

Gender and Elections: An Examination of the 2006 Canadian Federal Election

MARIE REKKAS *Simon Fraser University*

1. Introduction

As women have increasingly gained ground in the political arena, the role of gender in the electoral process has become an important area of scholarly research. Despite the significant inroads women have made over the past few decades, the underrepresentation of this group remains a persistent feature of the political landscape in Canada. Both the nomination of women candidates in the party selection process and the performance of women candidates in federal elections have been identified as critical measures of women's participation in the political process. The number of women holding federal cabinet positions has also been a concern for women's equity issues.

The local nomination of candidates may partly explain why fewer women than men are elected into the House. If women tend to be nominated in unwinnable ridings (i.e., lost-cause districts, fringe party representation, and so forth) then it is not surprising that they do not subsequently go on to win a seat in the election. In terms of the performance of women candidates at the polls, previous studies have shown that they are not disadvantaged because of their gender.

The objective of this paper is to extend the models presented in the literature in order to examine the role that candidate gender plays in a model that includes campaign spending. The general form of the models presented in the literature involve the candidate's vote share expressed as a function of gender and various other measures, such as incumbency status and party affiliation. This paper allows for differences in vote share responsiveness across gender with respect to two key candidate-level variables: incumbency status and campaign spending. Allowing for such dif-

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Marie Rekkas, Department of Economics, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia, Canada V5A 1S6, mrekkas@sfu.ca

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ferences is important if, for instance, male incumbent candidates are expected to be different from female incumbent candidates in terms of their marginal impact of expenditures on vote shares. Such a difference might arise as a result of a propensity for “entrenched” incumbents to be male, creating a more responsive effect of campaign spending by male incumbents in general. On the other hand, the effectiveness of challengers’ spending may vary by gender, perhaps favouring women candidates who have, more recently, entered federal political races as high-profile public figures (for example, as lawyers, entrepreneurs, or community leaders).

This paper examines these candidate vote share differentials across genders in the context of the most recent 2006 Canadian federal election, that is, the effect of gender is examined conditional on the candidate winning the local nomination contest. The study of gender effects in politics has a long history. Beginning in the 1970s the literature on this topic has generally found that, once relevant factors are controlled for, a candidate’s gender does not significantly affect his or her vote share. In Australia, Studlar and McAllister (1991) estimate a path model using ordinary least squares regression and do not find gender to be a significant determinant of vote share. Sawyer (1981) and Mackerras (1980) similarly do not find significant differences between votes for male and female candidates. In the United States, Darcy and others (1994) report that women fare as well as men in terms of support in general state elections. For British general elections, Studlar and others (1988) examine the 1987 election and find that once constituency characteristics are controlled for in a regression with candidate vote share as the dependent variable, any initial female disadvantage essentially disappears. Norris and others (1992) find no gender effect when appropriate controls are accounted for in the model. Rasmussen (1983) employs a number of techniques and does not find any evidence to suggest that female candidates are disadvantaged relative to male candidates for the 1979 British general election. Hills (1981), in her study of British elections in 1966, 1970 and 1974 finds that a candidate’s gender has only a slight effect on election outcomes. Welch and Studlar (1988) examine gender effects for local council office elections in England using a regression model that includes controls for the candidate’s incumbency status and the number of opponents in the race. They find no statistical differences in the votes received by female candidates compared to male candidates. In Canada, Hunter and Denton (1984) find a very slight and insubstantial vote advantage for male candidates in the 1980 election, while Black and Erickson’s (2003) analysis of the 1993 election, find a slight vote advantage for female candidates.

For the 2006 Canadian federal election under analysis in this paper, substantial differences are found to exist between the vote responsive-

Abstract. The existing literature on gender effects in the electoral process offers little evidence of significant gender vote share differentials. In this paper it is shown that for the 2006 Canadian federal election, once candidate campaign spending is introduced into the model with appropriate flexibility in the vote share responsiveness across genders, significant differences are found to exist between male and female candidates. The findings suggest that, for equal levels of spending, male incumbents have a vote share advantage relative to female incumbents, though this vote share advantage is found to diminish with increased expenditures. Female non-incumbent candidates, on the other hand, have a vote share advantage over male non-incumbent candidates for higher levels of expenditure and this advantage was found to increase with increased expenditures.

