Second Digit Implications of Voters' Strategies and Mobilizations in the United States during the 2000s*

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April 7, 2013

*Prepared for presentation at the 2013 Annual Meeting of the Midwest Political Science Association, Chicago, April 11–14, 2013. Thanks to Joe Klaver and Josh Lowenthal for assistance.

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Abstract

Alesina and Rosenthal's theory of divided government predicts voters act strategically: the presidential candidate of one party gets extra votes and so do legislative candidates of the opposite party. Empirically assessing the strategic behavior of voters supports the theory in U.S. election data from the 1980s, but by 2004 the same methods contradict the theory. Anomalous patterns seen in precinct vote counts' second digits in 2006 and 2008 data seemingly trace to the particular patterns of Democrat-favoring mobilization that occurred in those years. Digit patterns for federal and state legislative offices in the 2010 midterm elections resemble the 2000s more than the 1980s. To be more precise, patterns in the 2010 midterm for U.S. House races resemble the patterns seen for U.S. House races in the presidential elections of 1984 and 1988. In 2006, 2008 and 2010 second-digit patterns for state legislative races are similar to the patterns for U.S. House races in those same years while in the 1980s they differed. Stronger ties between the federal and state elections are apparent in the 2000s. To be even more precise, in the 2000s the digits diagnose especial mobilizations affecting votes for winning Democratic candidates and not for winning Republicans. Such an asymmetry is apparent in the 2010 election even though the results in that election were a wave of Republican (and "TEA Party") victories.

1 Introduction

Mebane (2013) emphasizes how patterns in the conditional mean of the second significant digits of precinct vote counts—a statistic he denotes $\hat{j}_x$—help diagnose the strategies voters were using in several elections in the United States, Germany, Canada, Mexico and other places.[1] The strategies in focus in many of those elections are ones whose existence has previously been established on the basis of other evidence that goes well beyond the digits in the vote counts themselves. In the United States the strategy of principal interest is the one described by the strategic party balancing theory of Alesina and Rosenthal (1995). That theory describes a relationship in presidential election years between votes cast for president and votes cast for the U.S. House of Representatives, and it makes predictions for how the votes cast in midterm elections should be distributed. The theory asserts that strategic considerations should cause the leading presidential candidate to receive some votes that the candidate would not otherwise receive while at the same time legislative candidates from the opposing party receive extra votes that they would not have otherwise received. Mebane (2013) describes these "extra" votes as being strategically switched toward the favored candidates, even though in a literal sense—according to the theory—the vote gains the candidates enjoy reflect merely the impetus that occurs as part of large-scale noncooperative equilibrium behavior. A main point in Mebane (2013) is that $\hat{j}_x$ behaves in ways that are compatible with the gains the respective parties are predicted to receive in the designated time periods. In midterm elections, when Alesina and Rosenthal's theory predicts voters do not strategically switch their votes, $\hat{j}_x$ has patterns that can be explained almost entirely as consequences of partisan imbalances among the voters in each of the different districts.

While extensive evidence ranging from macroeconomic data (Alesina, Londregan and

[1] Works addressing the diagnostic use of the second digits of vote counts, albeit not necessarily precinct vote counts, include Pericchi and Torres (2004); Mebane (2006); Shikano and Mack (2009); López (2009); Pericchi and Torres (2011); Cantu and Saiegh (2011); Deckert, Myagkov and Ordeshook (2011); Mebane (2011).

Rosenthal 1993; Alesina and Rosenthal 1995) to survey data (Mebane 2000; Mebane and Sekhon 2002) supports the validity of the Alesina and Rosenthal model during the 1980s, which is the time period covered by the analysis in Mebane (2013, Chapter 10), whether the same mechanisms operate in subsequent American national elections is more of an open question. Looked at from a distance, events give reason to question whether major predictions of the theory hold. Alesina and Rosenthal's theory predicts that the president's party regularly experiences a midterm loss, but both in 1998 and in 2002 the president's party gained vote share in midterm House elections. For 1998, Mebane and Sekhon (2002) suggests how that might occur even if the structure of the election is as Alesina and Rosenthal (1995) describes: Mebane and Sekhon (2002) point out that there are regular fluctuations in policy preferences that usually go against the president's party but in 1998 did not. In the 2006 and 2010 elections midterm losses by the president's party resumed. In the preceding presidential contests (2004 and 2008 respectively), same-party majorities and executives were elected, only to have presidential approval fall precipitously prior to the ensuing midterm election. Just before the 2006 election George W. Bush's approval rating sat at 38%; Barack Obama's approval rating was 43% on the eve of the 2010 midterm.[2]

The 2006 and 2010 elections seem in many ways to be mirror images of one another. After the 2006 election Democrats had gained 31 seats in the House and held a 31 seat advantage; after the subsequent midterm, Republicans had gained 63 seats and held a 49 seat advantage. Contested policy issues haunted each President and their legislative majorities. In 2006 war weariness was a major topic in the campaign, while in 2010 the recent passage of the Affordable Care Act weighed heavily upon Democratic prospects. Because these two elections with midterm losses follow two elections in which there were no losses, we can wonder whether the mechanisms that generate the losses differ from the reasons for losses in the earlier period.

Similarities between 2006 and 2010 reach beyond federal elections. As a result of the

[2]Source: `http://www.presidency.ucsb.edu/data/popularity.php`.

2006 election Democrats gained six governorships, and four years later Republicans gained six. The 2006 election saw substantial gains for Democrats in state legislatures, with no chambers switching from Democratic to Republican control, and in 2010 Republicans made huge gains in state legislative control with no chambers switching from Republican to Democratic control. These are the only two times such uniformly directed changes have happened since the Republican victories of 1994 (O'Toole 2010; Geller 2006).

Other seeming anomalies relative to the strategic party balancing theory appear if we use data from U.S. elections during the 2000s to compute the conditional means of the second significant digits of precinct vote counts ($\hat{j}_x$). Ultimately we find that for U.S. House races the midterm elections of 2006 and 2010 seem remarkably like the presidential year elections of 1984 and 1988 and unlike the midterms of 1986 and 1990. Patterns in $\hat{j}_x$ for state legislative elections in 2006, 2008 and 2010 track the patterns for U.S. House races, something that does not happen in the elections of the 1980s.

1.1 Conditional Digit Means

No formal theory exists to support interpretations of the patterns in the second significant digits of precinct vote counts, so the point of our efforts here is twofold. In one direction, our effort is an inductive effort to determine whether the second-digit patterns are in fact meaningful. In Mebane (2013) there is an extensive attempt to match statistics like $\hat{j}_x$ to known (or at least strongly substantiated) patterns of strategic and other normal political behavior by voters. Mebane (2013) finds that in several countries—with both plurality and mixed systems—the second significant digits of precinct or polling station vote counts behave in regular ways that match the strategies voters are using. But Mebane (2013) finds also that the digits respond not only to strategically induced additions and subtractions from the votes received by a party but also to changes that trace to other reasons for "especial mobilization." Mobilization by strategy is merely one type of mobilization that leaves regular traces in vote counts' digits.

In the current paper we use our judgments about the broad causes of voters' actions to interpret $\hat{j}_x$ statistics.

From the other direction, our interpretations are partly based on a simulation exercise reported for example in Mebane (2012). Table 1 and Figures 1 and 2 summarize the findings from the simulation. Table 1 shows that when there is an election with three candidates in a single district and voters use wasted-vote logic to abandon the third-place candidate in order to support one of the top two candidates, the results is second-digit mean values near $\hat{j} = 4.35$. The simulation that produces Table 1 considers a district where the leading parties have roughly balanced support. Figure 1 summarizes a simulation in which there are exactly two parties but the balance of support for one party over the other varies from the balanced situation to a situation that is relatively lopsided. There is no strategic voting in this simulation. The conclusion is that district imbalance alone is enough to produce a typical pattern of variation in $\hat{j}_x$ when the conditioning variable x is the margin between the two candidates: by construction $\hat{j}_x = \bar{j} \equiv 4.187$ when $x = 0$;[3] in the presence of turnout decline,[4] $\hat{j}_x$ first rises as the margin increases and then declines such that eventually $\hat{j}_x < \bar{j}$. Figures 2(a,b) summarize a simulation with three parties, strategic vote switching and varying degrees of imbalance. The pattern in $\hat{j}_x$ varies between the leading and second-place parties and depending on whether there is "wasted-vote" strategic behavior.[5]

*** Table 1 and Figures 1 and 2 about here ***

Mebane (2013) shows that the simulated patterns often match the patterns observed in real data from many countries, notably the United States during the 1980s, Canada, Germany and Mexico. The match between simulated and real data patterns helps build an inductive case for the meaningfulness of precinct vote counts' second significant digits. A

[3] If the distribution of the vote counts' second-digits j is described by Benford's Law, then the second digits' expectation is $E[j] = 4.187$. For brevity we define $\bar{j} \equiv 4.187$.

[4] "Turnout decline" means that turnout decreases as the margin increases from zero. Turnout decline is well established as occurring both in the United States and Canada (Cox and Munger 1989; Berch 1989).

[5] Figures 2(c,d) refer to a "coercion" condition that does not arise in any of the U.S. data.

challenge is whether the data from elections from the late 2000s in the United States add to the record of straightforward interpretability.

1.2 Data

For several states we have precinct vote count data for the U.S. House elections of 2006, 2008 and 2010, as well as precinct data for state legislative elections. Data come from 33 states in 2006, 40 states in 2008 and 29 states in 2010.[6] Data are not available for every precinct in some states.

2 United States in the 2000s

A baseline for our treatment of elections in the 2000s is the set of patterns observed for elections during the 1980s. We have precinct data from U.S. House and state legislative elections in 1984, 1986, 1988 and 1990.[7] In these years a major feature is that the pattern in $\hat{j}_x$ varies substantially between presidential and midterm election years. Consider for instance the contrast between Figures 3 and 4. In each figure the conditional mean of the second significant digits is shown separately in four categories. Clockwise from the upper left in the display these are means for the Republican candidate in districts where the Republican won, for the Republican candidate in districts where the Democrat won, for the Democratic candidate in districts where the Democrat won and for the Democratic candidate in districts where the Republican won. Each x-axis contains and each rug plot

[6]Data from 2006, 2008 and 2010 were collected by the author. The states with data in 2006 are AL, AK, AZ, AR, CA, DE, FL, GA, HI, ID, IA, KS, LA, ME, MD, MI, MN, MS, NE, NH, NY, NC, ND, OH, PA, RI, SC, TN, TX, VT, VA, WI and WY. The states with data in 2008 are AK, AZ, AR, CA, CT, DC, DE, FL, GA, HI, ID, IL, IN, IA, KS, LA, ME, MD, MI, MN, MS, NH, NM, NY, NC, ND, OH, OK, PA, RI, SC, SD, TN, TX, VT, VA, WA, WV, WI and WY. The states with data in 2010 are AK, AZ, AR, CA, DC, DE, FL, GA, HI, ID, IL, IA, KY, ME, MD, MI, MN, MT, NH, NM, OH, OK, RI, TN, TX, VT, VA, WI and WY. U.S. House and president margins are computed using files obtained from Office of the Clerk (2010).

[7]1984 U.S. data come from the Record of American Democracy (ROAD) (King, Palmquist, Adams, Altman, Benoit, Gay, Lewis, Mayer and Reinhardt 1997) and from Office of the Clerk (2010). The data include every state except California.

displays the absolute margin in each legislative district.[8] We use $\mathfrak{M}_{12}$ to refer to this absolute margin the text. Each plot shows a nonparametric regression curve (Bowman and Azzalini 1997) that indicates how the mean of the second digit of the vote counts for the candidates in each category varies with $\mathfrak{M}_{12}$.[9] We use $\hat{j}_x$ to denote this conditional mean. $\hat{j}_x$ is shown surrounded by 95 percent confidence bounds. A question in all the plots is whether $\bar{j}$, indicated by a horizontal dotted line in the plots, falls outside the confidence bounds. In such cases we say $\hat{j}_x$ differs significantly from $\bar{j}$.

*** Figures 3 and 4 about here ***

A difference between the figures for the two election years is apparent especially for winning Democratic candidates (Figures 3(d) and 4(d)). In Figure 3(d) for presidential year 1984 $\hat{j}_x > \bar{j}$ significantly over all of the distribution for Democratic winners, while in Figure 4(d) for midterm year 1986 $\hat{j}_x$ is mostly not significantly different from $\bar{j}$ and $\hat{j}_x > \bar{j}$ significantly only for a few intermediate values of $\mathfrak{M}_{12}$. Not much of a difference between years is apparent for Republican winners. Both in Figure 3(a) and Figure 4(a), $\hat{j}_x$ does not differ significantly from $\bar{j}$ for $\mathfrak{M}_{12}$ near zero or for the higher $\mathfrak{M}_{12}$ values, but $\hat{j}_x > \bar{j}$ significantly for all of intermediate $\mathfrak{M}_{12}$ values.

Mebane (2012, 2013) explains these differences across years and party affiliation for winning candidates as consequences of the operation of the mechanism identified by Alesina and Rosenthal (1995, 1996). To simplify slightly, according to that mechanism we should observe strategically switched votes being added to the vote counts of legislative candidates only of the party opposite that of the winning presidential candidate. Given that a Republican candidate won the presidency in 1984, the simulated digit means in Table 1 and in Figure 1 suggest that the patterns in Figures 3(a,d) and 4(a,d) diagnose the kind of strategic behavior the Alesina and Rosenthal model predicts. In Figure 3(d), $\hat{j}_x$ has values of about 4.35 for the whole distribution of winning Democratic candidates, a value

[8] In legislative races the margin is the difference between shares of the district two-party vote. Margins are based on district vote totals in documents available from Office of the Clerk (2010).

[9] Nonparametric regressions are computed using the `sm` package of **R** (R Development Core Team 2011).

that matches the value observed in Table 1 for the simulated cases of parties gaining from strategically switched votes. In Figure 3(a), for winning Republican candidates $\hat{j}_x$ closely resembles the pattern observed for simulated winners with district imbalance and turnout decline in Figure 1(b). In 1984 the conditional digit means give evidence of asymmetric strategic behavior. In contrast in the midterm year, 1986, Figures 4(a,d) show no departures of $\hat{j}_x$ from $\bar{j}$ that cannot be explained as a result solely of district imbalance and turnout decline without any strategically induced vote changes (Figure 1(b)).

