

# Gender-Based Voting in New Hampshire State Legislative Elections

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**Abstract:** Researchers studying women's representation have long sought to determine whether voters have a bias toward choosing male or female candidates. While survey experiments have identified gender biases in voters, observational studies of voter behavior in partisan elections have largely failed to find a significant effect of candidate gender on vote choice. This paper demonstrates that in at least one state, New Hampshire, voters are significantly more likely to vote for women than men in state legislative elections. Using the unique nature of the New Hampshire state house's large multi-member districts, I show that this gender gap is not caused by a "cream of the crop" selection bias in which only the best female candidates run for office, as suggested by previous research, but instead by a voter preference for female candidates. I further demonstrate this pattern by showing that in elections in which women and men from the same family run in the same district, the women consistently perform better than the men. Across a variety of methodological approaches, I find that female candidates perform about 5-8% better than their male counterparts. Finally, I show that women's electoral advantage may be greater in multi-member districts, especially districts with the largest magnitude.

## **Introduction**

The question of whether voters are biased toward or against candidates based on their gender is perhaps as well-researched as any in the field of gender and politics. Despite being studied across a wide variety of methodologies and contexts, the literature has failed to settle on a firm conclusion. Many have speculated that a voter bias against female candidates may be in part to blame for the systematic underrepresentation of women in elected office in the U.S. and around the world. Indeed, survey research has identified many ways in which voters hold gender-based stereotypes about candidates that might lead them to be biased against female candidates. However, analysis of election results has largely failed to demonstrate a clear voter bias against female candidates. Some recent studies of Democratic party primaries and candidate-choice survey experiments have even found a voter bias in favor of female candidates.

Amid this discordant series of results, this paper identifies a striking pattern. Looking solely at elections for the lower house of the state legislature of New Hampshire – the largest state legislative body in the country, in a state with unusually high overall levels of women office-holders – I find strong evidence that voters vote for female candidates at higher rates than their male counterparts. This gap is comparable to the electoral advantage enjoyed by incumbents. The New Hampshire state house also has an unusually high number of multi-member districts, and in some of these districts men and women from the same family run in the same election under the same party label. These unique features of the state house allow me to obtain more precise estimates of female candidates' electoral advantage. Using a variety of methodological approaches, I find that female candidates perform about 5-8% better than their male counterparts in New Hampshire state house elections. Finally, this paper provides evidence that women's electoral advantage in New Hampshire increases in districts with a larger number of seats.

## **The Debate Over Gender-Based Voting in American Elections**

Scholars have been attempting to determine whether candidate gender affects electoral performance for over four decades. Early work on candidate gender consistently found that male candidates do no better or worse than female candidates in congressional elections when controlling for district-level differences and incumbency, at least after 1970 (R. Darcy and Schramm 2002; Welch et al. 1985). More recent studies have similarly found that partisanship tends to swamp any gender considerations in candidate choice (Dolan 2014).

Yet there is ample evidence in the survey experiment literature that voters are influenced by candidate gender. Voters hold stereotypes about candidates based on gender, and these stereotypes inform the distinctions that they draw between male and female candidates (Kahn 1996). Voters' gender stereotypes affect their baseline preferences for male or female candidates, which in turn may affect vote choice (Sanbonmatsu 2002). Explicit and implicit attitudes against female leadership negatively affect peoples' willingness to choose female candidates, although this relationship is attenuated when voters learn about candidate quality (Mo 2015). Voters may also be biased against female candidates based on the belief that a woman would govern more favorably toward women than men (Goldman 2018). The major drawback of many of these survey experiments is that they tend not to include party labels when asking respondents to choose among candidates, making them a poor approximation of real-world general elections in which party is often the primary heuristic used by voters.

The strongest argument against the findings in observational studies of election results is that these studies are omitting a key variable: candidate quality. According to this argument, only the best potential female candidates choose to run for office because of structural sexist barriers to candidate entry in American politics, while male candidates span a much wider quality range (Fulton 2011). This difference could result from self-selection among women, who are less likely to view themselves as

qualified, or due to gender bias among party leaders (Lawless and Fox 2005). The gender quality gap shows up not just in election results but also in legislation, where it seems to translate to greater success among congresswomen in sponsoring legislation and delivering federal spending to districts (Anzia and Berry 2011). This problem has been called the “cream of the crop” effect (Milyo 2000), since only the “cream” of the potential female candidate “crop” will actually run for office. According to the theory, given that voters are more likely to vote for better-qualified candidates and female candidates are better qualified on average, any finding that women and men perform equally well in elections could still be evidence of a voter bias against women. Fulton (2012) in fact finds that once candidate quality is accounted for, female candidates are discriminated against by the electorate.

Several recent studies have found anti-women voter bias using an array of methodologies. A conjoint survey experiment conducted by Ono and Burden (2018) finds a small voter gender bias against women, though it is restricted to male Republican voters and only appears in presidential rather than legislative elections. Bucchianeri (2018) uses a regression discontinuity approach based around whether a man or a woman wins a close congressional primary and similarly finds a negative effect of female candidate gender only for Republican female candidates. Anastasopoulos (2016), however, finds no negative gender effect using a similar regression discontinuity approach. Urbatsch (2018) uses the relative “femaleness” of names to determine whether voters use gendered names to make voting choices in state legislative elections, finding that candidates with more feminine names tend to perform worse. This result is significant only for Republican candidates.

On the other hand, some studies have identified electoral advantages for female candidates. Scholars have used ANES data to demonstrate that women are more likely to vote for female candidates, a finding known as the “gender affinity” effect (Brians 2005; Dolan 2008). Dolan (2008) finds that this effect is mediated by the greater positive affect that female voters feel toward female Democratic candidates in particular. Evidence for pro-woman gender-based voting has been found in

intra-Democratic Party contests; for example, Lawless and Pearson (2008) find that women tend to receive more votes than their male counterparts in Democratic congressional primaries. This evidence became significantly stronger during the 2018 primaries, the first congressional elections held after the Women's March and birth of the #MeToo movement. In the 2018 Democratic congressional primaries, women defeated men in 69% of open-seat races with at least one man and one woman running (Wasserman 2018).<sup>1</sup> In a recent meta-analysis of 30 factorial candidate choice survey experiments in which candidate gender was randomized, Schwarz, Hunt, and Coppock (2018) find that female candidates are preferred on average by respondents by 2 percentage points. They do not find a consistent pattern of a gender affinity effect, but do find a partisan difference, with Democrats more likely to prefer the female candidate than Republicans.

In summary, the debate over gender-based voting remains muddled. There is evidence of both pro-woman and anti-woman biases among voters, as well as of no bias at all, depending on candidate and voter party, the office being elected, and the methodology used. It is safe to say that candidate gender does matter for voters, but it remains unclear in which contexts it is likely to affect vote choice, and in which direction. The only consistent finding in the literature is that Republican female candidates face a higher penalty based on their gender and Republican voters tend to be more biased in favor of male candidates. However, this partisan difference might be the result of voters inferring the ideological orientation of candidates from their gender, as female candidates are typically perceived as more ideologically liberal than men (Koch 2000).

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<sup>1</sup> Consistent with the finding that Republican voters are more likely to penalize candidates for being women, only 35% of female candidates won in 2018 Republican open seat primaries with both a man and a woman running.

## The Mystery of the Stolen Seats

From this macro-view of gender-based voting I will now zoom in to the micro-level, a curious case that would be easy for most observers of American elections to overlook: the 2012 election for New Hampshire's Hillsborough-37 state house district. This district is the largest in New Hampshire's state house, which is itself the largest state legislative body in the U.S. Hillsborough-37 has 11 seats, and because New Hampshire uses first-past-the-post voting, this means that Hillsborough-37 voters are able to vote for 11 different candidates for state house.

