

# Detecting Manipulation in U.S. House Elections: 1898-1992

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## Abstract

Some observers believe that entrenched political forces systematically manipulate the electoral process in their favor. Uncovering whether this is a widespread phenomenon is difficult since existing political forces are intentionally chosen by the electorate and electoral manipulation is by its very nature a clandestine process which is hard to detect. Looking at vote shares received by incumbents in congressional elections from 1898-1992 I find that in extremely close elections where the outcome should be random, incumbent candidates win significantly more often than expected which suggests that the vote counting process is biased in favor of incumbents.

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## 1 Introduction

One of the fundamental tenets of democracy is that electoral outcomes represent the voters will. An immediate corollary is that votes are recorded and tabulated accurately. When complete accuracy is impossible then the counting of the votes should at least be unbiased. However, historical evidence suggests that candidates sometimes manipulate the outcome of elections by influencing the vote counting process. My paper develops a novel test for ballot box manipulation. I examine the results of extremely close U.S. House elections (a sample in which the average margin of victory was 0.14 percent), and find that incumbents win significantly more often than one would expect.

There are two major difficulties in detecting electoral tampering. The first is that it is hard to disentangle the well known incumbency advantage from manipulation of the election process. Second since manipulation is by definition clandestine it is hard to gather evidence that the outcomes are biased. Acts such as coercion of election workers, destroying ballots, and placing friendly individuals within election commissions are difficult to verify since they are done under the veil of secrecy.

The solution I propose is to search for indirect evidence of systematic manipulation. I argue that the outcome of an extremely close election should resemble a random process. This is because the amount of noise in the voting system is greater than the handful of votes that make the difference in the outcome. So, if the ballot box is not tampered with, incumbents will win approximately half of these very close elections. On the other hand, if cheating is occurring, then incumbents may win these

close elections more often than challengers. Since incumbents have more experience, greater resources, and are more insulated within the local political infrastructure than their opponents they would be more likely to succeed in tampering with the tabulation process. I suggest that the likelihood of manipulation is highest in precisely those races that are the closest, since the outcomes hinges on a very small number of votes. This discontinuity in the returns to manipulation generates a natural experiment to detect electoral fraud.

In a sub-sample of U.S. House Elections from 1898 to 1992 where the difference between winning and losing is on average 155 votes incumbents win approximately 58 percent of the elections. The average number of ballots cast in these contests exceeds 110,000, making the average margin of victory equal to 0.14 percent. Statistical tests reveal that this is significantly different from the null hypothesis of a random outcome. I also derive a series of robustness tests that show this effect is in fact detecting bias in the vote counting process and not the underlying incumbency advantage. I interpret this as evidence of manipulation of outcomes in favor of incumbents.

This work contributes to the burgeoning empirical literature on corruption. This literature has introduced a set of tools to enable researchers to detect the existence of corruption in a variety of settings. The fundamental technique that these papers use is to examine the distributions of outcomes that are a result of a supposedly random data generation process and look for anomalies in the distribution that suggest manipulations. For example Duggan and Levitt (2002) make use of a similar discontinuity design to identify the existence of throwing Sumo wrestling

matches in Japan while Justin Wolfers (2003) looks at the prevalence of corruption in college basketball. DeGeorge, Patel, and Zeckhauser (1999) use discontinuities in forecast predictions to find evidence of earnings management.

There has been a significant amount of work done on the impact of incumbency on electoral outcomes. Much of this work has focused on identifying the causal impact that incumbency has on subsequent electoral outcomes. Gelman and King (1990), Levitt and Wolfram (1997), and Ansolabehere, Snyder, and Stewart (2000) are some representative papers in this tradition. Additionally Lee (2003) recognizes the usefulness in using the institution of majority rule voting to create a compelling counterfactual to estimate the incumbency advantage in elections.

This paper proceeds as follows: First I discuss some of the anecdotal evidence in favor of electoral fraud. I will then develop my identification strategy and formal empirical methodology. Finally I discuss my results and offer some speculative conclusions for future research.

## **2 Biasing Elections**

To understand how electoral outcomes are biased I separate biasing into two categories: *ex-ante* to the election day and *ex-post* after the election day. *Ex-ante* manipulations consist of voter intimidation, vote buying, or any activities that would deter or encourage voters to participate in favor of one candidate that go beyond generally accepted boundaries. *Ex-post* manipulation occurs after the ballots have been cast, for instance "finding" new voters, destroying ballots, and strategic tabulation are all prime examples. To further illustrate how these mechanisms are used in

American politics I consider two cases from American political history.

## **2.1 The 1948 Texas Democratic Senate Primary**

One instance of both *ex-ante* and *ex-post* manipulative behavior comes from the Texas Democratic primary for senator held in 1948 between Coke Stevenson and Lyndon Baines Johnson. In a poll released one week before the primary the challenger Johnson was trailing the incumbent Stevenson by a 48% to 41% margin with 11% undecided. Given these numbers it would have been improbable for Johnson to win the primary without either a phenomenal turn of events or using extra-legal means to influence the outcome of the election. One of Johnson's closest associates Edward Clark stated that "Campaigning was no good anymore... We had to pick up some votes." [Caro 1982] To go about this Johnson and his allies poured money into the hands of judges, local bosses, and other public officials to provide additional inducement to motivate the voters of Texas. In one instance Johnson gave the Streets Commissioner of San Antonio "a thousand dollars in one-dollar bills for expenses of poll-watchers" In short Johnson was using *ex-ante* manipulations of the democratic process to influence the electoral outcomes.

