

# Incumbency Advantages in the Canadian Parliament

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## **Abstract**

We apply a regression discontinuity approach to determine incumbency advantages in the Canadian Parliament, finding that incumbents enjoy a 9.4-11.2% increased probability of winning over non-incumbents. Due to the presence of multiple parties, an incumbency advantage in terms of vote share does not always translate to an increased probability of winning, because incumbents do not necessarily obtain votes from their closest opponent. Also, under the assumption that strategic exit is not an issue, we are able to split the incumbency advantage into party incumbency and individual candidate incumbency components, finding that the advantage is almost entirely due to the individual.

# 1. Introduction

The idea that incumbent candidates have an advantage in subsequent elections solely because they are incumbent has been an active area of research in economics and political science. In the interests of ensuring a healthy democracy, an important issue for guiding public policy is to understand how this incumbency effect translates into increased vote share and/or increased probability of winning.

In this paper, we apply a regression discontinuity (RD) approach to analyze the incumbency effects in the Canadian Parliament using over a century of data. While this approach has been used in the past to analyze U.S. data (Lee (2008)), it has not been applied to Canadian data where the presence of more than two significant political parties affects the analysis. With more than two political parties, an incumbency advantage in obtaining vote shares does not necessarily translate into an increased probability of winning, as the incumbent may obtain votes at the expense of relatively minor parties rather than from his or her closest opponent. We demonstrate that, in our dataset, it is in fact the case that incumbents obtain increased vote shares, but this increase does not always result in an increased probability of winning.

A secondary goal of this paper is to shed light on the division of incumbency effects between the component due to being the incumbent party and that due to being the incumbent candidate. It is important to attempt to separate these incumbency effects since the source of the effect determines its implications. From an individual candidate's perspective, the finding of a relatively powerful individual incumbency effect creates an incentive for the candidate to exert effort to effectively represent citizens' concerns, to bring prestige to their electoral district and to try to secure pork-barrel type projects. From the governing party's point of view, this same effect will create an incentive for the party leader to identify and retain winning candidates and,

furthermore, to replace candidates who were not elected. In contrast, when the party incumbency effect is relatively dominant, the incentives work the opposite way. An individual candidate will exert less effort and the national party leader will not have a strong incentive to replace losing candidates.

Under the identification assumption that individuals do not choose to strategically exit when their probability of winning is expected to be low (i.e. individuals that choose not to run, leave for personal reasons such as retirement more often than they do to, for example, scandal), we are able to separate the incumbency effect into its party and individual components in a way that has not been done in the past. Past work has instead tended to produce estimates of incumbency advantage that combine both individual and party effects. While the assumption of no strategic exit may be strong, we provide some evidence that it does not appear to play a major role in our dataset. Under this assumption, we find that the individual incumbency component dominates and party incumbency plays very little role, possibly even having a negative effect.

A considerable body of research has investigated the influence of the incumbency effect. In general it has been difficult to identify and estimate the advantage an incumbent candidate gains because incumbent candidates may differ from other candidates through unobservable characteristics. After all, the reason that the candidate is in fact the incumbent suggests that perhaps he or she is the best (highest ability) candidate. Researchers have documented an incumbency advantage for Canadian Parliamentary elections in the past, but these estimates have generally been secondary to other goals (for example, see Eagles (2004) and Milligan and Rekkas (2008)) and have only studied the incumbency effect on vote shares. In these works, the incumbency effect is estimated based on a dummy variable approach across the entire sample of candidates in the particular election year(s). As such, identification comes from the assumption that all other variables that could affect vote shares have been controlled for. Milligan and

Rekkas (2008) investigate the impact of campaign spending on vote shares. Their control for incumbency effects demonstrates that incumbents gain an average of at least 9.46% of the vote share. Eagles (2004) finds incumbents gain an average of between -1.04% and 24.25% of the vote share, depending on the party and the particular election. Both of these works use data from only two recent federal elections and both estimate the impact of incumbency on vote share only as a control for the primary variable of interest, campaign spending.

In this paper, we instead look at the incumbency advantage in terms of vote share and probability of winning by applying an RD approach which identifies the incumbency effect through the assumption that candidates who just barely won or just barely lost an election should not be statistically different. Furthermore, through the use of a much larger dataset which consists of Canadian Parliamentary elections dating back to 1867, we are able to track changes in incumbency effects over time. Post-1950, we find that Liberal incumbents have an increase of 7.0-10.8% in the probability of winning while Conservative incumbents have an increase of 7.0-10.6%. Pre-1950, Liberal incumbents have an increased probability of winning of 11.0-13.6% while the Conservatives have only a marginally significant increased probability of winning. We also investigate the incumbency effect on the vote share and the reasons for which increased vote share is not necessarily highly correlated with an increased probability of winning in elections with more than two parties. We find that parties that do not take significant votes shares from the other major party may increase their vote share but with less of an increase in the probability of winning than for parties that do take votes from the other major party.

Outside of Canada, both non-RD and RD approaches to measuring incumbency effects have been used. In the U.S., incumbency advantage in House elections has been well-studied. Lee (2008) compares the RD approach to measuring incumbency with more traditional approaches and discusses in some detail the difference between the three prominent measures of incumbency:

the sophomore-surge, the retirement slump, and the Gelman and King index.<sup>1</sup> The RD work with data from countries other than Canada has, to some extent, separately estimated both party and individual incumbency effects (Hainmueller and Kern (2008), Uppal (2008), and Lee (2008)). However, we feel that the estimates in the past literature that have been referred to as party and individual effects have been misnamed. Under an identification assumption, we provide a novel identification strategy that we feel better separates the incumbency effect into its constituent components. Our model allows us to conclude that, for close Canadian federal elections, the vast majority of the incumbency effect is due to the impact of being the incumbent candidate and not due to belonging to an incumbent party. In fact, we find that the party effect is actually negative. That is, there is a disadvantage to being an incumbent party, but this disadvantage is overcome if the party runs an incumbent candidate. This result is somewhat surprising given that, in Canadian politics, with strict confidence rules in place, Members of Parliament rarely vote across party lines. That is, the party has traditionally been felt to be much more important than the individual candidate. Our findings suggest, however, that individual candidates are more important than may have been expected. And, if individual incumbency effects are much larger than party incumbency effects in Canada, this result could carry over to other electoral systems (for example, in the U.S. or U.K.) where individual candidates are generally felt to have a much more important role.

In Section 2, we provide an overview of the RD methodology and its past application to elections. We also explain why we feel that the party and individual effects measured previously are somewhat misnamed and how we correct this problem. Section 3 describes our Canadian dataset. Section 4 describes the results of our analyses and we summarize our work in Section 5.

## 2. Regression Discontinuity

### 2.1. *Previous Literature*

The regression discontinuity approach has recently received increased attention from empirical researchers. Although it was first used almost 50 years ago by Thistlethwaite and Campbell (1960), researchers have only more recently put the technique on a solid theoretical footing and began to apply it to a variety of applications (Imbens and Lemieux (2008), Lee and Lemieux (2010), and Hahn, Todd, and Van der Klaauw (2001)). The regression discontinuity approach is a quasi-experimental approach that relies on any variable that may affect the dependent variable, except the assignment to treatment, being continuous around the threshold of a continuous forcing variable. With continuity of variables around the threshold, the effect of treatment can be precisely measured given that all of the other characteristics of individuals on either side of the threshold will be identical, on average. Thus, the approach is similar to that achieved with a completely randomized experiment and, as with randomized experiments, it allows for a causal interpretation of the treatment effect.

