spillover effects to their male colleagues: [Besley et al. \(2017\)](#) find gender quotas increase the quality of male politicians while parties place more emphasis on gender equality issues ([Catalano Weeks 2019](#)). It is clear that female representation has a significant impact on politics, so therefore it is important to understand the factors that explain why there is consistent under-representation of women in politics.

There is relatively little work, in both strands of the political science and economics literature, that investigates the effect of sporting events on political outcomes, and in particular on female representation in politics. Recent work by [Depetris-Chauvin et al. \(2020\)](#) suggests that sport can galvanise social ties across a nation that overcome other differences, while [Baade & Matheson \(2016\)](#) discusses the costs and benefits of a country hosting the Olympic Games. Both suggest some sense of national or civic pride, but do not explore its impact on female representation. The political science literature provides support

for focusing on the Olympic Games’ impact on female electoral outcomes. For example, [Capranica et al. \(2005\)](#) and [Delorme \(2014\)](#) find that the Olympic Games is a rare example of female athletes enjoying as much media attention as their male counterparts. However, even cases of women garnering increased media attention may not have a significant impact on female representation or voter attitudes towards gender roles. [Lake \(2020\)](#) uses text data from newspapers and finds that Virginia Wade’s victory at Wimbledon was portrayed as predominantly a nationalistic success rather than that for female athletes. However, to the best of my knowledge, there is no direct investigation of the effect of sporting events on female representation in politics. In particular, I contribute to the literature by using information about the electoral outcomes of 45,427 female candidate-election pairs over the course of almost 50 years and 12 Summer Olympic Games. I investigate not only how sporting events may or may not alter voter gender role attitudes or attitudes towards female representation, but I estimate the direct impact of female success in sport on female success in politics.

The remainder of the paper proceeds as follows: Section 2 explains the potential spillover effect from one arena to another, Section 3 provides context to female representation in US politics as well as in the Summer Olympic Games, Section 4 presents the data, and Section 5 outlines the empirical identification strategy. Section 6 reports the baseline results, as well as heterogeneous effects between Democrat and Republican candidates, and Section 8 explores the potential causal mechanism for a positive female medals effect. Section 9 estimates a back-of-the-envelope counterfactual scenario to measure the potential effect of the 2020 Olympic Games’ postponement to 2021. Section 10 concludes.

2 Spillover Effects into Female Representation

There are many ways that female representation or success in one arena may trigger success in another arena, the latter being politics in the context of this paper. I describe two potential causal mechanisms that have been discussed in the political science literature that explain a spillover effect from the success of women in one domain to another. In the literature these domains include different sectors of work (such as academia, politics or sport) or different levels of hierarchy, within firms or sectors (such as among CEOs or lower-level managers), but not *between* sectors. There is some empirical evidence of positive spillovers within firms, whether from the hiring of female board members increasing the number of female lower-level managers ([Matsa & Miller 2011](#)), or other top to bottom spillovers ([Kunze & Miller 2017](#)). In this paper, I estimate the spillover effect of women succeeding in sport (by winning medals at the Olympics) on women running for office in US state legislatures, and then investigate potential causal mechanisms.

There may be supply-side effects: increased female representation among professions such as law, academia, or business, may contribute to a greater supply of potential female candidates. Furthermore, women may observe the success of women in other sectors and update their beliefs about the likelihood of female success in their own sector. These may contribute to an increase in female representation in politics. Given the identification strategy, which focuses on the spillover effect’s impact on voter

decisions, I discuss two potential causal mechanisms that impact the demand for female representation among voters.

One potential reason for this positive spillover is that increased female representation in one area diminishes gender stereotypes, which increases female representation in another area. In their model of social identity, [Akerlof & Kranton \(2000\)](#) suggest associating men in leadership roles is an example of group stereotyping which has implications for female representation across all professions. In the empirical literature, [Beaman et al. \(2009\)](#) find that exposure to female leaders reduces gender stereotyping in Indian village councils and increases the perceived ability of women in leadership roles. In addition, men who are on boards with women reduces ‘role congruity-based gender bias’ ([Boutchkova et al. 2020](#)), so those who do not conform to stereotypes are not treated unfavourably. The empirical literature primarily focuses on spillovers within sectors, but do not explore the spillover of female success in other areas on female political success through the erosion of gender stereotypes. As [Kahn \(1996\)](#) and [Sanbonmatsu & Dolan \(2009\)](#) suggest, these attitudes are often longstanding.

Another potential mechanism is one of issue salience: female representation in one area may highlight the lack of women represented in another area. This theoretical mechanism has been well-defined in the political psychology literature, which suggests that the influence of a policy on their voting decisions depends on how much they are either affected by the policy personally or how much emphasis they place on the policy relative to others ([Sherif & Cantril 1947](#), [Brent & Granberg 1982](#), [Krosnick 1988](#)). In the political economy literature, there has been more recent empirical evidence to support this. [Ansolabehere & Socorro Puy \(2018\)](#) model issue salience as the weighting voters place on different issues, and estimate that voters in the Basque Country place as much as half as much importance on nationalism as they do traditional left-right wing policy preferences. Other examples of theoretical and empirical work on issue salience show that voters often need reminding about policy issues for them to become salient, whether over taxation ([Chetty et al. 2009](#)) or spending ([Huet-Vaughn 2019](#)).

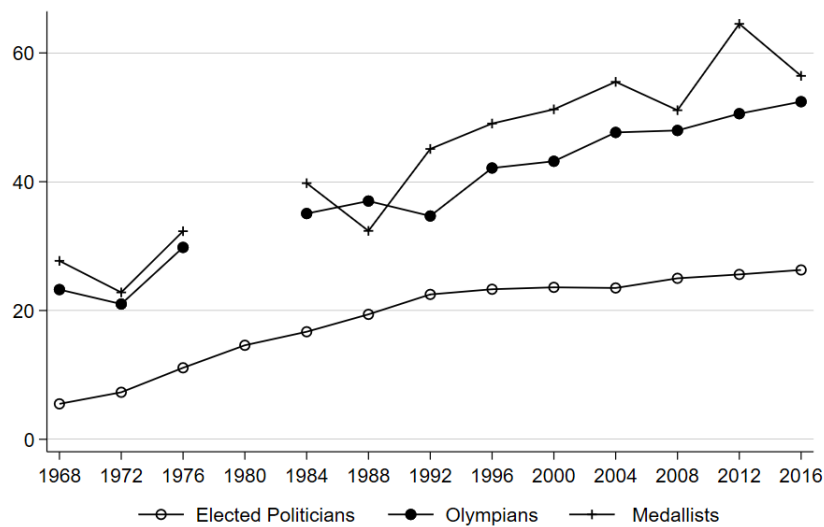
The theoretical and empirical literature largely focuses on spillover effects *within* sectors. I contribute to this literature by investigating spillover effects *between* sectors: in the case of this paper the positive spillover between high profile female success in sport and the success of women in politics. I also find evidence suggesting that this spillover effect is unlikely to be caused by a change in voters’ attitudes towards women running for office. Instead, I find some evidence consistent with issue salience: voters are newly convinced that the under-representation of women (among other groups) is a more important issue than they previously believed.

3 Female Representation at the Olympics and US Politics

The Nineteenth Amendment adopted in 1920 allowed women to vote for the first time in a US presidential election, with 15 states having already granted equal voting rights to women ([Cascio & Shenhav 2020](#)). In addition, Women had been elected in state legislatures since 1894 with the election of Clara Cressingham, Carrie Holly, and Frances Klock in the Colorado House of Representatives ([Center for American Women](#)

and Politics 2018). However, female representation in US politics, both at a federal and state level, grew slowly in the first half of the twentieth century. For example, in the US Congress, only a handful of women were elected even forty years after the Nineteenth Amendment. As Figure 1 illustrates, the proportion of elected officials at state level who are women increases from 5.5 per cent in 1968 to 22.5 per cent in 1992. However, this increase slows into the twenty-first century, with just over a quarter (26.3 per cent) in 2016, and remains some distance away from equality of representation across gender in US politics.

Figure 1: Representation of Women in US State Politics and Olympic Teams



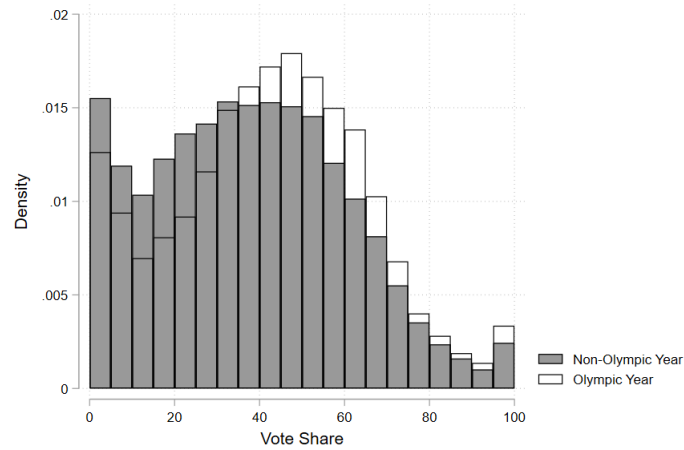
Notes: This figure shows the percentage of candidates who are elected into state legislatures who are women (solid line), as well as the percentage of US Olympians (dashed) and medallists (dotted) who are women. The figure reports these variables every four years from 1968 to 2016, including 1980 when the United States boycotted the Moscow Olympics.

Meanwhile, female representation among US Olympians and Olympic medallists has also been rising since the 1960s, with equality of representation reached in 2012 and 2000, respectively. Figure 1 shows that the proportion of US Olympians who were women has risen from 23.2 per cent in 1968 to a majority of 52.4 per cent in 2016, while the female proportion of US Olympic medallists follows a similar pattern from 27.7 per cent in 1968 to 56.4 per cent in 2016. This evidence is consistent with spillovers of female success across different areas, particularly with equality of representation in US Olympic teams, even though a great deal of both patterns is likely to be driven by factors such as changing attitudes to gender roles away from traditional stereotypes.

Supporting a potential spillover effect, Figure 2 shows how the proportion of the average vote share won by female candidates increases in Olympic years. The distribution clearly shifts to the right in Olympic years compared to non-Olympic years. Although there may be other influences, such as the coincidence of Summer Olympic Games and US presidential elections, Figure 2 suggests that there may be a positive influence of the Olympic Games on female electoral outcomes.