The Johnson campaign did not stop with these *ex-ante* mechanisms, instead it augmented these strategies with *ex-post* attempts to influence the process by which votes were tabulated. When the Texas elections bureau closed on the election day on August 1948 Lyndon Johnson was trailing Stevenson by 854 votes out of nearly a million votes cast. Given the size and importance of the election it was not surprising that there were both opportunities and incentives to manipulate the vote counting

process. A regional newspaper described the process of calculating the election totals as one where error was present "in counting, copying and tabulating, the votes pass through the hands of eight different groups, between the voter and the final declared result... With a million votes running the gauntlet of 'the Human Element' eight different times, there will always be mistakes regardless of the honesty and good intentions of the humans involved." [*The State Observer*] As Caro writes:

"Few persons familiar with Texas politics, though, were confident of the universality of the "honest and good intentions of the humans involved"; there was common knowledge in the upper levels of Texas politics of the precincts that were for sale, the "boxes" in which the County Judge wouldn't "bring the box" (report the precinct totals to the Election Bureau) until the man who paid him told him what he wanted that total to be. In close elections, precinct results were altered all through the state." [Caro 1982]

After Lyndon Johnson's death, in 1977 the election judge of Duval County Luis Salas admitted to out-right fraud in the process of tabulating the election results. "If they [the votes] were not for our party, I made them for our party" [Caro 1982]. As a result Johnson was able to overcome the electoral day deficit of 854 votes and win the primary by a mere 87 votes out of nearly a million ballots through the widely acknowledge use of both *ex-ante* and *ex-post* strategic manipulations. As a consequence of this electoral manipulation Johnson easily won the

general election and went on to have a significant impact on the landscape of American politics. Although in this example Johnson was in fact the challenger it is a useful example because it illustrates some of the mechanisms by which *ex-post* electoral manipulation can occur.

## 2.2 The Florida Presidential Election in 2000

Another example of *ex-post* electoral strategic behavior occurred in the 2000 presidential election in Florida. As perhaps the most famous close election in American history this case provides stark evidence of many of the *ex-post* and *ex-ante* activities that biased the voting process and tabulation. The 2000 presidential election was one of the most highly contested in American history. After election day November 8th, 2000 the votes for George Bush and Al Gore were so close that the officials tabulating the results could not come to conclusive result as to who won the election in the state. Given that Florida was the deciding state in the Presidential election, an unprecedented amount of scrutiny was paid to this election.

Numerous *ex-ante* events skewed the voting process, which lead many observers to question the fairness of the process. Perhaps the most famous of these *ex-ante* mechanisms was the design of the ballots in the county of West Palm Beach, Florida. In this county Pat Buchanan won a surprising .8% of the vote when he was expected to win at most .3% of the vote. Upon further inspection the design of the ballots in West Palm Beach was deemed by many to be confusing and misleading which visually led some Gore voters to choose Buchanan or double vote for

both Buchanan and Gore<sup>1</sup>. Although it is impossible to be conclusive, some empirical analysis has suggested that it is extremely likely that Gore would have won more than half of those potential mistakes [Brady 2000], and as a consequence the election. In addition to misleading ballots, other problems such as antiquated voting machines and poorly trained poll watchers also were also said to contribute to the failure to count all of the ballots [New York Times, Nov. 12th, 2001].

As highlighted by the Florida election the *ex-post* attempts to manipulate the manner and method by which the votes were tabulated by the two candidates played an important role in determining the who won the election. Since the tabulation process was large, complex, and fraught with many unforeseen contingencies it is easy to see why both parties tried to bias the chaos in their favor. After a year-long study conducted by the New York Times and various other news agencies it was found that what counted as a vote could have swayed the election one way or another. For instance on optically scanned ballots that had only full ovals counted and on punch card ballots where only full punches counted Gore would have won by 134 votes [New York Times Nov. 12th, 2001]. However had ballots with chads that were detached at three corners counted, George W. Bush would have won by 2 votes. This is just one of the many possible counting scenarios where the determination of the process of *ex-post* counting process would influence the final outcome.

As a consequence of the ambiguity in the counting process both camps engaged in strategic behavior in order to bias the tabulation

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<sup>1</sup>Although this was an *ex-ante* manipulation it is doubtful that it occur as a result of a deliberate strategy.

process. One of the key elements of Gore's strategy was to lobby the courts for selective recounts in counties that he felt would favor him. In the aftermath of the New York Times recount "the numbers reveal the flaws in Mr. Gore's post-election tactics and, in retrospect, why the Bush strategy of resisting county-by-county recounts was ultimately successful" [New York Times Nov. 12th, 2001]. One of the strategies central to Bush's campaign was to push for flawed ballots from overseas servicemen to be accepted, the majority of which would be in favor of Bush. While Bush was aggressive in pushing for the acceptance of those ballots Gore was hesitant to fight against their acceptance for fear that he would isolate the military community. These and other fights that took place in the courts and the court of public opinion clearly demonstrate the importance of *ex-post* political strategic behavior in trying to influence the final outcome.

### **3 Identification Strategy**

Fundamentally the problem with identifying the existence of electoral manipulation is that by its very nature it is a clandestine activity. Disentangling it from other factors that go into the final electoral outcome is a problematic task. One approach to this problem is to look at the distinction between *ex-ante* and *ex-post* manipulations. If it were possible to control for all *ex-ante* factors, legitimate or otherwise, and identify a group that was more likely to be able to engage in *ex-post* manipulations of electoral outcomes then it would be possible to detect the existence of corruption. Ideally if the *ex-ante* votes were randomly assigned then it would be possible to test for the existence of *ex-post* manipulations

by looking to see if the vote totals deviate from the random assignment process. The key assumption is that a fair *ex-post* tabulation process should unbiasedly filter the *ex-ante* voting process to final outcomes.

To replicate this ideal experiment with non-experimental data I make two critical steps to identify the existence of bias. The first step I take is to use incumbency advantage to proxy for variation in the relative ability of candidates to have elections biased in their favor. Conditional on the functional random assignment of votes on election day, if the incumbent received significantly more votes than expected from this assignment process this would present evidence in favor of manipulation. Once election day has occurred candidate characteristics should be irrelevant and the tabulation process should filter the votes through in an unbiased manner. If elections were not biased in favor of incumbents then the empirical results would show the random assignment process unbiasedly filtering through the *ex-post* tabulation. Recall from the above examples that incumbency is not the only dimension along which one can have power to exert influence over electoral outcomes. In the Johnson case he deep pockets substituted for political connections in turning the senate primary in Texas in his favor. Thus incumbency is only a crude proxy and any finding of bias from the data will occur despite measurement error.

The second step needed to identify the presence of corruption is to replicate the random assignment process in a non-experimental setting. Since votes are deliberate choices made by the electorate based on candidate qualities, assuming exogeneity of the voting process is implausible. However within the voting process it is widely acknowledged that there

is substantial randomness. Voter turnout and decisions are often influenced by events beyond the control of candidates. Changes in the weather, a recently broken heart, or traffic jams are just a few reasons why we might expect randomness in the voting process. Given this logic we would expect that for a small enough subset of the domain of the distribution that a uniform distribution would provide a good approximation of the underlying distribution.