In the 2012 presidential election, Mitt Romney received 57% of the votes in Hillsborough-37, while he lost the national popular vote by four percentage points; the district is solidly Republican. If all of Romney's voters had voted for each of the 11 candidates running for state house under the Republican party label, the GOP would have easily won all 11 seats in the district. But Republicans won only 10 seats, while the 11<sup>th</sup> was won by Mary Ann Knowles, a Democrat.

By itself, this district would just be an odd footnote in an election in which Democrats picked up 118 net seats to win control of the previously Republican-held state house. It could easily be explained by the fact that Mary Ann Knowles was more famous than the average New Hampshire state house candidate, as she was mentioned by John Kerry in his 2004 DNC speech as an example of a hard-working cancer survivor.<sup>2</sup> But Knowles was not alone: in the nine state house districts with district magnitudes of at least five (eight of which were won by Romney), Democrats "stole" six seats, as shown in Table 1.<sup>3</sup> All six victorious Democrats were women, and all six displaced Republican candidates were men.

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<sup>2</sup> This story is from the Boston Globe, where Knowles received an obituary after her death in 2017: <https://www.bostonglobe.com/metro/2017/02/12/remembering-mary-ann-knowles/NxSUyJlceZQ9UOWV1wAshO/story.html>

<sup>3</sup> A similar phenomenon occurred in 2018, where the Democrats "stole" eight seats in these Republican districts, with seven Democratic women and one Democratic man displacing eight Republican men, as shown in Appendix A. It did not happen in any other elections since the 2010 redistricting cycle, suggesting that it only occurs in election years that strongly favor Democrats nationally.

District	Number of Seats	R Seats		D Seats	
		M	F	M	F
<b>Strafford-6</b>	5	0	0	2	3
<b>Rockingham-4</b>	5	3	2	0	0
<b>Hillsborough-6</b>	5	4	0	0	<b>1</b>
<b>Hillsborough-7</b>	6	5	1	0	0
<b>Rockingham-5</b>	7	5	1	0	<b>1</b>
<b>Hillsborough-21</b>	8	4	3	0	<b>1</b>
<b>Rockingham-8</b>	9	6	3	0	0
<b>Rockingham-6</b>	10	7	1	0	<b>2</b>
<b>Hillsborough-37</b>	11	8	2	0	<b>1</b>
Total	66	42	13	2	9

Table 1: 2012 New Hampshire state house seats won by party and gender in 5+ seat districts

This paper was born out of a desire to solve this “mystery of the stolen seats.” Was this string of victories by Democratic women in Republican districts a coincidence? Or were New Hampshire voters exhibiting a preference for female candidates in a partisan election? If the latter were true, it would have significant implications for the debate over gender-based voting.

### **The Peculiar State Politics of New Hampshire**

New Hampshire presents an interesting context in which to study gender-based voting for several reasons. For one, no other state can rival it in sample size: with 400 seats in its lower house, nearly as many people run for the New Hampshire state legislature every year as run for the U.S. House of Representatives. If these candidates win elected office, they are paid only \$100/year, the lowest salary for state legislators in the country. As a result, candidates for the state house are unlikely to be

professional politicians. In general, voters are less likely to learn and use external information about candidates when voting for downballot offices (Hirano et al. 2015), and given the amateur nature of most state house candidates voters seem especially likely to rely on heuristics visible on the ballot in these cases, such as party labels and gender.

The New Hampshire state house's multi-member district system provides additional analytical leverage relative to the single-member district elections that are more typically studied. In multi-member districts, it is possible to directly compare the vote shares of female candidates to male candidates running under the same party label in the same district with the same voters. New Hampshire's districts vary widely in their magnitude, from single-member districts (primarily in the state's rural areas) to moderately-sized 2-4 seat districts (most often occurring in urban areas such as Manchester and Nashua) to the large 5-11 seat districts discussed in Section 3, all found in the suburban areas in the southeastern corner of the state. Before the 2011-2012 redistricting process, multi-member districts were even more common in the state house. The number of single-member districts increased from 12 in 2010 to 105 in 2012, while the number of districts with at least five representatives decreased from 25 to nine.

Assuming that the answer to the "mystery of the stolen seats" does have something to do with gender-based voting in New Hampshire high-magnitude districts, what is the exact mechanism? There are two plausible explanations for the phenomenon. One possibility is that some voters may decide to prioritize gender over party in their vote choice, and vote for a woman of the opposite party if their own party does not run enough female candidates, as was often the case for Republicans in large districts in 2012. While it would be surprising if strong partisans voted this way, independents and weak partisans might reasonably choose to use gender as a heuristic instead of party if increasing women's representation was important to them or they preferred female candidates for some other reason. In large multi-member districts, independent-minded voters might choose to vote for some candidates

from each party and might choose which candidates to vote for based partly on gender. Additionally, in many of the larger Republican leaning districts, Democrats did not nominate a full slate of candidates. Therefore, for a Democratic voter in such a district to use all their votes, they would have to choose some Republicans to vote for and might decide based on gender. To speculate further, a Republican voter in a large district might notice the lack of gender balance in their party's slate of candidates and choose to cross party lines and use one or more of their votes to support Democratic women.

A second possibility is that in large multi-seat districts, some voters for whatever reason do not cast as many votes as they are allowed to.<sup>4</sup> If some of these undervoters have a preference for female candidates, those candidates will end up with more votes than their male co-partisan counterparts. Given sufficient undervoting among both Republicans and Democrats, this theory could even explain the most popular Democrats among undervoters beating the least popular Republicans among undervoters. The dataset used in this study does not allow me to conclusively assess the degree to which these two mechanisms are occurring, but either would be evidence of voters using gender to decide among candidates.

The final peculiarity of New Hampshire that is relevant to this study is that the state's politics seem to be uniquely woman-friendly. In 2012, New Hampshire became the first state to elect an all-female slate of candidates to its higher offices; its two U.S. Senate seats, two U.S. House seats, and governorship were all won by women. Six years later, all four congressional seats are still held by women. At its peak in 2009, 37.5% of New Hampshire state legislative seats were held by women, the highest in the country, though that proportion has since fallen to 33.7% after the 2018 election (CAWP 2019). The relatively high level of women's representation in New Hampshire could be caused in part by the nonprofessional nature of the state legislature, which discourages male breadwinners from running.

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<sup>4</sup> In the sample of New Hampshire election results used in this paper, there are in fact high rates of undervoting, especially in large districts – in districts of at least five seats, candidates receive on average about 10% fewer votes than candidates in smaller districts, who in turn receive fewer votes than candidates for higher offices.

Some have also speculated that New Hampshire's "retail political culture," which places a greater weight on person-to-person campaigning and less on television ads, may play to women's strengths (Starr 2012). There is also evidence in both the American and comparative literatures that the use of multi-member district (MMD) systems, such as that used for the New Hampshire state house, is associated with higher levels of women's representation (Darcy, Welch, and Clark 1985; Welch and Studlar 1990; King 2002). If the MMD system causes more women to be elected to the state house, that might lead to more women in higher office by increasing the pool of female candidates with electoral experience.