Résumé. Les écrits traitant des effets du genre dans le processus électoral offrent peu de preuves d'un écart significatif dans le pourcentage des voix selon le genre. Cet article montrera que, dans le contexte des élections fédérales canadiennes de 2006, une fois que les dépenses de campagne des candidats sont introduites dans le modèle avec la flexibilité adéquate sur la réceptivité du pourcentage des voix selon les genres, on découvre que des différences significatives existent entre les candidats masculins et féminins. Le résultat des recherches montre que pour des dépenses équivalentes, les titulaires masculins ont un avantage sur le pourcentage des voix par rapport aux titulaires de sexe féminin bien qu'il s'avère que cet avantage diminue lorsque les dépenses augmentent. D'autre part, les candidates féminines non-titulaires ont un avantage sur le pourcentage des voix par rapport aux candidats masculins non-titulaires quand les dépenses sont plus élevées et cet avantage s'avère augmenter lorsque les dépenses augmentent.

ness of male and female candidates with respect to incumbency status and campaign spending. In particular, male incumbent candidates are found to have significant vote share advantages compared to female incumbents, especially so over lower ranges of campaign spending. Similarly, male challengers are found to have a positive vote share differential over female challengers though only up to a threshold amount of spending. Interestingly, beyond this threshold expenditure level, the vote share advantage belongs to female challengers.

The paper begins by discussing the empirical strategy and the data from the 2006 election in some detail. The empirical results are then presented followed by the conclusion and suggestions for future research.

2. Empirical Strategy and Data

The analysis first examines vote share differences between male and female candidates allowing only for a constant average difference between the two genders. In so doing, regressions reflective of the literature are presented. The analysis is then extended to allow for these male and female candidates to differ in their vote share responsiveness with respect to incumbency status and campaign expenditures.

The dependent variable used in all analyses is candidate vote share. This variable is recorded in percentage terms and represents the percent of valid votes received by a candidate in the candidate's constituency in the election. The independent variables included in the model are

candidate- and district-specific variables as well as controls for party and province.

The inclusion in the model of the party the candidate represents is important because of the prominence of parties in Canadian federal elections. Although campaign spending decisions are made by individual candidates, the prominence of candidates' associations with parties in Canadian federal elections demands the inclusion of party fixed effects in the model. Political party fixed effects are included for the major parties with the Liberal party as the reference category; candidates not associated with a major party are grouped under the "fringe" category label.¹ These variables are included to soak up any variation that is constant across candidates belonging to the same party. Provincial dummy variables are included to account for constant unobserved heterogeneity among provinces.

The candidate-specific variables included are the total campaign spending of the candidate, the total spending of the candidate's opponents, incumbency status and the gender of the candidate. Empirically, a wide array of studies estimates the effect of candidate campaign spending on vote shares. See, for example, Erikson and Palfrey (1998, 2000), Palda and Palda (1998), Gerber (1998), Nagler and Leighley (1992), Green and Krasno (1988). The consensus of these studies is that the evidence supports a significant effect of campaign spending on election outcomes. This finding is also supported for local spending in Canadian federal elections. Most recently, Rekkas (2007) and Eagles (2004) show that a candidate's campaign spending is an important determinant of a candidate's vote share.

The empirical literature further addresses the potential endogeneity of campaign expenditures in this context, both in the candidate's own spending as well as the total spending by the candidate's opponents. If, for instance, candidate campaign expenditures are determined in part, say, by candidate quality (which is not measured in this model) then campaign expenditures will not satisfy the exogeneity assumption of ordinary least squares as these expenditures will be correlated with the model error. In this case, instrumental variable techniques can be used.