For the case of measuring incumbency advantage, the regression discontinuity approach is particularly intuitive. In this case, the treatment is the state of being the incumbent party or candidate and the forcing variable is the share of votes in the previous election. When the vote share surpasses the threshold required for election, the treatment takes effect because the party or candidate gets elected and becomes the incumbent. By focusing on close elections, one expects that those parties or individuals that become the incumbent are very similar on average to those that failed to become the incumbent. Thus, the only difference between incumbents and non-incumbents in close elections is that the former were randomly assigned the treatment of becoming the incumbent and the latter were not. The implicit assumption in this approach is that

individuals and parties do not deterministically control their vote shares. In fair elections with thousands of voters, this assumption is very likely to be true. For example, any number of random events on the day of the election could be expected to result in different individuals showing up to vote, which could therefore affect the actual election results. One limitation of the regression discontinuity approach is that it should only be interpreted as a *local* effect. That is, it measures the advantage that incumbents enjoy in close elections and should not be generalized to elections in which incumbents dominate or are dominated by other candidates. However, in the case of elections, this interpretation restriction is not a major criticism because it is precisely close elections for which one is interested in the incumbency effect.

Several researchers have investigated incumbency effects using the regression discontinuity approach. Lee (2008) finds that Democrats have about a 45% better chance of winning the next election when they are the incumbent party in a seat of the U.S. House of Representatives. Butler (2009) finds that non-freshmen incumbents gain an average of 2.3 percentage points over freshmen incumbents in the U.S. House. In other related regression discontinuity work, Lee, Moretti, and Butler (2004) report that the degree of electoral strength in the U.S. House does not affect a legislator's voting behaviour, and Butler and Butler (2006) look at U.S. Senate elections, determining that the election outcomes for the two seats belonging to the same state are independent.

Most related to our work are two papers in which the authors must deal with multiple parties. Unlike investigations into U.S. election outcomes, which essentially have only two main parties, Canadian Parliamentary elections typically involve three or more viable parties. Because of this fact, the vote share cannot be used as the forcing variable. Instead, as in Hainmueller and Kern (2008) and Uppal (2009), we use the margin of victory in the previous election as the forcing variable. The margin of victory is the difference between the number of votes the winning party

received and the number of votes the second party received, divided by the total number of votes. Hainmueller and Kern investigate spillover effects in the German Bundestag, finding that incumbents receive a 1.4-1.7 percentage point advantage in vote share and that this advantage is similar for party incumbency and individual incumbency. Uppal, on the other hand, finds that individual incumbents in Indian state legislatures are significantly disadvantaged, being less likely to retain their seat.

## **2.2. Empirical Specification**

In this section, we formalize our regression discontinuity design model. For further background on regression discontinuity designs, we refer the reader to two papers in particular. Imbens and Lemieux (2008) discuss some of the theoretical and practical considerations for the regression discontinuity technique. Lee and Lemieux (2010) provide additional practical advice as well as summarize the wide variety of applications to which researchers have applied regression discontinuity analyses.

As mentioned previously, because Canadian parliamentary elections are multiparty (more than two), we cannot rely on a simple vote share as our forcing variable. Instead, as in Hainmueller and Kern (2008), we define the margin of victory,  $MV_{ijt}$ , for party  $i$  in riding (federal electoral district)  $j$  and election  $t$ . After ranking each party in each riding by the number of votes it received, the margin of victory for the winning party is determined by subtracting the number of votes received by the second-ranked party from the number of votes the winning party received and then dividing by the total number of valid votes cast. For the second and lower-ranked parties, the margin of victory is given by the number of votes the party received minus the number of votes the winning party received, again divided by the total number of valid votes cast. Thus, the winning party will have a positive margin of victory while losing parties will have

negative margins of victory. The threshold of margin of victory that defines assignment to treatment (incumbency) is zero, so that a positive margin of victory in the election at time  $t-1$  corresponds to an observation that is assigned treatment.

The empirical specification we use for our main results is:

$$V_{ijt} = \alpha_i + \beta_i D_{ij,t-1} + \gamma_i MV_{ij,t-1} + \delta_i D_{ij,t-1} MV_{ij,t-1} + \varepsilon_{ijt} \quad (1)$$

where  $D_{ij,t-1}$  is a dummy variable that takes the value one when the margin of victory is positive,  $MV_{ij,t-1}$  is the margin of victory for party  $i$  in riding  $j$  in the previous ( $t-1$ ) election, and the Greek letters denote the parameters to be estimated. The term  $\varepsilon_{ijt}$  represents the stochastic error term. When we estimate (1), we include all observations in which a particular party ran in election  $t$  and election  $t-1$ . We give the term *overall* incumbency effect to  $\beta_i$  estimated with this full sample of data. This effect is a weighted average of the effects of being the incumbent party and the effect of being an incumbent individual because it includes observations in which parties ran new candidates and observations in which parties ran repeat candidates. In the following subsection, we outline our new estimation model that allows us to separately identify the contributions due to the party and due to the individual.

In our actual estimations of (1), we expand it to include additional polynomial terms in the margin of victory by adding in higher powers of this variable and the corresponding interaction terms. Specifically, we estimate with both quartic and cubic polynomials and two linear models to test for robustness. As is typical in RD designs, we face a trade-off when deciding on the bandwidth, the range of observations on each side of the threshold, to use in each specification. Ideally, one would use only those observations very close to the threshold, but doing so results in very imprecise estimates. Thus, as in other RD work, we use a narrow bandwidth for the linear specifications, but a wider bandwidth for the polynomial specifications. Specifically, we consider

bandwidths of both +/- 15% and +/- 10% margin of victory for the linear specifications and a bandwidth of +/- 70% for the polynomial specifications. Note that doing so results in the sample size varying across specifications because it depends upon the bandwidth around the threshold. The sample size for each specification is included in our tables of results. As well, as recommended by Imbens and Lemieux (2009), we include an interaction term to allow the parameters of the functional form to be different between observations that receive treatment from those that do not. Finally, note that we include time and province fixed effects in all of our regressions and we determine the standard errors by clustering on riding.<sup>2</sup>

In addition to determining the effects of incumbency on vote share, we also determine the effects of incumbency on the probability of victory in election  $t$ ,  $P_{ijt}$ . This model takes a form identical to our vote share model in (1) except that the dependent variable is now  $P_{ijt}$  rather than  $V_{ijt}$ . To estimate this model, we use a linear probability model where  $P_{ijt}$  takes the value one when a particular party is victorious in election  $t$  and the value zero otherwise.

### **2.3. Decomposing Party and Individual Effects**

As we mentioned previously, the incumbency effect measured with (1) represents both the effect of being the incumbent *party* and the effect of being the incumbent *individual*. In this section, we discuss the terminology that has been used in the past literature, explain why we believe the naming is misleading, and demonstrate how to properly disentangle the party and individual incumbency effects. Note that we are not questioning the validity of the estimates obtained in the past literature, only their naming and interpretation.

Past literature (Lee (2008) and Heinmueller and Kern (2008)) has defined the incumbency advantage measured with (1) using the full sample as the party incumbency effect. When the data sample is restricted to only observations in which both the party and the individual are the same

between elections, the incumbency advantage has been referred to as the individual incumbency effect (Hainmueller and Kern (2008)). However, we feel that both of these names are misleading because, in both cases, the measured incumbency advantage consists of components of both the advantage due to being the incumbent party *and* the advantage due to being the incumbent individual.

Consider first the estimate obtained with the full sample which has been referred to as the party incumbency effect. As Lee (2008) notes, the effect is actually made up of both the effects of being the incumbent party and of being an incumbent individual. Thus, we believe *overall* incumbency effect is a more appropriate term and we refer to this estimate using this name. We instead reserve the term *party* incumbency effect for the effect of being *only* the incumbent party which can be estimated using (1) but restricting the data sample to only those observations in which a party runs in a subsequent election with a non-incumbent candidate.