The goal of this study is to use the unique context of the New Hampshire state legislature to gain some additional purchase on the questions of whether, when, and why voters vote based on candidate gender. There are three core hypotheses it seeks to test. First, I expect that at least some portion of female candidates' success in New Hampshire is due to gender-based voting; that is, New Hampshire voters are voting for women at higher rates than men and they are doing so because of candidate gender. Second, based on previous findings of a party differential in gender-based voting, I expect Democratic female candidates to perform better relative to their male counterparts than do Republican female candidates. Finally, drawing on results from the comparative electoral systems literature, I expect that female candidates will perform relatively better in districts with greater magnitudes, where voters have an opportunity to use gender in their voting decision while still primarily casting their votes for their preferred party.

## **Data**

I collect a unique dataset combining vote totals for elections to the New Hampshire's state house of representatives from 2008-2016 with the gender of candidates in those elections. This time period includes two general elections before and three general elections after the most recent round of redistricting in 2011-2012, for a total of 3447 candidate-year observations. Special elections are not

included. Vote totals, candidate names, incumbency status, and district magnitude are scraped from the Associated Press website and the New Hampshire Secretary of State website.<sup>5</sup> For the 2008-2014 elections, candidate gender is coded using an R package that estimates gender using candidates' first names using historical data (Mullen, Blevins, and Schmidt 2018) and follow-up research on all candidates with ambiguously gendered names.<sup>6</sup> For the 2016 election, candidate gender data is taken from the Center for American Women and Politics (CAWP 2016). Presidential vote totals in each state house district are taken from *Daily Kos Elections* for 2012 – 2016 (Daily Kos 2013) or calculated manually from Secretary of State election results for 2008 and 2010.

## Results

I first use simple OLS models to determine the relationship between candidate gender and vote share. These models include as controls the candidate's incumbency status, the percentage of votes that the Republican presidential nominee received in the district in 2008 or 2012 (to provide a baseline for the district's overall partisanship),<sup>7</sup> a dummy variable for election year, and a variable representing the number of seats in the district. I use logged vote share as the dependent variable to standardize the interpretation of effects on vote share across different district magnitudes. Standard errors are clustered at the district level. The analysis is restricted to only those districts where at least one man and one woman were running. Third-party candidates and independents are excluded from the analysis for simplicity.

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<sup>5</sup> The AP webpages listing the results are no longer online; the Secretary of State results can be found at: <http://sos.nh.gov/ElectResults.aspx>

<sup>6</sup> For names with a lower than 95% probability of being one gender or the other, I looked up the individual candidates to determine which gender is used to describe them in media reports.

<sup>7</sup> District partisanship is determined using John McCain's 2008 vote share for the pre-redistricting elections in 2008 and 2010 and Mitt Romney's 2012 vote share for the post-redistricting elections from 2012-2016.

The same model is then run for only Democratic and for only Republican candidates, as much of the gender-based voting literature suggests that pro-women voting is more likely to occur for Democratic women than Republican women (Dolan 2007; Lawless and Pearson 2008; Schwarz, Hunt, and Coppock 2018). The results of these models are shown in Table 2.

DV:	Logged Vote Share		
	All candidates	Democratic candidates	Republican candidates
Woman	0.08*** (.01)	0.13*** (.01)	0.04* (.02)
District Magnitude	-0.20*** (.01)	-0.20*** (.01)	-0.19*** (.01)
Democrat	-0.11*** (.02)		
GOP pres. vote share	-0.09 (.15)	-1.86*** (.14)	1.90*** (.16)
Incumbent	0.22*** (.01)	0.12*** (.02)	0.08*** (.02)
(Election year dummies)			
N	2880	1414	1446
Multiple R <sup>2</sup>	0.83	0.90	0.85

Table 2: OLS model of the effect of candidate gender on vote share

The results show that female candidates perform significantly better than male candidates in New Hampshire state house elections, with an effect size of 8%. As expected, this effect is larger for Democratic candidates than Republican candidates. Among Democratic candidates, women receive 13%

more votes than men, while Republican female candidates have a smaller but still significant ( $p < .05$ ) advantage of 4%. These effects are comparable to the effect of incumbency, which ranges from 8-22% in these models. While not shown in the table, when the “all candidates” model is run with simple vote share instead of logged vote share, the effect size of gender is 2 percentage points, which is identical to the pro-woman effect size found by Schwarz, Hunt, and Coppock (2018) in their meta-analysis of candidate choice experiments.

### **Testing the “Cream of the Crop” Theory**

The above results demonstrate that female candidates of both parties have performed better than male candidates in recent New Hampshire state house elections. However, the causal mechanism remains unclear from this correlational evidence. Previous literature suggests two plausible possibilities: either voters are using gender as a heuristic in their voting decisions and favoring women, or female candidates are of higher quality than male candidates, on average. If the latter account were true in this case, we would expect New Hampshire voters to be disproportionately voting for women not because they are women but because they are perceived to be better candidates – the “cream of the crop.”

I will test whether the “cream of the crop” effect is at play in New Hampshire using two strategies: first, by determining whether the gender difference in electoral performance is found at both the top and bottom of the performance distribution, and second by constructing a candidate quality variable using campaign fundraising data.

One implication of the cream of the crop theory is that while the average female candidate would be better qualified (and therefore perform better in elections) than the average male candidate, we would not expect to see this difference at the top end of the distribution. We might expect that the worst female candidates would be of a higher quality than the worst male candidates, because various structural barriers would block low-quality women from running for office while failing to block similarly

low-quality men. With the low end of the quality distribution cut off for women, they would have a higher average quality than men. However, there is no theoretical reason to expect that the best women would be better candidates than the best men.

New Hampshire’s multi-member districts provide an opportunity to examine the full distribution of male and female candidate performances. Candidates in these districts can be directly compared to other candidates running in the same district under the same party label to cleanly tease out the effect of candidate-specific characteristics on vote share. I assign each candidate a “performance relative to average candidate” score: the candidate’s vote share divided by the average vote share of like-party candidates in the same district. The distributions of these scores for men and women are shown in Figure 1.

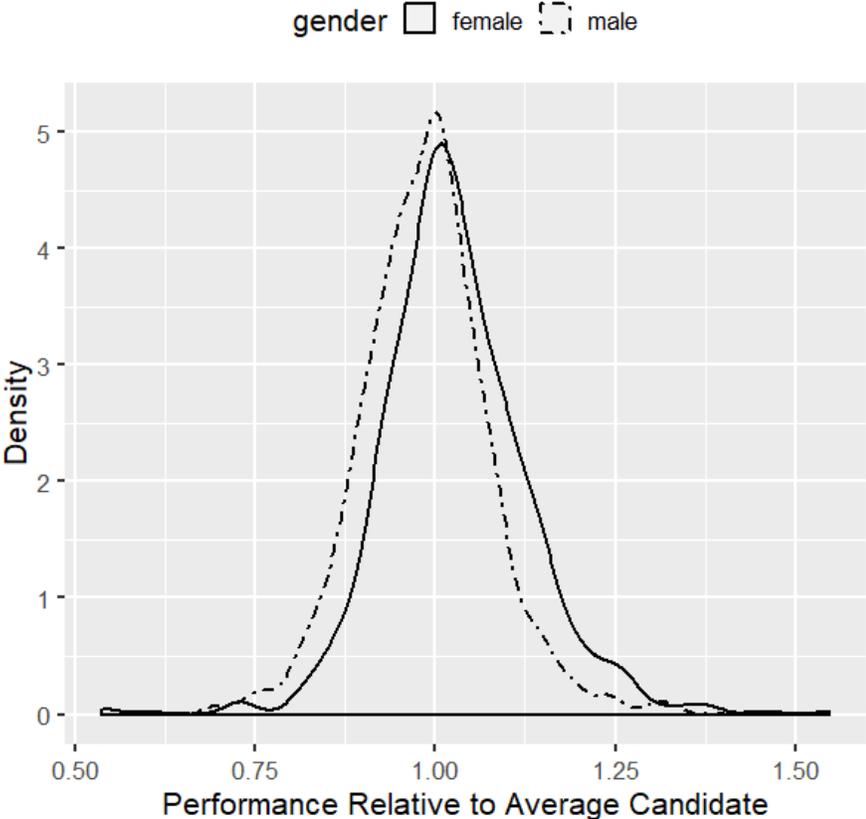


Figure 1: Kernel density plot of candidates’ vote shares relative to the average vote share of co-partisans in their districts, by gender

These distributions do not seem to support the cream of the crop theory. Instead of the female distribution looking like a truncated version of the male distribution without the low end, every point on the female distribution is higher than the same point male distribution. The best female candidates seem to be performing better than the best male candidates, just as the worst female candidates are performing better than the worst male candidates. It is possible that the best female candidates are higher quality than the best male candidates, but there is no clear theoretical reason for expecting that to be the case.