The lagged (previous election) campaign spending of the candidate's party in the riding is used as an instrument for current period spending; the instrument used for total opponent spending is the lagged value of this variable. The instrumental variables approach then involves a first stage which consists of a candidate's campaign spending and the total spending by the candidate's opponents (in the district) regressed on these two instruments and control variables. The second stage consists of a candidate's vote share regressed on a candidate's predicted campaign spending, the predicted total spending by the candidate's opponents and control variables. The idea is to use the variation in the spending vari-

ables induced by the variation in the instruments to estimate the causal relationship of spending on vote shares.

It is noted that if the same candidate ran in the previous election, then using the lagged values of the spending variables as instruments may be questionable.² For this reason, regressions are also done (though not reported) using the candidate's campaign contributions from the previous election as an exogenous regressor to proxy for candidate quality.³ The campaign spending is thereby net of this quality indicator for these regressions. It is noted that this issue of the endogeneity of campaign expenditures may not be as severe an issue in Canada as compared to in the United States. In Canada, due to the political system in place, the individual candidate features less prominently than in the US, thus making it relatively less likely that expenditures will be tied to candidate unobservables.

To control for the competitiveness of the candidate's riding, a measure of competitiveness is constructed using the candidate's party electoral performance in the district in the previous election. The district-level variables are used to control for the economic and demographic nature of the ridings and include the population density of the riding, average income, the standard error of this average income, the share of Canadian citizens and various education shares with the share of university educated individuals in the riding as the reference category.⁴ These variables vary at the district level and are included in the model to absorb riding characteristics that shape the local electorate. Population density is included in the model to capture the difference in the physical size of the riding as well as the urban/rural nature of the riding.

The focus of this analysis is on the most recent Canadian federal election which took place on January 23, 2006. During this election, campaign contributions were regulated by Bill C-24, a law which took effect in 2004. Bill C-24 introduced campaign contribution limits as well as new rules for public funding. For the 2006 election, corporations and trade unions were banned from contributing to registered parties and individual donations were regulated to a maximum of \$5,200 per year. While candidates were allowed to receive contributions from corporations and trade unions, these contributor types were mandated to a maximum donation of \$1,000 per year. The individual donation limit for candidates was \$5,200 per year. In terms of public funding, the registered party received an amount directly proportional to the number of votes the party obtained in the most recent previous election. From this public funding, registered parties could transfer amounts to individual candidates to help fund their individual riding-level campaigns.

A total of 1,634 candidates, of which 380 were female, ran in this election in the 308 electoral districts. In terms of the major parties, the New Democratic Party had the highest number of female candidates

with 108 running, followed by the Liberals with 79, the Conservatives with 38, and the Bloc Québécois with 23. The New Democratic Party also had the highest proportion of elected female candidates, followed by the Bloc, the Liberals, and the Conservatives. The results of this election saw the Conservative party unseat a Liberal minority government and form its own minority government of 124 seats with 36.3 per cent of the popular vote. The Liberals lost 32 seats from their 2004 level and had 103 members elected to parliament with 30.2 per cent of the popular vote. The New Democratic Party earned 10 additional seats which amounted to 29 overall with 17.5 per cent of the popular vote. The Bloc Québécois held relatively steady with 51 seats and 10.5 per cent of the popular vote, losing only three seats in 2006.

The data for this analysis originate from two sources, Elections Canada and Statistics Canada. Data from Elections Canada contain all the electoral information. This information includes the riding-specific information, such as the number of votes cast in the riding, the number of electors and the size of the riding, as well as the candidate-specific information. Data from Statistics Canada contain census information at the district level. The 2001 census held on May 15, 2001, was the most recent available census for this election period. Results from this census are used to control for economic and demographic riding-level effects.