The next step is to look for a part of the distribution where it would be expected that the incentives to perform *ex-post* manipulations would be the highest. The majority rule voting process used in House elections suggests that the incentives should be highest at the 50% vote share, the boundary where a candidate could just barely win or just barely lose. If one were to look at a very small range close to the 50% point, the distribution of incumbent votes shares should be reasonably approximated by a binomial distribution. If going into the election the final vote is going to be very close then in expectation the final winner should be random since the noise in the process will overwhelm any inherent incumbency advantage. Fifty percent of the time the incumbent candidate should win and fifty percent of the time the challenger should win. *Ex-ante* both candidates have very imprecise information of exactly who will vote for them and how many people will turn out. However *ex-post* the information about the electoral outcomes rapidly comes into view within a few days as the process of tabulating the votes takes place. If *ex-post* manipulations were occurring, then a discontinuity in the distribution will occur at the 50% cutoff. Here one would see that the final vote shares received by incumbents would cluster to the right of the 50%

point, the difference between just barely winning instead of just barely losing which would be evidence in favor of the hypothesis that votes that were for someone else are being changed to favor the incumbent.

## 4 Methodology

Although this paper is dealing with the case of electoral manipulation, this methodology provides a general means of detecting discontinuities in functions over a complete domain<sup>2</sup>. In the case of electoral manipulation the relevant density function is given in figure 1, which is the distribution of vote shares received by incumbents over all House elections from 1898-1992. As we can see from this graph there is an upward trend in this density function, so to argue that there is a discontinuity at the majority rule point it is necessary to show that one is not picking up the underlying trend in the density.

To derive the relevant test I start with benign assumptions about the form of the distribution function and use this to develop a refutable test statistic. For any given cumulative density function  $f(x)$  I define a discontinuity in the following manner:

**Definition 1** *There is a jump discontinuity in  $f(x)$  at  $x = x_m \Leftrightarrow$  The following conditions hold: For  $\delta > 0$ ;  $\lim_{\delta \rightarrow 0} f(x_m - \delta) = K_1$ ;  $\lim_{\delta \rightarrow 0} f(x_m + \delta) = K_2$ ;  $K_1 \neq K_2$  and  $f(x_m) \in \{K_1, K_2\}$*

This definition describes a jump discontinuity in a function. As opposed to using a more general definition of a discontinuity I use this

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<sup>2</sup>Most other studies use discrete domains. DeGeorge, et. al use a continuous domain, but the methods outlined here are more general and make certain assumptions more explicit.

specific class of discontinuities since they are the only relevant class by virtue of the fact that the cumulative distribution function is nowhere decreasing. Furthermore for analytical ease I assume over the range  $[x_m - \delta, x_m + \delta]$  that  $f'(x) \geq 0$  wherever  $f(x)$  is differentiable<sup>3</sup> and that  $f(x) > 0$  over the domain. Additionally I will assume that the number of discontinuities in  $F(x)$  is finite. Using this I establish the following bounds:

$$(1) \int_{x_m - \delta}^{x_m} f(x) dx \leq \delta f(x_m)$$

$$(2) \int_{x_m}^{x_m + \delta} f(x) dx \leq \delta f(x_m + \delta)$$

For notational convenience let  $A = \delta f(x_m)$  and  $B = \delta f(x_m + \delta)$  the upper bounds on 1&2 respectively. This leads to the following theorem.

**Theorem 1**  $\lim_{\delta \rightarrow 0} [\frac{B}{A+B} - \frac{A}{A+B}] = 0 \Rightarrow \text{No Jump Discontinuity}$

**Proof.** To proceed consider the contrapositive of the theorem: *A Jump Discontinuity*  $\Rightarrow \lim_{\delta \rightarrow 0} [\frac{A}{A+B} - \frac{B}{A+B}] \neq 0$ . Trivially computing the limit  $\lim_{\delta \rightarrow 0} [\frac{B}{A+B} - \frac{A}{A+B}] = \lim_{\delta \rightarrow 0} [\frac{f(x_m - \delta) - f(x_m)}{f(x_m + \delta) + f(x_m)}] = \frac{K_2 - K_1}{K_2 + K_1} \neq 0$ . This proves the contrapositive and as a consequence the theorem ■

This result says that for a small enough  $\delta$  that the relative area under  $f(x)$  over  $[x_m - \delta, x_m]$  and  $[x_m, x_m + \delta]$  should be approximately equal. If on the other hand there was a jump discontinuity at  $x_m$  then the area to the left of  $x_m$  would be relatively smaller than the area to the right of  $x_m$ .

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<sup>3</sup>This is done without loss of generality since over a small enough domain  $[x_m - \delta, x_m + \delta]$   $f(x)$  will be monotonic. The results hold as well if  $f'(x) < 0$ . Assuming  $f'(x) \geq 0$  is done simply to make the bounds easy to interpret.

Obviously since we don't directly observe the functional form of the distribution but only a finite number of draws from the distribution we need to transform the theorem into a test statistic. As a consequence to test for a discontinuity at  $x_m$  I must arbitrarily choose a finite number  $\delta > 0$  (hopefully small) and empirically observe a finite number  $n$  observations drawn from the range  $(x_m - \delta, x_m + \delta)$ . Unfortunately non-parametric econometric techniques provide little guidance as to what the optimal bandwidth should be so the subsequent choices of bandwidths are arbitrary [DiNardo and Tobias 2001]. The fundamental trade-off is that as one shrinks  $\delta$  the magnitude of the potential bias introduced by picking up underlying trends in  $f(x)$  decreases, but so does the power of the subsequent test. Furthermore  $l$  observations fall within  $(x_m - \delta, x_m]$  and  $u$  fall within  $(x_m, x_m + \delta)$  where by definition  $l + u \equiv n$ . As a consequence of the theorem above if  $|\frac{l}{n} - \frac{u}{n}| \rightarrow 0$  as  $\delta \rightarrow 0$  this would imply that  $\frac{l}{n} \approx \frac{u}{n}$  and that there is no jump discontinuity present. A natural implication this is that the counterfactual distribution to test for the existence of a jump discontinuity is  $l = \frac{1}{2}n$  and  $u = \frac{1}{2}n$ . That is to say, half of the total draws over  $(x_m - \delta, x_m + \delta)$  should fall to the left of  $x_m$  and half should fall to the right. *This exactly describes the binomial distribution, which is the local approximation of any distribution.* Without loss of generality we can characterize the binomial density for finite  $n$ :

$$(3) \quad b(u|n, p) = \frac{n!}{u!(n-u)!} p^u (1-p)^{n-u}$$

As a consequence of above reasoning if  $\delta$  was sufficiently small then we should see  $p = .5$ . To test whether the probability that we would observe  $u$  or greater from  $b(u|n, \frac{1}{2})$  we simply sum up the associated probabilities