For losing (second-place) major party candidates, Figures 3(b,c) and 4(b,c) have $\hat{j}_x$ patterns that match the simulated pattern in Figure 2(a). The diagnosis in this case is that, as in the simulation, the patterns in the real data arise solely because of district imbalance and turnout decline without any strategically induced vote changes. The question why the patterns for these losing candidates resemble the pattern from the three-party simulation that produces Figure 2(a) and not the two-party simulation that produces Figure 1(b) has a nuanced answer that refers to the frequent presence of third-party candidates on the ballot for House elections.[10]

Qualitatively similar patterns are observed in data for U.S. House races from 1988 and 1990. For Democratic winners in 1988 (Figure 5(d)) $\hat{j}_x > \bar{j}$ for all $\mathfrak{M}_{12}$ values, matching the 1984 pattern shown in Figure 3(d) and testifying to the action of strategically induced gains. For Democratic winners in 1990 (Figure 6(d)) and for Republican winners both in 1988 (Figure 5(a)) and in 1990 (Figure 6(a)), $\hat{j}_x$ has a pattern like that in Figure 1(b), which suggests no strategic gains add to these candidates' vote totals. And $\hat{j}_x$ for second-place finishers in 1988 (Figures 6(b,c)) has patterns like those in Figure 2(a) while $\hat{j}_x$ for second-place finishers in 1990 has patterns somewhere between those in Figures 2(a,b).

*** Figures 5 and 6 about here ***

[10] A discussion of this point goes beyond the scope of the current context, but for instance consider that in 1986 the sum of the votes for the Democratic or Republican candidates was less than the total number of votes in 222 of the 407 districts with vote totals reported at Office of the Clerk (2010). That is 55 percent of the districts with a third-party or write-in candidate. The mean share of the votes for the two major parties in those 222 districts was 96.10 percent (median 98.58 percent).

State legislative races during the 1980s give scant evidence of entanglement with the strategically induced variations in support for the parties that is apparent in the data from U.S. House races. Clearly in 1984, the patterns in $\hat{j}_x$ for winning Republican and Democratic state House candidates (Figures 7(a,d)) resemble the simulated patterns in Figure 1(b) in which variations in $\hat{j}_x$ relative to $\bar{j}$ arise due solely to district imbalance and turnout decline. For second-place Republican and Democratic state House candidates (Figures 7(b,c)) $\hat{j}_x$ resembles the simulated pattern in Figure 2(a), which again does not involve any strategically induced vote switching. The patterns in $\hat{j}_x$ for the state Senate races in 1984 (not shown) are similar. The difference that matters the most here is the contrast between $\hat{j}_x$ for Democratic winners in state House races (Figure 7(d)) and $\hat{j}_x$ for Democratic winners in U.S. House races (Figures 3(d)): the strategically induced variation in $\hat{j}_x$ that appears in the latter is not at all apparent in the former.

*** Figure 7 about here ***

The patterns in $\hat{j}_x$ for state legislative races in the midterm elections of 1986 and 1990 similarly show no evidence of strategically induced behavior among the vote counts for winning candidates. The patterns in $\hat{j}_x$ for winning Republican and Democratic state House candidates (Figures 8(a,d) and 9(a,d)) resemble the simulated patterns in Figure 1(b). For second-place Republican and Democratic state House candidates (Figures 8(b,c) and 9(b,c)) $\hat{j}_x$ resembles a mix of the simulated patterns in Figures 2(a,b), echoing what was observed in the same years in data from U.S. House races (recall Figures 4(b,c) and 6(b,c)). Patterns in data for state Senate elections in these same years (not shown) are similar.

*** Figures 8 and 9 about here ***

In 1988 votes for one party show signs that could be interpreted as showing the state-level votes are aligned with the federal election. The pattern in $\hat{j}_x$ for Democratic winners is unlike the patterns observed in 1984 or 1986. For winning Democratic state

house candidates, $\hat{j}_x$ is significantly greater than $\bar{j}$ when $\mathfrak{M}_{12} \approx 0$ (Figure 10(d)). For these candidates, however, usually $\hat{j}_x < 4.35$ significantly.[11] $\hat{j}_x$ for winning Democratic state senate candidates (not shown) is similar. According to Table 1, $\hat{j}_x \approx 4.35$ would suggest that votes are being added to the Democratic winning candidates perhaps for strategically induced reasons, but the simulation supports a different interpretation for values $\bar{j} < \hat{j}_x < 4.35$. The lower $\hat{j}_x$ values may suggest that each of those candidates tends to have ideologically similar third-party opposition (see Mebane (2012, 2013) for further discussion).

*** Figure 10 about here ***

For Republican state legislative candidates in 1988 there is nothing to suggest special strategic or other mobilization. The patterns in $\hat{j}_x$ for Republicans in 1988 are similar to the patterns seen in 1984 and 1986: for winners the patterns resemble the pattern in the nonstrategic, two-party simulation (compare Figure 10(a) to Figure 1(b)); for second-place finishers $\hat{j}_x$ is equal to slightly less than $\bar{j}$ (Figure 10(b)). $\hat{j}_x$ for Democratic second-place finishers is similar to the patterns observed for second-place candidates in 1984 and 1986 as well (Figure 10(c)).

2.1 2006

Compare $\hat{j}_x$ for U.S. House elections in 2006, in Figure 11, to $\hat{j}_x$ for U.S. House elections in 1986, in Figure 4. In discussing the 1986 U.S. House results, we noted that there were no departures of $\hat{j}_x$ from $\bar{j}$ that cannot be explained as a result of district imbalance and turnout decline. We noted that such a lack of evidence of strategic behavior in 1986 matches what the strategic party balancing theory of Alesina and Rosenthal (1995) implies. In 2006 the patterns in $\hat{j}_x$ are similar to those in 1986 with one possible exception. The exceptional case concerns Democratic winners. In 2006 $\hat{j}_x$ for Democratic winners is

[11] In Figure 10d, $\hat{j}_x$ is not significantly less than 4.35 only when $.63 < \mathfrak{M}_{12} < .67$.

significantly greater than $\bar{j}$ for $\mathfrak{M}_{12} < .7$, then $\hat{j}_x$ decreases as $\mathfrak{M}_{12}$ increases until $\hat{j}_x < \bar{j}$ significantly for the very highest observed $\mathfrak{M}_{12}$ value (Figure 11(d)). In 1986 $\bar{j}_x > \bar{j}$ significantly only when $0.3 < \mathfrak{M}_{12} < 0.35$, and for $0.3 < \mathfrak{M}_{12} < 0.35$ the lower bound of the confidence interval for $\bar{j}_x$ exceeds $\bar{j}$ in 1986 by only a tiny amount (Figure 4(d)). $\hat{j}_x$ in 2006 might be viewed as similar to the pattern for winning Democratic state House candidates in 1990, except that $\hat{j}_x$ in 2006 does not differ significantly from $\hat{j}_x \approx 4.35$ for $\mathfrak{M}_{12} < .7$ while in 1990 $\hat{j}_x < 4.35$ significantly for almost all values of $\mathfrak{M}_{12}$. According to the simulation results summarized in Table 1, the 2006 $\hat{j}_x$ values suggest especially mobilized vote gains for the Democratic winners while the 1990 $\hat{j}_x$ values need not.

*** Figure 11 about here ***

There are no major differences between 2006 and 1986 for other classes of vote counts. For winning Republicans in 2006, $\hat{j}_x$ does not differ significantly from $\bar{j}$ for higher $\mathfrak{M}_{12}$ or $\mathfrak{M}_{12}$ near zero, but $\hat{j}_x > \bar{j}$ significantly for intermediate $\mathfrak{M}_{12}$ values (Figure 11(a)). The pattern is similar to the one for winning Republicans in 1986 (Figure 4(a)). For second-place Republicans in 2006, $\hat{j}_x$ is not significantly different from $\bar{j}$ for values of $\mathfrak{M}_{12}$ near zero but is significantly below $\bar{j}$ at high values (Figure 11(b)). This pattern is similar to the pattern observed for both Republican and Democratic second-place finishers in 1986 (Figures 4(b,c)). For second-place Democrats in 2006 $\hat{j}_x$ is the same as in 1986 for low $\mathfrak{M}_{12}$, but for higher $\mathfrak{M}_{12}$ in 2006 $\hat{j}_x < \bar{j}$ but not significantly. This small difference between 2006 and 1986 for second-place Democrats probably should not affect the interpretation of voters' strategies in the two years.

The ambiguity here is whether $\hat{j}_x$ in Figure 11(d) is essentially the same as $\hat{j}_x$ in Figure 4(a): is the pattern for Democratic winners in 2006 the same as the pattern for Republican winners in 1986? If so, we might simply conclude that, as the strategic party balancing theory of Alesina and Rosenthal (1995) implies, there is no party-balancing strategic behavior in U.S. midterm elections. But while $\hat{j}_x$ seems qualitatively indistinguishable between years for high margin values, it differs for $\mathfrak{M}_{12} \approx 0$. In 1986, $\hat{j}_x$ clearly does not

differ significantly from $\bar{j}$ when $\mathfrak{M}_{12} \approx 0$, but in 2006 $\hat{j}_x > \bar{j}$ significantly when $\mathfrak{M}_{12} \approx 0$. The difference between the lower bound of the confidence interval for $\hat{j}_x$ and $\bar{j}$ when $\mathfrak{M}_{12} \approx 0$ in Figure 11(d) is tiny but it is positive.

Suppose we conclude that $\hat{j}_x > \bar{j}$ significantly when $\mathfrak{M}_{12} \approx 0$ in 2006, and as well that this $\hat{j}_x$ is not like $\hat{j}_x$ simulated for the advantaged candidate in Figure 1(b). From these conclusions we may conclude that $\hat{j}_x$ for Democratic winners in U.S. House elections in 2006 shows some signs that those candidates benefit from some kind of special mobilization. The pattern in the simulations that is closest to $\hat{j}_x$ in Figure 11(d) might be thought to be $\hat{j}_x$ for the advantaged candidate in either of Figures 2(a,c). U.S. House elections are purely bipartisan in only a minority of districts in 2006,[12] so the conditions for the simulation that produces Figures 2(a,c) may not apply everywhere. Still we may wonder whether $\hat{j}_x$ in Figure 11(d) is picking up on some kind of special mobilization toward Democratic candidates.

Evidence does suggest that a special kind of mobilization benefited winning Democratic U.S. House candidates in 2006. Of course the Democratic party gained by receiving 6,407,503 more votes nationally than the Republican party did for U.S. House candidates in 2006 while in 2004 the Democratic party received 2,968,291 fewer votes than the Republican party did (Trandahl 2005; Miller 2007).[13] The mobilization is "special" in the sense that it apparently affects $\hat{j}_x$, but it is special also in the sense that it goes with variation in the distribution of voters that raises questions about whether in a technical sense the theory of Alesina and Rosenthal (1995) applies to the 2006 midterm election. That theory assumes that the proportion of the electorate with policy preferences ("ideal points" in a one-dimensional policy space) located between the policy positions of the two parties is constant between the presidential election and the following midterm (Alesina

[12] According to Miller (2007), third-party, write-in or scattering votes were recorded for 67 percent of U.S. House districts in 2006.

[13] In 2006 a total of 80,975,537 votes are counted for a U.S. House candidate while in 2004 there are 113,192,286 votes counted for a candidate (Miller 2007; Trandahl 2005).

and Rosenthal 1996, 1328).[14] In fact the proportion seems to have changed between 2004 and 2006.

The admittedly weak evidence for this conclusion comes from Election Weekend surveys conducted by the Pew Research Center for the People & the Press (Pew Research Center 2004*a*, 2006*a*). These are surveys of American adults conducted the weekend before the fall general elections. The surveys include scales used to determine whether each survey respondent is a "likely voter" (Pew Research Center 2004*b*, 2006*b*). We use the likely voter scales to define weights so that the proportions of likely voters in the surveys equal the actual proportions of the voting age population turning out in the elections. We estimate the percentage of likely voters in each of six categories of "political views" ("Very Liberal" to "Very Conservative", plus "Don't Know/Refused") and compute difference in the percentages between presidential and midterm years. The results, in Table 2, show that a significantly higher percentage of likely voters say they are "Moderate" in the midterm election than in the preceding presidential election. The difference is about 7.5 percent. Significantly more likely voters say they are "Conservative" in the presidential election than in the midterm election. This difference is about five percent. The percentage who say "Don't Know" or who refuse to state a political view is significantly higher—by about 1.9 percent—in the presidential election year than in the midterm. None of the other differences between years are significant.

*** Table 2 about here ***

The apparent increase in the number of "Moderates" and decrease in the number of "Conservatives" echoes the pattern documented for 1978–1994 by Mebane and Sekhon (2002), wherein the electorate's policy positions tend to move away from the president's party at midterm. This statement depends on stipulations about the locations of the Democratic and Republican parties' policy positions. The Pew surveys do not ask

[14]Specifically, a key assumption of the formal theory is "there is always a constant proportion $(\theta_d - \theta_R)$ of the electorate with ideal points in the interval $[\theta_d, \theta_R]$" (Alesina and Rosenthal 1996, 1328).

respondents to state policy positions or "views" for the parties, so evidence about those positions to compare to likely voters' views in the Pew data must come from another source. We refer to the estimates of Mebane (2000, 53, Table 6), based on data from the American National Election Studies of 1976–1996, which show that about one-quarter of voters have positions more extreme in either direction than the respective parties' positions. Applying this to the Pew data, in the parlance of the "views" measured by Pew, about a quarter of the likely voters in the presidential election are more conservative than the Republican party and about a quarter are more liberal than the Democratic party.[15] Based on the marginal distribution estimated for "views" in the 2004 Pew data and treating the categories from "Very conservative" to "Very liberal" as ordered, the Republican party position is somewhere in the "Conservative" category while the Democratic party position is somewhere in the "Moderate" category.