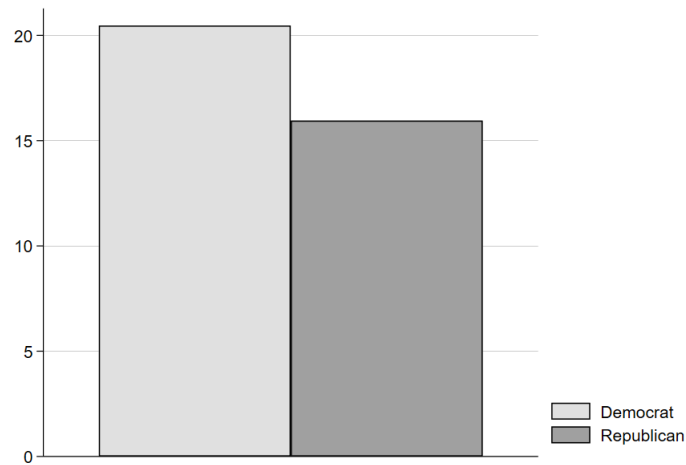
Another notable feature of female representation in US politics is the difference between the major political parties in female representation. Figure 3 reports the percentage of candidates in the Democrat

Figure 2: Distribution of Female Candidate Vote Shares in Olympic and Non-Olympic Years



Notes: This figure illustrates the distribution of female candidate vote shares in Olympic years and non-Olympic years.

Figure 3: Female Representation Across Parties, 1968-2016

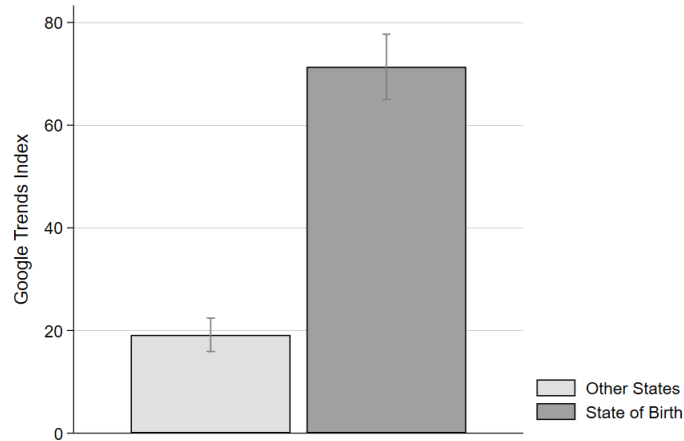


Notes: This figure compares the percentage of candidates in the Democrat and Republican parties who are women across the sample from state legislature elections held between 1968 and 2016.

and Republican parties in the sample who are women. Women are more represented among Democrat candidates by around 5 percentage points more than in the Republican party. A similar gap between parties exists in the proportion of winning candidates who are women, and has grown since the late 1980s and early 1990s. Given the differences between parties, I investigate potential differences in the female medals effect on female Democrat and Republicans.

This setting is ideal in testing the effects of positive shocks on female electoral outcomes for several reasons. The impact of a non-political event on political outcomes is more likely to be an exogenous shock, which I address in more detail in Section 5. Furthermore, the Olympic Games attracts a different type of media attention compared to most coverage of sport. Firstly, coverage tends to be more equal across genders in Olympic Games compared to most coverage of sport in the United States, which consists largely of male-dominated sports like American football, basketball and baseball. The Olympic Games

Figure 4: Localised Attention of Female Medallists, 2016 Olympics



Notes: This figure compares the Google Trends Index for female Olympic medallists at the 2016 Olympics in their state of birth and in the other states. The index is a value between 0 and 100, where 100 is assigned to the state with the most Google search activity for a particular medallist.

provide a unique setting where female sporting achievements are appreciated in a similar manner to male achievements. Secondly, the media attention of individual athletes tends to be geographically focused. While there are many athletes who are household names across the whole of the United States, Figure 4 reports the difference in Google search activity for female medallists in the 2016 Summer Olympic Games. It illustrates that attention to an athlete may be localised and heightened in their state of birth, more than three times so than in other states. As a result, I am able to exploit geographical variation in the number of medals won by athletes between states, as the impact of a woman winning an Olympic medal is likely to be more focused on their home state.

The political setting also presents some advantages, the most important being the timing of US state elections and the Summer Olympic Games. Almost all US state primary elections are held in the first half of the year, where the parties select their candidates for the state general elections². Furthermore, the outcomes of the state primary elections are often known well before the primary elections. The Summer Olympic Games tend to be held between June and September (inclusive), and are held before the state general elections in November where voters choose between the selected candidates. This timing is ideal as it allows for a clean identification of the impact of medals won by women on the decisions of voters in the medallists' home states. This timing disentangles voter and party decisions, and focuses on the former, as the latter has already happened. In addition, the regularity of state elections (held every two years in most state legislatures) allows for variation within a state of elections held in Olympic and non-Olympic years, as well as variation in the number of medals in Olympic years. Finally, the US state elections also provide a wealth of elections and candidates, with over 260,000 candidate-election pairs between 1968 and 2016.

²There is some variation in the processes used to select candidates depending on the state and the party, but this is somewhat inconsequential for the purposes of empirical identification of the impact of female medals on voters' decisions in November.

4 Data

I combine two data sources. The first is state electoral data from [Klarner et al. \(2018\)](#), which provides information about state general elections held in all fifty U.S. states between 1967 and 2016. Importantly this excludes primary elections. There are 261,842 such candidate-election pairs, which is the unit of observation. There are also 9,787 districts in the sample: districts within a state are treated as different between different stages of redistricting, where a district may be geographically different to the "same" district a decade ago. The most pertinent information from the state electoral data for each candidate-election is the name of the candidate, the party that they are standing for in the election, and the percentage of the total votes won by the candidate in the district that they are running in. The gender of candidates is determined using the candidate's name and US census data compiled by [Howard \(2016\)](#). I use the candidate's first name from the electoral data and match them with the US census data, which indicates whether the name is more likely to be associated with a man or a woman.

Table 1: State Election Vote Shares

Vote Share	Mean	SD	Candidates	Percent.
All Candidates	45.9	27.8	261,842	100.0
Female Candidates	45.1	27.6	45,427	17.3
Male Candidates	46.4	27.8	216,415	82.7
Female Democrat Candidates	49.1	27.0	23,535	9.0
Female Republican Candidates	45.8	25.9	15,279	5.8
Male Democrat Candidates	51.6	27.0	100,159	38.3
Male Republican Candidates	47.1	26.0	96,381	36.8

Notes: This table illustrates the mean vote shares won by candidates from several groups within the sample. The average vote share for female candidates is not a weighted average of female Democrat and Republican candidates as they also include candidates from other parties who tend to win a small proportion of votes (likewise for male candidates).

Table 1 illustrates the distribution of candidates across gender and political party. Female candidates receive between one to two percentage points fewer of total votes compared to their male counterparts for both parties, and make up 17.3 per cent of all candidates.

The second data source concerns US Olympians. I scrape data from *Olympedia.org* to find information about US athletes who competed in any Olympics between 1968 and 2016. Profiles about each US Olympian contains their name, their sex, their date and place of birth, their college affiliations, and sporting achievements at the Olympic Games. The data includes 6,187 athlete-Olympics pairs, within which there are 4,472 athletes competing at 12 Summer Olympic Games (the United States boycotted the Moscow Olympics of 1980). The US have also won more medals at the Olympics than any other country winning 2,877 between 1968 and 2016, and 1,314 of those won by women (this includes team sports where the same medal is awarded to multiple medallists).

I combine this data with the electoral data. The mean number of female and male Olympians from a state in the sample is 4.9 and 7.4, respectively, while the mean number of medals won by women and men from the state is 3.1 and 2.6, respectively. The number of medals won by women is positively skewed (as illustrated in Figure C.1) and as Appendix C shows, there is considerable variation between states and across time. One limitation is the presence of a few states (North Dakota, New Hampshire,

Idaho, and Alaska) where no medals are won by woman who were born in those states. In addition, California averages around 25 of these medals at each Olympics, more than twice the average of any other state. In the appendix I reproduce the analysis, firstly excluding the states with no variation in female medals, and secondly excluding the undisputed outlier of California. The results are robust to omitting these outliers. Another limitation are the 149 athletes where information about their state of birth is not available, while 293 athletes were born outside of the United States. I exclude both of these groups from the sample. The former is more potentially problematic, but only accounts for 3 per cent of athletes.

5 Identification Strategy

I test whether a medal won by a female Olympian has a significant effect on female candidate vote shares in their home state. The baseline identification strategy implements a reduced-form specification:

$$FemaleVoteShare_{idt} = \alpha_d + \gamma_t + \beta_1 FemaleMedals_{st} + \beta_2 FemaleCompetitors_{st} + X'_{it}\delta + \epsilon_{idt}, \quad (1)$$

where the outcome variable is $FemaleVoteShare_{idt}$ is the share of the vote won by female candidate i in district d at election t , as a percentage of total votes cast in the district's election. $FemaleMedals_{st}$ is the number of medals won by women who were born in state s in the summer a few months before election t , where district d is in state s . $FemaleCompetitors_{st}$ is the number of female competitors from state s . X_{it} is a vector of controls, which include dummy variables indicating the candidate's party, whether they are an incumbent, and whether the election is held in an Olympic year, as well as the candidate's experience in the legislatures, in years. I also include district (where districts are treated as distinct between different redistricting cycle³) and year fixed effects, while the standard errors are clustered at the state level.

The coefficient of interest is β_1 , the effect of a medal won by a woman on female vote shares in her home state. However, a naive estimate of β_1 without any fixed effects or controls is likely to have a positive bias. A state whose population is in favour of the gender equality may be more likely to have more female medallists as they encourage gender equality in participation in sport in general. In addition, that state may also have a smaller gender bias against women running for office. This would suggest a naive estimate would have a significant positive bias. To address this, I include district fixed effects (as even within states there may be significant variation in characteristics such as gender role attitudes). However, there may still exist a bias. Even with district and year fixed effects, the change in gender attitudes may differ between districts and states. For example, a state that responds more positively to the women's liberation movement in the 1970s may change its gender role attitudes more rapidly than other states. This time-variant heterogeneity (it seems unlikely that gender role attitudes in a district or state do not change between 1968 and 2016) may influence both female participation in sport and also

³Redistricting often radically changes the geographical boundaries of state legislature districts as a result of population changes and political gerrymandering: for example the boundaries of the fourth district of the Texas State Senate in 1968 may be significantly different to that of the fourth district in 2016.

the vote shares received by women in state elections.