(since it is discrete) and arrive at the following test statistic:

$$(4) \text{ test statistic} = \sum_{i=u}^n \frac{n!}{i!(n-i)!} \left(\frac{1}{2}\right)^n$$

A small test statistic implies that the likelihood that  $u \& l$  came from a binomial distribution where  $p = .5$  is small. Since the binomial distribution was endogenously derived from very mild assumptions on the form of the function this implies that the true probability is greater than .5 and as a consequence there is a jump discontinuity in the density at  $x_m$ .

One problem with this approach is that since  $\delta$  is no longer approaching zero it is conceivable that for a close range that this result is not picking up a discontinuity but rather is picking up the underlying trend in  $f(x)$ . If  $f(x)$  is increasing over  $(x_m - \delta, x_m + \delta)$  then binomial test at  $p = \frac{1}{2}$  is a counterfactual that is not taking into account the trend in  $f(x)$ . To adjust for this it is necessary to show that the jump at  $(x_m - \delta, x_m + \delta)$  is relatively greater at  $x_m$  than it is at other similarly sized bands within the domain of  $f(x)$ . For a given point  $x_o$  one can construct an estimate of  $f'(x_o)$  in the same manner that the estimate of the discontinuity was constructed. By comparing the relative number of observations  $t_l$  inside the band  $(x_o - \delta, x_o)$  to the number of observations  $t_u$  inside  $(x_o, x_o + \delta)$  it is possible to estimate  $f'(x_o)$  with  $\frac{t_u - t_l}{t_u + t_l}$ . When implementing this empirically for a finite number points  $x_o$  I can construct a set  $S$  such that  $\{x_o, f'(x_o)\} \in S$ . For any sub-domain over  $x$  the set  $S$  provides an out of sample comparison group to test for a discontinuity at  $x_m$ . By looking at the slope of the distribution function at  $x_m$  and comparing it to the slope of the distribution function at any

given point  $x_o$  it is possible to see whether the slope at  $x_m$  significantly differs from slopes at the other points.

The construction of the comparison set  $S$  is problematic for two reasons. First when estimating  $f'(x_o)$  the precision of the estimate is a function of the total number of draws  $n_o$  that fall between  $(x_o - \delta, x_o + \delta)$ . The estimate of the slope  $f'(x_o)$  will be less accurate when  $n_o$  is small. This implies that it is natural to exclude observations in  $S$  around  $x_o$  as the number of draws within  $(x_o - \delta, x_o + \delta)$  falls.

Secondly since the information about what is happening around  $x_m$  provided by  $f'(x_o)$  improves as  $x_o \rightarrow x_m$  it would be important to put more weight on observations of  $f'(x_o)$  that are closer to  $x_m$ . If I want to see if there is a discontinuity at  $x_m = \frac{1}{2}$  then the slope at  $x_o = \frac{2}{3}$  would be more informative than the slope at  $x_o = \frac{9}{10}$ <sup>4</sup>.

A simple way to construct the set  $S$  is as follows:

1. Create point estimates of  $f'(x_o)$  for arbitrary points across the domain of the distribution.
2. Create a function  $h(x_o, n_o) \subset [0, 1]$  that determines the probability that any element  $\{x_o, f'(x_o)\}$  will be mapped into the set  $S$ .
3. Use the set  $S$  as the comparison distribution to test for a discontinuity.

The crucial step is the construction of  $h(x_o, n_o)$ . The key idea is for any element  $\{x_o, f'(x_o)\}$  the probability of inclusion in  $S$  is influenced by

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<sup>4</sup>Formally if the  $i^{th}$  derivative of  $f(x)$  is non-zero then this logic comes as a direct consequence of Taylor's theorem.

both the precision of the estimate and the information content provided at  $x_o$ . This leads to three criterion for the function  $h(x_o, n_o)$ :

**Criterion 1**  $h(x_o, n_o)$  is non-decreasing as  $x_o$  approaches  $x_m$

**Criterion 2**  $h(x_o, n_o)$  is non-decreasing as  $n_o$  increases

**Criterion 3**  $h(x_m, n_m) \notin S$

A few important caveats are necessary at this point. First one could also use additional information such as the estimate of  $f^i(x_o)$  in the construction of the mapping  $h$ . I leave this to future research. Additionally the third criterion is necessary since putting the discontinuity in the out of sample comparison set is not a good thing. Finally though the three criterion provide guidance on the construction of  $h$ , they do not provide a specific functional form. They do not suggest what the actual levels associated with the two criterion should be, nor do they suggest what the modularity between criterion 1&2 should be. As a consequence the final construct  $h(x_o, n_o)$  will meet the above criterion, but is otherwise arbitrary. When using this construction a variety of functional forms should be used to test for robustness. Once the set  $S$  has been constructed the observed slope  $f'(x_m)$  can be compared to the out of sample slopes  $f'(x_o)$  in a natural way by looking at where  $f'(x_m)$  falls on the empirical distribution of  $f'(x_o)$ . If  $f'(x_m)$  is near the mean of that distribution, then it would be reasonable to believe that there is no discontinuity at  $f(x_m)$ , however if it was at the extremes of the distribution one might believe there was a discontinuity at  $f(x_m)$ .

## 5 Data & Results

### 5.1 Data

To test for electoral manipulation I look at congressional election results from 1898 to 1992. This data has been graciously provided to the public by Gary King in ICPSR data set 6311. This data contains information on vote totals, incumbency, party affiliation, and district locations. For more details on this data set see Gelman and King (1990). This initial data consists of 21,045 elections. After removing elections in which there was no incumbent, more than one incumbent, the elections where the Democrats and Republicans weren't the top two vote getters and elections where at least one party received zero votes the sample is reduced to 13,981 elections. I then construct vote shares by taking the votes received by the incumbent candidate and dividing it by the total votes received by the top two candidates. Within this sample the incumbent wins 89.8% of the elections with an average margin of victory of 62.5% and the average number of votes for the top two candidates was 114,596.