### **Campaign Contributions and Candidate Quality**

Candidate quality is difficult to measure even for congressional candidates, but it poses a special challenge in the New Hampshire state house, where few of the candidates are professional politicians. This makes it next-to-impossible to use the standard measure of candidate quality, a binary variable for whether the candidate has previously held elected office (Jacobson 2006). The New Hampshire state house is an entry-level elected office, so prior office-holding experience is rare. For this study we will need to considerably lower the bar for what counts as a “quality candidate.”

The best option for differentiating among the ability levels of state house candidates given the existing data is campaign finance returns. In congressional elections, fundraising and candidate experience are closely correlated, except in cases of especially competitive elections (Maestas and Rugeley 2008). Thus, campaign contributions can be used as an imperfect proxy for candidate quality. We would expect candidates who are skilled at raising money for their campaigns to be similarly skilled at other aspects of campaigning and to have the networks and local political backing that are traditionally associated with quality candidates. I collect data on campaign contributions for all New

Hampshire state house candidates from 2008 – 2016, including both the number of contributions and the total amount raised, from FollowtheMoney.org, a project of the National Institute on Money in Politics. This data is then merged with the previous election results dataset using candidate names.<sup>8</sup>

Just a third of state house candidates in the sample receive any monetary campaign contributions at all. There is a small but noticeable gender difference in fundraising, however: female candidates are more likely to receive a contribution, receive more contributions on average, and raise more money on average, as shown in Table 3. But do these differences fully explain the gender gap in electoral performance?

	Men	Women
<b>Percentage with no contributions</b>	70%	63%
<b>Percentage with contributions</b>	30%	36%
<b>Mean number of contributions</b>	3.8	5.1
<b>Mean funds raised</b>	\$607	\$646

Table 3: Fundraising ability by gender in New Hampshire state house candidates

In Table 4, the same models as from Table 2 are run but with the new candidate quality variable added to the regression. The addition of this variable does not significantly change the results.<sup>9</sup> The effect size for a candidate being a woman on logged vote share is lowered slightly to 7%, but is still significant ( $p < .001$ ). The effect of candidate quality is a similar 8%. Using a continuous variable for campaign contributions or total money raised instead of a binary variable for quality does not

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<sup>8</sup> Due to discrepancies in the formatting of candidate names between the election results and campaign finance datasets, the sample size of this merged dataset is smaller than that used in the previous models.

<sup>9</sup> Note that the relationship between this formulation of candidate quality and vote share includes both the effect of candidate quality itself and the effect of having campaign funds on campaign success. Presumably, spending the money raised on campaigning should further increase vote share over and above the votes gained by generally being a strong candidate. The candidate quality variable is perhaps better thought of in this case as “campaign quality.”

substantively change these results. Another model tests for the interaction between candidate quality and candidate gender to see if women are particularly helped by being quality candidates. This interaction term is non-significant. Gender is still a significant predictor of vote share for Democratic candidates, but the effect size of gender for Republican candidates drops to 3% and is just outside of significance ( $p = .0502$ ). There is a post-treatment bias concern in this analysis, as candidate quality is both affected by candidate gender and affects vote share. This problem is addressed by using the controlled direct effect method of fixing the mediating variable – candidate quality – to a specific value (Acharya, Blackwell, and Sen 2016). Though the campaign finance-based candidate quality variable may not completely capture differences in candidate quality, this analysis does alleviate the concern that gendered quality differences are the primary driver of women's advantage in New Hampshire state house elections.

DV:	Logged Vote Share			
	All candidates	All candidates	Democratic candidates	Republican candidates
Woman	0.07*** (.01)	0.08*** (.01)	0.13*** (.01)	.03 (.02)
District Magnitude	-0.20*** (.01)	-0.20*** (0.01)	-0.20*** (.01)	-0.20*** (.01)
Democrat	-0.11*** (.02)	-0.11*** (0.02)		
GOP pres. vote share	-0.08 (.20)	-0.08 (.15)	-1.86*** (.15)	1.90*** (0.17)
Incumbent	0.22*** (.02)	0.22*** (.01)	0.12*** (.02)	0.07*** (.02)
Quality	0.08*** (.02)	0.09*** (.02)	.05** (.02)	.05** (.02)
Woman*Quality		-0.02 (.02)		
N	2588	2588	1306	1282
Multiple R <sup>2</sup>	0.84	0.84	0.91	0.85

Table 4: OLS models of the effect of candidate gender on vote share with candidate quality control

### Family Feud

If one were to imagine the ideal test of whether voters have a preference for men or female candidates, it would resemble gender-randomized candidate choice survey experiments. Voters would choose between two candidates who are identical in every respect other than gender – perhaps identical twins – except the election would be real, with partisan implications. Of course, this ideal situation never occurs, and in most mixed-gender elections there are enough differences between the

male and female candidate that any attempt to isolate the effect of candidate gender in a specific election is fruitless.

The closest we could realistically get to this ideal test is an election in which two members of the same family are running in the same election, in the same district, under the same party label. Such a situation would hold several important candidate characteristics constant, aside from party, district, and voting population: socio-economic status, social networks, even name-recognition (of the last name, at least). Family members might differ in candidate quality in other respects, but these differences are less likely to be significant in elections in which voters have little information about candidates aside from their names.

The unusual culture of New Hampshire's state house elections provides a surprising number of examples of this phenomenon. Most of these involve a husband and a wife running on the same party's slate in one of New Hampshire's large multi-member districts. The husband and wife likely do not see each other as rivals in these cases, since voters are able to vote for both of them.<sup>10</sup> Nonetheless, we can compare the final vote totals of the husbands and wives in these cases to determine which gender usually comes out on top.