Now, consider the estimate of (1) in which the data sample is restricted to observations in which parties run the same candidate. We feel that referring to this estimate as the individual incumbency effect is also misleading. If, as in Hainmueller and Kern (2008), we define the legislator (or individual) incumbency advantage as the additional vote share a particular incumbent legislator gains when running in an election over the vote share the incumbent's party would have obtained had they run a different candidate, estimating (1) with this sub-sample does not provide the individual incumbency effect. Instead, it estimates the advantage due to being both the incumbent party *and* the individual incumbent. To estimate the true *individual* incumbency effect as defined, we would ideally have data on individual incumbents running in ridings in which their party is not incumbent. However, these observations are very infrequent because they occur only when a particular individual switches parties. Instead, we first define the effect estimated with (1) in which the sub-sample is restricted to parties that run the same

candidate as the *party plus individual* incumbency effect. Then, to determine the true *individual* incumbency effect, we subtract the *party* incumbency effect from the *party plus individual* incumbency effect. Under the assumption that the *party* and *individual* effects are additive, we can thus obtain estimates of the separate effects. We see that, in our terminology, the *individual* incumbency effect and *party* incumbency effect reflect only the effect of being the incumbent individual or the incumbent party, respectively. Given our terminology, past research has not estimated either effect, because they have not considered the sub-sample of data in which parties run non-incumbent candidates. We demonstrate now how estimating this sub-sample in addition to the full sample and the sample restricted to parties running incumbent candidates can be used to estimate the true individual and party effects.

First, estimating the *party* incumbency effect is simple: estimate (1) with a sub-sample of data in which parties run non-incumbent candidates. To estimate the individual incumbency effect requires two steps. In the first step, estimate (1) with the sub-sample of observations in which parties run incumbent candidates: we call this the *party plus individual* incumbency effect. In the second step, subtract the *party* incumbency effect from *the party plus individual* incumbency effect. The difference is the *individual* incumbent effect.

Rather than estimating the party and individual effects using the sub-samples described, we can also estimate the effects simultaneously with the following model:

$$V_{ijt} = \alpha_i + \beta_i D_{ij,t-1} + \gamma_i MV_{ij,t-1} + \delta_i D_{ij,t-1} MV_{ij,t-1} + \lambda_i R_{ijt} + \omega_i D_{ij,t-1} R_{ijt} + \mu_i D_{ij,t-1} R_{ijt} MV_{ij,t-1} + \varepsilon_{ijt} \quad (2)$$

This model is an extension of (1) in which additional terms are added.  $R_{ijt}$  is an additional dummy variable that is set to one if the observation is for a repeat individual (an individual that participated in election  $t$  and election  $t-1$ ). We also include interaction terms between  $R_{ijt}$  and the

other dependent variables which allow us to obtain the party and individual incumbency effects directly. To aid in understanding, refer to Figure 1 which illustrates the estimation of (2).

-- Insert Figure 1 here --

The parameter,  $\beta_i$ , in model (2) corresponds to the *party* incumbency effect for a particular party  $i$ ; the effect of being the incumbent party when  $R_{ijt}=0$  (non-repeat individuals). This effect is labelled as “party” in the figure.  $\beta_i + \omega_i$  corresponds to what we refer to as the *party plus individual* incumbency effect; the effect of being the incumbent party when  $R_{ijt}=1$  (repeat individuals). This effect is labelled as “party + individual”. At the discontinuity, the *individual* incumbency effect, as defined previously, is simply  $\omega_i$ , the parameter attached to the interaction between the variables  $D_{ij,t-1}$  and  $R_{ijt}$ .<sup>3</sup> Thus, with model (2), we can estimate the party and individual incumbency effects simultaneously.

Notice that we can also express the coefficients of interest in our model in terms of the notation commonly used in the RD literature. Specifically,  $\beta_i$  is the average treatment effect of interest, corresponding to

$$\beta_i = E[V_{ijt}(D_{ij,t-1} = 1) - V_{ijt}(D_{ij,t-1} = 0) | MV_{ij,t-1} = 0, R_{ijt} = 0]. \quad (3)$$

That is,  $\beta_i$  is the difference in expected value of the vote share for incumbents and non-incumbents, evaluated at a margin of victory equal to zero for non-repeat candidates. Equation (3) is simply a mathematical expression of the corresponding discontinuity observed in Figure 1. A similar expression for the discontinuity for repeat individuals also exists.

One potential problem with the estimates of the *party plus individual* and the *party* incumbency estimates is that the estimates could be biased if incumbent individuals selectively avoid subsequent elections if they anticipate not being successful. This potential problem has been referred to as ‘strategic exit’ in the past literature (Hainmueller and Kern (2008)). Strategic

exit must be considered any time one tries to estimate the effect of individual contributions to incumbency, whether combined with party incumbency effects as in the party plus individual incumbency estimated in the past literature, or when trying to completely separate the incumbency effect into the party and individual components, as we do. Put another way, both the sub-sample that includes only those incumbents which re-run and the sub-sample that includes only those incumbents which do not re-run would be samples that are subject to a self-selection bias if candidates that suspect they will lose choose not to run in the next election. Thus, in order to separate the party and individual incumbency effects in the way we have described, we must assume that strategic exit is not an issue. In order for the estimates to be valid, any time an individual chooses not to run, it must be for reasons that are unrelated to how they expect to do in the subsequent election. While this assumption is obviously quite strong, we provide evidence in our dataset that strategic exit does not appear to be particularly common, allowing us to separate the effects. However, we note that some caution is necessary in putting a lot of weight on the validity of our results because we are not able to completely eliminate the possibility of strategic exit. Nevertheless, we feel that pointing out the misleading terminology currently being used in the literature and attempting to estimate the true party and individual effects is important.

In Section 4, we focus on the presentation of results of the overall incumbency effect which is obtained using (1) and the full sample of data. Then, we present results in which we use (2) to separate out the party and individual effects, under the assumption of no strategic exit. Before presenting our results, however, we first describe our dataset.

### **3. Data**

Our dataset originates from the Library of Parliament of Canada. It consists of riding information (province and riding name), election dates, candidate first and last names, votes

received, and whether or not the candidate won by acclamation. It covers all 40 Canadian Parliamentary elections which span the years of 1867 to 2008.<sup>4</sup> Over this time, the number of Parliamentary seats increased from 180 in 1867 to 308 in 2008. Typically, each seat represents one riding, a geographical electoral district established by an independent electoral commission. The geographical districts are determined by population such that overall the Parliament features representation by population. Due to population growth and various changes to the representation formula, the number of seats has grown over time. Members of Parliament in the Canadian Parliament are determined by a first-past-the-post election system in which the candidate with the most votes obtains a seat in Parliament. Each seat is generally contested by multiple parties, providing us with a total of 38,711 candidate observations over the 10,889 contested seats.

Over the entire time period, the two dominant political parties in Canadian federal politics are the Liberals and the Conservatives. The Liberals tend ideologically between the left and centre while the Conservatives tend ideologically to the right. The Conservative Party has existed under several different names and, for estimation purposes, we treat the Liberal-Conservatives (1867-1873), the Conservative Party (1873-1942), the Progressive Conservatives (1942-2003), and the Conservative Party of Canada (2003-present) as a single party which we refer to as the Conservatives. The Liberal Party has existed since 1867.

In more recent elections, the Bloc Québécois (BQ) and New Democratic Party (NDP) have also received significant support. The Bloc Québécois is a left-leaning Québec separatist party which fields candidates exclusively in Québec. It has existed since 1991. The NDP is a left-leaning party which fields candidates more broadly across the country. For the period 1932-1961, a predecessor to the NDP, the Cooperative Commonwealth Federation, existed. In 1961, this party transformed into the NDP and thus, for estimation purposes, we combine the two parties and treat them as one. The remainder of the parties in Canadian politics (for example, the Reform

Party and the Social Credit Party) have much smaller party-specific sample sizes and thus we focus on the four parties mentioned. In fact, for most of our results, we restrict our analysis further to only the Liberals and Conservatives.