### 5.2 Main Results

To implement the above empirical analysis I chose an initial  $\delta = .005$  and select the midpoint  $x_m = .5$ , the cutoff between where a candidate just barely wins versus just barely loses. Given the initial choice of  $\delta$  is arbitrary all that is necessary is to show that there is a discontinuity at  $\delta = .005$ . The analysis works for other  $\delta$  and the results for  $\delta = .003$  are reported in in the table. Elections to the left of the majority rules point are coded as a lose while elections to the right of the majority rule

point are coded as a win. On average these elections are decided by 155 votes out of 108,025 ballots cast for the top two candidates from either party. In these elections the incumbent wins 183 elections out of 315, whereas the incumbent would be expected to only win 157.5 elections. The incumbent wins 58.1% of the elections. Using test statistic (4) I find that the probability of this observation coming from a random draw is .2%, which would be refuted at any conventional confidence interval close elections clear deviate. This is a clear piece of evidence that the *ex-post* process does not filter the *ex-ante* votes without bias. This is consistent with the final vote totals being manipulated in favor of incumbents. It is important to note that this 58.1% result is merely measures the ability of incumbents relative to challengers to manipulate elections rather than the absolute level of manipulation. For instance this results would be consistent with the scenario where in close elections everyone tries to bias the system every time the election is close but that incumbents are only slightly better at it. Therefore this result can be thought of as a lower bound on the absolute level of electoral manipulation that is taking place.

Problematic with the above analysis is the assumption that  $p = \frac{1}{2}$ . Upon casual inspection figure 1 suggests that there is a natural upward sloping trend in  $f(x)$  around the majority rule point. Specifically over the interval  $[.41, .59]$  the density function  $f(x)$  is increasing. Thus for any arbitrary sized band  $\delta$  one should expect to see  $p > \frac{1}{2}$ . In order to construct a comparison distribution  $S$  for  $f'(x)$  I start by taking a random sample of 18,000 points within the interval  $[.41, .59]$ . For each random point  $x_o$  I estimate  $f'(x_o)$  by counting the number of elections

$l_o$  that occurred in the domain  $[x_o - \delta, x_o]$  and the number of elections  $u_o$  that occurred in  $(x_o, x_o + \delta]$ . Subsequently the estimated slope at  $x_o$  is  $f'(x_o) \approx \frac{u_o - l_o}{u_o + l_o}$ . From above it is necessary to determine whether to map the pair  $(x_o, f'(x_o))$  into  $S$  using the rule  $h(x_o, n_o)$ . As discussed above though there are specific criteria that this function should meet it is impossible to derive the specific functional form. As a consequence I chose a simple set of rules, using cut-off points to determine whether  $(x_o, f'(x_o))$  should be included in  $G$ . For instance one such function used in this analysis is:

**Example 1**  $h(x_o, f'(x_o)) : \{(x_o, f'(x_o)) \rightarrow S \text{ if } x_o \in [.41, .49] \cup [.51, .59] \text{ and } n_o > 300\}$

If the midpoint  $x_o$  is in the set  $x_o \in [.41, .49] \cup [.51, .59]$  and the total number of elections within  $[x_o - \delta, x_o + \delta]$  is greater than  $n_o > 300$  then the pair  $(x_o, f'(x_o))$  will be included in  $S$ . By choosing these discrete cut-offs  $h(x, n)$  satisfies criterion 1-3. This mapping indicates if the incumbent's margin of victory is close to the majority rule point and there is an adequate number of observations in that range to observe  $f'(x_o)$  accurately it will be included in  $S$ . Table two shows the empirical results for various mappings  $h(x_o, n_o)$ . This table provides evidence consistent with the story that there is a discontinuity present at the majority rule point. For a given domain and minimum  $n_o$  this table reports the average slope at a given point, the standard deviation, and test statistic (5) that tests for the significance of the discontinuity at  $x_m$ . The key findings are that as the minimum number of elections that occurs within a given bin increases the test-statistic's significance increases. This is

consistent with the observation that when  $f'(x_o)$  is poorly measured the noise in the mean decreases at a greater rate than the decrease in the power of the test. Additionally as the domain includes less observations further away from  $x_m$  I find that the test statistic becomes more and more significant. Overall the result holds at the 95% confidence level except for the inclusion of small  $n_o$  which implies the inclusion into  $G(x)$  of imprecisely estimated slopes. In summary this evidence is consistent with the assertion that there is a significant discontinuity at the majority rules point.

### **5.3 Is Ex-ante Incumbency Advantage Naturally Increasing in Close Elections?**

One objection to this analysis is that there is an underlying advantage to incumbency that is even more relevant in close elections. For instance one plausible explanation is that candidates know when they are in a close election and have certain advantages at winning these elections relative to challengers. In a close election that hinges on a few hundred votes if an incumbent has more money on election day then she might be able to spend that money to push herself over the top. This perspective suggests the empirical finding is a result of an advantage incumbent candidates have campaigning in close elections rather than in the *ex-post* tabulation process.

For this alternative hypothesis to be plausible two conditions must be met: 1) The incumbent knows when they are in a close elections and 2) Conditional on knowing that they are in a close election the *ex-ante* actions that an incumbent can take will influence the final vote outcomes.

Referring to figure 3 distribution B would correspond to the case where the *ex-ante* advantage increases in close elections. Distribution A is consistent with only *ex-post* advantages being of importance, since the noise in the electoral process overwhelms any underlying incumbency advantage. If distribution B were in fact the true distribution then a natural consequence would be that the slope of  $f(x)$  would be increasing between  $[49\%, 50\%]$  and between  $[50\%, 51\%]$ . From the data I find that between both of these intervals the distribution is approximately flat, which is consistent with the noise overwhelming any *ex-ante* incumbency advantage<sup>5</sup>. As a consequence it appears that the actual vote totals are closer to distribution A which implies that at least local to the majority rule point the distribution is more consistent with the *ex-post* bias story.