3. Results

Table 1 provides summary results for several key variables; these statistics are provided conditional on gender as well as conditional on gender

TABLE 1
Summary Statistics by Incumbency Status and Gender

	Major Party Candidates					
	All major party candidates		Incumbent		Challenger	
	Male	Female	Male	Female	Male	Female
Incumbent	0.29	0.23				
Winner	0.33	0.26	0.87	0.84	0.10	0.08
Current margin	12.00	17.86	-19.83	-16.45	25.18	28.10
Vote share	30.23	25.90	48.80	46.46	22.54	19.77
Total contributions (\$)	45,237	38,979	68,532	68,608	35,585	30,137
Excluding transfers (\$)	21,700	16,655	31,867	27,891	17,488	13,302
Total expenditures (\$)	44,339	38,471	61,723	64,399	37,137	30,733
N	751	248	220	57	531	191

and incumbency status. These statistics are only provided for major party candidates. The number of observations for each case is listed; a total of 248 female candidates and 751 male candidates ran for major parties in the 2006 election. The statistics shown in the table include the proportion of incumbents in the election (*Incumbent*), the proportion of winning candidates (*Winner*), the mean candidate vote share in percentage terms (*Vote share*), the mean of total contributions received by the candidate (*Total contributions*), and the mean of total expenditures (*Total expenditures*). The following two variables included in the table are constructed from the raw data: the mean of total contributions excluding transfers (*Excluding transfers*), and the mean of the current election victory/loss margin for candidates (*Current margin*). In light of Bill C-24, the mean of total contributions is calculated with and without the inclusion of transfers from registered parties to candidates. The current election margin is defined in percentage terms and is constructed to reflect the current election performance by the candidates; in particular, this variable records the vote share the candidate lost by, or, if the candidate won the seat, the negative of the vote share by which the candidate won. Defining the variable in this way makes it easy to interpret; the larger this variable becomes, the less competitive the candidate's seat. This variable is used only as a summary statistic to assess the competitiveness of the race and is not included in any of the regression analyses.

From the first two result columns in Table 1 it is clear that female candidates have proportions or means that are lower than those of their male counterparts. The 2006 election had proportionally fewer female incumbents and proportionally fewer female winners. In addition, women candidates tended to lose by more votes on average and obtain fewer votes overall. If votes are positively related to campaign spending, then it is not surprising to see considerable differences in terms of contributions and expenditures between the two genders. Women received fewer overall contributions and incurred fewer campaign expenditures compared to men. An examination of total contributions received excluding transfers reveals once again that female candidates received less on average than male candidates.

Overall, this table suggests that, on average, female candidates raised and spent less money than male candidates and, perhaps correspondingly, received less of the vote share in their constituencies. Female candidates lost by a larger vote share percentage and did not win proportionally as many seats compared to male candidates.

Table 1 presents these statistics by further conditioning on incumbency status; these results are recorded in the last four columns of the table. For the purposes of this paper, a candidate is labelled as a *challenger* if the candidate is not an incumbent. Accordingly, in ridings where an incumbent is not present, all candidates are labelled as challengers.

The large gender differentials seen in the first two columns are now much smaller. In fact, the table shows that among major party incumbents, female candidates obtain slightly *more* contributions and spend *more* on average than male incumbent candidates. Although total contributions excluding transfers are on average fewer for female candidates, the interesting implication from this table is that the transfer amount female candidates received from registered parties must be on average greater than the transfer amount male candidates received implying that campaigns run by females rely proportionately more on public funding.⁵

In terms of vote share, the mean of the distribution for female incumbents is still lower than the mean of the distribution for male incumbents; however, the differential spread is lower than what was observed in the first two columns. Table 1 shows that male incumbents tend to win by more of a margin than female incumbents and in fact this is true for any male/female comparison across the table.

Table 2, column (a), contains OLS regression results of candidate vote share regressed on candidate, district, party and provincial variables for major party candidates.⁶ The candidate-specific variables included in the model are incumbency status, through the dummy variable *Incumbent* (which takes on the value one if the candidate is an incumbent), and gender, through the dummy variable *Male* (which takes on the value one if the candidate is a male). Given these dummy variables are only included in the model as main effects, the regressions correspondingly allow only for a constant average difference between incumbents and challengers and a constant average difference between male and female candidates. *Margin* is constructed as the percentage of votes by which the candidate's party won or lost in the riding in the previous election. This variable is included in the model to account for the competitiveness of the candidate's seat. The remaining variables are included in the model as controls and will be subsequently discussed.