The increase in the percentage of likely voters saying they are "Moderate" violates the key assumption in the theory of Alesina and Rosenthal (1995, 1996) if the increase means that more voters' policy positions are located between the parties' positions at midterm than in the preceding presidential election. The Pew data do not provide enough information to say for sure whether such an increase occurs—and that is the fundamental weak spot in this analysis—but the data also do not contradict the occurrence of such an increase. The meaning of the categories remains the same between the elections, at least in the sense that vote intentions depend on the political view categories in the same way across the two elections. A logistic regression of vote intentions on political view category shows no significant difference between presidential and midterm election years. When data are pooled across years and differences in effects are allowed by means of interactions with a midterm-election dummy variable, none of the interaction terms are significant (see Table 3). So it seems that the party positions remained the same even while the

[15]Note that the methods used to estimate positions in Mebane (2000) are based on vastly more information than is available in the Pew data. Mebane (2000) defines voter-specific party positions and features other complications.

distribution of likely voter political views shifted.

*** Table 3 about here ***

To put the survey results for the 2004–2006 presidential-midterm election pair into some perspective, compare them to the elections that precede and follow them. As Table 4 shows, in 2002 the distribution of political views among likely voters does not differ from the distribution in 2000. Table 4 also shows that in 2010 the distribution of views includes significantly more "Very Conservative" likely voters than does the distribution in 2008. In 2008 there are more likely voters whose views are "DK/Refused" than there are in 2010.[16] The different profiles describe two sharply different patterns of gains in the midterm elections. The Republican party gains slightly in 2002: the party's national advantage over the Democratic party in votes received by candidates for the U.S. House is 3,449,128 (out of a total 74,706,555 votes counted for some U.S. House candidate) in 2002 compared to only 338,616 (out of 98,799,963) in 2000 (Trandahl 2001, 2003). In contrast in 2010 the party gains tremendously: the national advantage over the Democratic party is 5,739,207 (out of 86,784,957) in 2010 compared to finishing behind the Democrats by 12,935,109 votes (out of 122,586,293) in 2008 (Miller 2009; Haas 2011). That's a difference of 4.3 percent in 2000–2002 but of 17.2 percent in 2008–2010.

*** Table 4 about here ***

In electoral terms the meaning of the different political views remains mostly the same between 2000 and 2002 but changes significantly between 2008 and 2010. Again we use the stability of vote intentions as functions of political view categories as the standard for constancy of meaning. Table 5 shows that in the logistic regression of vote intentions on political view category there are only two significant differences between 2000 and 2002. In 2002 the chances that a "Very Liberal" likely voter chooses a Democrat instead of a

[16]The 90% confidence interval for the "DK/Refused" difference in Table 4 is $(.0011, .0296)$.

Republican substantially increase compared to 2000, and a likely voter whose views are "DK/Refused" has an increased chance of supporting the Republican.[17] None of the other interaction terms involving the midterm-election dummy variable are significant. In 2010 all types of likely voters except those whose views are "Very Liberal" have increased chances of supporting a Republican instead of a Democrat. The baseline Midterm interaction term is significantly negative. But "Very Conservative" likely voters are especially more likely to support a Republican. "Liberal" likely voters are as well.[18] The effect of the Tea Party and a more general disenchantment with Democratic candidates in 2010 is apparent (Leibovich and Parker 2010). A sign of the increased polarization in 2010 is that a "Very Liberal" likely voter may be more likely than in 2008 to choose the Democrat instead of the Republican.[19]

*** Table 5 about here ***

The 2006 election resembles 2010 in having a volatile distribution of political views, but it resembles 2002 in having views that have the same meaning, in terms of vote intentions, as during the preceding presidential election. Not having precinct election returns from 2002 unfortunately makes it impossible to investigate whether the differences among these elections also manifest in the distributions of the respective vote counts' digits. We return to the case of 2010 further below.

Signs that the 2006 election features a special increase in the number of voters supporting winning Democratic candidates also appear in that year's state legislative elections.[20] Using vote counts from state House elections in 2006 to estimate $\hat{j}_x$, $\hat{j}_x$ for

[17] The 90% confidence interval for the Midterm interaction of the "DK/Refused" category in Table 5 is $(-1.82, -.0918)$.

[18] The 90% confidence interval for the Midterm interaction of the "Liberal" category in Table 5 is $(-1.56, -0.0066)$.

[19] The 90% confidence interval for the Midterm interaction of the "Very Liberal" category in Table 5 is $(.129, 2.90)$. This effect is probably at least as large as than the baseline Midterm interaction, for which the 90% confidence interval is $(-.679, -.0985)$.

[20] The states for which we have data for 2006 are listed in note 6 on page 5. Not all of those states has an election for the state legislature in 2006. Elections in AZ, NH and VT feature multimember districts. These states are excluded.

Republicans in districts where the Republican won (Figure 12(a)) resembles $\hat{j}_x$ for Republicans estimated using the state legislative elections of the 1980s (Figures 7(a), 8(a) and 10(a)). For the 2006 Republican winners, $\hat{j}_x > \bar{j}$ significantly only for an intermediate set of $\mathfrak{M}_{12}$ values, as is true in the 1980s data. $\hat{j}_x$ for Democratic second-place finishers is also similar across the years: $\hat{j}_x$ both in 2006 (Figure 12(c)) and in the 1980s and 1990 data (Figures 7(c) and 8(c)) is significantly less than $\bar{j}$ for intermediate $\mathfrak{M}_{12}$ values but not for $\mathfrak{M}_{12} \approx 0$ or for the highest observed $\mathfrak{M}_{12}$. The pattern in $\hat{j}_x$ for Republican second-place finishers in 2006 (Figure 12(b)) is like the pattern in the same year for Democratic second-place finishers. $\hat{j}_x$ for winning Democratic state house candidates resembles the pattern for winning Democratic state house candidates in 1988 (Figure 10(d))—indeed, even more the 2006 pattern resembles that for winning Democratic candidates for the U.S. House in 1988 (Figure 5(d)): $\hat{j}_x$ is persistently greater than $\bar{j}$ and often is not substantially different from $\hat{j}_x \approx 4.35$.

*** Figure 12 about here ***

Signs of special mobilization in favor of Democratic winners in the state senate elections are more ambiguous. $\hat{j}_x$ estimated using results from state senate elections in 2006 resemble the results from that year's state house elections. $\hat{j}_x$ for Republicans and for second-place Democrats generally resemble the patterns in $\hat{j}_x$ seen for house candidates, which suggest the occurrence of nonstrategic behavior (Figures 13(a–c)). $\hat{j}_x$ for winning Democrats is greater than $\bar{j}$ when $\mathfrak{M}_{12} < .85$ although not significantly so when $\mathfrak{M}_{12} < .16$ (Figures 13(d)). $\hat{j}_x$ for winning Democrats in 2006 may reasonably be viewed as similar to $\hat{j}_x$ for winning state house Democrats in 1986 (Figures 8(d)), which would support an interpretation according to which there is no special mobilization.

*** Figure 13 about here ***

Quantitatively, in terms of percentages of voters, the amount by which the actual distributions of voters in the 2004 and 2006 elections deviate from the perfect constancy

assumed in the theory of Alesina and Rosenthal (1995, 1996) is probably small. Even though in principle violation of this assumption means the theory does not apply to the midterm, in fact a quantitatively small deviation from the assumption probably also means the amount by which the election outcome deviates from what the theory predicts is small as well. And the deviation that $\hat{j}_x > \bar{j}$ for $\mathfrak{M}_{12} \approx 0$ may be picking up from the theory's midterm predictions for the 2006 midterm, in Figure 11(d), is quantitatively small.

2.2 2008

Mostly we do not discuss the statistics for presidential vote counts, but to fully motivate discussion of the legislative election results in 2008 we do so for that year. The patterns in $\hat{j}_x$ for the 2008 presidential election, in Figure 14, clearly reflect voting with asymmetric gains—possibly strategically motivated—in favor of the Democrat. $\hat{j}_x$ persistently has a value of $\hat{j}_x \approx 4.3$ for the Democratic candidate in states where the Democrat won (Figure 14(d)) while for the Republican in those same states (Figure 14(b)) $\hat{j}_x > \bar{j}$ significantly only for an intermediate range of $\mathfrak{M}_{12}$ values. This matches the pattern that based on the first simulation (Table 1) diagnoses strategically switched votes for one candidate but based on the second simulation (Figure 1) diagnoses nonstrategic votes for the other.[21] The pattern in $\hat{j}_x$ for the Republican in states where the Republican won (Figure 14(a)) also resemble the simulated nonstrategic pattern in Figure 1(b). $\hat{j}_x$ for the Democrat in states where the Republican won differs significantly from $\bar{j}$ for only a couple of states (Figure 14(c)).

*** Figure 14 about here ***

Whether the asymmetric pattern in Figure 14 reflects solely voters' strategic behavior in accord with the theory of Alesina and Rosenthal (1995) may be doubted, however. The most important reason to believe that voters' strategies alone are not responsible for the apparent surge in votes for winning Democrats is the appearance of gains for winning

[21] The confidence interval for $\hat{j}_x$ in Figure 14(d) includes $\bar{j}$ but also $\hat{j}_x \approx 4.3$ for the two closest states where the Democrat won, namely, IN and FL.

Democrats in the 2008 elections for the U.S. House. Figure 15, which shows $\hat{j}_x$ for candidates in U.S. House elections that year, suggests that Democratic House winners but not Republican winners seem to benefit from special gains. $\hat{j}_x$ for winning Democrats is significantly greater than $\bar{j}$ except when $.36 < \mathfrak{M}_{12} < .47$, and only when $.3 < \mathfrak{M}_{12} < .5$ is $\hat{j}_x$ significantly less than $\hat{j}_x \approx 4.3$ (Figure 15(d)). $\hat{j}_x$ for winning Republicans differs significantly from $\bar{j}$—$\hat{j}_x > \bar{j}$—only when $.23 < \mathfrak{M}_{12} < .34$ (Figure 15(a)). $\hat{j}_x$ for second-place Republicans and for second-place Democrats resemble $\hat{j}_x$ for second-place candidates in 1984 (compare (Figures 15(b,c)) to Figures 3(b,c)). This asymmetric pattern, which would suggest strategic voting in favor of Democrats both for U.S. House and President, does not match the predictions of Alesina and Rosenthal's theory.

*** Figure 15 about here ***

To rely on mobilization and not primarily strategic behavior to explain the patterns in $\hat{j}_x$ for the presidential and U.S. House elections is not a surprise. For instance, using the Pew Election Weekend surveys (Pew Research Center 2006*a*, 2008) to compare the political views of likely voters between 2008 and the preceding midterm election shows a significantly lower proportion of the likely voters say they are "Moderate" and a significantly higher proportion say they are "Liberal" or "DK/Refused" in 2008 (see Table 6). Comparing the distribution of likely voters in 2008 to the distribution in the previous presidential election, significantly more likely voters say they are "Very Conservative" and significantly fewer say they are "Conservative" in 2008 than in 2004 (Table 6).[22] To assess whether the meaning of the political view categories changed over time, we again use the stability of vote intentions as functions of political view categories as the standard for constancy of meaning. Table 7 shows that in a logistic regression of vote intentions on political view category, using data from the 2006 and 2008 Election Weekend surveys, the only significant difference between the elections is that "Moderate" likely voters are more

[22]The significance of the differences between 2004 and 2008 refer to the 90% confidence intervals reported in Table 6.

likely in 2006 than in 2008 to support a Democrat instead of a Republican (Table 7). The mobilization of new "Liberal" voters in 2008 seems to help Democratic candidates in ways that the changes in the numbers of "Conservative" and "Very Conservative" voters do not help Republican candidates.

*** Tables 6 and 7 about here ***

The mobilization interpretation of the 2008 elections is also supported by the patterns in state legislative elections. There are signs of special gains by Democratic winners and not by Republicans. $\hat{j}_x$ for Democratic winners in state house elections is virtually always significantly greater than $\bar{j}$, and typically $\hat{j}_x \approx 4.28$ (Figure 16(d)).[23] Occasionally the upper limit of the confidence interval for $\hat{j}_x$ exceeds $\hat{j}_x \approx 4.35$. $\hat{j}_x$ for Republican state house winners is significantly greater than $\bar{j}$ only when $.16 < \mathfrak{M}_{12} < .27$, otherwise $\hat{j}_x$ does not differ significantly from $\bar{j}$ (Figure 16(a)). For second-place Republicans and second-place Democrats, $\hat{j}_x$ in 2008 resembles $\hat{j}_x$ in 2006 (compare Figures 16(b,c) and 12(b,c)). $\hat{j}_x$ for Democratic state senate winners is significantly greater than $\bar{j}$ and near $\hat{j}_x \approx 4.35$ when $.14 < \mathfrak{M}_{12} < .35$ and when $.48 < \mathfrak{M}_{12}$ (Figure 17(d)). For Republican state senate winners $\hat{j}_x$ is significantly greater than $\bar{j}$ only when $.14 < \mathfrak{M}_{12} < .44$ (Figure 17(a)), resembling the nonstrategic pattern of Figure 1(b). Patterns in $\hat{j}_x$ for second-place Republican and for second-place Democratic state senate candidates resemble the patterns for second-place state senate candidates in other years (Figures 17(b,c)).

*** Figures 16 and 17 about here ***

2.3 2010

In view of the previously discussed large gains by Republicans in 2010, we might intuitively think that any mobilization story for that year involves mobilization in favor of the Republicans. Perhaps the energy manifested by the "TEA Party" is the locus for that. On

[23] In Figure 16(d), $\hat{j}_x$ does not differ significantly from $\bar{j}$ only when $\mathfrak{M}_{12} < .01$.

the other hand, the election returns and even the "TEA Party" activism may be nothing more than a somewhat large manifestation of the usual midterm movement of the electorate's policy positions away from the president's party (Mebane and Sekhon 2002). One aspect of this is whether the distribution of policy preferences satisfies the condition necessary for the model of Alesina and Rosenthal (1996) to apply: is the proportion of the electorate with policy preferences located between the policy positions of the two parties constant between the presidential election of 2008 and the midterm of 2010. The discussion of Pew data referring to Table 2 addressed this, but that analysis had the major weakness that only the positions of the likely voters were explicitly measured. Some volatility is apparent in those positions, but the volatility is mainly on the "Very Conservative" extreme and any relationship to the positions of the parties is conjectural.