Defining the connection between athlete and state by the athlete's state of birth, rather than the state of their college, somewhat reduces the bias. The time-variant heterogeneity of gender role attitudes changing at different rates may influence their participation in sport at a younger age, but less so when they go to college, which is mostly outside of their state of birth. On one extreme, if high school athletes were randomly allocated across colleges across the United States, the influence of changing gender role attitudes in their home states have less of an impact on their ability to compete at the Olympics. On the other extreme, if high school athletes only went to college in their home states, then changing gender role attitudes in their home states may have a significant impact, such as through supporting female college teams⁴. Although one suspects the reality is between the two, this still opens the possibility of time-variant heterogeneity causing some bias.

As a result, I further reduce the potential bias by including *FemaleCompetitors_{st}*, the number of female competitors (who competed at the Olympics in the summer just before the election in year t and were born in state s), to the specification. This controls for much of the time-variant heterogeneity that may influence both female electoral outcomes and the number of female medallists from the state from the above discussion. Therefore the interpretation of β_1 is the effect of a medal won by a woman on vote shares of female candidates in her home state, controlling for the number of women competing at the Olympics from that state (as well as district and year fixed effects). In addition, I also control for other important candidate characteristics (party, incumbent status, experience) for more precise estimation.

To summarise, the conditional independence assumption I make in the baseline specification is that changes to the vote share of female candidates is independent of women from the same state winning medals at the Olympic Games, having controlled for the number of women from the state competing at the Olympic Games. There is a ubiquity of professional and student athletes in the United States and the vast support they receive (the NCAA system provides over 180,000 sports scholarships a year⁵), from which Olympians make up a tiny group - 555 men and women at the 2016 Rio Olympic Games. It seems unlikely that factors determining whether female athletes making the step up from competing at the Olympics to winning a medal is linked to a factor that also influences female electoral outcomes in their home state (especially as many leave their home state to become professional or student athletes). Furthermore, given the widespread support hundreds of thousands of athletes receive, the level of support that Olympians and Olympic medallists receive may be very similar (especially given the likely diminishing returns to financially supporting an athlete). In other words, even if there was a significant difference in the support that a female medallist receives compared to a female Olympian, it is questionable whether this difference is linked to female electoral outcomes once I account for the number of female athletes from the state

⁴Although Title IX of the Education Amendments Act (1972) requires colleges to equally support male and female athletes, there is still scope for more or less support of potential female Olympians. For example, if a state has changed its gender role attitudes more quickly, it may divert more financial assistance to colleges that is renowned for one of its female sports programs, which is more likely to impact female student athletes at the highest level (those who are potential future Olympians).

⁵The number of sports scholarships is taken from the NCAA's recruiting statistics, <https://www.ncaa.org/sites/default/files/Recruiting%20Fact%20Sheet%20WEB.pdf>.

who make the step up to becoming Olympians in the first place.

6 Results

In this section I present the results of the baseline specification that estimates the female medals effect on female candidate vote shares in the medallists' state of birth. In addition, I undertake two falsification tests. The first is to check whether male Olympians winning medals has an effect on female candidate vote shares, and the second to check whether female medallists are associated with more female candidates (which they should not given the timing of the Olympics after the state primary elections).

6.1 Main Results

Table 2 presents the estimates of the baseline specification outlined in the previous section. It shows a significant relationship between the number of medals won by women at the Olympics and the vote share of female candidates in their home state. Columns 1 and 2 present the results of the baseline specification without and with controls, which report a significant female medal effect of 0.181 and 0.151, respectively. The mean number of medals won by women from a state in an Olympic year is 3.1, so the preferred specification in Column 2 implies a total effect is an increase of 0.47 percentage points (0.151×3.1) for female candidates. This around 1 per cent of the average female vote share (45.1 per cent).

Columns 3 and 4 replicate the specification of Columns 1 and 2, but also include a dummy variable (Female Medals > 0) that takes a value of one if at least one woman born in the state won an Olympic medal in the summer before the election (and zero otherwise). This is to test whether the effect of the first medal won by a woman from the state dominates the overall female medal effect. This could occur if there was decreasing marginal media attention for every additional female medallist: if there is only one female medallist they may be given full attention, while the twentieth may be relegated to a footnote. However, I find that the female medal effect is not dominated by the 'extensive margin' of treatment, as the estimated impact of an additional female medal is still significant (albeit slightly lower) at the five per cent significance level.

Finally, the coefficient estimates of the controls are significant (besides the Olympic year dummy), and of expected magnitude and direction. The incumbency advantage implied (around 15 per cent) is similar to that of the regression discontinuity design literature measuring the incumbency advantage (Lee 2008, Hainmueller et al. 2015), while there is a significant association between more experience in the legislature and vote shares. Finally, Table 2 suggests that there is a significant difference between parties in the vote shares won by female candidates, female Democrat candidates winning around 5.8 percentage points more of the vote than their Republican counterparts. This is consistent with the general divide in female representation between the two major political parties, as illustrated earlier in Figure 5. Finally, the female medals effect appears not to diminish in light of medals won by men. Table E.1 suggests that there is no evidence of a crowding out effect.

To check the validity of this result, I implement a procedure outlined by Oster (2019). I estimate δ ,

Table 2: Baseline Results: Vote Share of Female Candidates

	(1)	(2)	(3)	(4)
Female Medals (State)	0.181** (0.0767)	0.151** (0.0715)	0.173** (0.0703)	0.141** (0.0665)
Female Medals > 0 (State)			0.178 (0.646)	0.242 (0.544)
Female Competitors (State)	-0.0443 (0.0267)	-0.0476 (0.0304)	-0.0440 (0.0266)	-0.0470 (0.0305)
Incumbent		15.42*** (1.233)		15.42*** (1.232)
Experience, Years		0.551*** (0.0782)		0.551*** (0.0784)
Democrat Candidate		5.830*** (1.211)		5.831*** (1.211)
Olympic Year		0.0951 (1.208)		-0.0117 (1.181)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.507	0.609	0.507	0.609
Observations	45427	45427	45427	45427

Notes: This table reports the estimates using the specification outlined in (1). The unit of observation is the female candidate-election. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in, while Female Competitors is the number of female competitors who were born in the state that the district is in. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Incumbent, Democrat Candidate, and Olympic Year are dummy variables that take value one if the candidate is an incumbent legislator, a candidate selected by the Democrat party, and whether the election is held in an Olympic year, respectively, and zero otherwise. Experience, Years is the number of years that the candidate has been a member of the legislature (which may also include years in another chamber within the legislature). All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

the coefficient of proportionality, and find that $\delta = -1.73$ for the preferred specification in Column 2⁶. This means that, in order for β_1 to be incorrectly estimated such that the true value is $\beta_1 = 0$, the selection (for treatment) on unobservables would have to be at least 1.73 times as important as selection on observables. In the context of Table 2, this suggests that, in order for the true value of β_1 to be equal to zero, there would have to exist some omitted variable (beyond those already specified including year and district fixed effects) that is both negatively correlated with the treatment (and positively correlated with female candidate vote shares), and is 1.73 as important in explaining the number of medals won by women in the state as the control variables and the fixed effects. Given the discussion of the conditional independence assumption in Section 5, it seems unlikely on both counts.

6.2 Falsification Tests: Male Medallists and Candidate Selection

I also test whether the effect of men winning medals has an effect on female candidate vote shares in their home state. More men winning medals may crowd out the media attention that female medallists

⁶As recommended by Oster (2019), I estimate δ using $R_{max} = 1.3 \times \tilde{R}$, where \tilde{R} is the estimated R-squared from the specification in Column 2.

may enjoy. Equally male success may attract more attention from the state’s news media towards the Olympics in general. Media attention towards female Olympians may increase as male success increases total attention to local sporting heroes at the Olympics (rather than just national household names) - so the success of a female athlete from the state may have greater coverage as a result of their male counterparts. To identify whether the net effect is significant, I undertake this falsification test by using the baseline specification and replacing the number of female medallists and female competitors from the state with the number of male medallists and male competitors from the state.

Table 3: Falsification Test: Male Medallists and Female Candidate Vote Shares

	(1)	(2)	(3)	(4)
Male Medals (State)	-0.0328 (0.0394)	-0.0315 (0.0405)	-0.0386 (0.0389)	-0.0408 (0.0397)
Male Competitors (State)	0.0592 (0.0388)	0.0461 (0.0355)	0.0523 (0.0411)	0.0380 (0.0383)
Male Medals > 0 (State)			0.532 (0.561)	0.779 (0.618)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.507	0.609	0.507	0.609
Observations	45427	45427	45427	45427

Notes: This table reports the estimates using the specification outlined in (1). The unit of observation is the female candidate-election. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Male Medals is the number of medals won in the summer before the election by men who were born in the state that the district is in, while Male Competitors is the number of male competitors who were born in the state that the district is in. Male Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Columns 2 and 4 include controls, which are incumbent, Democrat candidate, Olympic year dummy variables, and the candidate’s experience in the legislature, in years. All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

Table 3 provides the main results from this altered specification. In all four specifications the number of medals won by men from the state has no significant effect on the vote share won by female candidates in the state. The effects are negative, but they are both statistically insignificant and an order of magnitude smaller than the estimates effects of female medallists in Table 2. Furthermore, the binary variable of whether any men from the state win medals or not appears to have an significant effect. This evidence is supported by Table E.1, which interacts the number of medals won by women from the state with the number of medals won by men from the state. There also appears to be no effect of the number of medals won by men on the effect that medals won by women has on female candidate votes shares in their home state.

Another falsification test is to estimate the effect of medals won by women on female candidacy. According to the Olympic-election timeline, there should not be an effect of female medallists on female candidacy, as candidates are selected before the Summer Olympic Games. However, there may be an anticipation effect: part of the effect of female medallists on female candidate vote shares that occurs when female athletes win medals may also occur before the Olympic Games, as some may identify certain athletes as favourites to win a medal.