The preceding regression approach is reflective of what appears in the literature. Given the controls included in the models, the gender of the candidate does not have any explanatory power with respect to the candidate's vote share. This finding supports the general, though not universal, results found in the literature.

Column (b) augments the regression of column (a) with two expenditure variables: the candidate's own campaign spending and the total campaign spending by the candidate's rivals. Column (d) presents this regression accounting for the endogeneity of candidate and total opponent spending through IV regressions. Recalling the earlier discussion of IV regression, the lagged campaign expenditures of the candidate's party in the riding is used as an instrument for current period expenditures and total opponent spending is instrumented with its lagged value. Robust standard errors clustered by federal electoral districts have been

TABLE 2
Regression Results for Major Party Candidates

	OLS			IV	
	(a)	(b)	(c)	(d)	(e)
Expenses (\$1000s)		0.192*** (0.018)	0.256*** (0.024)	0.251*** (0.049)	0.353*** (0.055)
Total opponent expenses (\$1000s)		-0.087*** (0.007)	-0.086*** (0.007)	-0.113*** (0.016)	-0.113*** (0.017)
Male × Expenses			-0.084*** (0.025)		-0.118*** (0.036)
Incumbent	21.803*** (0.972)	17.395*** (0.991)	14.348*** (1.581)	16.035*** (1.203)	11.821*** (1.718)
Male	0.438 (0.666)	0.115 (0.566)	2.480*** (0.776)	0.017 (0.568)	3.443*** (1.219)
Male × Incumbent			3.817** (1.760)		5.057*** (1.915)
Margin	-0.156*** (0.018)	-0.064*** (0.022)	-0.060*** (0.022)	-0.035 (0.045)	-0.022 (0.048)
Population density	-0.106 (0.130)	-0.109 (0.072)	-0.157** (0.079)	-0.110 (0.073)	-0.182** (0.082)
Canadian citizen share	-0.163** (0.065)	-0.057 (0.049)	-0.035 (0.051)	-0.025 (0.051)	0.009 (0.054)
Unemployment rate	-0.014 (0.063)	-0.037 (0.047)	-0.055 (0.050)	-0.044 (0.055)	-0.068 (0.061)
Primary education share	0.050 (0.060)	0.010 (0.041)	0.020 (0.044)	-0.002 (0.043)	0.013 (0.050)
High school share	0.172*** (0.065)	0.132*** (0.049)	0.125** (0.051)	0.120** (0.053)	0.112* (0.057)
Trades diploma share	-0.050 (0.150)	-0.145 (0.113)	-0.180 (0.116)	-0.173 (0.114)	-0.220* (0.120)
College share	-0.121 (0.101)	-0.089 (0.081)	-0.100 (0.085)	-0.078 (0.092)	-0.088 (0.101)
Average income (\$1000s)	0.199*** (0.074)	0.088* (0.052)	0.062 (0.055)	0.054 (0.058)	0.017 (0.063)
Standard error income	-0.003* (0.002)	-0.002* (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.000 (0.002)
BQ	11.042*** (1.755)	8.723*** (1.581)	8.825*** (1.574)	8.009*** (1.538)	8.074*** (1.534)
Conservative	8.775*** (0.953)	5.573*** (0.971)	5.808*** (0.980)	4.581*** (1.289)	4.751*** (1.318)
NDP	-3.147*** (0.790)	1.828** (0.706)	1.793** (0.696)	3.360*** (1.036)	3.495*** (1.015)
Constant	33.528*** (5.777)	27.622*** (4.620)	25.082*** (4.778)	25.710*** (7.657)	21.126** (8.407)
N	999	999	999	999	999
R-squared	0.686	0.754	0.757	0.748	0.749

Notes: Results represent separate regressions with candidate vote share as the dependent variable for major party candidates only. Provincial dummy variables are included in the regressions but are not reported. Robust standard errors clustered on federal electoral district are reported in parentheses. The asterisks denote significance levels: * 10 percent, ** 5 percent, *** 1 percent.

reported for all the regressions in the table. Although provincial dummy variables have been included in all the regressions, their coefficients are not reported.