The Cooperative Congressional Election Study (CCES) (Ansolabehere 2006, 2011, 2010) has asked respondents to place themselves and other political entities (importantly, including the major parties) on ideological scales since 2006. Thus, they appear to offer us an opportunity to test more directly the condition required by the theory of Alesina and Rosenthal (1996). Armed with ideological placements of the Democratic Party, Republican Party, and the respondents themselves, finding the proportion of respondents who place themselves between the major parties in each cycle is a straightforward exercise.

Unfortunately, the measurement of ideological placement changed between the 2008 and 2010 CCES: in 2008 and before, respondents placed political elements on a 0–100 scales; in 2010, they were asked to use a classic seven point scale.[24] Using these different measures naively we arrive at Table 8; the increase in the proportion of respondents who place themselves between the major parties—importantly, we include ties with one party or another in this category—from 2008 to 2010 is striking. If this result is taken as truly indicative, the requirement for the key assumption of Alesina and Rosenthal (1996) clearly does not obtain.

[24] "Very Liberal," "Liberal," "Somewhat Liberal," "Middle of the Road," "Somewhat Conservative," "Conservative," "Very Conservative."

*** Table 8 about here ***

However, there is reason to doubt this result. The granularity in the measure decreases dramatically from 2008 to 2010, increasing the likelihood that the respondent places themselves and one of the parties in the same "bin." In this way, we should expect the 2010 measure to encourage ties and therefore increase the "Between R & D" category in Table 8.

To test this, we leverage the fact that the 2006 and 2008 CCES included a five point ideology self-placement and fabricate five point ideology scales from the 100 point scales used for self-placement and the parties. The means for each bin were found, then the midpoints between these means were used as cutpoints to produce five ideological classifications. The results of this procedure are displayed in Table 9. This adjustment makes the expected difference: more respondents tie with a party and are included in the "Between R & D" category. 2006 and 2008 are no longer statistically distinguishable from one another, and these years show significantly more people in the "Between" category than in Table 8's result for 2010.

Clearly there are still issues after this adjustment. Now 2006 and 2008 are computed using five ideological classifications and 2010 remains at seven; if we are correct in our assumption that lower granularity measures will cause more ties, it is not surprising to see higher proportions of respondents placing themselves between the parties in 2006 and 2008. We address this by using a similar procedure to fabricate five point scales from the seven point scales used in 2010, with the results shown in Table 9.[25] Now 2010 has the highest proportion of respondents between the parties, and after so many transformations and using none of the original measures, we cannot with any confidence conclude that there was any trend with meaningful bearing on the theory of Alesina and Rosenthal (1996) over this time period.

*** Table 9 about here ***

[25]To transform the seven point ideological scale to a five point scale, we combined categories "Liberal" and "Somewhat Liberal," and "Conservative" and "Somewhat Conservative," and placed these respondents into "Liberal" and "Conservative" respectively in the five point scale.

The patterns in $\hat{j}_x$ for for Democratic candidates in U.S. House elections in 2010, in Figures 18(c,d), resemble the patterns in $\hat{j}_x$ for Democratic candidates in U.S. House elections in 2008. For Democratic winners (Figure 18(d)), $\hat{j}_x > \bar{j}$ significantly for all values of $\mathfrak{M}_{12}$, and $\hat{j}_x$ is usually not significantly different from $\hat{j}_x \approx 4.35$.[26] For second-place Democratic candidates (Figure 18(c)) $\hat{j}_x$ resembles the pattern in the nonstrategic, two-party simulation (Figure 1(b)). The digit patterns for these candidates in the midterm give evidence of special mobilization for the winners to the same extent as do the patterns in the preceding presidential election.

*** Figure 18 about here ***

For Republican candidates in the 2010 U.S. House elections, $\hat{j}_x$ does not suggest any kind of special mobilization for these candidates. The pattern for Republican winners (Figure 18(a)) has the familiar form that matches the nonstrategic pattern of Figure 1(b). The pattern for second-place Republicans (Figure 18(b)) is similar to the pattern for second-place Democrats in 2006 (compare Figure 11(c)).

In the state House elections of 2010, for both parties the patterns in $\hat{j}_x$ closely resemble the patterns observed in the 2006 and 2008 elections more than they do the patterns from the midterms of the 1980s. The difference, as in 2006, is mainly apparent for $\hat{j}_x$ for winning Democrats. $\hat{j}_x$ for winning Democrats in the state House elections (Figure 19(d)) is usually greater than $\bar{j}$ and often not significantly different from $\hat{j}_x \approx 4.35$. For winning Republicans (Figure 19(a)) $\hat{j}_x$ once again resembles the simulated pattern of Figure 1(b) and for second-place Republicans and Democrats (Figures 19(b,c)) $\hat{j}_x$ again resembles the simulated pattern of Figure 2(a). Signs of special mobilization are apparent for Democratic winners but not for the other classes of candidates.

*** Figures 19 about here ***

[26]The upper bound of the confidence interval for $\hat{j}_x$ is less than 4.35 only when $.18 < \mathfrak{M}_{12} < .48$, and for those values of $\mathfrak{M}_{12}$ $\hat{j}_x$ is never significantly less than $\hat{j}_x \approx 4.29$.

In the state Senate elections of 2010 there is no clear evidence of mobilization for either party. The confidence bounds for $\hat{j}_x$ for Democratic winners are wide (Figure 20(d)); while the point estimate of $\hat{j}_x$ is always greater than $\bar{j}$, $\hat{j}_x > \bar{j}$ significantly only for a an intermediate range of $\mathfrak{M}_{12}$ values. So the dominant impression is that more than anything else the pattern resembles the simulated pattern summarized in Figure 1(b). The patterns in $\hat{j}_x$ for the other classes of candidates have the familiar forms that do not suggest any strategically motivated or any other special mobilization.

*** Figure 20 about here ***

2.4 Discussion

Are the statistics based on the second significant digits of precinct vote counts meaningful? Is the message they help tell about recent (and not so recent) elections in the United States plausible? The message suggests that from the 1980s to the late 2000s there has been a substantial change in the way not only midterm but indeed all American legislative elections operate. The changes affect not only national elections but also the degree to which state elections are entangled with federal elections.

At the federal level, in the 2000s U.S. House races do not present a significantly different pattern at midterm than they do in presidential election years. In the 1980s, for Democratic winners the pattern in the conditional second-digit mean ($\hat{j}_x$) suggests these candidates were benefiting from strategically motivated votes in ways the same kinds of candidates did not benefit at midterm. Strictly speaking, the conditional second-digit means do not speak to the motivations for any gains they are indicating occur, but they testify only to their occurrence. The strategic interpretation for the pattern comes mainly from the background theoretical and empirical findings that support the Alesina and Rosenthal (1995, 1996) theory about strategic partisan balancing and coordination. That theory's predictions happen to match closely the patterns observed during the 1980s: winning federal legislative candidates of the party opposing the president gain votes in the

presidential year but not at midterm; winning candidates of the same party as the president show no special gains. In the elections of 2006 and 2010, winning Democrats show signs of special gains but there is no support for such gains from the theory of Alesina and Rosenthal (1995, 1996). Indeed, in the presidential election of 2008, winning Democratic U.S. House candidates seem to gain according to the digit diagnostics even as the Democratic presidential candidate was expected to win and did in fact win. Such a result seems to be a complete overthrow of the theory.

Whether the Alesina and Rosenthal (1996) mechanism no longer operates remains a question, but we suggest that in any case new forms of mobilization have come into play—at least on the Democratic side—that perhaps outweigh it (e.g. Issenberg 2012).[27] The movements in votes due to the new forms of mobilization may simply be larger than the movements in votes due to the Alesina and Rosenthal (1995, 1996) mechanism, and statistics such as the conditional mean of the second-digits reflect only the net effect of all such forces.

A substantial difference in mobilization between the 1980s and the 2000s may also explain why, in terms of the conditional second-digit means, state legislative elections track the federal elections in the later period in ways that do not occur in the earlier period. Extensive support for this is outside the scope of this paper, but a cursory investigation bolsters it somewhat: the Democratic Legislative Campaign Committee, for example, was founded in 1994 to professionalize Democratic state legislative elections (Democratic Legislative Campaign Committee 2013); since 2004, the organization's 527 arm has spent roughly $50 million toward this end (OpenSecrets.org 2013). In view of these developments, we are not surprised that state legislative elections have begun to track federal election mobilization phenomena more closely.

Mebane (2012) maintains the view that tests based on the second significant digits of

[27]There is reason to believe that this revolution in mobilization is indeed one-sided in the time period we study here. As one Romney campaign operative put it, "[Democrats] were playing chess while we were playing checkers"—even through 2012 (Draper 2013).

precinct vote counts may be useful for detecting election fraud, but even more they may be useful for helping to diagnose the operations of normal politics. By "normal politics," Mebane (2012) emphasizes strategic voting. Mebane (2013) and this paper expand the scope of what the digit tests can discriminate to include the effects of kinds of mobilization that go well beyond the scope of strategic voting. The expanded scope for digit tests may be good for general political science interests, but it may reduce the potential for using the tests to diagnose election fraud. The question of whether the patterns in digits produced by fraud differ sharply from the patterns produced by normal politics is not an easy one to answer. Mebane (2013) gives some cases where likely fraud produces very distinctive patterns (such as the Iranian election of 2009 (Mebane 2010), and other elections), but also cases where natural political shocks produce patterns that would otherwise be interpreted as political coercion. The current paper illustrates the potential for digit diagnostics to be informative in "normal" political contexts.

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Table 1: Second-digit χ^2_{2BL} statistics, means, standard errors and "vote" totals: asymmetric four-candidate simulation

	y_1	y_2	y_3	y_4	w_1	w_2	w_3	$\tilde{w}_1$
χ^2_{2BL}	10.7	12.6	11.9	12.6	12.3	12.2	951.1	58.0
$\hat{j}$	4.29	4.15	4.32	4.32	4.35	4.35	2.68	3.75
s.e.	.040	.041	.041	.040	.041	.041	.043	.042
votes	200,284	271,628	181,172	163,970	329,043	310,300	13,741	493,013

Note: $n = 5000$ precincts. $\mathcal{N} = 1300$, $\sigma = 1$, $v = 1.75$, $t = 0.15$, 500 replications.

Table 2: United States: Political View Percentages in 2004 and Differences between 2004 and 2006

Political View	2004 percentage	difference: 2004 − 2006	difference 95% CI[a] lower	upper
Very conservative	8.0	−.145	−2.17	1.91
Conservative	36.2	4.96	1.09	8.43
Moderate	34.6	−7.46	−10.98	−3.61
Liberal	13.0	1.97	−.49	4.52
Very liberal	3.7	−1.24	−2.85	.46
DK/Refused	4.5	1.91	.47	3.37

Note: Percentage of likely voters in each ideological category in 2004 and difference between that percentage and the percentage in the category in 2006 during the weekend before the general election in each year. Data are from Pew Research Center (2004*a*, 2006*a*): $n = 2804$ adults in 2004 and $n = 2912$ in 2006. Survey respondents are weighted using sampling and likely voter weights, with likely voter weights chosen to match the turnout actually observed in the elections.

[a] 95% confidence interval estimated using the nonparametric studentized bootstrap stratified by year.

Table 3: United States: Voting Intentions in 2004 Presidential and 2006 Midterm Election-weekend Surveys, Logistic Regression

		95% CI[a]	
Variable	Coef.	lower	upper
(Intercept)	−1.20	−1.41	−.997
View: Very conservative	−.567	−1.153	−.0191
View: Moderate	1.65	1.37	1.92
View: Liberal	3.48	2.93	4.10
View: Very liberal	3.87	3.10	4.98
View: DK/Refused	1.72	1.08	2.33
Midterm	−.0231	−.372	.328
Midterm × View: Very conservative	−.0713	−1.05	.858
Midterm × View: Moderate	.235	−.221	.693
Midterm × View: Liberal	.0528	−.883	1.04
Midterm × View: Very liberal	−.167	−1.41	1.09
Midterm × View: DK/Refused	.285	−.921	1.62

Note: Logistic regression model for the intention (during the weekend before the election) of likely voters to vote Democratic (as opposed to Republican) in the 2004 presidential and 2006 midterm elections in the United States. Data are from Pew Research Center (2004*a*, 2006*a*): $n = 2804$ adults in 2004 and $n = 2912$ in 2006. Survey respondents are weighted using sampling and likely voter weights, with likely voter weights chosen to match the turnout actually observed in the elections. "Conservative" is the category associated with the intercept; other effects are relative to that category.

[a] 95% confidence interval estimated using the nonparametric studentized bootstrap stratified by year.

Table 4: United States: Political View Percentages in 2000 and 2008 and Differences between 2000 and 2002 and between 2008 and 2010

	2000	difference:	difference 95% CI[a]	
Political View	percentage	2000 − 2002	lower	upper
Very conservative	6.3	−.876	−3.06	1.27
Conservative	36.2	.0264	−4.31	4.01
Moderate	37.2	.636	−3.14	4.56
Liberal	12.6	−.329	−2.93	2.43
Very liberal	2.9	.362	−1.04	1.66
DK/Refused	4.8	.180	−1.50	1.86

	2008	difference:	difference 95% CI[a]	
Political View	percentage	2008 − 2010	lower	upper
Very conservative	9.6	−3.00	−5.32	−.79
Conservative	32.9	−2.32	−5.84	1.44
Moderate	32.8	2.13	−1.36	5.63
Liberal	14.3	1.53	−1.07	4.03
Very liberal	4.7	.0626	−1.63	1.82
DK/Refused	5.7	1.59	−.04	3.20

Note: Percentage of likely voters in each ideological category in 2000 and difference between that percentage and the percentage in the category in 2002 during the weekend before the general election in each year, along with corresponding quantities in 2008 and 2010. Data are from Pew Research Center (2000, 2002, 2008, 2010): $n = 2898$ adults in 2000, $n = 2113$ in 2002, $n = 3402$ in 2008 and $n = 3005$ in 2010. Survey respondents are weighted using sampling and likely voter weights, with likely voter weights chosen to match the turnout actually observed in each election.