Furthermore the previous argument rested in the assumption that argument (1) was true. Anecdotal and empirical evidence from the polling literature suggests that this is not the case. As Leigh and Wolfers (2003) point out polling technology is extremely imprecise. For instance in the 2001 election for Prime Minister in Australia John Howard won a narrow election getting 50.5% of the votes for the the top two parties. ACNielsen, Morgan, and Newspoll (three prominent election forecasting groups) predicted that Howard would win 52%, 45.5%, and 53% of the votes respectively. In close elections where the accuracy of the polls matter most these polling companies were highly inaccurate. Additionally this election was undoubtedly more important to the electorate than al-

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<sup>5</sup>See table 5 for results. For example comparing the intervals  $[49\%, 49.5\%]$  and  $[49.5\%, 50\%]$  I find that there are almost an equal number of elections that fall into both intervals which suggests a flat distribution. Similar results hold for  $[50\%, 50.5\%]$  and  $[50.5\%, 51\%]$ . Choosing different interval sizes yields similar results.

most any house election. Also considering that most of my sample comes from before the birth of modern information technology it is plausible that the polling technology was less accurate than the Australian case. Since polling technology is fairly imprecise one can conjecture that a candidate will put forth their maximal effort on election day regardless of what the polls indicate. This suggests that again the noise in the election and polling process should overwhelm any *ex-ante* incumbency advantage that candidates have in very close elections.

## 5.4 Additional Results

Naturally it would be of interest to look at how the covariates impact *ex-post* manipulation. However since this is a non-parametric estimation technique one quickly runs into the curse of dimensionality [DiNardo and Tobias 2001]. Examining the interaction of incumbency and other variables of interest such as experience severely limits the power of the tests. As a result it is necessary to take a piece-meal approach, examining the impact of only one or two variables on the impact of incumbency on electoral manipulation.

One variable of particular interest is the time trend that exists: is corruption an artifact of the past or is it still prevalent today? Surprisingly we see that the existence of corruption seems to be *increasing* over time. When the data is divided into the following intervals [1898, 1924], [1926, 1950], [1952, 1974], and [1976, 1992] I find that the mean percentage of close elections won by incumbents is increasing by era the .01 bandwidth. In the .01 bandwidth I find that the mean number of elections won by incumbents between 1898 and 1924 is 47.2% which

is not rejected by the test statistic. By the final three intervals above the mean increase from 61.3% to 65% and then finally to 69% when the counterfactual hypothesis is expected to be close to  $p = .5$ . Testing against the binomial distribution all of the results for close elections are significant for the intervals after 1924. One plausible rationale for this increase in manipulation is that technology such as automobiles, computers, etc. have allowed for greater efficiency and coordination within the vote tabulation process, thus requiring fewer people to tabulate the votes. As Shleifer and Vishny (1993) point out a key component of corruption is secrecy, so as a consequence there is a decline the costs of *ex-post* manipulations since fewer people will be needed to turn an election over to an incumbent.

Another issue of interest is to look at the role that political experience plays on how incumbents manipulate elections. First I construct an experience variable indicating how many terms the candidate has been in office. The results indicate that in absence of any other covariates, the probability that an incumbent will win a close election increases with experience. When a candidate has a single term of experience his probability of winning a close election is between 52% – 54% in both bandwidths. However as we look at when a candidate has three or more terms of experiences his probability of winning the election increases to 62% – 65% and is statistically significant. These numbers are suggestive of the fact that as a candidate becomes more experienced he is more able to manipulate close elections in his favor. However when one runs this test using the above year intervals the effect if experience disappears. When testing for the difference between having more than

2 terms of experience within each of these year intervals there is essentially no difference between the relatively experienced and inexperienced candidates.

Also of interest is the role that political parties play the *ex-post* process of electoral manipulation. To test for this effect I change the unit of observation from vote share received by incumbents to vote share received by Democrats and proceed with the analysis as presented above. Not surprisingly I find that in elections where there is no incumbent the percentage of victory is evenly split between Republicans and Democrats, neither party is more corrupt relative to the other. However when controlling for incumbency we see that both Democrats and Republicans demonstrate behavior consistent with *ex-post* manipulation. When a Republican incumbent runs I find that they win approximately 55.9% percent of the the elections while Democrats win approximately 61.1% of the elections. Though Democrats appear to more prone to *ex-post* manipulation, testing for equality of the means for both of the samples fails to reveal a significant difference between the two means. I fail to find significant evidence of one party being more likely than another party to cheat.

Another set of estimates I ran was to look at the impact of state political conditions variables on close elections<sup>6</sup>. Surprisingly I find no evidence that the party of the governor nor the composition of the upper and lower state houses have any impact on *ex-post* manipulation. One might believe that if a Democrat was running in a state with a Demo-

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<sup>6</sup>This data was graciously provided by Rui De Figueiredo. For more information on the construction of this dataset see De Figueiredo (2003)

crat governor and a Democrat upper and lower house that there would be more *ex-post* manipulation regardless of incumbency status. I find no evidence that in states that are heavily Democratic or Republican influence the outcomes of close elections vary in any systematic manner. This suggests that incumbency is more important relative to the regional political environment. The ability to influence the *ex-post* vote counting process seems to rest in the individual rather than in the regional political machine.

## 6 Conclusions

This paper provides evidence that close elections are systematically biased in favor of incumbents. Given that the process of collecting and tabulating votes is very complex, especially in close elections, it is not surprising that it could be subject to implicit or explicit manipulation. This does not say that the candidate necessarily has a hand in it but rather that some force is pushing close elections in their favor. Nor is this manipulation necessarily illegal, it merely says that the process that one would like to believe is, if not perfect, at least fair, is biased in favor of incumbents. This evidence suggests that the advantage of incumbency isn't only based on legislative experience and ideological position but also in the ability to have the democratic process biased in their favor. From a policy standpoint this provides some evidence in favor of increased enforcement of legislation such as the Voting Rights Act of 1965 which was passed to ensure that citizen's votes were properly handled.

Additionally this paper provides lower bound on the level of electoral

manipulation in congressional elections. First it only looks at *ex-post* manipulations, rather than the potentially more important *ex-ante* manipulations. Also this paper only looks at close elections for identification purposes, but that is not to say that there aren't systematic manipulations in other types of elections. Finally the observation that 58% of all close elections are won by incumbents is a relative number rather than an absolute one. This number is consistent with the notion that everyone could be cheating, both the challengers and the incumbents, but that incumbents are slightly better at it.