In addition to dealing with party renaming, we must also consider the treatment of by-elections. These elections occur between major elections when a Member of Parliament vacates his or her seat. The most common reason for leaving a seat is resignation, but leaving a seat may also occur if a Member is appointed to another position, becomes ill, or dies. By-elections pose a complication when estimating incumbency effects because we may expect the incumbency effect to be different in such elections. As such, we identify by-elections as any election which did not occur on the same date as a general election and we do not include observations of the dependent variable (vote share or probability of winning) that result from by-elections. However, as with past studies of incumbency in Canada (Milligan and Rekkas (2008)), we do consider by-elections when determining incumbency status.<sup>5</sup> That is, to determine the margin of victory in the previous election, we look at the most recent past election which may be a general election or a by-election. In other words, a candidate that won in a by-election would be labeled as the incumbent if he/she ran in the subsequent election.

To identify the effects of incumbency, we must first identify parties and individual candidates which run in consecutive elections. We identify repeat parties by matching on party name, riding and province. We require riding names to match exactly so that any riding which was redistricted to one with a new name is excluded. We believe that requiring the riding names to match exactly is a conservative approach as there are likely many ridings which change names but whose geographical boundaries did not change significantly.<sup>6</sup> Repeat candidates represent a subset of the repeat party observations which we identify by matching on last name only because first names are inconsistent between elections. Using only last names is sufficient because there

are never two candidates in the same riding with the same party and same last name. This methodology of identifying repeat candidates does exclude any candidates that switch parties, but this is a very rare occurrence in Canadian politics.

Following standard practice in estimations of incumbency effects (Gelman and King (1990)), we drop uncontested seats from our analysis. In fact, we limit our analysis to margins of victory less than 70%, following Uppal (2008). Including margins of victory greater than 70% and assigning uncontested seats a margin of victory of 100% does not alter the qualitative results, but does somewhat change the estimates obtained using a fourth-order polynomial fit. The polynomial estimator appears to be quite sensitive to these outlying observations.

As mentioned, a riding typically elects only one seat in the Parliament. However, in our dataset, approximately 100 contested ridings exist in which there are two seats in a single riding.<sup>7</sup> In these ridings, we are required to modify the margin of victory calculation because each party ran two candidates. Because there are two winners that become incumbents, we define the margin of victory for each winner as the difference between their vote share and that of the third party candidate. The margin of victory of the remaining candidates is calculated as their vote share minus the vote share of the second place candidate. Calculating the margin of victory in this way preserves the property that a margin of victory equal to zero corresponds to the threshold between becoming an incumbent and not. In what follows, we present and discuss our estimation results.

## **4. Incumbency Effects**

### **4.1. Overall Incumbency**

We first present general statistics for our entire sample to get a sense of the impact of incumbency on elections outcomes. 79.3% of incumbent candidates become candidates in the

next election, and of those that re-run, 77.3% are re-elected. While these numbers are lower than the corresponding numbers for elections in the U.S. House (Lee (2008)), they strongly demonstrate that incumbent candidates are more likely than not to run and win in the next election. Thus, these statistics support the common belief that incumbents enjoy advantages that cause them to be re-elected.

Our main results consist of estimating what we have named the *overall* incumbency effect, using model (1) with our entire sample. Given that, in Canada, there are more than two parties that receive significant vote shares, we feel it is most important to focus on the incumbency effect on the probability of winning. Thus, we present the probability of winning estimation results first and then follow up with the vote share results. We restrict our analysis to the two main political parties: the Liberals and the Conservatives. Results for the New Democratic Party and the Bloc Québécois are not generally statistically significant due to the smaller numbers of observations for these parties. We believe that restricting our analysis to the Liberals and Conservative is justified given that, over the entire time period, the two parties together win 80.8% of the seats with the Liberals winning 45.5% and the Conservatives winning 35.4%.

-- Insert Figure 2 here --

Figure 2 graphs the average probability of winning in each 1% bin of the margin of victory in the previous election along with the results of a local linear regression for a bandwidth of 15% on either side of the threshold. The figure pools the data for Liberals and Conservatives over all available time periods.<sup>8</sup> We see a clear discontinuity at the zero margin of victory threshold, suggesting that the regression discontinuity approach should yield significant results. Table 1 presents the incumbency effects on probability of winning, confirming that the discontinuity in Figure 2 is significant. The results in Table 1 are estimated using model (1) with four different specifications for the polynomial in margin of victory: a quartic, a cubic, and linear specifications

restricted to +/- 10% and +/-15% of the bandwidth around the discontinuity. As is traditional in the RD literature, we consider multiple polynomials as a robustness check for our results.

In addition to presenting our results for the full sample and the Liberal and Conservative parties pooled together, we also estimate the effects separately for the Liberals and Conservatives, split into two time periods: pre-1950 and post-1950. Dividing the results at 1950 allows us to compare with U.S. results that have shown that incumbency effects have increased since 1950 (Gelman and King (1990)). Table 1 also includes the mean values of the probability of winning for each sample.

The overall incumbency effect on the probability of winning for our entire sample is between 9.4% and 11.2%, significant at the 5% level. This result means that, on average, incumbent parties, whether running an incumbent candidate or not, are about 10% more likely to win an election than non-incumbent parties. Pre-1950, the Liberal party had an incumbency advantage of between 11.0% and 13.6%, while the Conservatives had a marginally significant advantage of 8.9%. Post-1950, the incumbency advantage is lower for the Liberals with an advantage of 7.0% to 10.8%, but higher for the Conservatives with an advantage of 7.0% to 10.6%.<sup>9</sup> Our results are fairly robust to the specification.<sup>10</sup> However, in general, we find that the local linear regressions provide more significant results which may be due to a watering-down effect of observations away from the discontinuity.

In addition to estimating the incumbency effect separately by party and over time, we consider two additional aspects of the overall incumbency effect.<sup>11</sup> In the first, we estimate the overall incumbency effect by province, pooling the data from both parties and time periods. The results are presented in Table 2. We find that by far the strongest incumbency effect is in the province of British Columbia (BC) where an incumbent party enjoys a 31.6% to 34.6% better chance of winning the next election, a huge advantage. Incumbent parties in Ontario and Quebec

also have significant advantages, but with increases in the probability of winning similar to the overall levels we reported above. In all other provinces, there is no significant incumbency advantage but this may simply be due to limited numbers of observations in these provinces. An area of future research is to explore these provincial differences in detail and examine the possible explanations as to why the differences exist.

The second aspect we explore is whether or not the incumbency effect depends upon a candidate being a member of the party that formed the government in the last period.<sup>12</sup> One may think that the incumbency effect may be lower for incumbents that are a member of the government or that the incumbency effect varies with the length of time the government has been in power. If there is a desire to remove a party from power due to poor performance, for example, we would expect the incumbency effect to be lower for those candidates whose party makes up the government. On other hand, we may think that the incumbency effect would be higher for candidates whose party is in power due to political or financial advantages of being in power. To explore this possibility, we consider two related specifications. In the first, we interact the dummy variable indicating incumbency with a variable that indicates whether or not the candidate's party formed the government in the previous period. In the second, we interact the dummy variable with a quadratic in the number of years the candidate's party has been in power. The results of both specifications are presented in Table 3. We find that the incumbency effect is unaffected by whether or not the candidate is a member of the current government. In both specifications, the interaction terms are insignificant and in fact very close to zero.