[a] 95% confidence interval estimated using the nonparametric studentized bootstrap stratified by year.

Table 5: United States: Voting Intentions in 2000 and 2008 Presidential and 2002 and 2010 Midterm Election-weekend Surveys, Logistic Regression

	2000 and 2002			2008 and 2010		
		95% CI[a]			95% CI[a]	
Variable	Coef.	lower	upper	Coef.	lower	upper
(Intercept)	−.985	−1.20	−.767	−.927	−1.13	−.732
View: Very conservative	−1.20	−2.20	−.520	−.582	−1.12	−.0800
View: Moderate	1.42	1.12	1.71	1.41	1.14	1.68
View: Liberal	2.86	2.39	3.38	4.12	3.54	4.82
View: Very liberal	3.87	3.17	5.43	3.83	2.99	5.21
View: DK/Refused	1.77	1.15	2.40	1.80	1.19	2.43
Midterm	.158	−.180	.505	−.398	−.727	−.0582
Midterm × View: Very conservative	.551	−.604	1.60	−1.03	−1.99	−.168
Midterm × View: Moderate	−.106	−.585	.340	.269	−.182	.702
Midterm × View: Liberal	.157	−.712	1.06	−.732	−1.69	.146
Midterm × View: Very liberal	8.39	7.46	20.5	1.23	−.007	3.22
Midterm × View: DK/Refused	−.994	−2.02	.0505	−.488	−1.55	.620

Note: Logistic regression models for the intention (during the weekend before the election) of likely voters to vote Democratic (as opposed to Republican) in the 2000 presidential and 2002 midterm elections and in the 2008 presidential and 2010 midterm elections in the United States. Data are from Pew Research Center (2000, 2002, 2008, 2010): $n = 2898$ adults in 2000, $n = 2113$ in 2002, $n = 3402$ in 2008 and $n = 3005$ in 2010. Survey respondents are weighted using sampling and likely voter weights, with likely voter weights chosen to match the turnout actually observed in each election. "Conservative" is the category associated with the intercept; other effects are relative to that category.
[a] 95% confidence interval estimated using the nonparametric studentized bootstrap stratified by year.

Table 6: United States: Political View Percentages in 2008 and Differences from 2006 and 2004

		2008 − 2006		2008 − 2004 difference			
	2008	difference 95% CI[a]		95% CI[a]		90% CI[b]	
Political View	percentage	lower	upper	lower	upper	lower	upper
Very conservative	9.6	−.64	3.59	−.54	3.50	.01	3.22
Conservative	32.9	−1.91	4.88	−6.62	.01	−5.86	−.40
Moderate	32.8	−12.74	−5.80	−4.98	1.48	−4.50	.82
Liberal	14.3	1.03	5.82	−.92	3.72	−.73	3.29
Very liberal	4.7	−2.15	1.50	−.53	2.30	−.20	2.11
DK/Refused	5.7	1.59	4.51	−.34	2.69	−.22	2.48

Note: Percentage of likely voters in each ideological category in 2008 and difference between that percentage and the percentage in the category in 2006 and in 2004 during the weekend before the general election in each year. Data are from Pew Research Center (2004*a*, 2006*a*, 2008): $n = 2804$ adults in 2004, $n = 2912$ in 2006 and $n = 3402$ in 2008. Survey respondents are weighted using sampling and likely voter weights, with likely voter weights chosen to match the turnout actually observed in the elections.
[a] 95% and [b] 90% confidence interval estimated using the nonparametric studentized bootstrap stratified by year.

Table 7: United States: Voting Intentions in 2008 Presidential and 2006 Midterm Election-weekend Surveys, Logistic Regression

Variable	Coef.	95% CI[a] lower	upper
(Intercept)	−.937	−1.15	−.749
View: Very conservative	−.570	−1.11	−.075
View: Moderate	1.41	1.14	1.69
View: Liberal	4.12	3.54	4.72
View: Very liberal	3.83	3.04	5.21
View: DK/Refused	1.80	1.23	2.43
Previous Midterm	−.288	−.615	.0523
Previous Midterm × View: Very conservative	−.0690	−1.03	.757
Previous Midterm × View: Moderate	.476	.0255	.914
Previous Midterm × View: Liberal	−.585	−1.51	.409
Previous Midterm × View: Very liberal	−.128	−1.40	1.25
Previous Midterm × View: DK/Refused	.200	−.958	1.59

Note: Logistic regression model for the intention (during the weekend before the election) of likely voters to vote Democratic (as opposed to Republican) in the 2008 presidential and 2006 midterm elections in the United States. Data are from Pew Research Center (2006*a*, 2008): $n = 2912$ adults in 2006 and $n = 3402$ in 2008. Survey respondents are weighted using sampling and likely voter weights, with likely voter weights chosen to match the turnout actually observed in the elections. "Conservative" is the category associated with the intercept; other effects are relative to that category.

[a] 95% confidence interval estimated using the nonparametric studentized bootstrap stratified by year.

Table 8: United States: Self-Party Relative Placement Percentages in 2006, 2008 and 2010

Year	Between R & D	Left of R & D	Right of R & D	Confused	Don't Know
2006	0.369	0.208	0.232	0.034	0.157
	(0.3630, 0.3743)	(0.2032, 0.2125)	(0.2273, 0.2370)	(0.0320, 0.0367)	(0.1525, 0.1615)
2008	0.366	0.185	0.244	0.028	0.178
	(0.3586, 0.3723)	(0.1803, 0.1902)	(0.2383, 0.2491)	(0.0249, 0.0302)	(0.1720, 0.1850)
2010	0.430	0.134	0.223	0.014	0.200
	(0.4228, 0.4358)	(0.1295, 0.1380)	(0.2176, 0.2284)	(0.0124, 0.0158)	(0.1935, 0.2063)

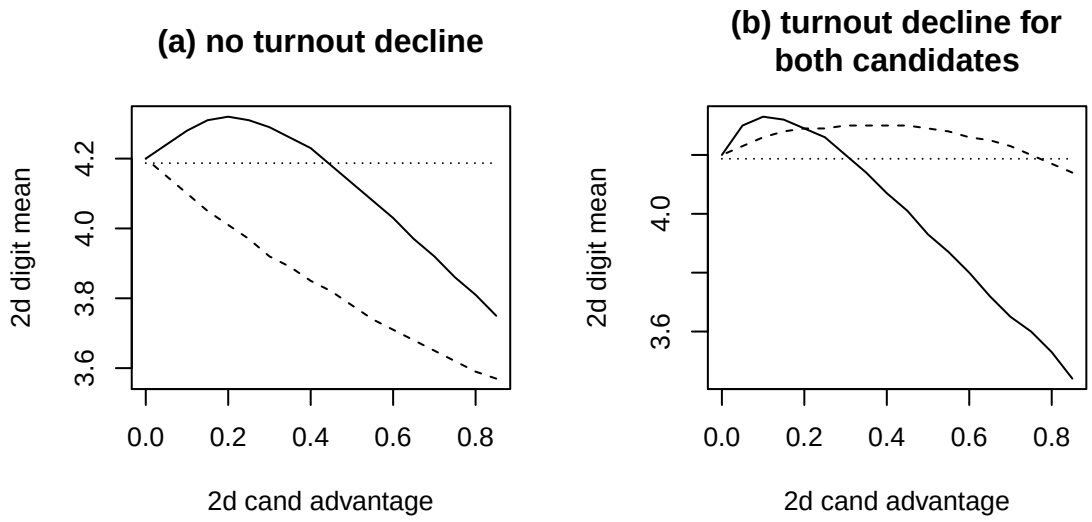
Note: Percentage of respondents placing themselves between the positions they select for the two parties ("Between R & D"), stating they are more liberal than (2010) or giving themselves a lower number than both parties ("Left of R & D"), stating they are more conservative than (2010) or giving themselves a higher number than both parties ("Right of R & D"), stating they are between the parties but with incorrectly ordered parties ("Confused") or give a Don't Know/Refused response to at least one of the three component scales ("Don't Know"). Respondents missing on all three component scales are omitted. Survey respondents are weighted. Point estimates for percentages appear above 95% confidence intervals (in parentheses). 95% confidence interval estimated using the nonparametric studentized bootstrap. Data are from Ansolabehere (2006, 2011, 2010).

Table 9: United States: Five-Category Self-Party Relative Placement Percentages in 2006, 2008 and 2010

Year	Between R & D	Left of R & D	Right of R & D	Confused	Don't Know
2006	0.498	0.158	0.165	0.020	0.159
	(0.4920, 0.5040)	(0.1536, 0.1623)	(0.1607, 0.1701)	(0.0182, 0.0217)	(0.1549, 0.1638)
2008	0.505	0.126	0.173	0.013	0.182
	(0.4981, 0.5121)	(0.1219, 0.1308)	(0.1690, 0.1781)	(0.0112, 0.0148)	(0.1755, 0.1891)
2010	0.536	0.094	0.153	0.012	0.200
	(0.5325, 0.5463)	(0.0910, 0.0983)	(0.1494, 0.1589)	(0.0100, 0.0134)	(0.1944, 0.2073)

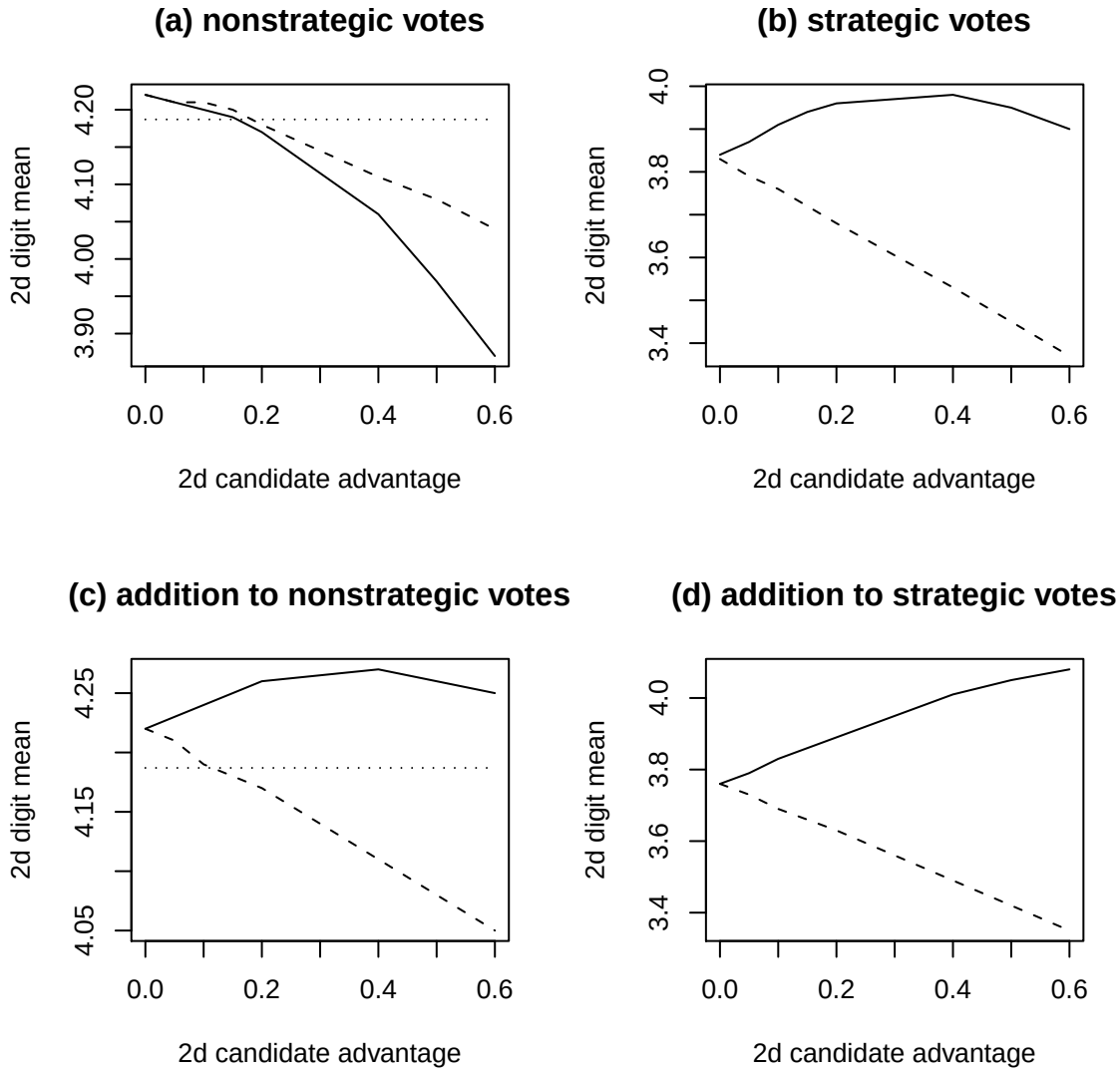
Note: Percentage categorized as in Table 8 but after transformations. 2006 and 2008 were transformed from 100-point ideological scales, 2010 was transformed from a seven-point scale. Survey respondents are weighted. Point estimates for percentages appear above 95% confidence intervals (in parentheses). 95% confidence interval estimated using the nonparametric studentized bootstrap. Data are from Ansolabehere (2006, 2011, 2010).