I have identified 25 family pairs of mixed gender in the dataset of 2008-2016 New Hampshire state house candidates, including 16 married couples, five mother-son duos, one sibling duo, and three family pairs whose relationship type I was unable to confirm.<sup>11</sup> In each case, the man and woman ran in the same district under the same party label. Several of these pairs ran in more than one election, so this family dataset consists of 37 family pair-year observations. In one district – the aforementioned Hillsborough-37 in the 2012 election – four different husband-wife pairs ran at the same time, though

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<sup>10</sup> In fact, some of these couples campaigned together, as demonstrated by a conservative blogger's post complaining about John and Brenda Grady dropping off a collective Grady family campaign flier at his house: <http://granitegrok.com/blog/2012/11/brenda-and-john-grady-toeing-the-liberal-lie-in-merrimack>

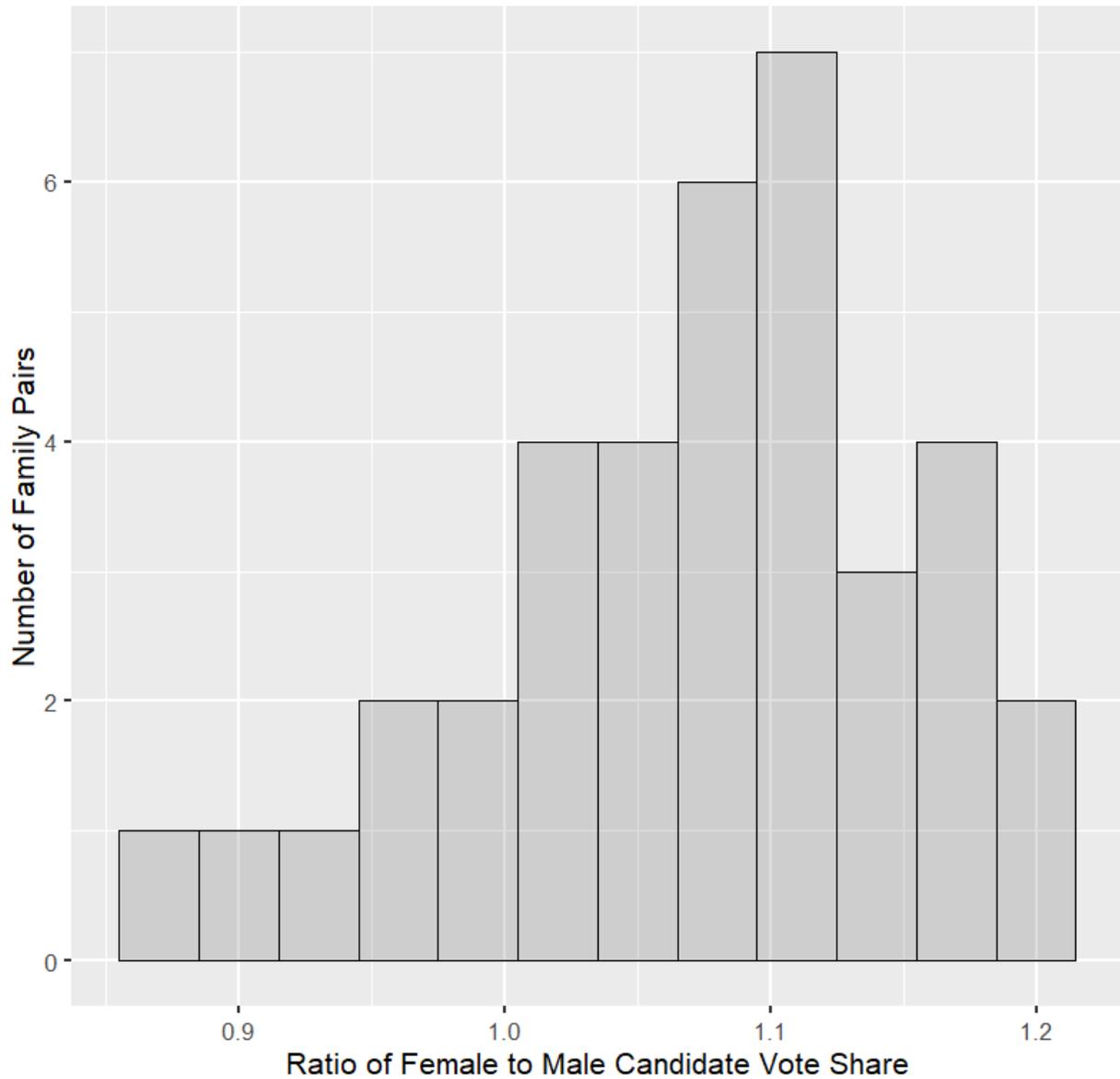
<sup>11</sup> Relationship type was determined using publicly available information in news stories, Facebook profiles, and online directories such as Whitepages.

two of the pairs were mixed-party and are thus excluded from this analysis.<sup>12</sup> In fact, one of the Democrats Mary Ann Knowles left in her wake on her way to victory in Hillsborough-37 was her husband.

In these 37 elections, the woman received more votes than the man in 31 races and the man “won” in just six cases. The consistency and magnitude of these differences is striking: women received 8% more votes than their male family members on average, and in 16 of the 37 races the woman received between 5% and 15% more votes. The average ratio was roughly the same for married couples and mother-son pairs: wives performed an average of 7% better than their husbands and mothers performed an average of 9% better than their sons. The histogram in Figure 2 shows the distribution of the ratios of the women’s votes to those of their husbands, sons, and brothers in these elections.

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<sup>12</sup> The story of these couples can be found here:  
[http://www.lowellsun.com/todayshadlines/ci\\_20906985/another-kind-running-mate](http://www.lowellsun.com/todayshadlines/ci_20906985/another-kind-running-mate)



[Figure 2: Histogram of the distribution of the ratios of the female candidate's and male candidate's vote shares in New Hampshire state house family pairs. Bin size is .03.]

To model the effect of candidate gender on vote share in this small dataset of family pairs, I use a strategy of family pair fixed effects. This allows me to directly compare the male and female family members while holding family-specific characteristics constant. Because the district and party are also

constant within each family pair, I only include controls for incumbency and candidate quality. The results of this model are shown in Table 5.

DV:	Logged Vote Share
Woman	0.05*** (.01)
Incumbent	0.07* (.03)
Quality	0.06 (.04)
<i>(Family pair fixed effect)</i>	
N	74
Multiple R <sup>2</sup>	0.996

Table 5: OLS model of the effect of candidate gender on vote share with fixed effects for each family pair

Even in this small sample size of family pairs, women perform statistically significantly better than their male family members in state house elections. The effect size is 5%, only slightly smaller than the effect found in the full sample. This result represents the clearest evidence we are likely to find that candidate gender directly affects vote choice in New Hampshire state house elections.

I also obtained party primary results for this sample of 37 family pair-years.<sup>13</sup> In these elections, primary voters can vote for as many candidates as representatives in the district, though undervoting is commonplace. The median female–male ratio among these family pairs in the GOP primary was 1.08 and the median ratio in the Democratic primary was 1.06. While these within-party sample sizes are too

<sup>13</sup> Primary results taken from the New Hampshire Secretary of State website: <http://sos.nh.gov/ElectResults.aspx>

small to achieve statistical significance, they provide some context for interpreting the results in the rest of the paper. Unlike in the general election results, we know exactly what groups are voting in the party primaries: Democrats in the Democratic primary and Republicans in the Republican primary.<sup>14</sup>

Therefore, any advantage for female candidates in the primary are unlikely to be the result of cross-party voting. The fact that a gender gap is found in the GOP primary results suggests that gender-based voting may not be solely restricted to Democrats.<sup>15</sup>

### **Gender-based Voting and Multi-Member Districts**

Political scientists have also studied whether the choice of electoral system affects women's representation. There is considerable evidence that multi-member district systems tend to produce higher percentages of female candidates and elected women. Women win a higher proportion of seats in multi-member districts than in single member districts (Robert Darcy, Welch, and Clark 1985) and when states switch from multi-member districts to single-member districts, women's representation tends to go down, though this has not been true in every state (King 2002). Matland and Bowen (1992) posit several theoretical explanations for why women would win more often in MMDs. Increasing district magnitude (that is, the number of seats in a district) could make women more likely to run for office, since candidates in MMDs can concentrate more on winning votes and less on attacking their opponents, which may be a preferred strategy for women. Parties may be more likely to recruit female candidates in MMDs both because they want to be seen as promoting gender-balanced tickets and

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<sup>14</sup> In New Hampshire, voters must affiliate with a party to participate in that party's primary. However, voters can temporarily affiliate with a party just for the day of the election, making the system semi-open.