Table 4: Falsification Test: Female Candidacy and Female Medallists

	(1)	(2)	(3)	(4)
Female Medals (State)	0.0414 (0.0440)	0.0491 (0.0438)	0.0578 (0.0491)	0.0612 (0.0481)
Female Medals > 0 (State)			-0.420 (0.256)	-0.334 (0.259)
Female Competitors (State)	-0.0181 (0.0284)	-0.0216 (0.0278)	-0.0182 (0.0274)	-0.0221 (0.0273)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.151	0.158	0.151	0.158
Observations	261842	261842	261842	261842

Notes: This table reports the estimates using the specification outlined in (1), but replaces the dependent variable with a dummy variable which takes a value of one if the candidate is female, and zero otherwise. The unit of observation is the candidate-election, and notably includes female and male candidates. Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in, while Female Competitors is the number of female competitors who were born in the state that the district is in. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Columns 2 and 4 include controls, which are incumbent, Democrat candidate, Olympic year dummy variables, and the candidate's experience in the legislature, in years. All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

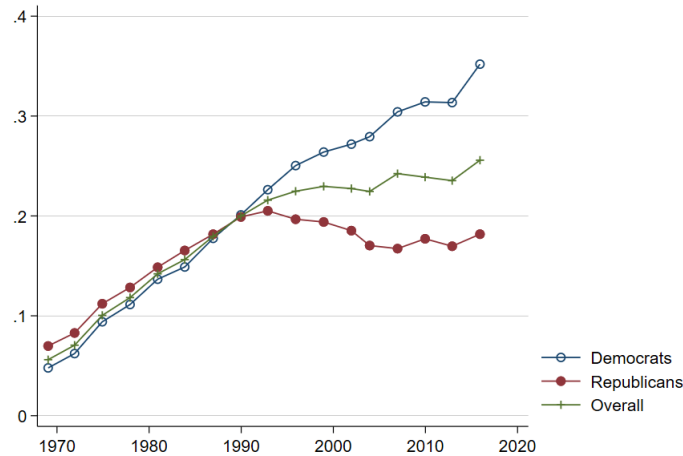
I replicate the baseline specification, but replace the outcome variable with a dummy variable: is the candidate a woman (value of one) or not (zero)? As a result, I also include all candidates in the sample, both female and male, as opposed to the baseline specification which only includes female candidates. Table 4 reports the results of this adapted specification, and confirms that there is no significant impact of medals won by women on female candidacy in their home state. This finding is robust across the same specifications.

7 Party Polarisation

As discussed in Section 4, there are significant differences between the Democrat and Republican parties in female representation, whether as elected officials or as candidates. The political science literature highlights long-running differences in female representation between parties (Adams 1997, Carmines & Woods 2002, Carroll & Sanbonmatsu 2013), potentially linked to their policy platforms. Further, there has been a divergence in female representation since the late 1980s and early 1990s, as illustrated in Figure 5.

Figure 5 shows that the proportion of Democrat candidates who are women has continued to increase since the beginning of the sample in the late 1960s. This is only true among Republican candidates until the early 1990s, at which point there is even a small decrease in female representation among Republican candidates. While I do not claim to explain this polarisation, I investigate whether heterogeneity between parties in their female medal effects are consistent with this divergence. I do this by testing whether the female medal effects is significantly larger for either female Democrat candidates or female Republican candidates.

Figure 5: Party Differences in Female Representation



Notes: This figure reports the changes in female representation among state legislature candidates (female candidates as a percentage of all candidates) across time, as well as the differences between the major political parties.

I supplement the baseline specification with an interaction term between medals won by women from the state and a dummy variable that takes value of one if the candidate has been selected by the Democrat party. The results of the adapted specification, including a Democrat candidate dummy variable interaction with female medals, are reported in Table 5. Most notably, the positive female medal effect is driven almost entirely by an increase in the vote share of female Democrat candidates. The first row effectively presents coefficient estimates of the effect of female medals on female Republican candidate (as well as independent candidates). The estimates are much smaller than the baseline estimates in Table 2 and insignificant (with the exception of Column 2). In contrast, the effect for female Democrat candidates is between 0.4 and 0.7 percentage points for each medal won by a woman. Taking the estimate from the preferred specification in Column 2, the total effect of the average treatment of 3.1 medals won by women from the state is around 1.7 percentage points, or equivalently an increase of 3.8 percent from the average female candidate vote share. This suggests that there is divergence between candidates of different parties in response to the same shock in a given state. Furthermore, this divergence is exacerbating an already wide gap between parties in female candidate vote shares of around 5 percentage points, as reported in the second row of Table 5. These results are robust to including a binary variable of whether any medals were won by women from the state at all in Columns 3 and 4. Columns 3 and 4 also suggest the importance of the first medal, although the estimates are noisier despite the point estimate being far larger than the effect for each medal.

Although Table 5 provides evidence of a positive shock creating more divergence in female representation between the Republican and Democrat parties, there are potential issues with interpreting the causal mechanism. This effect may well occur due to voters switching parties (for example from a male Republican candidate to a female Democrat candidate). However, this effect may also be a result of would-be Democrat voters choosing to vote instead of staying at home on election day. In the absence of information regarding these choices at a state legislature level, one cannot conclude definitively what

Table 5: Party Polarisation: Democrat and Republican Candidates

	(1)	(2)	(3)	(4)
Female Medals (State)	-0.110 (0.0799)	-0.0990* (0.0546)	-0.0511 (0.0453)	-0.0511 (0.0453)
Democrat Candidate	5.638*** (1.877)	5.214*** (1.068)	4.954*** (1.030)	4.954*** (1.030)
Female Medals (State) \times Democrat Candidate	0.672*** (0.209)	0.559*** (0.156)	0.455*** (0.160)	0.455*** (0.160)
Female Medals > 0 (State)			-0.753 (0.964)	-0.753 (0.964)
Female Medals > 0 (State) \times Democrat Candidate			1.518 (1.079)	1.518 (1.079)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.518	0.611	0.611	0.611
Observations	45427	45427	45427	45427

Notes: This table reports the estimates using the specification outlined in (1), and includes interactions between . The unit of observation is the female candidate-election. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in. Democrat Candidate is a dummy variable that takes value of one if the candidate is selected by the Democrat party for the general election. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Columns 2 and 4 include controls, which are incumbent and Olympic year dummy variables, and the candidate's experience in the legislature, in years. All specifications include the number of female competitors from the state, as well as district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

the causal mechanism may be that links female success in sport and female success in politics.

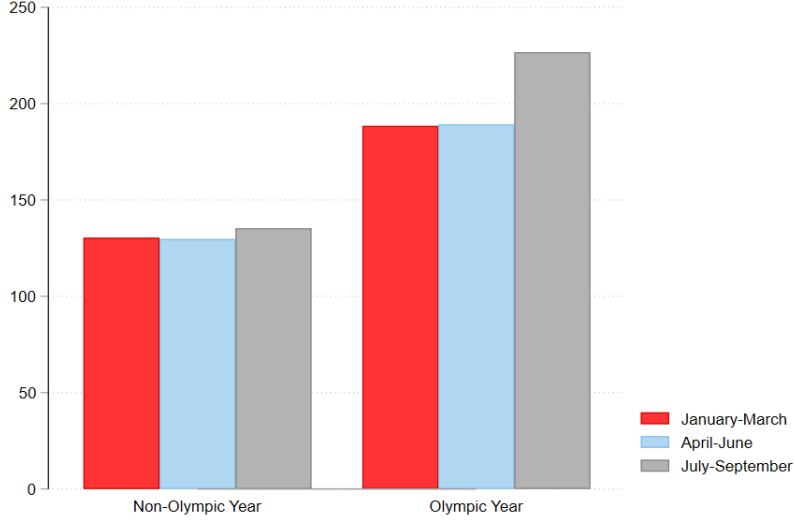
8 Causal Mechanism

In this section, I explore the causal mechanism behind the female medals effect that I observe in the previous sections, as well as its heterogeneity between candidates of different parties. To further provide evidence of a spillover effect, I test whether there is also spillover effect from female success at the Olympics and women in politics through newspaper reporting. I then test how this spillover effect affects voters, and whether it likely to be either one of two potential causal mechanisms, which I discuss in Section 2. The first mechanism that I test is whether voters observe female success at the Olympics, and as a result update their beliefs about women in politics, or their attitudes towards gender roles. The second mechanism is one of issue salience. Voters may be reminded of the lack of women in politics by the news media (in light of reporting on female Olympic success), and as a result prioritise female representation in politics more highly at the upcoming election. This would be the case even if voters do not change their beliefs about women in politics.

8.1 From the Back Pages to the Front Pages

I investigate the causal mechanism that links female success in sport to politics. I first do this by identifying the link between discussion of female Olympians and discussions of female representation. I scrape data from *newspapers.com*, which includes 1,608 different newspapers across the United States between 1968 and 2016, for all state-year pairs where a state election was held. The minimum number of newspapers for a state is 3 in Rhode Island, while the maximum is California with 115.

Figure 6: Discussion of Women in Politics and Women at the Olympics



Notes: This figure illustrates the average number of articles written in a state's newspapers in each three month period that include key phrases 'women in politics', 'female representation', and 'under-representation of women' (or similar variations), in non-Olympic and Olympic years.

Figure 6 presents the average number of articles that a state's newspapers mention key phrases 'women in politics', 'female representation in politics', 'under-representation of women in politics', and similar variations, across the three quarters leading up to the elections in a non-Olympic and Olympic year. There are two notable features of Figure 6. The first is the level increase in the discussion of female representation in Olympic years compared to non-Olympic years. The second is the increase in discussion of female representation from the first two quarters of the year to the third, which is significantly larger in Olympic years than in non-Olympic years. These two features may be somewhat explained by the coincidence of Olympic years and US presidential elections: this may generally increase discussion about politics in newspapers (and potential about female representation in politics), as well as a further increase as the election looms closer. However, the large increase in discussion of female representation in politics that occurs after July also coincides with the Summer Olympic Games. Despite this, Figure 6 provides some motivation of a link between reporting on women in sport and politics.

To identify the effect of female Olympians on the discussion of female representation in politics, I use the following specification:

$$PoliticsMentionsJS_{st} = \alpha_s + \gamma_t + \beta_1 OlympicMentionsJS_{st} + \beta_2 PoliticsMentionsAJ_{st} + \epsilon_{st} \quad (2)$$

The unit of observation is the state-year. The outcome variable, $PoliticsMentionsJS_{st}$, is the natural logarithm of the number of articles in a state's newspapers mentioning female representation (or other related phrases) in the third quarter of the year (July to September). The treatment variable, $OlympianMentionsJS_{st}$, is the natural logarithm of the number of articles in the state's newspapers mentioning a female Olympian who was born in the state. I also include $PoliticsMentionsAJ_{st}$, the logarithm of the number of articles in a state's newspapers mentioning female representation in the second quarter of the year (April to June). Finally, I include state and year fixed effects, while the standard errors are clustered at the state level.