Figure 1: Second-digit means by candidate advantage: two-candidate simulation



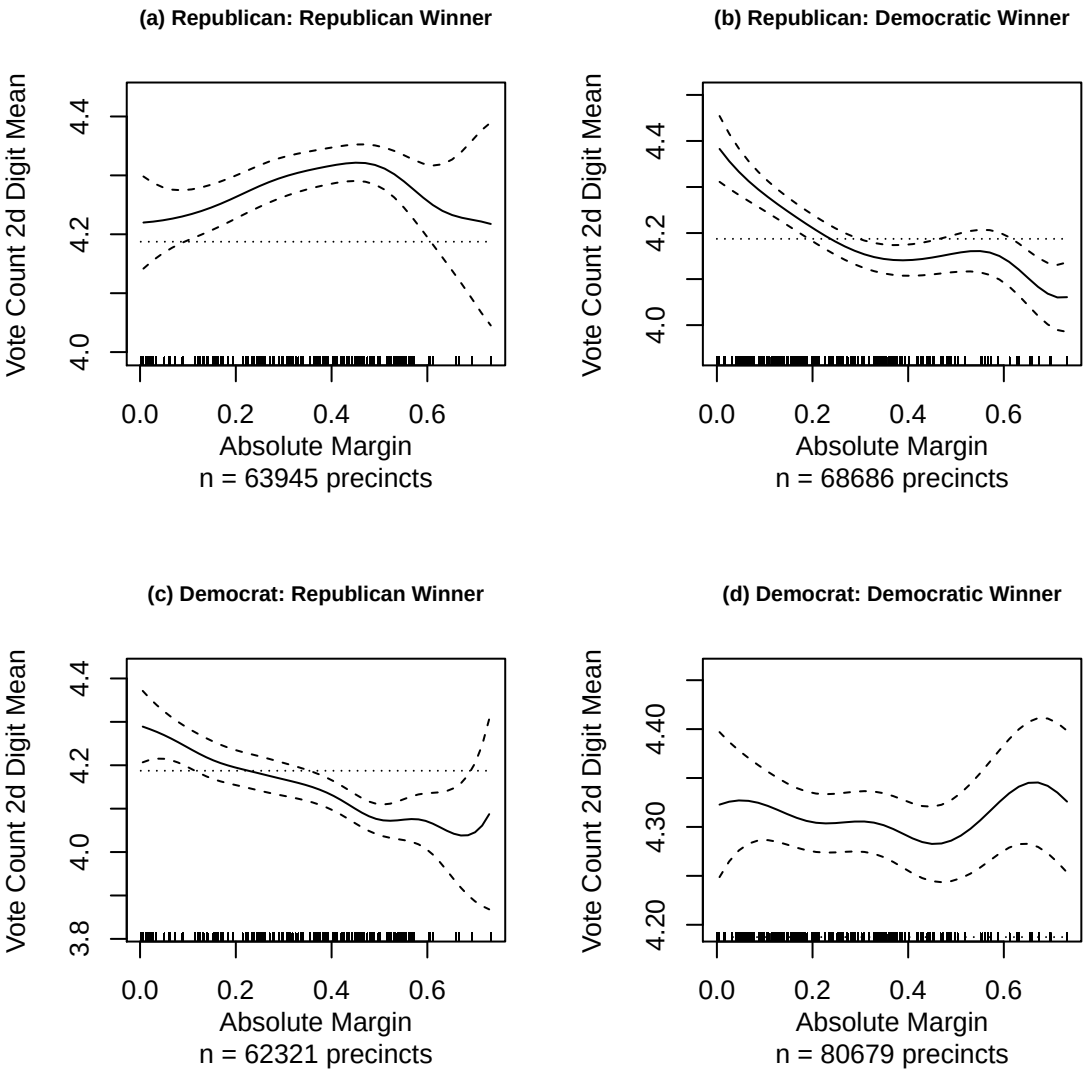
Note: In rightmost graph, turnout decline factor = −2. Solid line is first candidate (disadvantaged). Dashed line is second candidate (advantaged). Dotted line is mean expected under Benford's Law.

Figure 2: Second-digit means by candidate advantage (0 turnout decline factor): symmetric four-candidate simulation including coercion



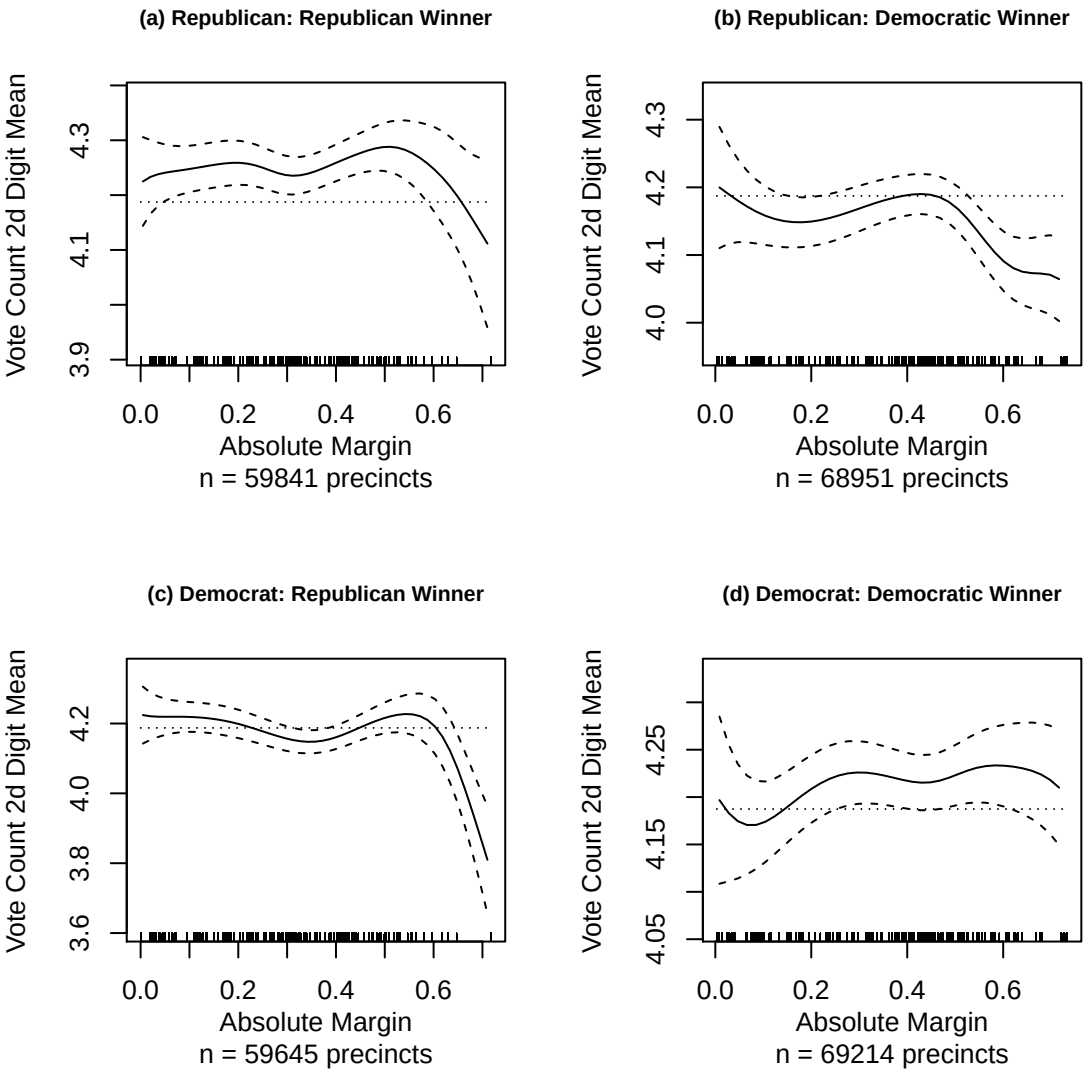
Note: Solid line is first candidate (disadvantaged). Dashed line is second candidate (advantaged). Dotted line is mean expected under Benford's Law.

Figure 3: Vote Counts for United States Representative, 1984



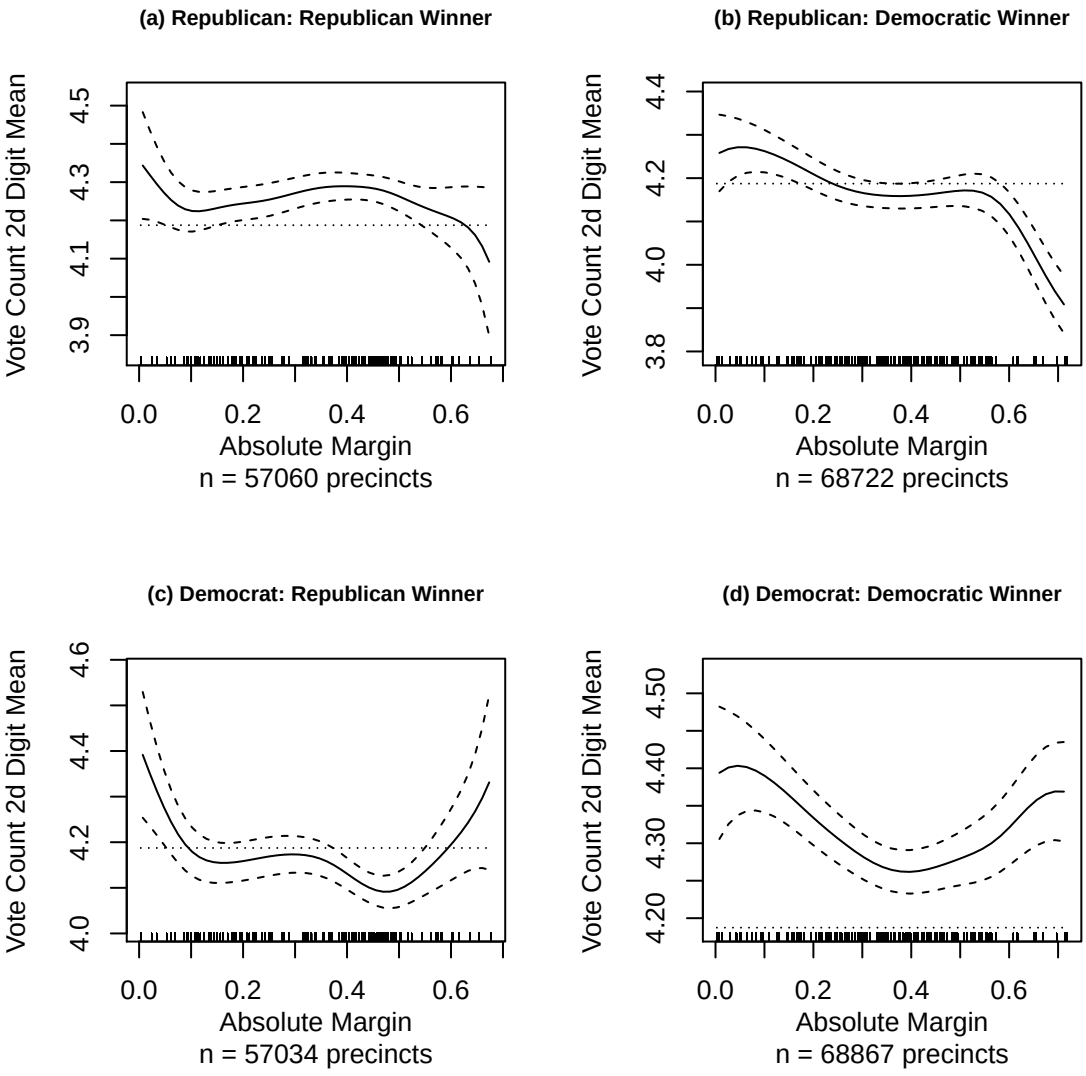
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 4: Vote Counts for United States Representative, 1986



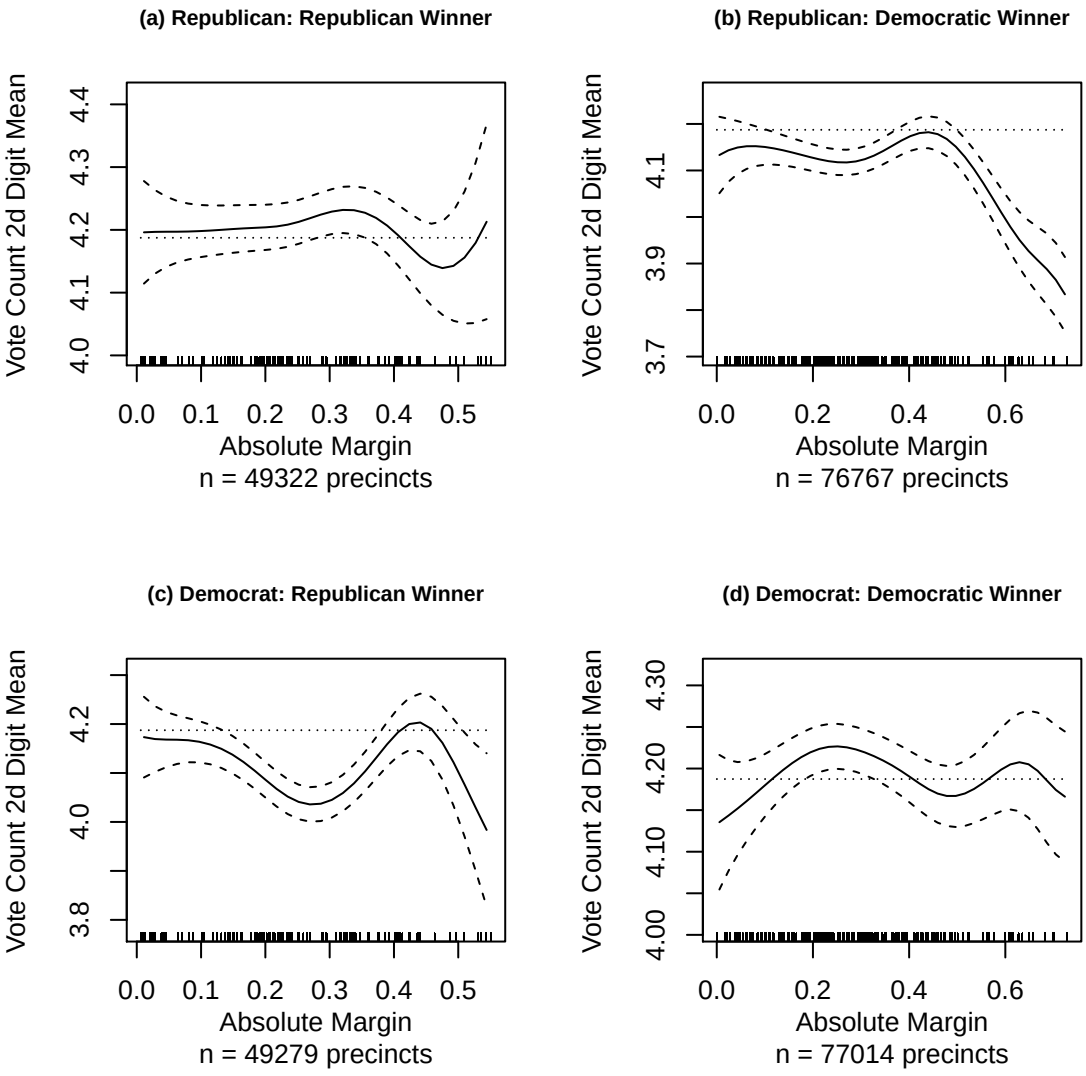
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 5: Vote Counts for United States Representative, 1988