To better understand the incumbency effect, we explore the relationship between vote share and the probability of winning by first estimating model (1) with vote share as the dependent variable. In an electoral system such as Canada's, in which there are typically more than two parties that receive a significant number of votes in a riding, obtaining vote share does not

necessarily translate into an increased probability of winning the election. If votes are taken from one of the weaker parties in the riding rather than from another dominant party, it is possible that no increase in the probability of winning is observed.

Table 4 provides results for the effect of overall incumbency on vote share for our full sample as well as for sub-samples of the Liberals and Conservatives pre-1950 and post-1950. Again, we provide results for four different polynomial specifications. For the full sample, incumbents enjoyed between 2.38% and 2.78% additional vote share, significant at the 1% level. Post-1950, the overall incumbency effect for the Liberals is 3.77%-4.20% of vote share and for the Conservatives is 2.46%-3.77%, both significant at the 1% level. The ranges reported are for the estimates obtained using the different specifications, indicating that these results are fairly robust to the specification used. Pre-1950, the Conservatives do not experience a statistically significant *overall* incumbency effect and, for the Liberals, we find a smaller effect (2.43%) significant at the 5% level only when using the linear estimator. Our finding that the incumbency effects are smaller pre-1950 is consistent with findings in the U.S. House (see Gelman and King, 1990) where incumbency effects have also been found to have increased since 1950. This finding thus justifies the interest in determining the magnitude and nature of the incumbency advantages given that they appear to be increasing over time.

Our vote share results coincide roughly with our probability of winning results, but if we take a closer look at the post-1950 results, we find interestingly that the Liberals gain more vote share than the Conservatives, but gain less in terms of the probability of winning. This fact supports our earlier assertion that, in a multi-party system it is possible for a party to gain vote share, but, by taking votes from minor opponents, the vote share may not translate into an increased probability of winning. We take a closer look at this effect here. We focus on the local linear regression results because they are generally more significant and should theoretically be

better estimates because they are restricted to using observations closer to the discontinuity.<sup>13</sup> Post-1950, the Liberal incumbents gained 3.80-4.20% of vote share versus 2.63-3.19% for the Conservatives. But, the Liberal probability of winning increased by a comparable 10.8% versus 10.6% for the Conservatives. In a two-party system, such a result, while not impossible, would be unlikely.<sup>14</sup> To see why this can happen in a system with more than two parties, we investigate from which parties the incumbents are taking votes.<sup>15</sup>

## **4.2. Vote Loss**

In the Canadian Parliament, the Liberals and Conservatives are the two major parties with the New Democratic Party and the Bloc Québécois winning large numbers of votes in particular areas of the country. Thus, we would expect that to increase their probability of victory, the Liberals or Conservatives would want to take a significant number of votes from the other major party. Taking votes from more minor parties increases their vote share, but doesn't have the double effect of simultaneously increasing their vote share while reducing the other major parties vote share. Therefore, we would expect the increase in probability of winning to be less in such a case.

Tables 5 and 6 present the results of the vote loss regressions. In each case, the vote share of the parties from which the party of interest can take votes replaces the party of interest's vote share as the dependent variable in our model. Thus, one should interpret the estimated coefficients on the dummy variable that corresponds to incumbency status as the percentage of votes a particular party can expect to lose in a close election if the Liberal (Conservative) Party is incumbent. As can be seen, the Liberal incumbents do not take a significant share of votes from the Conservatives. Instead, they mainly take votes from other parties. Conservative incumbents, on the other hand, do take between 2.41% and 3.52% of the Liberal votes, significant at the 5%

level. Given that the Liberals and the Conservatives are the two largest parties in Canadian Parliamentary elections, this result explains how it is that Liberal incumbents gain more vote share, but yet gain almost no more in terms of the probability of winning. By taking votes from only more minor parties, they do not gain as much as the Conservatives, as we would expect. We conclude, therefore, that in ridings with more than two parties with significant vote shares, incumbency advantages measured in terms of increased vote share may not always meaningfully translate into increased probabilities of victory. In the following section, we explore another aspect of the incumbency effect, decomposing the incumbency effect into its constituent party and individual components.

### **4.3. *Party and Individual Incumbency***

The incumbency effect we have documented in the previous sections includes contributions due to both party incumbency and individual incumbency and ideally we would be able to separate these out because, as discussed in the introduction, the source of the effect is important for its policy implications. In this section, we estimate the party and incumbency effects according to our terminology. The party incumbency effect is the advantage a party gains when they run a non-incumbent candidate. The individual incumbency effect is the additional advantage a party would gain from running an incumbent candidate. In order to be able to identify these effects separately, however, we need to rely on the potentially strong assumption that individuals are not selectively exiting. Although almost 80% of incumbents in our dataset are choosing to re-run, strategic exit could pose a problem for our analysis if those that are not choosing to re-run are exiting when they are more likely to lose the subsequent election.

Recent literature has suggested that strategic exit does not significantly affect incumbency estimates. For example, Ansolabehere and Snyder (2002) find that strategic exit is not a

significant factor in U.S. state-wide elections. To test whether or not strategic exit is a problem in our dataset, we run logistic regressions of incumbent's decisions to run again on the margin of victory attained in the past election, controlling for province and time fixed effects. The margin of victory from the previous election serves as a proxy for incumbent's expectations in the subsequent election. That is, our sample is restricted to those individuals that won the previous election. We report the results of these regressions in Table 7. In this section, we do not attempt to separate out the incumbency effects by party and by time period because we need the full sample to obtain significant results when we decompose based on party and individual incumbency. Thus, our estimates for this section are for the Liberals and Conservatives pooled over all time periods.

From the results in Table 7, we see that the coefficient on the margin of victory is insignificant, indicating that the decision to run again may not depend on past election performance.<sup>16</sup> To the extent that one's margin of victory in the past election is a good proxy for one's expectations in the next election, this finding lends credibility to our belief that strategic exit is not an issue. However, we acknowledge that this proxy is not perfect. During the time between elections, expectations can be affected by general popular opinion, economic downturns, scandals, etc. These possibilities are not captured using past margin of victory as a proxy, but our dataset does not allow us to more thoroughly test for strategic exit in other ways. If we had additional data on the characteristics of the candidates, we could run additional robustness tests to ensure strategic exit is not biasing our results. For example, given the candidates' ages we could compare the average retirement age to the average running age to ensure that the average retirement age is much higher. Unfortunately, candidate characteristics are not available over the entire sample (i.e. for all elections and for all candidates). In fact, we are limited to those candidate characteristics described in Section 3. Thus, while we cannot rule out some form of

strategic exit, the limited tests we are able to perform given our data constraints suggest that it may not be a problem. We proceed to estimate the party and individual effects while being cautious about interpreting the results.

-- Insert Figure 3 here --

For the analysis of party and individual effects, we look at both probability of winning and vote shares. We begin by plotting vote share against the margin of victory in the past election in Figure 3. Referring to this figure, we can observe both the *party plus individual* incumbency effect (which has been referred to as the individual incumbency effect in past literature, for example in Hainmueller and Kern (2008)) and the *party* incumbency effect. The figures plot the average vote share of election  $t$  for each 1% bin of margin of victory in election  $t-1$  against the middle point of each bin. The upper fitted line segment in the figure is for repeat individuals (the discontinuity measures the *party plus individual* incumbency effect) and the lower fitted line segment is for non-repeat individuals (the discontinuity measures *party* incumbency). In each case, the curves represent linear fits over +/-15% of observations around the discontinuity. As can be seen, Figures 3 shows a clear, positive discontinuity at the threshold of margin of victory (equal to zero) for repeat individuals. For non-repeat individuals, the discontinuity is negative, indicating that the *party* incumbency effect is actually negative, a finding we quantify with our regression analysis.