Table 6: Newspapers: Discussion of Female Olympians and Women in Politics

	(1)	(2)	(3)	(4)
Female Olympian Mentions (July-September)	0.0653*** (0.0178)	0.0753*** (0.0265)	0.104*** (0.0356)	0.106*** (0.0351)
Male Olympian Mentions (July-September)		-0.0159 (0.0224)		0.0507 (0.0371)
Women in Politics Mentions (April-June)	0.285*** (0.0847)	0.285*** (0.0846)	0.205** (0.0807)	0.201** (0.0783)
State Fixed Effects	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
Olympic Years Only	N	N	Y	Y
Adjusted R ²	0.837	0.837	0.803	0.804
Observations	1754	1754	763	763

Notes: The unit of observation is the state-election. The dependent variable is the natural logarithm of the number of articles in a state's newspapers mentioning female representation (or other related phrases). Female and Male Olympian Mentions (July-September) is the natural logarithm of the number of articles in the state's newspapers mentioning a female and male Olympian who was born in the state, respectively. Women in Politics Mentions (April-June) is the logarithm of the number of articles in a state's newspapers mentioning female representation between April and June of the election year. Columns 1 and 2 include all state-elections in the sample, whereas 3 and 4 only include elections in Olympic years. All specifications include state and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

The estimates of this specification are reported in Table 6. Columns 1 and 2 include all state-election pairs. However, it may not be reasonable to assume that the counterfactual of a state in an Olympic year having fewer mentions of its female Olympians is similar as the same state in a non-Olympic year. Therefore the specifications estimated in Columns 3 and 4 only include elections held in Summer Olympic years. The first row presents the estimated effect of the number of articles mentioning female Olympians on the discussion of female representation in politics. The effect of female Olympian mentions on the discussion of female representation is significant across all specifications. Doubling the number of articles mentioning female Olympians increases the number of articles mentioning female representation by 6.5 to 10.6 per cent. For the average state in an Olympic year, this increases the number of articles written about female representation from 75 a month to between 80 and 83. Given that there are on average 32 newspapers for each state in the newspaper data, this means a reader of one newspaper may read an article about female representation from once every 12.8 days to once every 11.5 days. While the effect I find is not particularly large, it provides evidence of a link between the reporting of women in sport and female representation. In Columns 2 and 4 I also include the number of mentions of male Olympians as a falsification test. As expected, the reported estimates in the second row of Table 6 do not suggest they

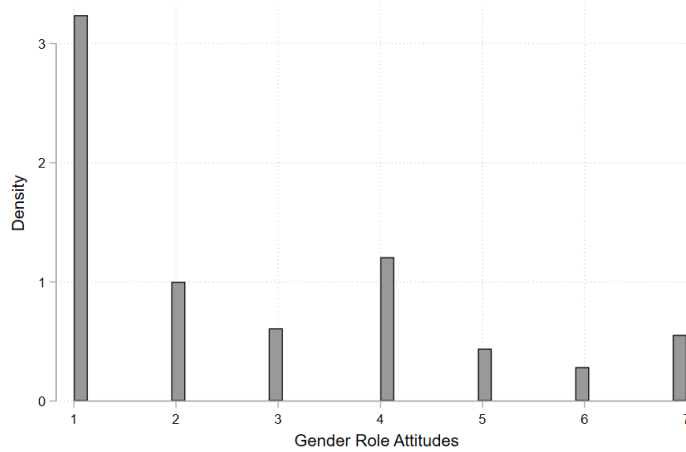
have a significant effect on discussions of female representation.

This suggests that newspapers write more about female representation in politics when they write more about female Olympians. This link may be an editorial one or from individual journalists, linking the then topical theme of female success in sport (which is largely concentrated to the Olympics) to female representation, or lack of, in politics. Overall, the newspaper data supports the causal mechanism of a spillover from discussions in sport to politics through discussions in the media.

8.2 Voter Gender Role Attitudes

To further investigate the causal mechanism, I test the effect of the positive shock on attitudes towards gender. I use survey data from the American National Election Study to test whether observing female medallists alters attitudes towards gender roles among voters. The American National Election Study collected 27,045 responses to the following question across 16 election years between 1972 and 2008 (some in presidential election years and some in other election years): *‘Recently there has been a lot of talk about women’s rights. Some people feel that women should have an equal role with men in running business, industry, and government (1). Others feel that a woman’s place is in the home (7). And of course, some people have opinions somewhere in between, at 2,3,4,5, and 6. Where would you place yourself on this scale or haven’t you thought much about this?’* Figure 7 illustrates the distribution of answers across time. While around 44 per cent of respondents indicated a preference of total equality, an additional 22 per cent were in favour but less strongly. Furthermore a large minority of over 17 per cent indicated some preference against equality of gender roles.

Figure 7: Gender Role Attitudes



Notes: This figure reports the distribution of answers (from all years) to the American National Election Study question about women’s roles in public life. For example, an answer of one represents those who ‘feel that women should have an equal role with men in running business, industry, and government’, while an answer of seven represents those who ‘feel that a woman’s place is in the home’.

To test whether there is any meaningful changes to votes I estimate the effect of medals won by women in the state on the gender role attitudes of voters from that state. These estimates are reported in Table 7. Columns 1 and 2 estimate the effect of women winning medals on gender attitudes. Including

state and year fixed effects, the estimated effect of all sporting success (male or female) appears to be insignificant. Furthermore, these estimates are orders of magnitude smaller than what one would expect to be an observable change in gender attitudes. This is confirmed in Columns 3 and 4 where I use the number of articles mentioning female Olympians at the time and immediate aftermath of the Olympics (controlling for the number of articles mentioning them earlier on in the year). In addition, the gender of the respondent appears to be far less significant than differences between states and years.

Table 7: Gender Role Attitudes and Female Medallists

	(1)	(2)	(3)	(4)
Female Medals (State)	0.000576 (0.00287)	0.000419 (0.00261)		
Female Competitors (State)	0.000886 (0.00111)	0.000787 (0.00103)		
Female Olympian Mentions (July-September)			0.00131 (0.0227)	0.00412 (0.0230)
Female Olympian Mentions (April-June)			0.00421 (0.0239)	0.000426 (0.0239)
State Fixed Effects	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.0787	0.0791	0.0787	0.0791
Observations	25454	25297	25454	25297

Notes: This table reports the estimates of the effect of female medals and related reporting on gender role attitudes. The dependent variable is the answer that the respondent, which is between 1 (equal role) and 7 (women's place is in the home). Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in, while Female Competitors is the number of female competitors. Female Olympian Mentions (July-September) and Female Olympian Mentions (April-June) are the natural logarithm of the number of articles in the state's newspapers mentioning a female Olympian who was born in the state between July-September and April-June, respectively. Columns 2 and 4 include controls which include categorical variables concerning the respondent's ethnicity and gender. All specifications include state and year fixed effects, while standard errors are clustered at the state level. Columns 1 and 3 have more observations than Column 2 and 4 due to a smaller number of missing respondents with missing control variable data, such as ethnicity or party affiliation. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

There appears to be no change in attitudes towards gender in response to women winning medals at the Olympics. This discounts the explanation that female success in sport translates to female success in politics as voters update their beliefs away from traditional gender stereotypes. To some extent this is somewhat expected: attitudes such as these are often formed from voters' family backgrounds and other long-term factors. The survey evidence suggests that these attitudes do not change in a significant manner in the time between the summer Olympics and elections in November. Furthermore, a voter observing a woman from their state win an Olympic medal against other women may not change their belief of a female candidate's ability against a male one. Table 6 provides evidence that the causal mechanism is unlikely to involve voters updating their gender role attitudes or gender biases. This is supported by evidence presented in Table D.1 that reports no persistent female medals effect on female candidate vote shares in elections two years after an Olympic Games: one would expect changes to gender role attitudes to be relatively long-lasting.

8.3 Issue Salience

The causal mechanism between medals being won by women and female electoral success appears not to be driven by changing gender biases. The increase in discussion about female representation that occurs from women winning medals at the Olympics attracts may attention to the lack of women in politics. As discussed in Section 2, one may also assume that voters have a limited selection of issues that they are particularly concerned about when they go to the ballot box, for example the level of income tax. In the context of this paper, voters may be newly convinced that the under-representation of women in politics is a more important issue than they previously believed. This may lead to an increase in votes for female candidates.

I test this using the American National Election Survey data. Another question that the Survey asks relates to how highly do voters prioritise equality in influence over policy. The question asked (every four years from 1972 to 1992) ‘*For a nation, it is not always possible to obtain everything one might wish. On this page, several different goals are listed. If you had to choose among them, which one would seem most desirable to you?*

1. *Maintaining order in the nation.*
2. *Giving more people more say in important political decisions.*
3. *Fighting rising prices*
4. *Protecting freedom of speech’*

While the second option is not a perfect measure of issue salience of female representation, it does illustrate whether voters *prioritise* equality in political decisions (over other policy issues), of which gender equality is a key component. I test whether observing women winning medals, or newspapers discussing their success, impacts whether voters prioritise equality in political decisions. The outcome I use is the binary variable that indicates whether the respondent selects the second issue as their main priority⁷ and implement previous specifications. To test whether there is an asymmetric issue salience effect, I include a dummy variable indicating whether the respondent identifies with the Democrat party and an interaction effect between that dummy variable and the number of medals won by women who were born in the respondent’s state.

Table 8 presents the results. Columns 1 and 2 report the effect of medals won by female Olympians on whether voters from their home state prioritise equality of representation above other issues, with and without controls, respectively. There appears to be a positive female medals effect of around 0.32 percentage points. Given that the average number of medals won by women for a given state in the sample is 3.1, the total effect is around 0.99 percentage points (0.32×3.1), or an increase of 3.9 per cent from the average probability of a respondent prioritising equality of representation of 25.5 per cent. However, the estimates in Columns 1 and 2 are relatively noisy. Columns 3 and 4 split interact the number of medals won by women from the respondent’s state with whether the respondent is a

⁷I assign value 100 to illustrate percentage point effects in the coefficient estimates.

Table 8: Female Medallists and Issue Salience (Equality of Representation)

	(1)	(2)	(3)	(4)
Female Medals	0.319* (0.163)	0.322* (0.165)	0.235 (0.176)	0.231 (0.177)
Female Medals \times Democrat Voter			0.199*** (0.0387)	0.211*** (0.0370)
State Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.0299	0.0328	0.0315	0.0340
Observations	9136	9102	9136	9102

The unit of observation is the female candidate-election pair.