Table 2 shows that among the specifications given in columns (a), (b) and (d), the candidate's gender is not a significant determinant of vote share. In terms of the other candidate-specific variables, campaign spending is found to positively impact vote share. For instance, focusing on the IV regression (column d), an additional \$1,000 in spending earns a candidate an average of 0.25 percentage points in vote share. The total spending by a candidate's opponent significantly and predictably decreases a candidate's vote share by 0.11 percentage points for every extra \$1,000 spent in total by rivals. Incumbent candidates are found to have a strong positive statistical advantage in term of vote share over their challengers. In terms of the margin variable, it is only significant at conventional levels for the OLS regressions. The negative sign on this variable indicates that in less competitive ridings (as measured by the margin, or closeness, of the race), a candidate receives less in term of vote share. In terms of the census or riding-level variables that were included as controls, only the high school share of the district and average income are positively and significantly related to vote share. The standard error of average income is negative and statistically significant at the 10 per cent level only in the OLS regressions. This variable may pick up an economic inequality measure of the riding and thus may indicate that as the level of economic inequality increases, a candidate's vote share decreases. It is not surprising that the majority of the census variables are not significant since these coefficient estimates are net of any constant provincial effects given the included provincial dummy variables in the model. The political party dummy variables in columns (a), (b), and (d) indicate that major party candidates (BQ, Conservative, or NDP) benefited relative to Liberal party candidates.

It is noted once again that all the regressions presented in the paper have been additionally estimated (though not reported) with the inclusion of the candidate's party's campaign contributions from the previous election as an independent variable. This variable was included in the regressions as an exogenous variable to try to proxy for candidate quality. All specifications with this variable were robust to this variable insofar as providing qualitatively similar results to the estimated regressions reported in the paper.

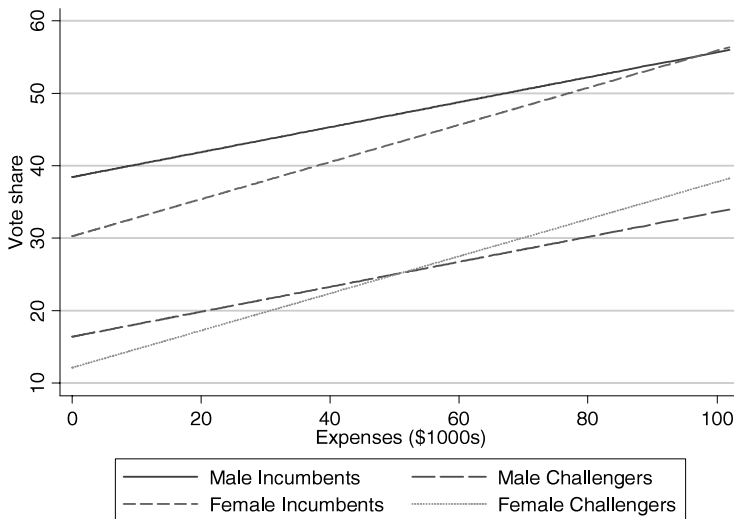
In light of the summaries presented in Table 1, it is important to consider underlying gender differences in vote share with respect to incumbency status and campaign spending. To specify a model that allows for a difference in the vote share responsiveness between male and female candidates with respect to incumbency status and campaign expenditures, interaction terms are added to the regression models. Table 2 con-

tains regressions with the addition of two interaction terms, *Male* × *Incumbent* and *Male* × *Expenses*, and these results are reported in columns (c) and (e) using OLS and IV, respectively. These two terms allow for varying gender impacts of incumbency status and spending on a candidate’s average vote share.