Turning to the regression results provided in Table 8, we find that when we attempt to separate the incumbency effects, we do not have enough power to obtain significant results for the probability of winning dependent variable. As we saw with overall incumbency, the probability of winning incumbency effect is not as statistically significant and thus, when we try to decompose it, we lose almost all significance. However, the vote share results prove to be significant, so we focus our discussion on these results here. The combined *party plus individual*

incumbency effect on vote share is 2.32-3.47%, significant at the 1% level. This result is consistent with the discontinuity observed in Figure 3.

Next, we decompose the *party plus individual* incumbency effect into separate party and individual incumbency effects using model (2), something which to our knowledge has not been done in other work. As discussed in Section 2, we feel that the party and individual incumbency effects estimated in the previous literature can more accurately be named the *overall* incumbency effect and the *party plus incumbency* effect, respectively, because they both to some extent combine contributions from both the party and individual. What we believe are true estimates of the contributions of the party and the individual to the incumbency effect are determined directly from model (2). The coefficient on the dummy variable that represents a margin of victory greater than zero corresponds to the *party* incumbency effect and the coefficient on the interaction term between the margin of victory dummy variable and the repeat individual dummy variable represents the *individual* incumbency effect. The *party* and *individual* incumbency effect results are provided in Table 8.

When we decompose the *party plus individual* incumbency effects in this way, we see clearly that the total effect is almost entirely determined by the individual effect. First, note that the *party* effect for the combined regression is actually negative, as anticipated from observation of the lower fitted line segment in Figure 3. While the party effect is only marginally statistically significant, the effect is consistently negative across all specifications and therefore we can safely say it is at most zero. The individual effect, on the other hand ranges from 4.20-5.20% across our specifications, and it is significant at the 1% or 5% level.<sup>17</sup> Therefore, we are able to conclude that, for the case of close Canadian Parliamentary elections, the *party plus individual* incumbency effect is in fact mainly due to incumbent individuals re-running. The portion of the effect due to being the incumbent party is small and sometimes even significantly negative.

Our results here suggest that the incumbency effect is mostly due to the individual incumbent running, rather than to the party. However, as we mentioned previously, these results may potentially be biased if individuals are exiting prior to those elections in which they feel they have a good chance of losing. While we have tried to provide some evidence that this is not happening significantly in our dataset, we must acknowledge the possibility that it is occurring. We also note that, if individuals are exiting strategically, it would tend to bias the individual effect upwards, which may explain why we see such a large individual effect. So, while our results may be subject to criticism, we hope that we have convinced the reader that separating out the party and individual effects better than has been done in the past is a worthy goal. We have provided a methodology for doing so and hopefully we can better account for the possibility of strategic exit in the future.

## **5. Conclusion**

We have used an RD approach to document the fact that incumbents enjoy a considerable advantage in the Canadian Parliament, both in terms of obtaining higher vote shares and in terms of an increased probability of winning. In addition, we have provided some evidence that the incumbency effect is larger in the post-1950 period than prior to 1950 which underlines the importance of continuing to study the magnitude and reasons for this effect. In a multi-party system, it is possible for an incumbent party to obtain additional vote share from minor parties which does not translate into an increased probability of winning, and we find such a result in the Canadian Parliamentary data. Specifically, post-1950, Conservative incumbents have been more successful at taking votes from the Liberal Party, which has translated into a higher probability of winning for their incumbents. Liberal incumbents, on the other hand, have obtained votes from more minor parties, leading to less of an increase in the probability of winning.

In addition, we believe that we have presented terminology that better represents what we intuitively think of as the party and individual incumbency effects, clarifying the terminology used in past literature. Furthermore, we have presented a methodology for estimating these components of the incumbency effect. We find that it is critical to run an incumbent candidate in order to obtain any incumbency advantage: an incumbent party that runs a new candidate is not likely to obtain any incumbency advantage. However, we have acknowledged limitations in our dataset that prevent us from being certain that our decomposition results are not biased due to strategic exiting by candidates that expect to lose in the next election. We hope to address this potential problem in future work, but hope we have at least convinced others to also attempt to decompose the incumbency effect, since doing so is necessary to understand potential policy implications.

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Table 1: Incumbency effects on probability of winning by time period: overall incumbency

Dependent variable: Probability of winning	Combined	Liberal Party		Conservative Party	
		Pre-1950	Post-1950	Pre-1950	Post-1950
Mean probability of winning	0.456	0.612	0.430	0.479	0.378
<i>Regression discontinuity incumbency estimates</i>					
<i>Overall Incumbency</i>					
Linear (+/-15%)	0.112*** (0.0322)	0.136*** (0.0438)	0.108*** (0.0371)	0.0889* (0.0472)	0.106*** (0.0359)
Linear (+/-10%)	0.0941** (0.0376)	0.112** (0.0506)	0.0697 (0.0443)	0.0873 (0.0574)	0.0699 (0.0431)
Cubic	0.0942*** (0.0326)	0.110** (0.0475)	0.0868** (0.0384)	0.0762 (0.0495)	0.0827** (0.0388)
Quartic	0.102*** (0.0393)	0.130** (0.0574)	0.0862* (0.0456)	0.0929 (0.0622)	0.0954** (0.0451)
<i>N (linear, +/-15%)</i>	6465	1627	1886	1369	1583
<i>N (linear, +/-10%)</i>	4742	1242	1337	1059	1104
<i>N (polynomial)</i>	13195	2425	4406	2016	4348

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. The reported results for the linear regressions are restricted to margins of victory as noted \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2: Incumbency effects on probability of winning by province: overall incumbency

Dependent variable: Probability of winning	NB	NS	ON	QC	BC	MB	AB	SK	PE	NL
<i>Regression discontinuity incumbency estimates</i>										
<i>Overall Incumbency</i>										
Linear (+/- 15%)	0.189 (0.140)	0.0567 (0.114)	0.115** (0.0485)	0.143** (0.0661)	0.346*** (0.0952)	-0.0269 (0.149)	-0.0359 (0.240)	0.130 (0.125)	-0.191 (0.245)	0.255 (0.362)
Quartic	0.342* (0.174)	0.0783 (0.157)	0.113** (0.0568)	0.131* (0.0791)	0.316*** (0.117)	0.00345 (0.164)	-0.0661 (0.205)	0.0137 (0.164)	-0.603 (0.391)	0.362 (0.286)
<i>N (linear, +/-10%)</i>	349	497	2762	1341	472	294	175	260	183	69
<i>N (polynomial)</i>	578	710	4727	3517	1015	641	831	633	224	204

Notes: Clustered standard errors in parentheses, clustering is by riding. Time fixed effects are included. The reported results for the linear regressions are restricted to margins of victory as noted \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Province abbreviations are as follows: NB refers to New Brunswick, NS refers to Nova Scotia, ON refers to Ontario, QC refers to Quebec, BC refers to British Columbia, MB refers to Manitoba, AB refers to Alberta, SK refers to Saskatchewan, PE refers to Prince Edward Island and NL refers to Newfoundland.