<sup>15</sup> That said, several features of the full dataset indicate that gender-based voting is more common among Democratic voters. Women performed significantly better in election years with high Democratic turnout (2008 and 2012) than years with low Democratic turnout (2010 and 2014). They also performed significantly better in counties that tend to vote more Democratic and significantly worse in counties that tend to vote Republican. An interaction between gender and district partisanship was also significant in the direction of Democrats. While we should always be cautious about inferring the behavior of specific groups of voters from aggregate election results, women consistently perform relatively better in contexts in which Democrats make up a greater share of the electorate.

because they would not necessarily have to prevent powerful men in the district from running in order to allow women to run. Finally, voters might be more willing to vote for women in a multi-member district, either because they would be less hesitant voting for a woman as part of a slate than as their single representative or because they want a gender-balanced ticket and more gender diversity in representation. However, no direct evidence for this voter demand-side mechanism has been found, as studies on women and multi-member districts have tended to use the percentage of seats won by female candidates, and not vote totals, as their dependent variables.

It is reasonable to ask whether New Hampshire's use of multi-member districts might have something to do with the unusually strong pro-women voter bias in New Hampshire state house elections identified in this paper. While the commonality of MMDs has declined in the US over the past half-century, New Hampshire is one of the ten states that still use MMDs today to elect their state legislatures. The New Hampshire state house is the only state legislative body in the country with a substantial proportion of districts with more than three seats, as well as the only legislative body with wide variation in the number of seats in each district. This makes it the only place in the U.S. where the effects of district magnitude on gender-based voting can be assessed at an intra-state level.

Testing the effect of district magnitude on gender-based voting is not simple even in New Hampshire, however. The most straightforward approach would be to interact gender with district magnitude to see if female candidates perform relatively better than men in large districts. The problem with this approach is that the largest districts in New Hampshire are systematically different from smaller New Hampshire districts in ways other than district magnitude that are difficult to control for. The largest districts are primarily located in the southeastern part of the state and can be considered distant suburbs of Boston. These suburbs vote more Republican than the state as a whole and contain very different sorts of voters from those in the more rural north and west of the state, and might well

have different attitudes toward women in politics. This section will use two strategies to address these concerns.

### **Quasi-Experimental Test of the Effect of Multi-Member Districts on Women's Electoral Advantage**

First, I gain some causal leverage through using a quasi-experimental identification strategy centered on the 2011-2012 redistricting process. This redistricting cycle significantly changed how New Hampshire's district map was structured, altering districts not just in shape but also in magnitude. Thus, many candidates who campaigned in both 2010 and 2012 faced dramatically different electoral contexts despite running in the same geographic area. Democratic State Rep. Anne Grassie, for instance, was moved from the nine-seat Strafford 1 district in 2010 to the one-seat Strafford 11 district in 2012.

By comparing candidates' performances in 2010 and 2012 while controlling for the change in the underlying partisanship of their districts, the effect of receiving the "treatment" of switching from a multi-seat district to a single-seat district (or vice-versa) on candidates' electoral performance can be determined. This strategy can be thought of as a triple difference-in-difference strategy, as it estimates the effect of being a female candidate who receives a district size change "treatment" between the 2010 and 2012 elections on her performance relative to a male candidate. While some candidates received the treatment in 2012 of being reassigned to a multi-seat district from a single-seat district, other candidates received the opposite treatment of being reassigned from a multi-seat district to a single-seat district. This analysis uses a model with a candidate fixed effect and an interaction between two indicator variables: female gender and multi-seat district. Because we only have data to examine a candidate's district's magnitude change for the case of redistricting between the 2010 and 2012 elections, this model captures the effect of a candidate being redistricted into or out of a multi-seat district on their performance.

The validity of this identification strategy rests on the assumption that the change in district magnitude in candidates' districts in the 2011-2012 redistricting cycle was effectively random. The primary reason to doubt this assumption is that the state legislature itself makes the final decisions on redistricting. Because Republicans held a majority in the state legislature after the 2010 elections, they were able to gerrymander by maximizing the number of districts that favored their party or by putting influential incumbents in favorable districts. In fact, New Hampshire Democrats claimed that Republicans gerrymandered in part by drawing large multi-member districts that would allow Republicans to win all of the seats in an area even if only a small majority of voters in that area preferred Republicans (Celock 2011). There is some evidence that Republicans succeeded in this: under the 2010 district lines, the median state House district would have given Mitt Romney 45.4% of the two-party vote, while under the new lines 47.7% of voters in the median district chose Romney.

If they were gerrymandered, the lines drawn in 2011-2012 cannot be considered truly random. However, the line-drawing itself need not be completely at random for internal validity of the quasi-experiment. Only the decision to increase or decrease the district magnitude of individual state legislators must be close to random. That is, candidates who ran in both 2010 and 2012 must be assumed to have been selected at random into the treatment of a district magnitude change or into the control group of no change in district magnitude. A series of validity checks presented in Appendix B show that changes in district magnitude during this redistricting cycle are not associated with the partisanship of the incumbent candidate, the gender of the incumbent candidate, or the interaction between party and gender. These results mitigate selection bias concerns.

The models include the underlying partisanship of the district both before and after redistricting based on 2008/2012 presidential results, so that partisan changes in a candidate's district during redistricting are controlled. The other independent variables used in previous models in this paper are

still included: candidate party, incumbency status, election year, and district magnitude. The dependent variable is logged vote share as in earlier models.

The model is run for Democratic and Republican candidates separately in addition to being run with all candidates pooled. There are a total of 288 candidates who ran for the New Hampshire state house in either 2008 or 2010 and any of 2012, 2014, and 2016, of which 134 are Democrats and 111 are women. Another model excludes the candidate fixed effect to test whether there is a general correlation across the full sample of women performing differently than men in multi-seat districts. Finally, the model is run on single-seat races alone to determine whether women's electoral advantage persists in one-on-one races.

### **Quasi-Experimental Results**

Table 6 shows the effect of a candidate switching from a single-member to a multi-member district or vice versa on women's advantage in New Hampshire state house elections. The quasi-experimental models find positive results for the interaction between female candidates and multi-seat districts for models including all candidates and models with just Democrats or Republicans, but this result is significant only for Democrats (effect size of 0.16). It is worth reiterating that most of the variation in district magnitude is coming from large Democratic districts that were broken up into smaller districts during redistricting. This finding suggests that Democratic women performed relatively worse than their male counterparts in the new single-seat districts than they had in the old multi-seat districts. Republican women did not experience a similarly strong difference in relative performance in the move to single-seat districts.