Notes: This table reports the estimates of the effect of female medals on the likelihood of a respondent prioritising equality of representation above the other suggested national priorities. The dependent variable is a dummy variable that takes value 100 if the respondent chooses option 2 in answer to the question outlined above (so that the coefficients can be interpreted as the effect on the percentage probability of choosing option 2), and zero otherwise. Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in, while Democrat Voter is a dummy variable that takes value one if the respondent feels affiliated to the Democrat party. Columns 2 and 4 include controls, which consist of the categorical variables concerning the respondent's ethnicity and gender. All specifications include also Female Competitors and Democrat Voter, as well as state and year fixed effects. Standard errors are clustered at the state level. Columns 1 and 3 have more observations than Column 2 and 4 due to a smaller number of missing respondents with missing control variable data, such as ethnicity or party affiliation. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

Democrat voter. I include this interaction as Table 5 shows that Democrat voters respond differently to the female medals effect compared to Republican voters, and this occur through differences in an issue salience mechanism. Columns 3 and 4 report a significant difference between Democrat and Republican voters. The first row effectively reports the estimated effect on Republican voters, which is positive but insignificant. However, the second row shows that Democrats are more influenced by a female medals effect when it comes to prioritising equality of representation.

While the results in Table 8 is only evidence consistent with an issue salience mechanism and not direct evidence, it is also consistent with the asymmetric female medals effect that is observed in Table 5. Further research would explore this asymmetric issue salience effect with more direct evidence, as well as explaining why there exists such a divergence between political parties. A similar argument may be that Democrat voters read more of the discussions about women in politics. In addition to this evidence, Table D.1 suggests that this issue salience mechanism may be fleeting and that voters need to be reminded again - the effect is non-existent on the next elections two years later.

9 Counterfactual Simulation

I estimate a back-of-the-envelope counterfactual scenario describing the case where the Olympic Games are not held, and therefore the positive shock to female representation is not realised. The results of this scenario may be relevant in evaluating the US boycott of the 1980 Moscow Olympics and the postponement of the 2020 Tokyo Olympics to 2021. Given the noticeable difference between the two parties in the female medal effects, I assume heterogeneous female medal effects between the Democrat and Republican parties (using the estimates of the preferred specification in Column 2 of Table 5).

Figure 8: Counterfactual Simulation, Female Medal Effect (Percentage of Female Winners)



Notes: This figure illustrates the results of the counterfactual scenario that removes the female medal effect. It reports the percentage of successful female candidates that hypothetically would have lost removing the estimated female medal effect from their vote share.

I estimate the lost vote share for women in the absence of an Olympic games and therefore no women winning medals from the state. This loss will therefore be homogeneous among female candidates within the state. I calculate this using the number of medals won by female Olympians from a given state and a given Olympic year, and the estimated effect as reported in Column 2 of Table 5. I calculate the proportion of successful female candidates who hypothetically would have lost their election without the estimated female medal effect. Figure 8 illustrates these estimates across different Olympic years (the United States boycotted the Moscow Olympics of 1980). The estimated proportion of female candidates that are associated with the female medal effect is between 1 and 4 per cent between 1968 and 2016, with an average of 2.68 per cent. Although these estimations are not particularly sophisticated, these counterfactual scenarios suggest that the postponement of the Tokyo Olympics to 2021 (and therefore not in the election year of 2020) may have a non-negligible effect on female representation in US politics.

10 Conclusion

I find that a non-political event, a woman winning a medal at the Summer Olympic Games, has significant spillover effects on female electoral outcomes. I estimate that the total effect of medals won by women is around an increase of 1 per cent of the average female candidate vote share in the Olympians' state of birth. I also find that this event has a polarising effect: this effect is around 3.8 per cent for female Democrat candidates, whereas it is not significantly different to zero for female Republican candidates. This difference exacerbates an already wide gap in female candidate vote shares between the Democrat and Republican parties. More generally, these results illustrate the impact of high-profile events on voting outcomes.

Data from newspapers suggests that there is a spillover from the increased discussion of female Olympians in light of their Olympic success to the discussion of female representation (or the lack of) in politics. Medals won by women appear to not have an effect on gender role attitudes for voters, which suggests that they do not increase female candidate vote shares by changing updating voters' beliefs concerning gender in comparing female politicians to male politicians. I find evidence consistent with an issue salience mechanism. Women winning medals increases the probability that voters prioritise more inclusivity in political decisions, but only so for those who identify as Democrat voters. These results suggest that events that may be described as positive shock may also lead to increased polarisation, even within the same state. A woman winning an Olympic medal is associated with a divergence in vote shares between female Democrat and Republican candidates in her home state.

These results may have three main implications for more equal representation (whether on gender, racial, or other dimensions) in politics and beyond. The first is that positive spillovers in more equal representation may exist, even between areas that are seemingly unrelated. The second is that these positive spillovers may actually lead to increased polarisation within groups, such as between Republican and Democrats within the same state. An event that all voters observe, for example the police killing of George Floyd, may at the same time be positive for the Black Lives Matter movement and BAME representation in politics yet also increase polarisation, in attitudes and outcomes, as the same shock observed has heterogeneous effects on voters. Further work would investigate other spillovers, as well as more cleanly identify the reasons for polarisation in the face of observing a common shock. The final implication is that the impact of celebrating the success of under-represented groups in one field is not only to encourage more participation of those under-represented, but also to highlight issues of their under-representation in other fields, such as in politics.

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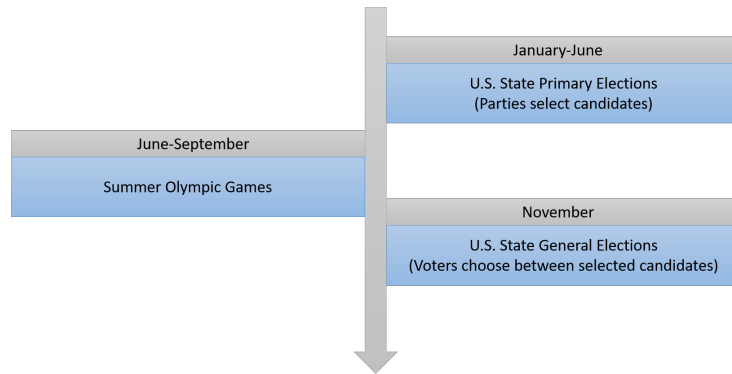
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Appendices

A Institutional Context

Figure A.1: Localised Attention of Female Medallists, 2016 Olympics




B Data Summary and Sources

B.1 Olympic Medals

Figure B.1: Olympic Medal Data Example

Jenny Barringer-Simpson 🇺🇸




Biographical information



Type Competed in Olympic Games
Sex Female
Full name Jennifer Mae "Jenny" Barringer-Simpson
Used name Jenny Barringer-Simpson
Born 23 August 1986 in Webster City, Iowa (USA)
Measurements 166 cm / 53 kg
Affiliations Colorado Buffaloes, Boulder (USA)
NOC(s)  United States

Biography

Personal Best: 3000S – 9:12.50 (2009).

Results

Games	Discipline (Sport)	Event	Status	Team	Pos	Details
2008 Summer Olympics	Athletics	3,000 metres Steeplechase, Women	Olympic		8	Representing United States  as Jenny Barringer
2012 Summer Olympics	Athletics	1,500 metres, Women	Olympic		10 h2 r2/3	Representing United States  as Jenny Simpson
2016 Summer Olympics	Athletics	1,500 metres, Women	Olympic		3	Bronze Representing United States  as Jenny Simpson

Internet search
 Name Full News
 English

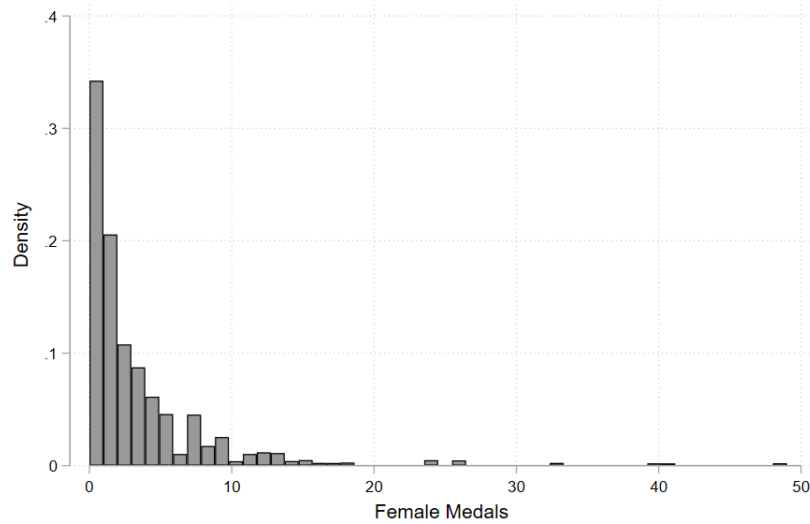
Medals	OG
Gold	0
Silver	0
Bronze	1
Total	1

Notes: This figure presents an example of information provided about US Olympians, as presented on *olympedia.org*

C Variation in Female Medals

This section outlines the variation in medals won by women across the U.S. states and across Summer Olympic Games, from 1968 to 2016. Figure C.1 illustrates the positive skew in the distribution of medals won by women across states and Olympic Games. Figures C.2, C.3, C.4, C.5, and C.6 show the variation in female medals across time for each of the 50 states.

Figure C.1: Data



Notes: This figure illustrates the distribution of medals won by women born from a state across state-Olympic pairs. This includes all states from 1968 to 2016.