Table 3: Incumbency effects probability of winning if formed government: overall incumbency

Dependent variable: Probability of winning	Combined Linear (+/-15%) Estimate		Combined Quartic Estimate	
<i>Regression discontinuity incumbency estimates</i>				
Incumbency	0.132*** (0.0354)	0.133*** (0.0359)	0.120*** (0.0424)	0.124*** (0.0446)
Incumbency * Years in Power	-0.0128 (0.00887)		-0.00523 (0.00751)	
Incumbency * Years in Power <sup>2</sup>	0.000820 (0.000564)		0.000272 (0.000468)	
Incumbency * Formed Government		-0.0214 (0.0274)		-0.0260 (0.0360)
<i>N</i>	13195	13195	6465	6465

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. The reported results for the linear regressions are restricted to margins of victory as noted \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4: Incumbency effects on vote shares by time period: overall incumbency

Dependent variable: Vote share	Combined	Liberal Party		Conservative Party	
		Pre-1950	Post-1950	Pre-1950	Post-1950
Mean vote share	40.443	49.748	38.281	46.646	33.927
<i>Regression discontinuity incumbency estimates</i>					
<i>Overall Incumbency</i>					
Linear (+/-15%)	2.426*** (0.551)	2.431** (1.033)	4.200*** (0.717)	-0.00147 (1.051)	3.193*** (0.756)
Linear (+/-10%)	2.379*** (0.643)	1.783 (1.147)	3.765*** (0.821)	0.569 (1.294)	2.625*** (0.909)
Cubic	2.666*** (0.581)	1.621 (1.124)	4.241*** (0.758)	0.352 (1.162)	2.462*** (0.831)
Quartic	2.780*** (0.734)	1.602 (1.221)	4.058*** (0.944)	1.204 (1.434)	3.766*** (0.943)
<i>N (linear, +/-15%)</i>	6465	1627	1886	1369	1583
<i>N (linear, +/-10%)</i>	4742	1242	1337	1059	1104
<i>N (polynomial)</i>	13195	2425	4406	2016	4348

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. The reported results for the linear regressions are restricted to margins of victory as noted \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5: Vote loss of other parties due to Liberal incumbency, post-1950: overall incumbency

Dependent variable: Vote share of party in column heading	Conservative	NDP	BQ	Other
<i>Regression discontinuity incumbency estimates</i>				
<i>Overall Incumbency</i>				
Linear	-0.271 (1.015)	-1.089 (0.874)	-3.598 (2.582)	-2.429** (1.093)
Quartic	-0.0841 (1.273)	-0.889 (1.088)	-5.587* (3.041)	-1.861 (1.304)
<i>N (linear)</i>	1868	1695	99	1886
<i>N (quartic)</i>	4375	4046	346	4405

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. The reported results for the linear regressions are restricted to margins of victory between +/-15%. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6: Vote loss of other parties due to Conservative incumbency, post-1950: overall incumbency

Dependent variable: Vote share of party in column heading	Liberal	NDP	BQ	Other
<i>Regression discontinuity incumbency estimates</i>				
<i>Overall Incumbency</i>				
Linear	-3.518*** (0.800)	-1.720** (0.825)	1.916 (8.371)	0.875 (0.907)
Quartic	-2.431** (1.032)	-2.873*** (1.043)	10.85 (8.210)	0.144 (1.083)
<i>N (linear)</i>	1576	1418	45	1583
<i>N (quartic)</i>	4337	4007	341	4348

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. The reported results for the linear regressions are restricted to margins of victory between +/-15%. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7: Effect of margin of victory at time  $t-1$  on decision to run at time  $t$

Dependent variable: Decision to run again	Combined
Mean probability of running again	0.812
<i>Regression estimates</i>	
Margin of victory	0.019
	0.017
<i>N</i>	6940

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 8: Incumbency effects on vote shares and probability of winning: party and individual incumbency

	Combined	
	Probability of winning	Vote share
Mean probability of winning/vote share	0.456	40.443
<i>Regression discontinuity incumbency estimates</i>		
<i>Party plus Individual Incumbency</i>		
Linear (+/-15%)	0.0479 (0.0381)	2.320*** (0.824)
Linear (+/-10%)	0.0662 (0.0455)	2.827*** (0.913)
Cubic	0.0415 (0.0393)	3.473*** (0.886)
Quartic	0.0562 (0.0473)	3.148*** (1.097)
<i>Party Incumbency</i>		
Linear (+/-15%)	0.0502 (0.0489)	-1.904* (0.991)
Linear (+/-10%)	0.0286 (0.0582)	-1.851 (1.161)
Cubic	0.0453 (0.0502)	-1.721* (1.042)
Quartic	0.0678 (0.0604)	-1.057 (1.270)
<i>Individual Incumbency</i>		
Linear (+/-15%)	-0.00234 (0.0508)	4.223*** (1.315)
Linear (+/-10%)	0.0376 (0.0617)	4.677*** (1.469)
Cubic	-0.00372 (0.0526)	5.194*** (1.398)
Quartic	-0.0116 (0.0636)	4.205** (1.670)
<i>N (linear, +/-15%)</i>	6465	6465
<i>N (linear, +/-10%)</i>	4742	4742
<i>N (polynomial)</i>	13195	13195

Notes: Clustered standard errors in parentheses, clustering is by riding. Time and province fixed effects are included. The reported results for the linear regressions are restricted to margins of victory as noted. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Figure 1: Representation of individual and party effects