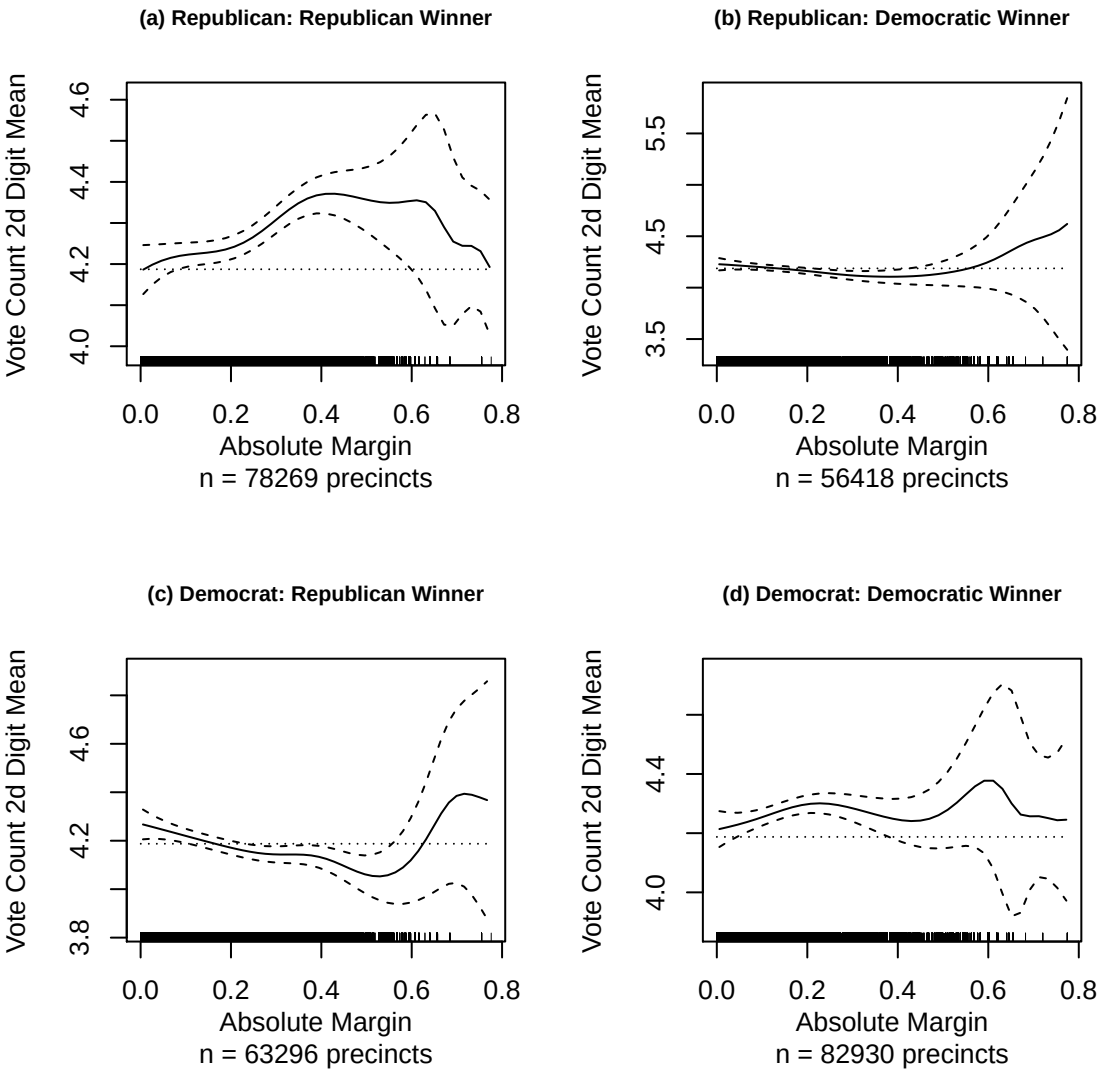
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 6: Vote Counts for United States Representative, 1990



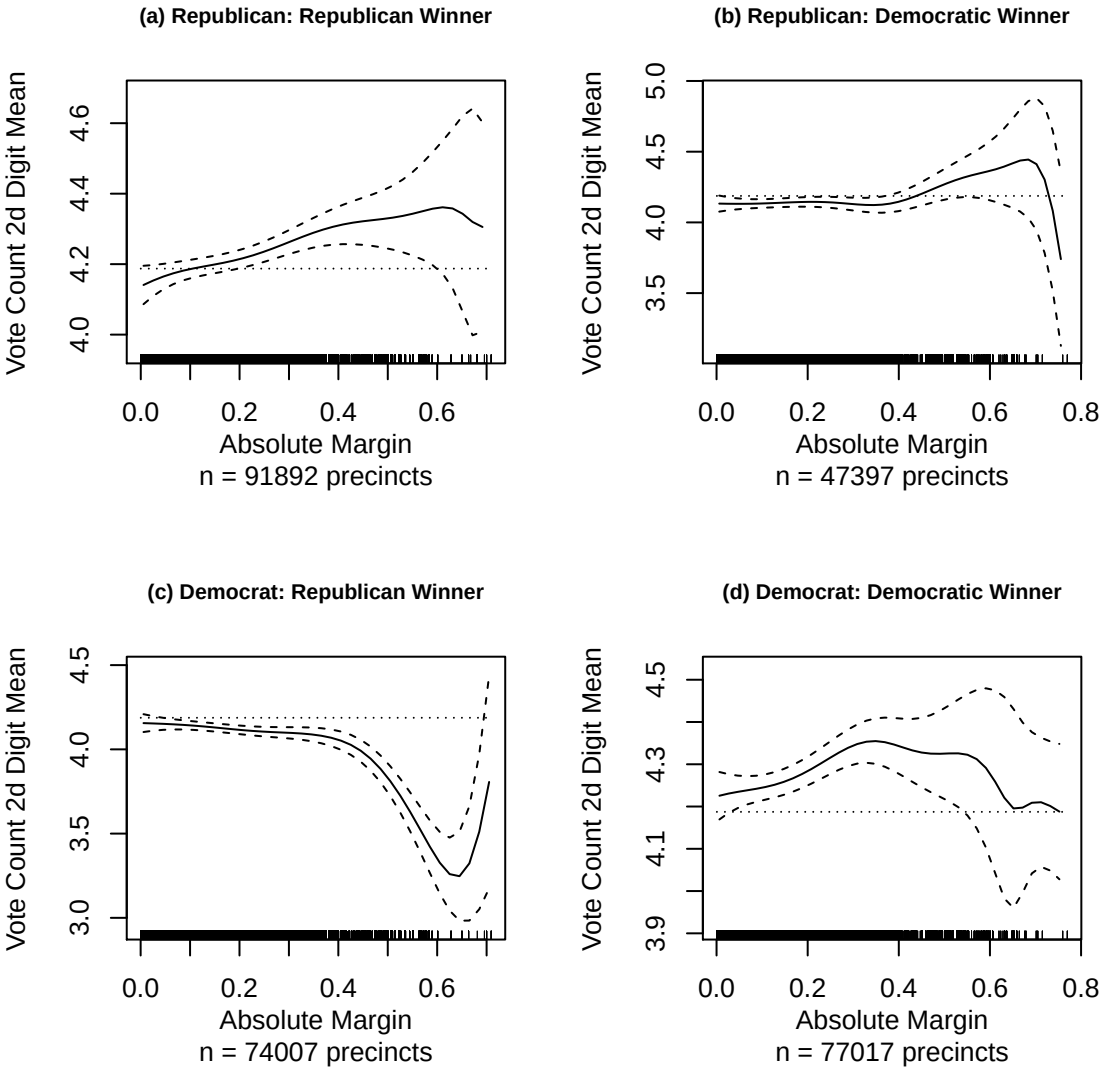
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 7: Vote Counts for State House, 1984



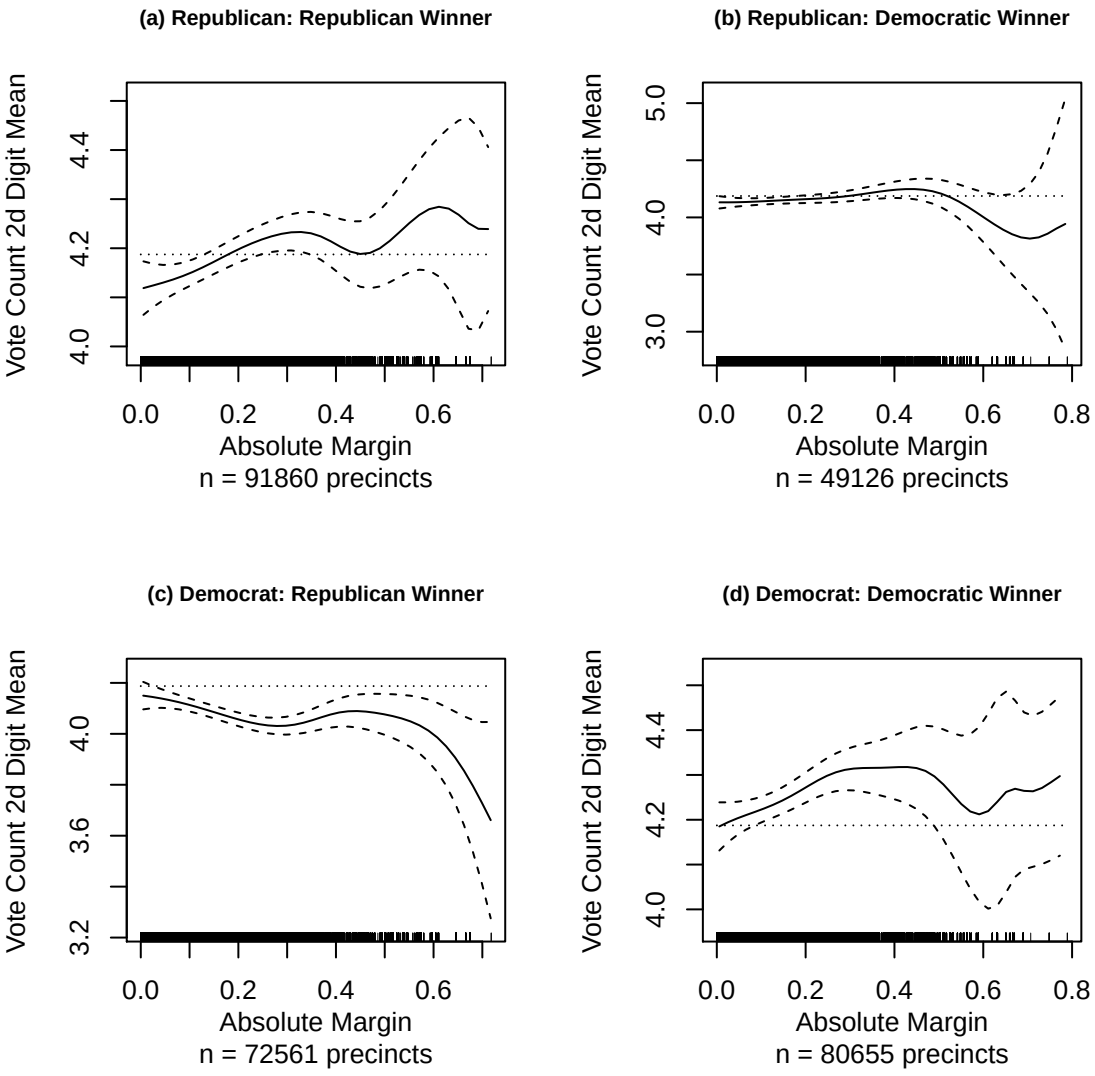
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 8: Vote Counts for State House, 1986