DV: Logged Vote Share

	Single-member districts	All candidates model 1	All candidates model 2	Democratic candidates	Republican candidates
Woman	0.05* (.02)	0.08** (.03)	-0.09 (0.16)	-0.08 (0.19)	0.01 (0.19)
Multi-member district (dummy)	--	-0.63*** (.02)	-0.73*** (0.05)	-0.78*** (0.07)	-0.78*** (0.05)
District magnitude	--	-0.18*** (.01)	-0.178*** (0.00)	-0.19*** (0.01)	-0.17*** (0.00)
Democrat	-0.02 (.02)	-0.10*** (.02)	-0.50** (0.19)	--	--
GOP pres. vote share	-0.14 (.15)	-0.11 (.13)	-0.39 (0.31)	-1.74*** (0.39)	0.74* (0.33)
Incumbent	0.15*** (.02)	0.23*** (0.01)	0.01 (0.03)	0.03 (0.03)	0.00 (0.04)
Woman*Multi-seat	--	-0.05 (.03)	0.05 (0.06)	0.16* (0.08)	0.09 (0.07)
(Candidate Fixed Effect)	No	No	Yes	Yes	Yes
(Year Fixed Effect)	Yes	Yes	Yes	Yes	Yes
N	246	2887	2887	1431	1456
Multiple R <sup>2</sup>	0.17	0.89	0.99	0.99	0.99

Table 6: OLS models of the effect of the interaction between female candidates and running in a multi-seat district on vote share

In the single-member districts model, which restricts the sample to only those candidates running in single-seat districts, women still perform significantly better than men on average. This result

demonstrates that women's advantage cannot be explained entirely by New Hampshire's use of multi-member districts in the state house. The effect size of being a female candidate in single-seat races is .05, slightly lower than the .08 effect identified for female candidate gender across all candidates.

In the model with all candidates, an interaction between multi-seat district and candidate gender, and no candidate fixed effect, there is a non-significant negative effect of the interaction term. This result suggests caution is warranted in interpreting the positive result in the quasi-experiment, as on average across the full sample female candidates do not perform better in multi-seat districts than they do in single-seat districts.

### **Assessing the Relationship Between District Magnitude and Women's Electoral Advantage**

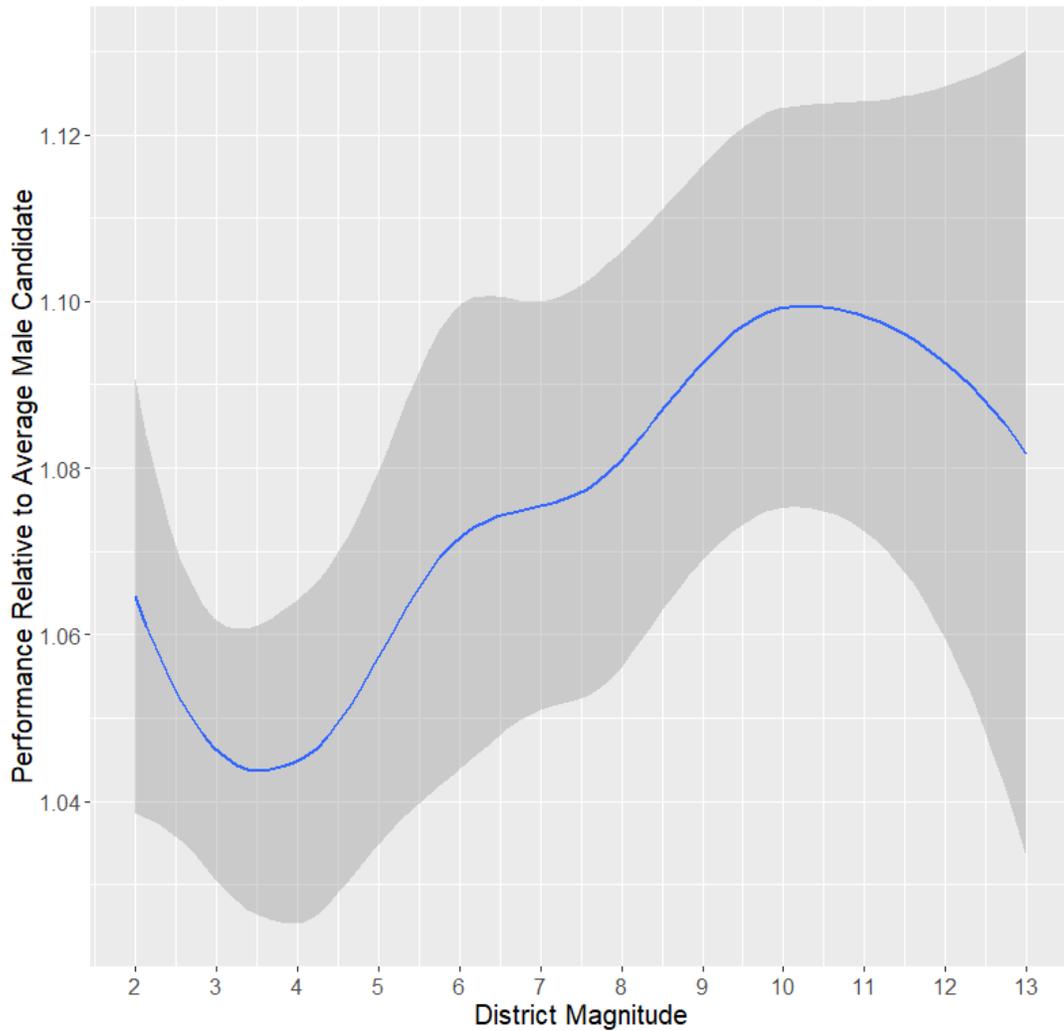
A second approach to determining whether district magnitude affects women's electoral advantage is to compare the success of female candidates directly to that of male co-partisans running in the same districts, similar to the test of the "cream of the crop" account above. While this approach does not allow the comparison of candidates in multi-seat districts with candidates in single-seat districts, it allows us to make a clean comparison of the relative performance of female candidates across different magnitudes of multi-seat districts. If the theory that voters are more likely to demand female candidates in multi-seat districts due to a desire to balance their tickets by gender is correct, we should expect women's advantage to be especially strong in high-magnitude districts where gender disparities might be especially apparent. For example, in the previously-mentioned Hillsborough-37 2012 election, the Republican slate included nine men and two women, a gender gap that would be obvious to any voter and might cause some voters to consider gender as a factor in their vote choice to address this imbalance. In a two-seat district with a Republican slate of two men, however, voters would be less likely to perceive a gender imbalance and might not feel the need to balance their tickets based on gender.

The “cream of the crop” analysis above compared the distributions of male and female candidate performance by assigning each candidate running in a multi-seat district a score representing the ratio of their vote share to the average vote share of all other co-partisans running in their district. To compare women’s electoral advantage across district magnitudes, all female candidates are given a similar score: this time, the ratio of their vote share to the average vote share of all male co-partisans in their district. In this analysis, I compare the relative performance of women in low-magnitude multi-seat districts (defined here as those with two, three, or four seats) with their performance in high-magnitude districts (five seats or more). The analysis uses an OLS model to test whether these scores are significantly higher for women in high-magnitude districts than for women in low-magnitude districts. It uses same control variables as in previous models: incumbency, election year, and partisanship of the district.

Figure 3 shows the relationship between district magnitude and the degree of women’s electoral advantage over men. This association is positive as expected, albeit with high uncertainty. In low-magnitude districts women received about 4-6% more votes than the average male co-partisan in their district. In high-magnitude districts, female candidates’ advantage increases to 7-10%. The difference between low-magnitude and high-magnitude districts is statistically significant.<sup>16</sup>

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<sup>16</sup> This statistical significance is not sensitive to the definition of “high-magnitude,” as the variable is significant whether “high-magnitude” is defined as a district with at least five, six, or seven seats. However, an alternate model in which a discrete variable of district magnitude is used instead of an indicator variable for “high-magnitude district” does not produce significant results.



[Figure 3: Ratio of female candidates' vote shares to the average vote share of male co-partisans in the same district for each district magnitude in New Hampshire multi-member state house districts. Shaded area indicates 95% confidence interval.]