Figure C.2: Number of Medals won by Women from the State between the 1968 and 2016 Summer Olympic Games (Alabama-Georgia)

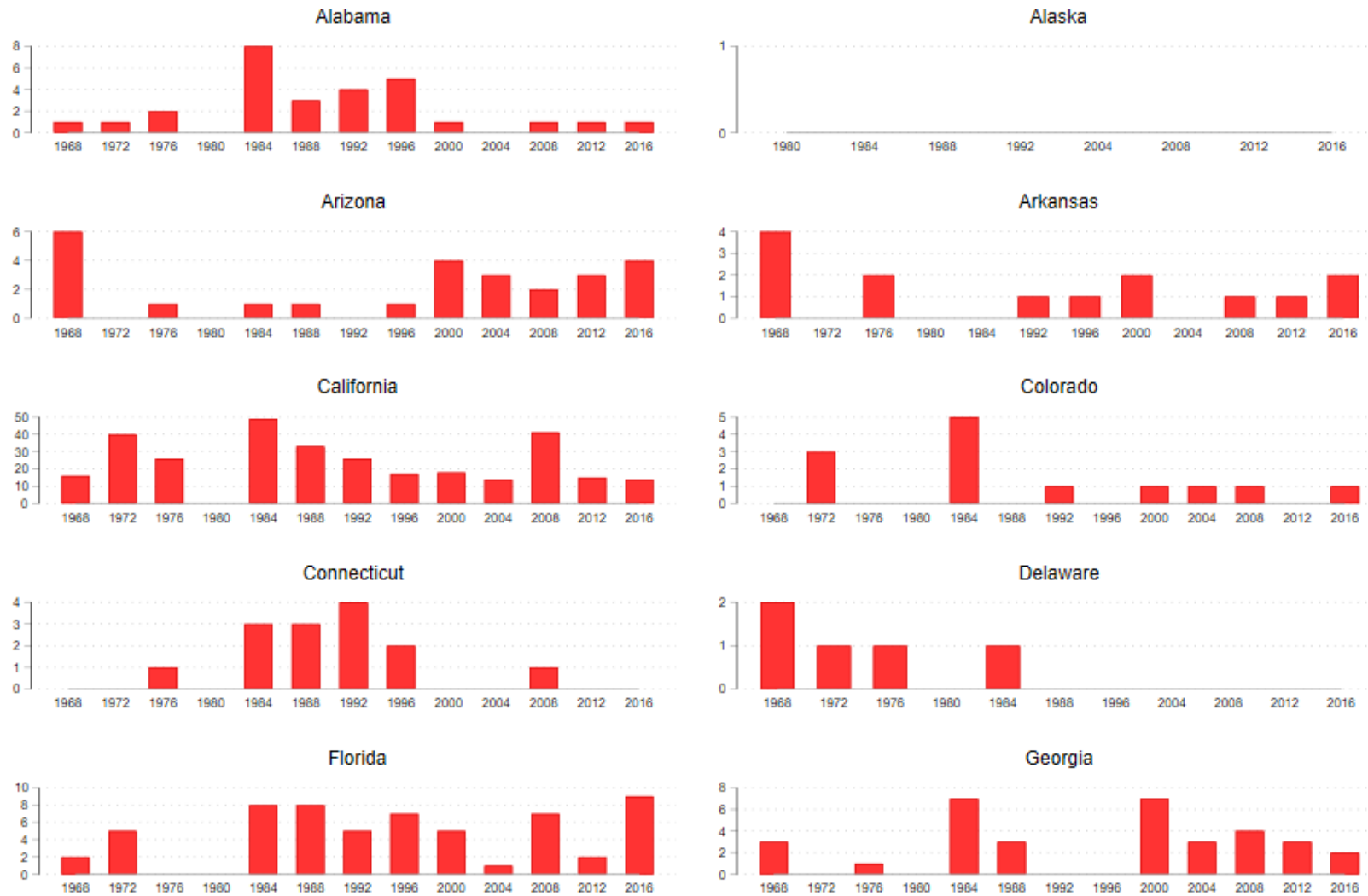


Figure C.3: Number of Medals won by Women from the State between the 1968 and 2016 Summer Olympic Games (Hawaii-Maryland)

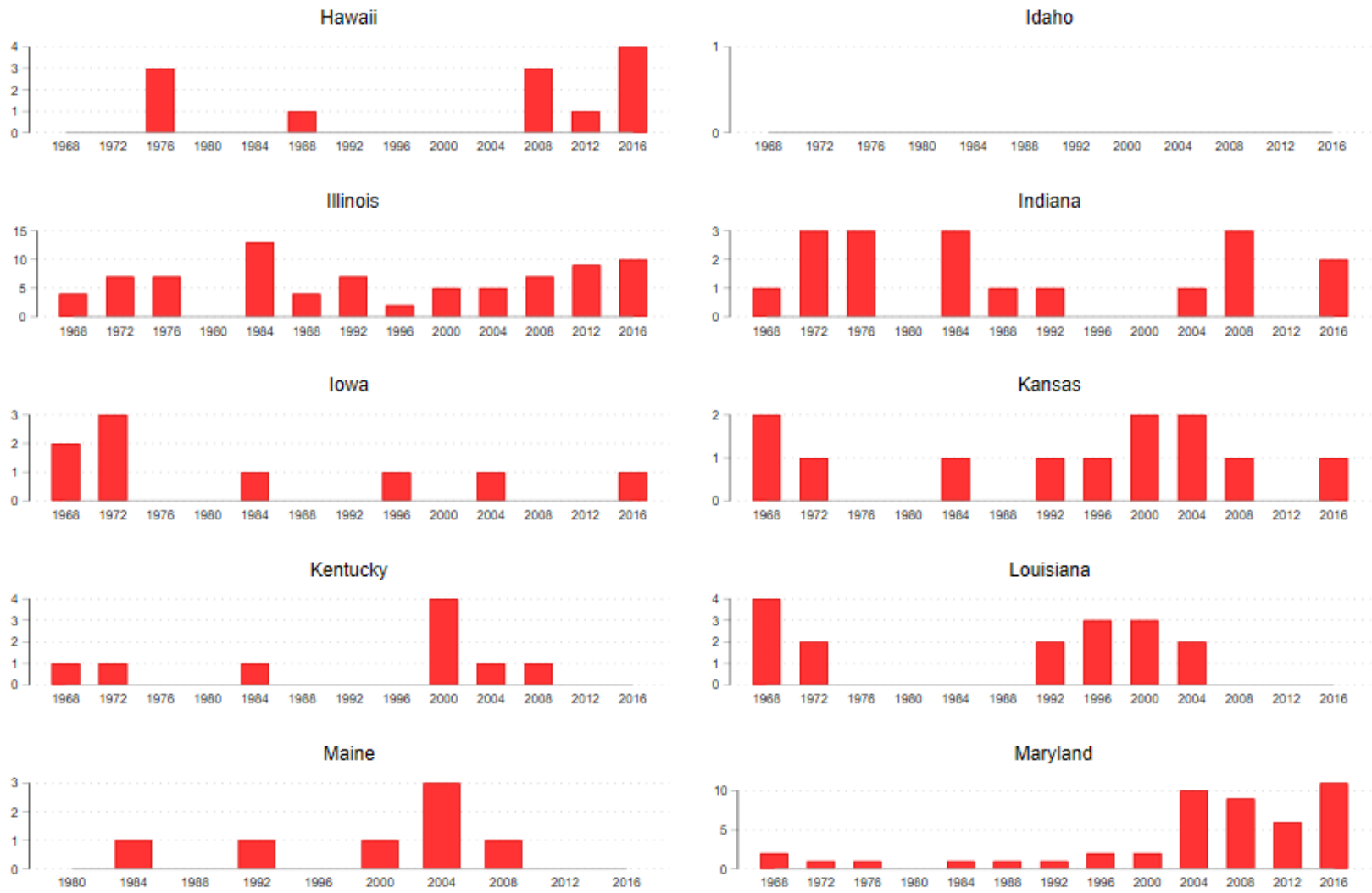


Figure C.4: Number of Medals won by Women from the State between the 1968 and 2016 Summer Olympic Games (Massachusetts-New Jersey)

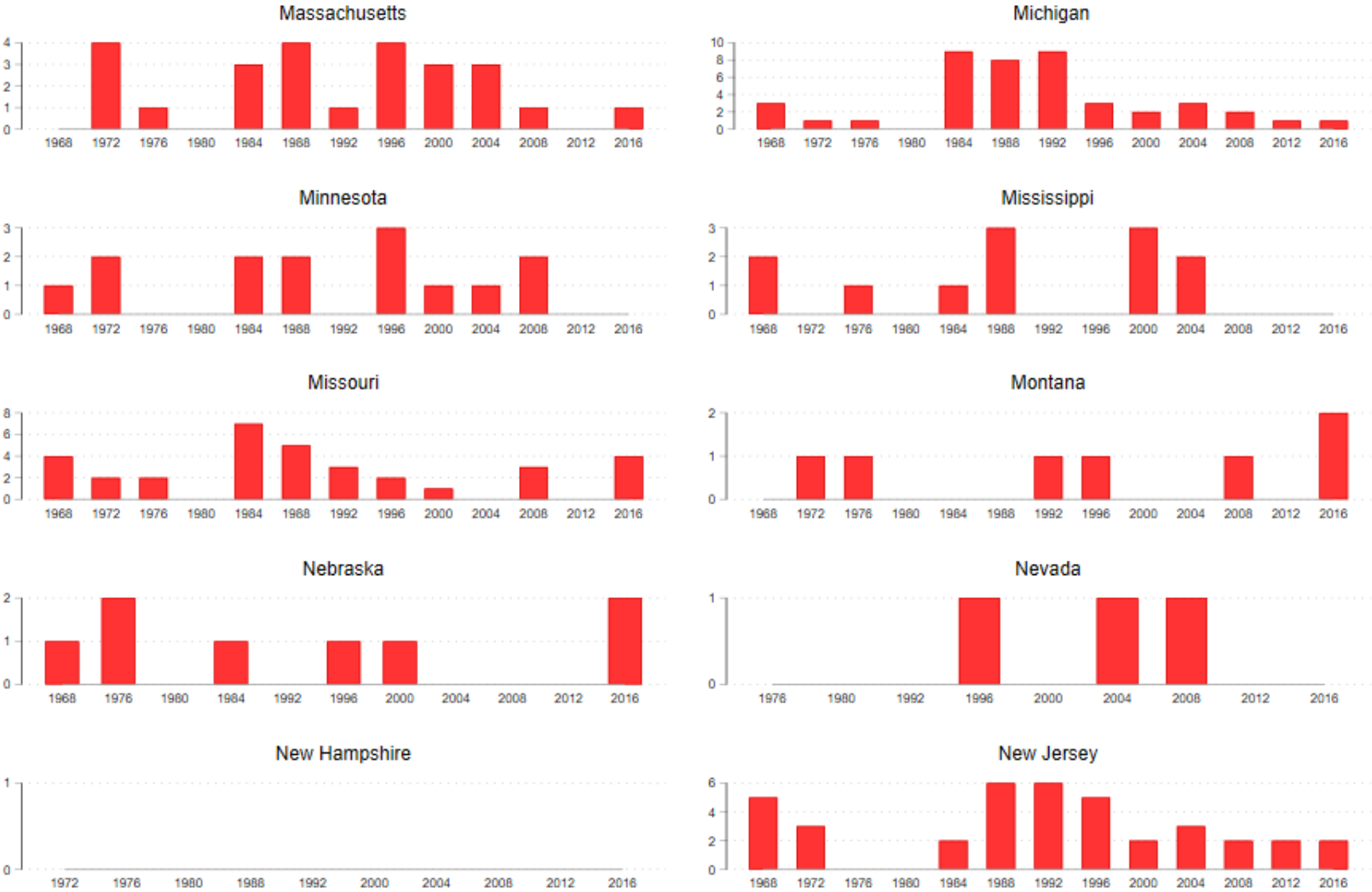


Figure C.5: Number of Medals won by Women from the State between the 1968 and 2016 Summer Olympic Games (New Mexico-South Carolina)