To gain a better understanding of the interaction terms in this model, Figures 1a and 1b plot the conditional estimated regression lines for major party candidates using the OLS estimation results (column c) as well as using the IV estimation results (column e) for each of the four mutually exclusive candidate types identified by the model against candidate campaign expenditures (\$1000s). The estimated regression lines are evaluated for mean values of the relevant independent variables.

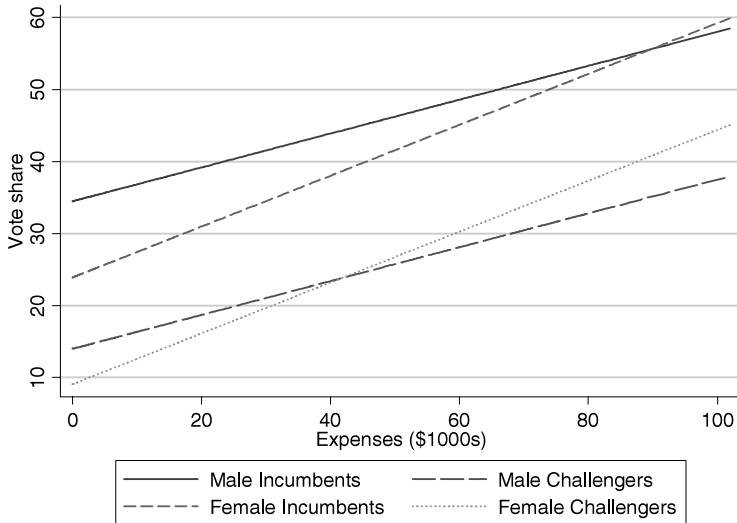
Figures 1a and 1b reveal that while male incumbent candidates enjoy a vote share advantage over female incumbents, this advantage decreases with increased expenditures and disappears when each candidate spends approximately \$100,000 using the OLS estimates or approximately \$90,000 using the IV estimates. This figure is also useful to gauge the amount female incumbents would have to spend to equalize the vote share gap for any given amount spent by male incumbents. Male challengers also enjoy a vote share advantage over female challengers that similarly diminishes with increased expenditures. However, this vote share

FIGURE 1A
Estimated Regression Lines by Candidate Type—OLS



Notes: Estimated OLS regression lines correspond to the regression in Table 2 column (c) for major party candidates only.

FIGURE 1B
Estimated Regression Lines by Candidate Type—IV



Notes: Estimated IV regression lines correspond to the regression in Table 2 column (e) for major party candidates only.

advantage disappears when both candidate types spend approximately \$50,000 using the OLS estimates or approximately \$40,000 using the IV estimates, after which the vote share advantage is taken over by female challengers. Again, this assumes that both candidates spend the same amount, which is by no means necessary as the figure can be used to identify the vote share differential for candidates who spend different amounts.

Focusing on column (e), The coefficients on *Male*, *Male × Expenses*, *Male × Incumbent*, as well as *Expenses* and *Incumbent* are all significant determinants of candidate vote share for all the estimated models. It is important to note that the coefficient associated with *Male*, can no longer be interpreted as a main effect, instead the estimated value of 3.44 represents the vote share advantage for male challengers over female challengers when each candidate's expenditures are zero. In terms of gender differences between incumbents, male incumbents earn an average of 8.50 percentage points greater vote share compared to female incumbents when each candidate's expenditures are zero. As these are both unlikely scenarios for major party candidates, it is more interesting to compare across the candidate types when each type spends their respective average expenditures. The average campaign expenditures (\$1000s) for each of the candidate types from Table 1 are as follows: male incumbents \$61.72, male