Finally this paper is a contribution to the growing empirical literature on corruption by showing how these techniques can be fruitfully used to examine issues of voting manipulation. Rather than relying on parametric assumptions about incumbency advantage this paper uses institutional details to non-parametrically identify the existence of *ex-post* manipulations. Further empirical research on corruption in politics would without a doubt provide many interesting findings that would be of significant relevance. Understanding what determinants other than incumbency impact the ability of politicians to exercise political influence would be a logical next step, as would examining whether this holds in contexts other than house elections. Given that at times decisions hinge on the choices of one or two representatives the real costs of the types of manipulations that are described in this paper are potentially quite important.

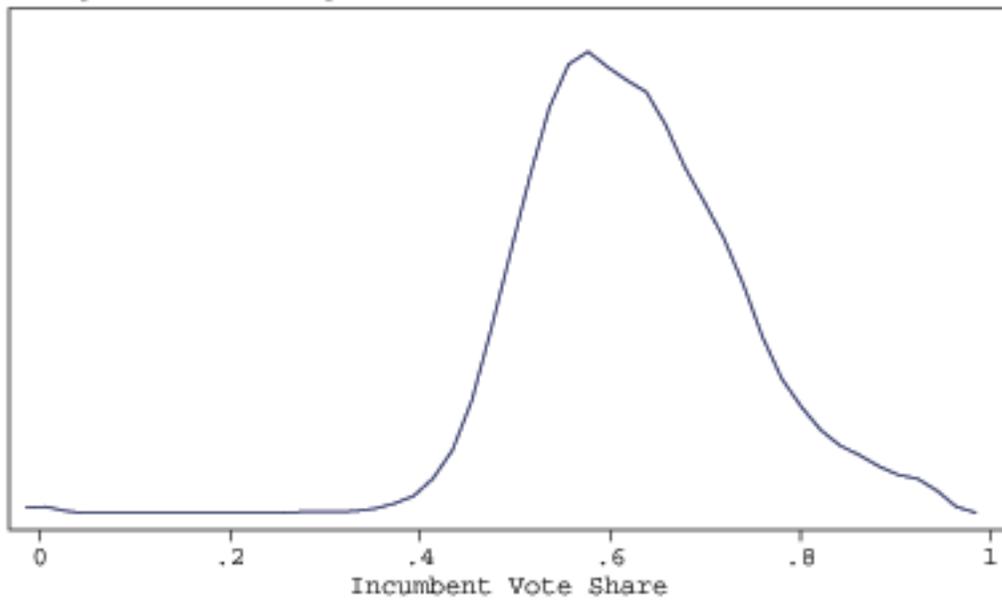
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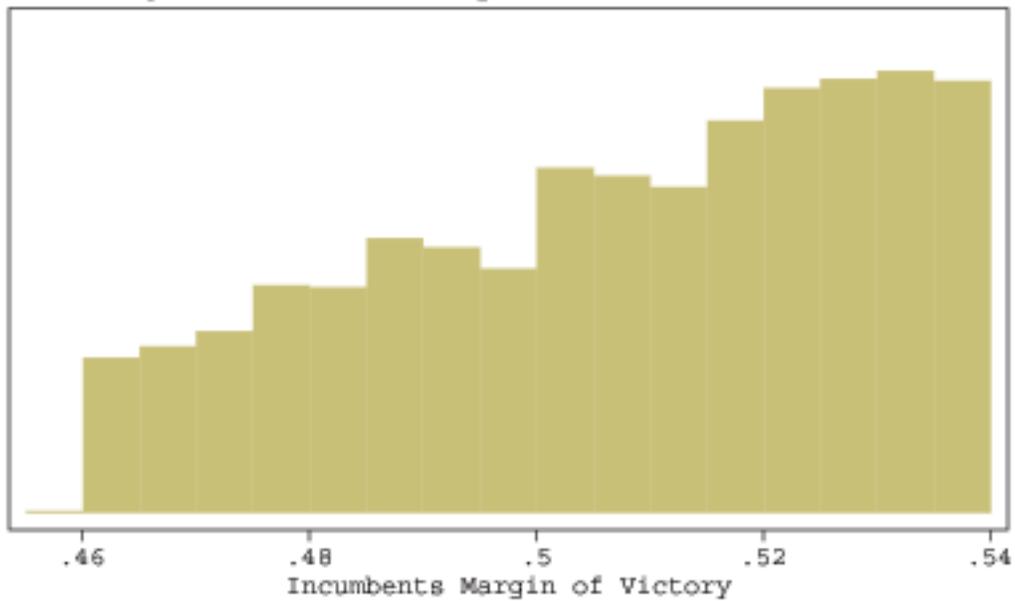
Figure I: Congressional Elections 1898-1992



Epanechnikov kernel used

The total number of elections equals to 13,981

Figure II: Density of Close Elections



Histogram with bin sizes equal to .5% of the vote share  
The total number of elections equals 2,573