### Discussion

The evidence in this study strongly suggests that female candidates perform better than male candidates in New Hampshire state house elections. The most plausible explanation for these findings is that New Hampshire voters have a systematic preference for female candidates because of their gender. While it is possible that voters are using gender to infer candidate ideology based on the belief that

female candidates will be more liberal, it seems unlikely that New Hampshire voters would systematically prefer more liberal candidates, given the even partisan split of the state and the fact that Republican women also perform better than their male counterparts. It is also possible that there remains some unobserved difference between male and female candidates – even husbands and wives – that is not controlled for in this analysis, but it is not obvious what that difference would be.

The findings on the question of whether this electoral advantage of female candidates can be attributed to New Hampshire's use of multi-member districts is more mixed. The bulk of the evidence indicates that Democratic women perform better in multi-member districts and that all women perform better in higher-magnitude districts. These findings are at least somewhat sensitive to model specification. Furthermore, given that women's electoral advantage persists in single-seat districts, district magnitude cannot fully account for the pro-woman bias in New Hampshire state house voting.

One implication of these findings is that parties in New Hampshire may be leaving votes and seats on the table by not making an active effort to recruit more female candidates. In these data, 42% of Democratic candidates and 19% of Republican candidates were women. In the 2016 election, the percentage of Democratic candidates who were women rose to 45% while the Republican percentage fell to 17%. Even though the Democratic slate was close to gender parity, the considerable effect size of a 13% advantage for female Democratic candidates identified in this paper means that Democrats could reasonably expect to win a handful of additional seats if they achieved or even exceeded gender parity. While the effect size for Republican candidates was only 3% and on the border of statistical significance when controlling for candidate quality, Republicans could perhaps ameliorate the advantage that Democrats currently enjoy due to their higher percentage of female candidates by running more women. More broadly, any party leaders who still consider being a woman to be a negative factor in predicting candidate electability should reconsider these ideas in New Hampshire.

The primary question that this study leaves us with is that of generalizability. Because similar patterns of gender-based voting have not been found in nationwide studies of elections for higher-level offices such as congressional elections, it would be hard to argue that the findings in this paper are universally generalizable. But that does not mean they necessarily apply only to New Hampshire state house elections. Perhaps in other contexts that share some important characteristics with downballot New Hampshire elections, a similar pattern exists.

Identifying what those characteristics might be is difficult because New Hampshire state house elections are distinct from most American elections in so many ways. The lower house of the legislature is the largest and least professional in the country, meaning that many candidates are not yet professional politicians. The use of large multi-member districts presents an unusual context for voters, as they are asked to vote for many candidates in a partisan election instead of just one. The success of women in higher-level offices in New Hampshire suggests a strong culture of women's representation relative to the rest of the country.

Any or all of these characteristics could be the driving force behind the female candidate advantage identified in this paper. The dataset used in this paper does not provide the leverage that would be needed to distinguish among them. This question is therefore left for future research. By investigating other similar contexts – for instance, other states that use multi-member districts, have less-professional legislatures, or elect relatively high percentages of women to Congress – we might be able to achieve a clearer understanding of what causes pro-woman gender-based voting.

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## Appendix A: 2018 Election in Large Multi-Seat New Hampshire Districts

Table A1 shows the results of the 2018 elections by party and gender in the nine New Hampshire state house districts with a district magnitude of at least 5. These results mirror those shown in Table 1 in Section 3 of this paper, demonstrating that the 2012 election was not an isolated example of Democratic women “stealing” seats in traditionally-Republican multi-seat districts. In 2018, it was again a common phenomenon for Democratic women to win seats in majority-Republican districts in place of male Republican candidates.

District	Number of Seats	R Seats		D Seats	
		M	F	M	F
<b>Strafford-6</b>	5	0	0	2	3
<b>Rockingham-4</b>	5	4	1	0	0
<b>Hillsborough-6</b>	5	3	1	1	0
<b>Hillsborough-7</b>	6	3	2	0	1
<b>Rockingham-5</b>	7	5	1	0	1
<b>Hillsborough-21</b>	8	3	1	0	4
<b>Rockingham-8</b>	9	8	1	0	0
<b>Rockingham-6</b>	10	7	2	0	1
<b>Hillsborough-37</b>	11	8	3	0	0
Total	66	41	12	3	10

Table A1: 2018 New Hampshire state house seats won by party and gender in 5+ seat districts

## **Appendix B: Validity Checks for 2011 Redistricting Quasi-Experiment**

The models in Table 6 rest on the assumption that changes in district magnitude during the 2011-2012 redistricting process were randomly assigned to each candidate. There are reasons to worry that this might not have been the case, as the Republican-controlled state house may have had partisan reasons to make the district line changes that they did. This appendix explores that redistricting cycle in more depth and presents validity checks for the assumption of random treatment assignment.

The 2011-2012 redistricting process led to a sharp reduction in the number of multi-member districts in New Hampshire, due in part to the growing dissatisfaction among state legislators with the expense and hassle of campaigning in and representing large districts. The number of single-member districts increased from 12 in 2010 to 105 in 2012, while the number of districts with at least five representatives decreased from 25 to nine. As a result, the vast majority of changes in district magnitudes experienced by incumbents in this cycle were switches from high-magnitude districts to low-magnitude districts; of the 214 candidates who ran in both 2010 and 2012, only 13 saw their district magnitude increase and none saw the magnitude increase by more than three. By contrast, 31 candidates saw their district magnitude decrease by five or more seats.

This significant reduction in district size raises concerns that Republican legislators systematically changed district sizes for partisan benefit. If Republicans knew that women tend to perform better in multi-member districts, for instance, they could have deliberately drawn Democratic women into smaller districts to disadvantage them. This possibility is tested in Table B1, which shows the results of a logit model estimating the likelihood of being redistricted from a multi-seat district to a single-seat district. I find no relationship between being a candidate being a Democratic woman and being switched from a multi-seat to a single-seat district during redistricting. However, candidates in multi-seat Republican districts were significantly less likely to be drawn into a single-seat district, suggesting that the legislature did intentionally break up large Democratic districts.

Another possible source of selection bias that is not possible to test empirically with the data used in this study is whether changes in district magnitude tended to happen in certain sorts of geographic areas: i.e., in the centers of major urban areas, in suburbs, or in rural areas. For example, if large districts that included both rural and urban areas were broken up into some rural and some urban single-seat districts, and female candidates mostly ended up in one or the other, this could potentially affect their performance. Such a bias in district structure changes does not appear to be the case based on an “eyeball test” of the New Hampshire state house district map. Both before and after redistricting, the districts with the most seats tend to be suburban districts on the outskirts of major cities like Nashua, Manchester, and Portsmouth. Districts in the center of these cities tend to be small multi-member districts of two to four seats, while districts in rural New Hampshire with very low population density are more likely to be single-member districts. The changes to district magnitude in the 2011-2012 redistricting process appear to have primarily involved breaking up some of the very large suburban districts into smaller suburban districts and significantly increasing the number of rural single-member districts. These patterns do not pose any obvious selection bias problem.

DV:	Indicator for district size change
Woman	0.21 (0.55)
Democrat	-0.27 (0.46)
GOP Pres. Vote Share	-4.72* (1.91)
Woman*Democrat	0.08 (0.73)
N	214

\*p < .05, \*\*p<.01, \*\*\*p<.001

*Table B1: Logit model estimating the likelihood of a New Hampshire state house candidate being redistricted from a multi-seat district to a single-seat district in the 2011-2012 cycle.*