challengers \$37.14, female incumbents \$64.40, and female challengers \$30.73. Figures 1a and 1b reveal that male incumbents still enjoy a vote share advantage relative to female incumbents when each spends their respective average amount. Male candidates who are not incumbents also continue to enjoy a vote share advantage over female candidates who are not incumbents when each candidate spends their respective average. These results hold with the differences increased for all amounts spent below the mean amounts. The figures allow for other interesting visual comparisons across several gender-incumbency combinations in terms of the effectiveness of campaign spending on vote shares. For instance, male incumbents are found to enjoy a vote share advantage relative to male challengers and this advantage is greater than the vote share advantage enjoyed by female incumbents relative to female challengers. In particular, the estimates $11.82 + 5.06$ represent the vote share difference between male incumbents and male challengers. Male incumbents earn, on average, 16.88 percentage points more than male challengers. And, the parameter associated with *Incumbent*, represents the vote share difference between female incumbents and female challengers. Female incumbents earn, on average, 11.82 percentage points more vote share than female challengers. In terms of the marginal return to spending, the estimated negative value of -0.12 reveals that female candidates are able to convert an additional dollar of spending into a higher vote share compared to male candidates. These important gender and incumbency differences with respect to campaign spending highlight the importance of the two interaction terms included in the model. The rest of the coefficients estimated in column (e) are qualitatively similar to those coefficients estimated in the other columns.

A next step in the analysis would be to obtain more data, in particular, to obtain a series of elections to exploit the panel structure of the data as well as analyze gender differentials more closely by considering these effects at the party level.

4. Conclusions

Using an appropriately specified regression model, this paper shows significant, though not straightforward, gender effects among the candidates in the 2006 Canadian general election. First, male incumbent candidates were found to enjoy a vote share advantage over female incumbent candidates over practically the full range of campaign expenditure levels. This advantage or gap in the vote share differential was found to decrease with higher levels of expenditures and in fact equaled zero near expenditure levels of \$90,000. Second, male candidates who were not incumbents were also found to enjoy a vote share advantage over female

candidates who were not incumbents for ranges of expenditures less than approximately \$40,000, but above this amount the vote share advantage was reversed. The vote share differential was found to decrease with increased expenditures up to this threshold amount and then increase with increased expenditures above the threshold, indicating that female challengers who spent relatively large amounts were able to obtain a vote share advantage over their male counterparts.

This paper sheds some light on the importance of accounting for campaign spending and allowing for differences in vote share responsiveness across the genders. In terms of policy regarding campaign spending limits, it is essential to have a correctly specified model to properly understand the implication of such reforms on the vote share of male and female candidates. By incorporating a more flexible model than models used in prior research, this paper improves policymakers' understanding of the dynamics of gender effects in Canadian general elections.

Notes

- 1 Major parties are classified as: Conservative party, Liberal party, Bloc Québécois, and New Democratic Party. Fringe parties are defined as: Green party, Christian Heritage party, Progressive Canadian party, Communist party, Marijuana party, Canadian Action party, Libertarian party, First Peoples National party, Western Block party, Animal Alliance Environment Voters party, independents, and no affiliation.
- 2 Valid instruments must satisfy two conditions. First, they must be highly correlated to the endogenous variables, and second, they must be uncorrelated to the unobservable component of the model (that is, the model error). The first condition is satisfied; current spending levels and lagged spending are highly correlated variables. If the model error contains candidate-specific unobservables then the second condition may not be satisfied for repeat candidates as lagged spending may be correlated to this component of the model for these candidates.
- 3 If the candidate did not run in the previous election then the candidate's party's lagged campaign contributions are used.
- 4 The education shares included in the models are the share with the highest level of education less than high school, the share of high school graduates, the share with trades certificates or diplomas and the college-educated share.
- 5 Although female incumbent candidates receive, on average, larger transfers than male incumbent candidates, this result is dependent upon the party affiliation of the candidate. If we examine the transfers on a party basis, it is the Liberal and Conservative female incumbents who receive more than their male counterparts, while in other parties the reverse is true.
- 6 Regressions using the full sample of candidates have been estimated and do not qualitatively differ from those presented in Table 2 for major party candidates.

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