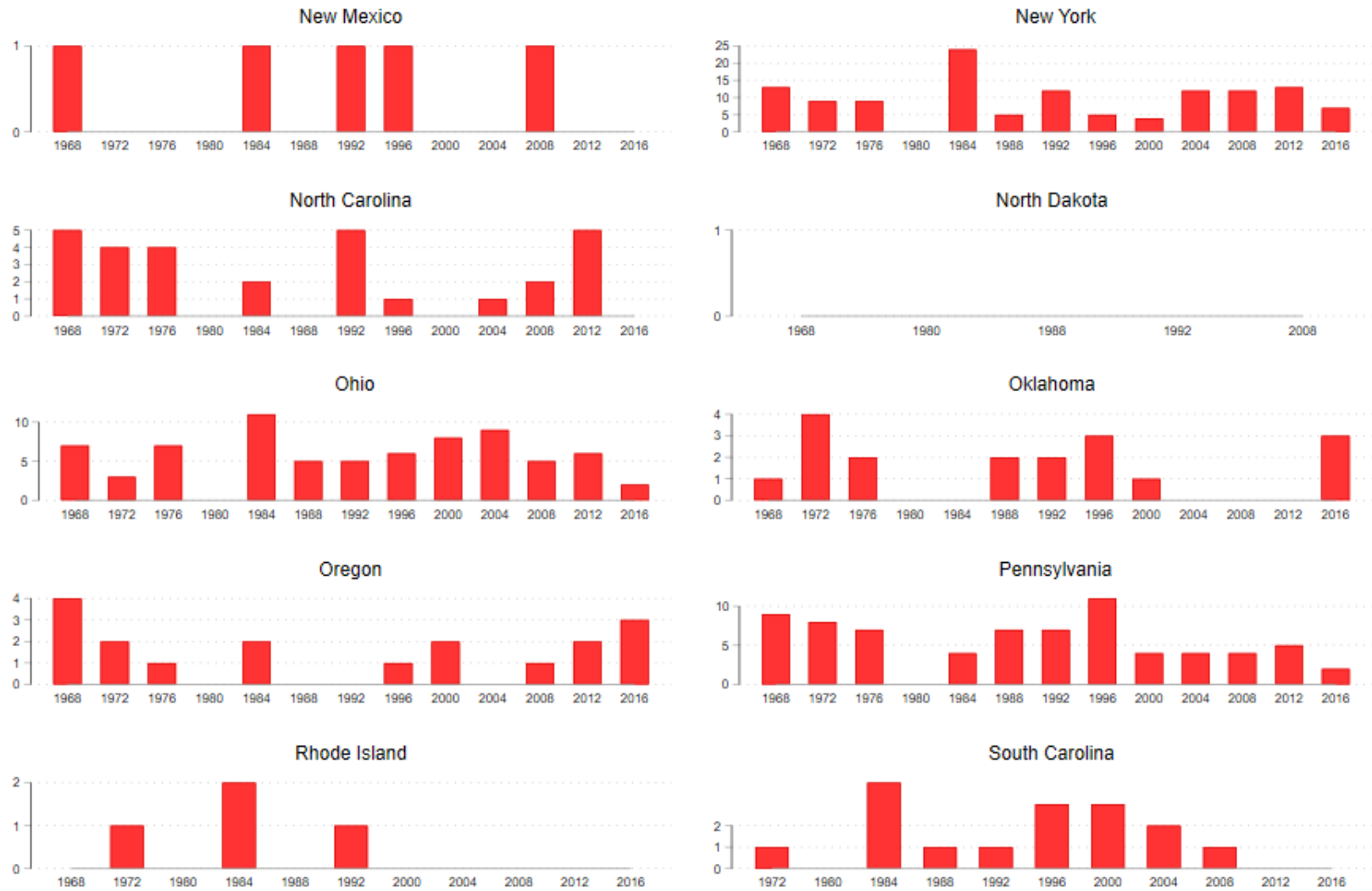


Figure C.6: Number of Medals won by Women from the State between the 1968 and 2016 Summer Olympic Games (South Dakota-Wyoming)



D Persistence of Female Medal Effect

Table D.1: Persistence: Female Medal Effect Two Year Later

	(1)	(2)	(3)	(4)
Female Medals (State)	0.270 (0.169)	0.152 (0.162)	0.243 (0.163)	0.126 (0.156)
Female Medals > 0 (State)			1.268 (1.699)	1.218 (1.711)
Female Competitors (State)	-0.0782 (0.152)	0.00305 (0.111)	-0.0666 (0.154)	0.0142 (0.113)
Incumbent		16.44*** (1.473)		16.45*** (1.471)
Experience, Years		0.421*** (0.0915)		0.420*** (0.0917)
Democrat Candidate		4.672*** (1.109)		4.665*** (1.110)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.494	0.601	0.494	0.601
Observations	15208	15208	15208	15208

Notes: This table reports the estimates using the specification outlined in (1), but on female candidate votes shares in elections two years after the Olympics. The unit of observation is the female candidate-election. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Female Medals is the number of medals won in the summer two years before the election by women who were born in the state that the district is in, while Female Competitors is the number of female competitors who were born in the state that the district is in. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer two years before the election, and zero otherwise. Incumbent, Democrat Candidate, and Olympic Year are dummy variables that take value one if the candidate is an incumbent legislator, a candidate selected by the Democrat party, and whether the election is held in an Olympic year, respectively, and zero otherwise. Experience, Years is the number of years that the candidate has been a member of the legislature (which may also include years in another chamber within the legislature). All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

E Male Medals Crowding Out Female Medals?

Table E.1: Crowding Out? Male Medals and the Female Medals Effect

	(1)	(2)	(3)	(4)
Female Medals (State)	0.213** (0.0922)	0.167* (0.0853)	0.207** (0.0832)	0.150* (0.0806)
Female Medals (State) \times Male Medals (State)	-0.00214 (0.00215)	-0.000806 (0.00182)	-0.00170 (0.00224)	-0.0000105 (0.00195)
Female Medals > 0 (State)			0.280 (0.622)	0.577 (0.523)
Female Medals > 0 (State) \times Male Medals (State)			-0.284 (0.333)	-0.385 (0.396)
Female Competitors (State)	-0.0727 (0.105)	-0.106 (0.0916)	-0.0665 (0.106)	-0.0955 (0.0936)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.507	0.609	0.507	0.609
Observations	45427	45427	45427	45427

Notes: This table reports the baseline specification outlined in (1), and includes the interaction of the number of medals won by men from the state with the number of medals won by women. The unit of observation is the female candidate-election. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Female and Male Medals are the number of medals won in the summer before the election by women and men who were born in the state that the district is in, respectively, while Female Competitors is the number of female competitors who were born in the state that the district is in. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Incumbent, Democrat Candidate, and Olympic Year are dummy variables that take value one if the candidate is an incumbent legislator, a candidate selected by the Democrat party, and whether the election is held in an Olympic year, respectively, and zero otherwise. Experience, Years is the number of years that the candidate has been a member of the legislature (which may also include years in another chamber within the legislature). All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

F Robustness Checks

F.1 Omitting Large States

Table F.1: Main Results without California

	(1)	(2)	(3)	(4)
Female Medals (State)	0.228** (0.113)	0.201* (0.106)	0.229** (0.104)	0.192* (0.102)
Female Medals > 0 (State)			-0.0202 (0.655)	0.139 (0.528)
Female Competitors (State)	-0.0411 (0.0735)	-0.0730 (0.0818)	-0.0409 (0.0756)	-0.0740 (0.0826)
Incumbent		15.27*** (1.252)		15.27*** (1.252)
Experience, Years		0.548*** (0.0784)		0.548*** (0.0785)
Democrat Candidate		5.397*** (1.142)		5.397*** (1.142)
Olympic Year		0.0607 (1.244)		0.00944 (1.212)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.511	0.610	0.511	0.610
Observations	44300	44300	44300	44300

Notes: This table reports the estimates using the specification outlined in (1). The unit of observation is the female candidate-election, but without observations from California. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in, while Female Competitors is the number of female competitors who were born in the state that the district is in. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Incumbent, Democrat Candidate, and Olympic Year are dummy variables that take value one if the candidate is an incumbent legislator, a candidate selected by the Democrat party, and whether the election is held in an Olympic year, respectively, and zero otherwise. Experience, Years is the number of years that the candidate has been a member of the legislature (which may also include years in another chamber within the legislature). All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

F.2 Omitting States with No Female Medallists

Table F.2: Main Results without States with No Female Medallists

	(1)	(2)	(3)	(4)
Female Medals (State)	0.218*** (0.0811)	0.175** (0.0765)	0.195** (0.0759)	0.162** (0.0719)
Female Medals > 0 (State)			0.694 (0.649)	0.423 (0.639)
Female Competitors (State)	-0.0499* (0.0265)	-0.0555* (0.0310)	-0.0488* (0.0267)	-0.0544* (0.0311)
Incumbent		16.62*** (0.856)		16.62*** (0.856)
Experience, Years		0.597*** (0.0830)		0.598*** (0.0831)
Democrat Candidate		6.956*** (1.216)		6.956*** (1.216)
Olympic Year		2.842*** (0.992)		2.599** (1.176)
District Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Controls	N	Y	N	Y
Adjusted R ²	0.482	0.606	0.482	0.606
Observations	38432	38432	38432	38432

Notes: This table reports the estimates using the specification outlined in (1). The unit of observation is the female candidate-election, but excludes states from which no woman ever wins a medal in the sample. The dependent variable is the votes won by the female candidate as a percentage of total votes cast in the election in the district. Female Medals is the number of medals won in the summer before the election by women who were born in the state that the district is in, while Female Competitors is the number of female competitors who were born in the state that the district is in. Female Medals > 0 is a dummy variable that takes a value of one if at least one woman from the state won a medal in the summer before the election, and zero otherwise. Incumbent, Democrat Candidate, and Olympic Year are dummy variables that take value one if the candidate is an incumbent legislator, a candidate selected by the Democrat party, and whether the election is held in an Olympic year, respectively, and zero otherwise. Experience, Years is the number of years that the candidate has been a member of the legislature (which may also include years in another chamber within the legislature). All specifications include district and year fixed effects, while standard errors are clustered at the state level. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.