Figure 3:  
Distribution of Incumbent Votes Shares in Close Elections

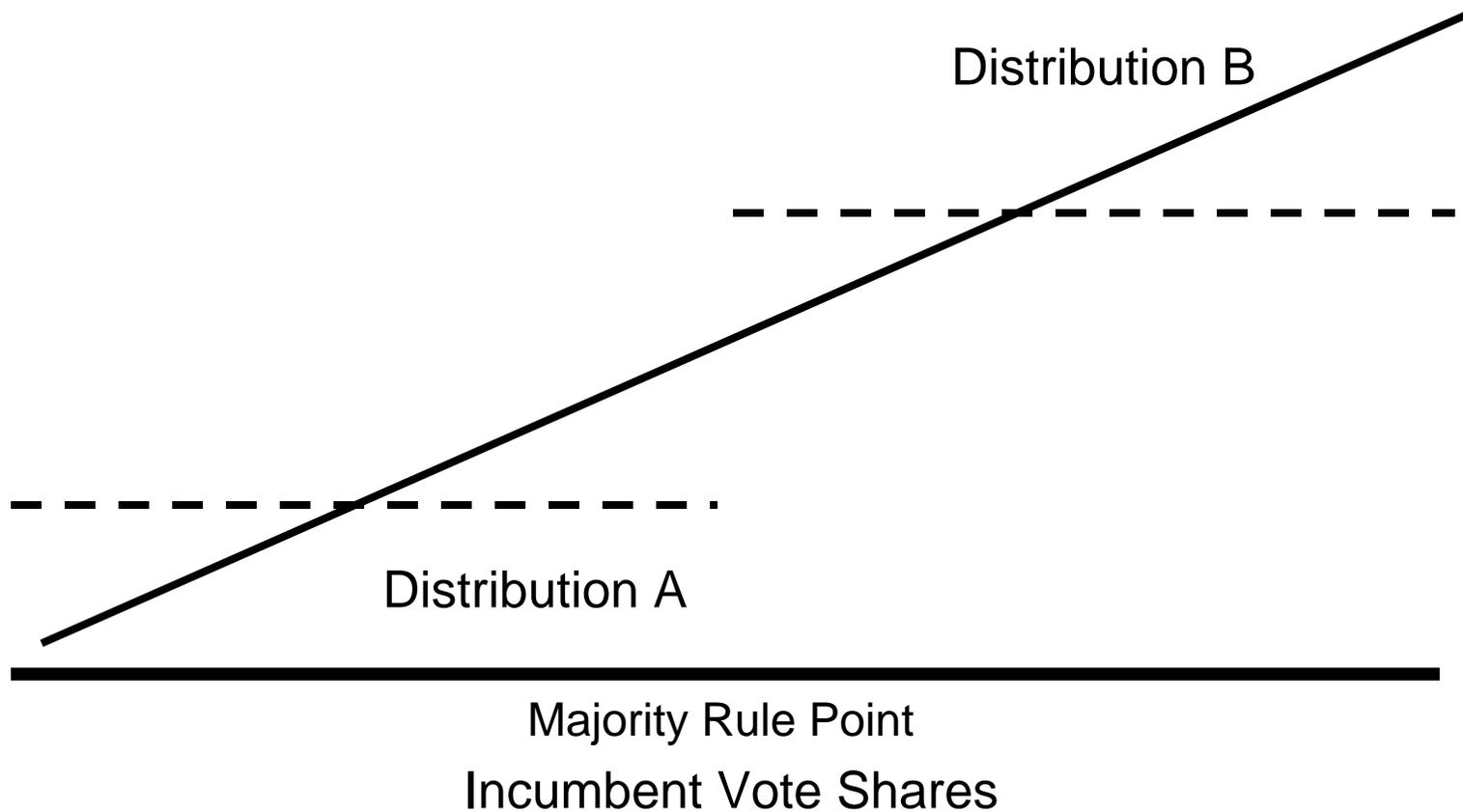


Table 1: Summary Statistics

Election Characteristics	Observations	Mean Total Votes	SD Total Votes	Difference Mean	Difference SD
Overall for all Elections with Incumbents	13981	114596.1	101668	27196.49	38317.68
Centered at 50% With Band Width = .06	178	108510.5	82568.05	88.04494	529.637
Centered at 50% with Band Width = .01	315	108025.1	86584.08	155.1555	867.5803

Table 2: Results with Bandwidth = .01

	N	Mean	Middle Tail	Upper Tail
Main Results	315	0.580952	0.004767	0.002383
1898-1925	110	0.472727	0.633756	0.747658
1925-1951	106	0.613208	0.025021	0.012511
1951-1975	60	0.65	0.02734	0.01367
1975-1992	39	0.692308	0.023703	0.011851
Experience > 2	139	0.61151	0.010678	0.005339
Experience <= 2	176	0.55682	0.151889	0.075945
1975 to 1992: experience > 2	39	0.615385	0.790634	0.604683
1951 to 1975: experience > 2	60	0.466667	0.9154	0.4577
1925 to 1951: experience > 2	106	0.415094	0.683522	0.658239
1898 to 1925: experience > 2	110	0.4	0.395741	0.802129

Table 3: Results with Bandwidth = .06

	N	Mean	Middle Tail	Upper Tail
Main Results	178	0.5730337	0.0606494	0.0303247
1898-1925	57	0.4385965	0.4270429	0.8553782
1925-1951	61	0.6065574	0.1237314	0.0618657
1951-1975	38	0.6578947	0.0729514	0.0364757
1975-1992	22	0.6818182	0.1338005	0.0669003
Experience = 2	70	0.64286	0.022464	0.011231
Experience <= 2	108	0.52778	0.630634	0.315317
1975 to 1992: experience > 2	22	0.6363636	0.6831666	0.6584167
1951 to 1975: experience > 2	38	0.4210526	0.3205101	0.839745
1925 to 1951: experience > 2	61	0.3606557	0.3745319	0.8127341
1898 to 1925: experience > 2	57	0.3333333	0.7118596	0.6440702

Table 4: Comparison Set G(x)

Incumbent Vote Share Interval	Minimum N	Average Slope	SD	Observations	Min	Max	Test Statistic (5)
[.41,.49]U[.51,.59]	50	0.5184	0.0361	15124	0.4058	0.6727	1.734
[.41,.49]U[.51,.59]	100	0.5158	0.03	11875	0.4351	0.626	2.1733
[.41,.49]U[.51,.59]	200	0.5096	0.0259	9823	0.4351	0.5855	2.7553
[.41,.49]U[.51,.59]	300	0.5074	0.0245	8000	0.4465	0.5804	3.0041
[.45,.49]U[.51,.55]	50	0.5236	0.0306	8000	0.4351	0.626	1.866
[.45,.49]U[.51,.55]	100	0.5232	0.0306	7875	0.4351	0.626	1.8889
[.45,.49]U[.51,.55]	200	0.5151	0.0265	5823	0.4351	0.5855	2.4868
[.45,.49]U[.51,.55]	300	0.5133	0.025	4000	0.4586	0.5804	2.708
[.47,.49]U[.51,.53]	50	0.5185	0.0259	4000	0.4351	0.5855	2.4131
[.47,.49]U[.51,.53]	100	0.5185	0.0259	4000	0.4351	0.5855	2.4131
[.47,.49]U[.51,.53]	200	0.5179	0.0257	3823	0.4351	0.5855	2.4553
[.47,.49]U[.51,.53]	300	0.5167	0.022	2000	0.4663	0.5636	2.9227

Table 5: Number of Close House Elections: 1898-1992

Incumbent Vote Share	Number of Elections
[.49,495]	137
[.495,.5]	132
[.5,.505]	183
[.505,.51]	174
[.49,.5]	269
[.5,.51]	357