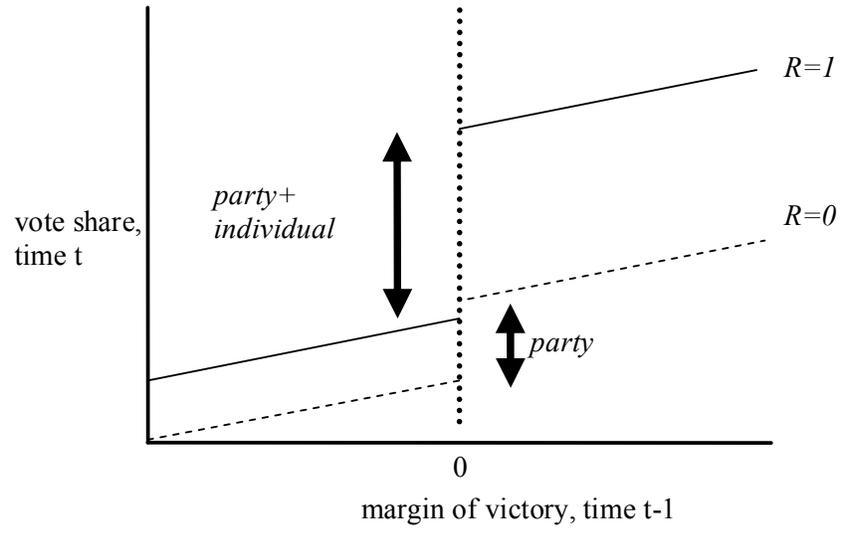
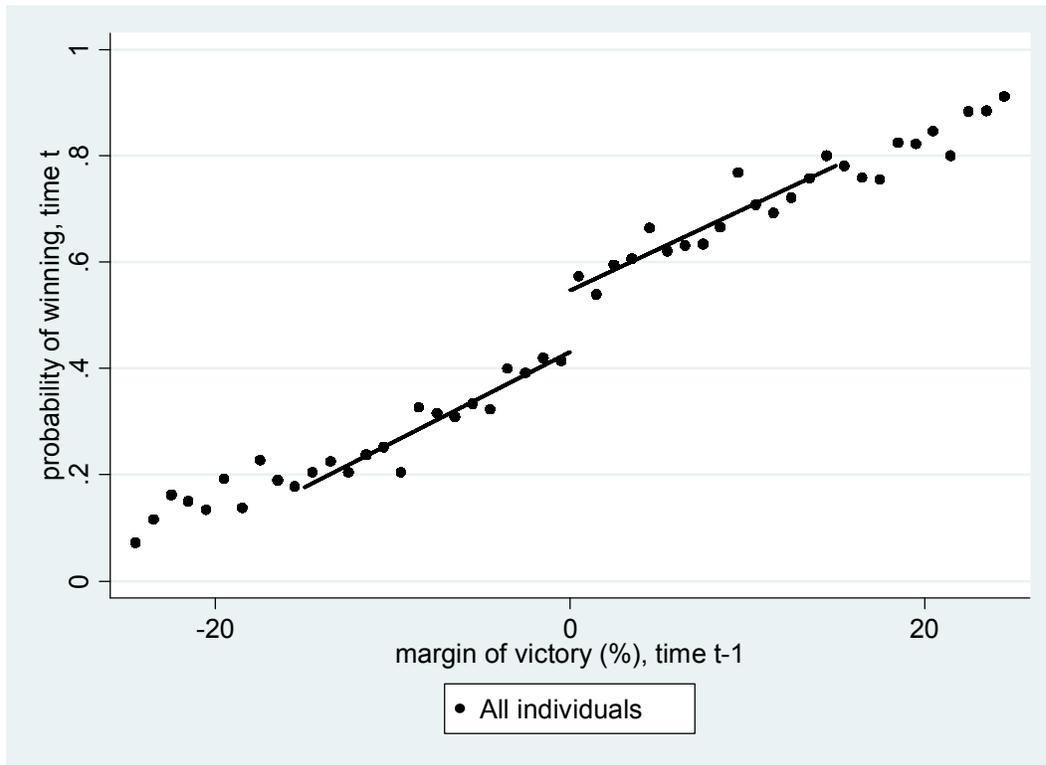
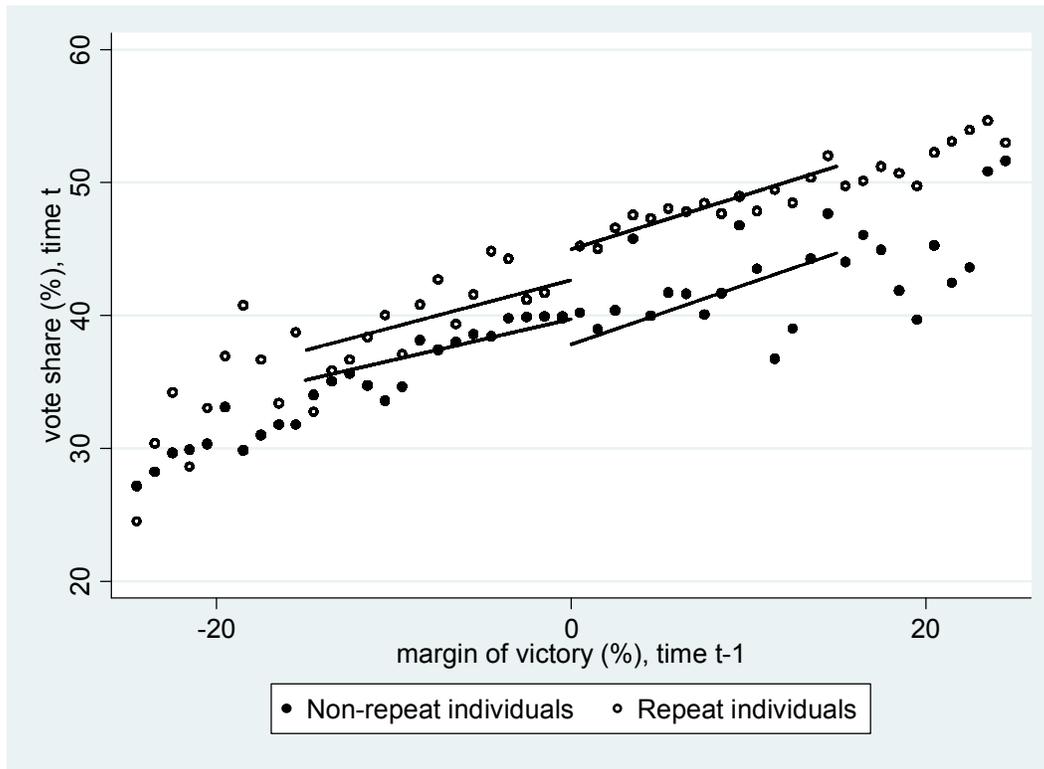


Figure 2: Combined (Liberal and Conservative) probability of winning, all time periods



Note: Curves are for linear probability model using +/-15% of margin of victory around the discontinuity at zero.

Figure 3: Combined (Liberal and Conservative) vote share (individual and party effects)



Note: Curves are for linear regression using +/-15% of margin of victory around the discontinuity at zero.

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Lead footnote: \*Corresponding author. We would like to thank Kevin Milligan for his helpful comments and suggestions as well as the Library of Parliament for access to the data. SSHRC (Rekkas) support is gratefully acknowledged.

<sup>1</sup> Refer to Gelman and King (1990) for a good summary of these three traditional approaches.

<sup>2</sup> As suggested by Imbens and Lemieux (2008), including additional covariates that affect the dependent variable can be beneficial for increasing precision and reducing the bias introduced by including observations away from the discontinuity. Our qualitative results are unchanged if we do not include the fixed effects.

<sup>3</sup> Note that our model and previous models that measure the party plus individual incumbency effect require there to be a reasonable number of repeat individuals that lose in the previous election in order to be able to identify the party plus individual and individual incumbency effects. We have between 249 and 452 such individuals in each of the sub-samples we consider.

<sup>4</sup> We omit the elections in the years 1917 and 1921 because the political parties of the candidates in the 1917 election were not coded correctly for use in our estimation.

<sup>5</sup> If we instead ignore general election observations for which the past election was a by-election, our standard errors are somewhat reduced due to the reduced number of observations, but all qualitative results are unchanged.

<sup>6</sup> Redistricting always poses problems in analyzing Canadian election data because of the frequent redistricting that occurs. To obtain a completely accurate panel of only those ridings which were completely unchanged would require the painstaking manual identification of all ridings which have not undergone any boundary change between consecutive elections. We instead take the simpler approach of relying on exact name matches to identify ridings which did not significantly change.

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<sup>7</sup> The most recent example of a two-seat riding occurred in 1965 and the Canadian Parliament now exists solely of single-seat ridings.

<sup>8</sup> Figures separated by party show similar discontinuities.

<sup>9</sup> Here we report the range of estimates that are significant at at least the 10% level.

<sup>10</sup> Our results are also robust to inclusion of a dummy variable indicating that the candidate has participated in the last two elections. We have limited data on candidate characteristics with which we can check that the characteristics vary smoothly across the  $MV=0$  boundary, but this result provides some evidence that our RD design is valid.

<sup>11</sup> To preserve space, we present only a single linear specification and the quartic specification for these additional results.

<sup>12</sup> We thank the editor and an anonymous referee for suggesting this investigation.

<sup>13</sup> The local linear regressions will yield better results theoretically as long as there is truly a linear relationship between the dependent and independent variable over the bandwidth range used, as appears to be the case in our data. Note, however, that our qualitative analysis continues to hold if we consider the polynomial estimates instead.

<sup>14</sup> For such a result, it would have to be the case that the incumbents for the party that is taking less vote share happens to be doing so in ridings which are more tightly contested such that only small vote share increases result in higher increases in the probability of winning.

<sup>15</sup> Hainmueller and Kern (2008) also investigate vote loss. In the German Bundestag, they find that the majority of votes are taken from the other major party.

<sup>16</sup> Including an interaction term between the margin of victory and election number, we find that the interaction terms are also insignificant except for four elections. Further, replacing the margin of victory with vote share provides qualitatively similar results.

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<sup>17</sup> Our results are qualitatively similar when we drop the 1993 election in which Prime Minister Kim Campbell led the Conservatives. Anecdotal evidence suggests strategic exit may have been particularly likely in this election. When we exclude this election, the individual effect is somewhat reduced but remains significant at the 10% level and our conclusion that the *party plus individual* incumbency effect is entirely made up of the effect of being the incumbent individual continues to hold.