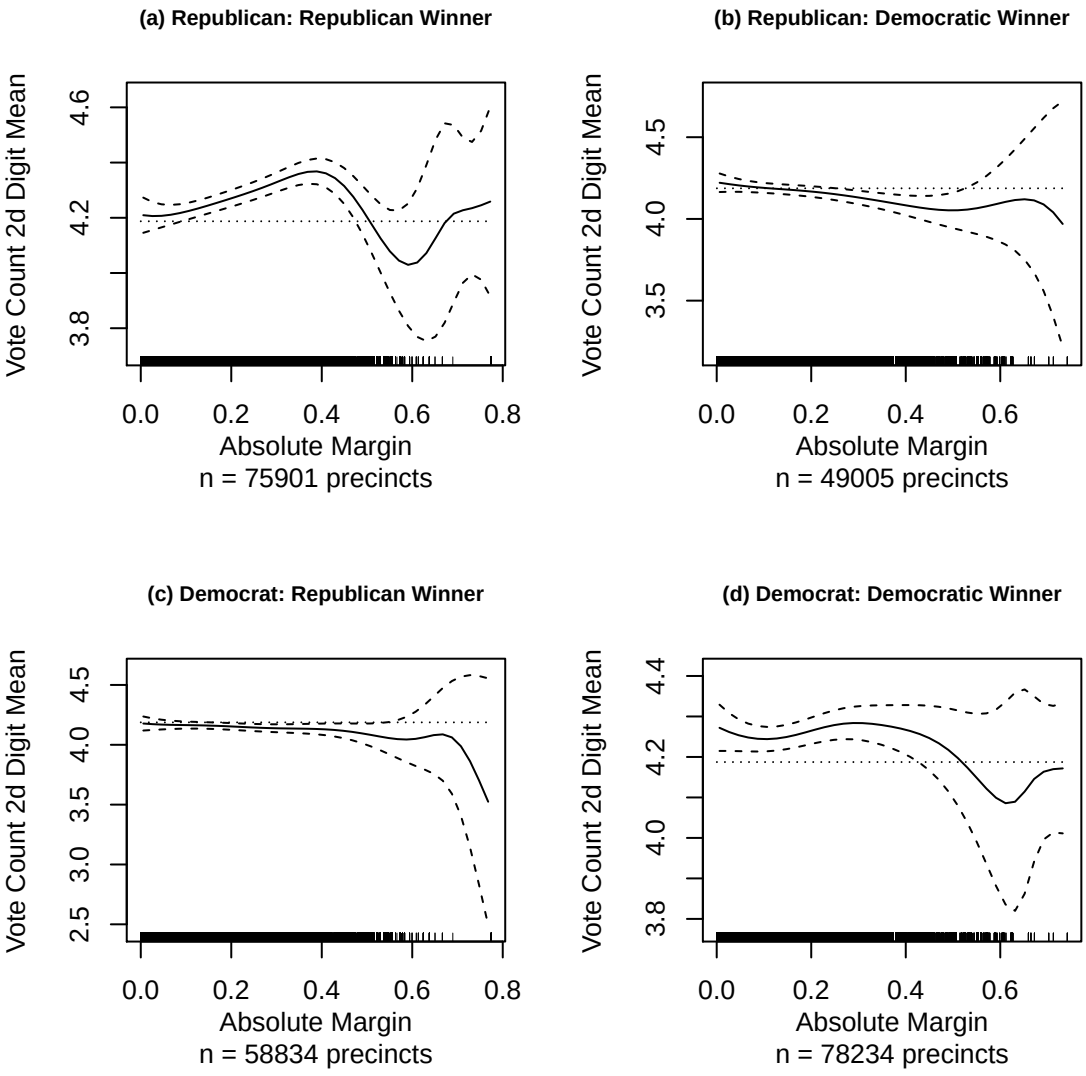
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 9: Vote Counts for State House, 1990



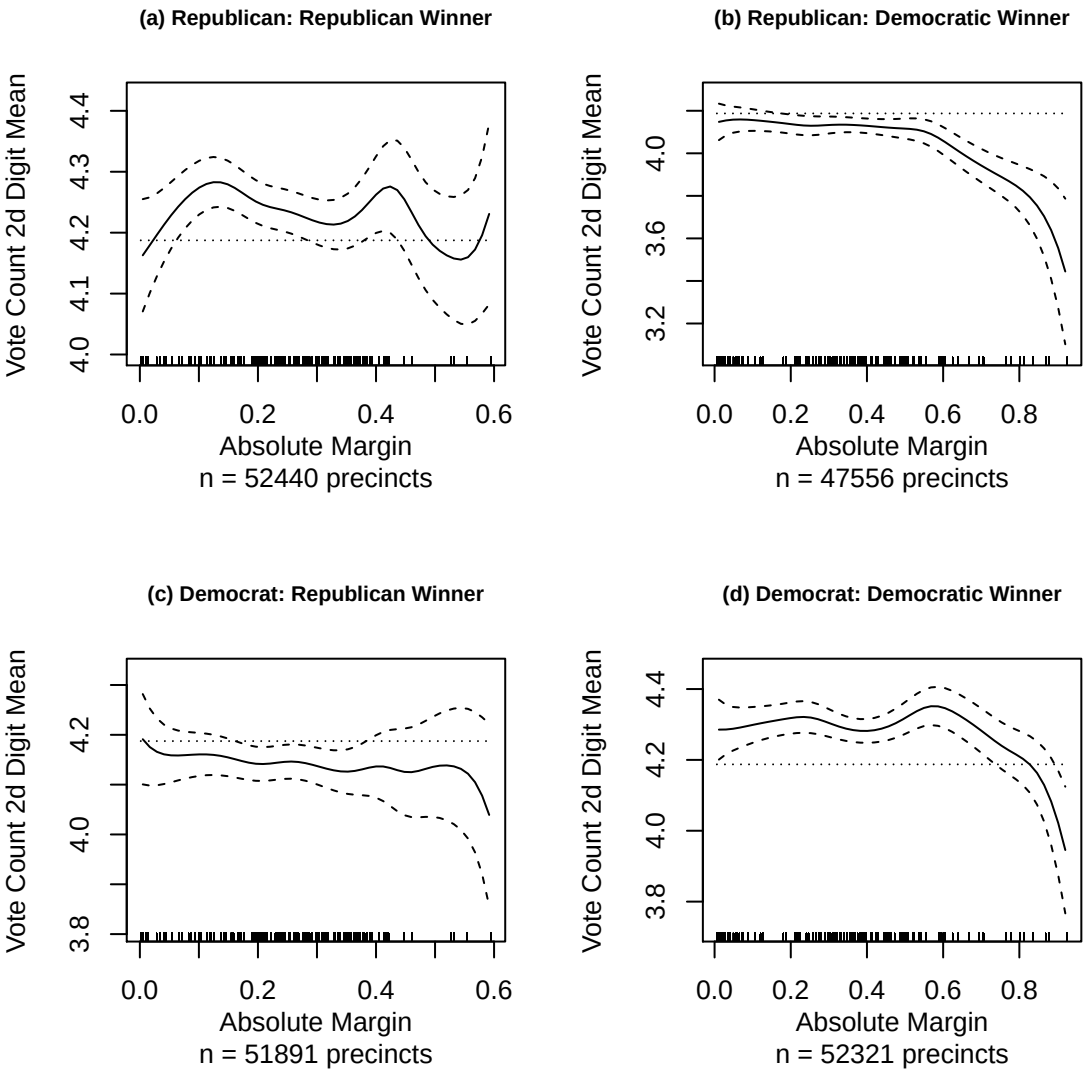
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 10: Vote Counts for State House, 1988



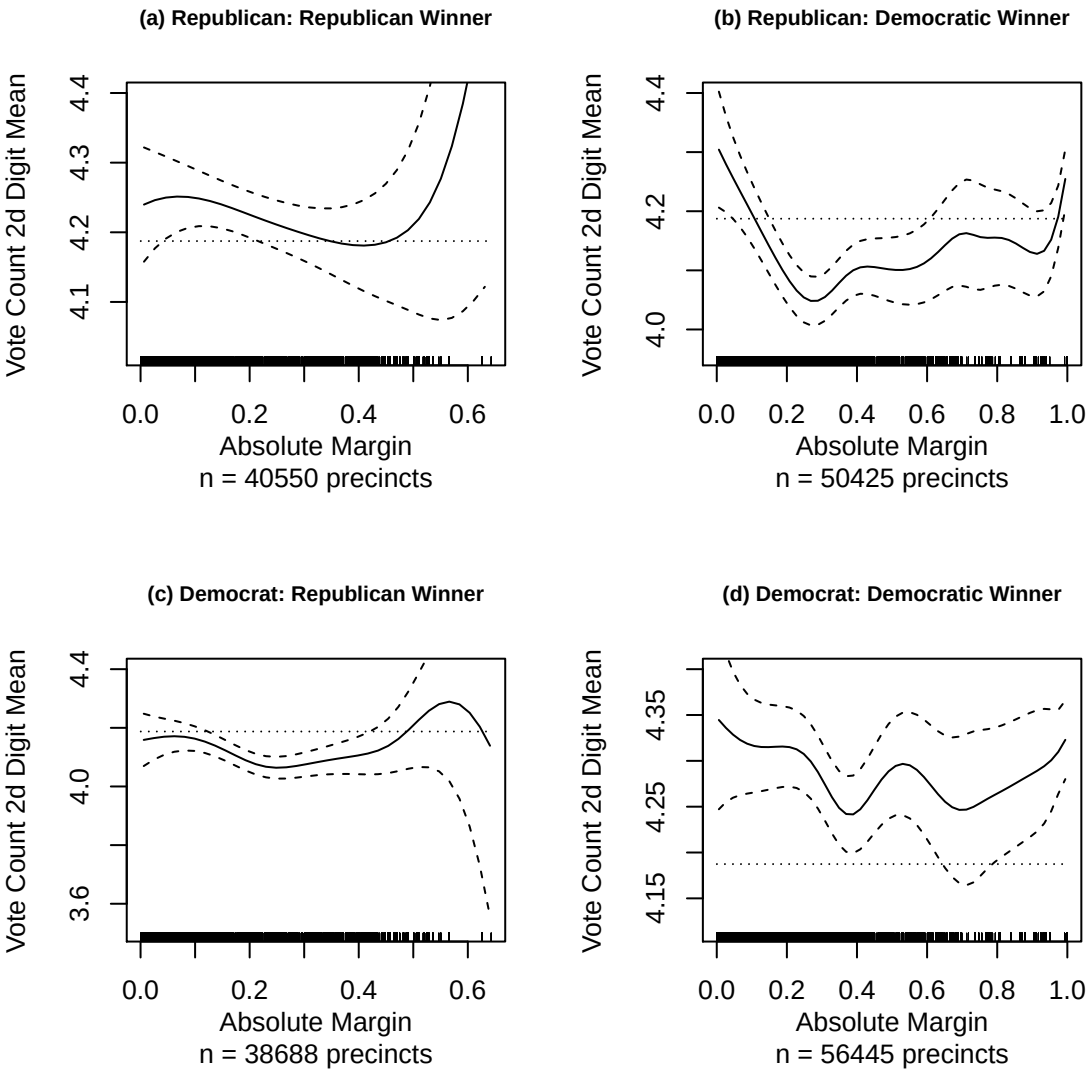
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on ROAD precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 11: Vote Counts for United States Representative, 2006



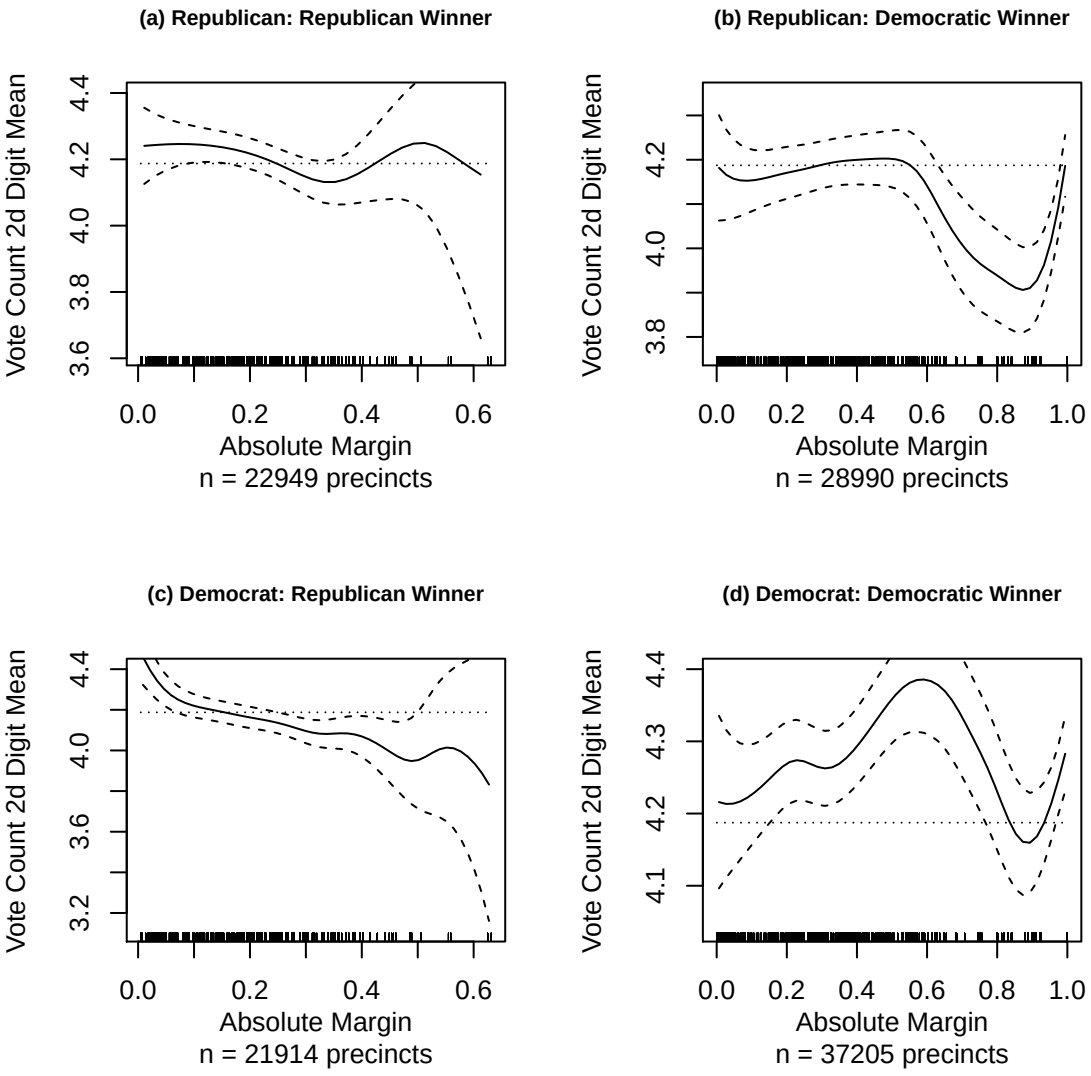
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 12: Vote Counts for State House, 2006



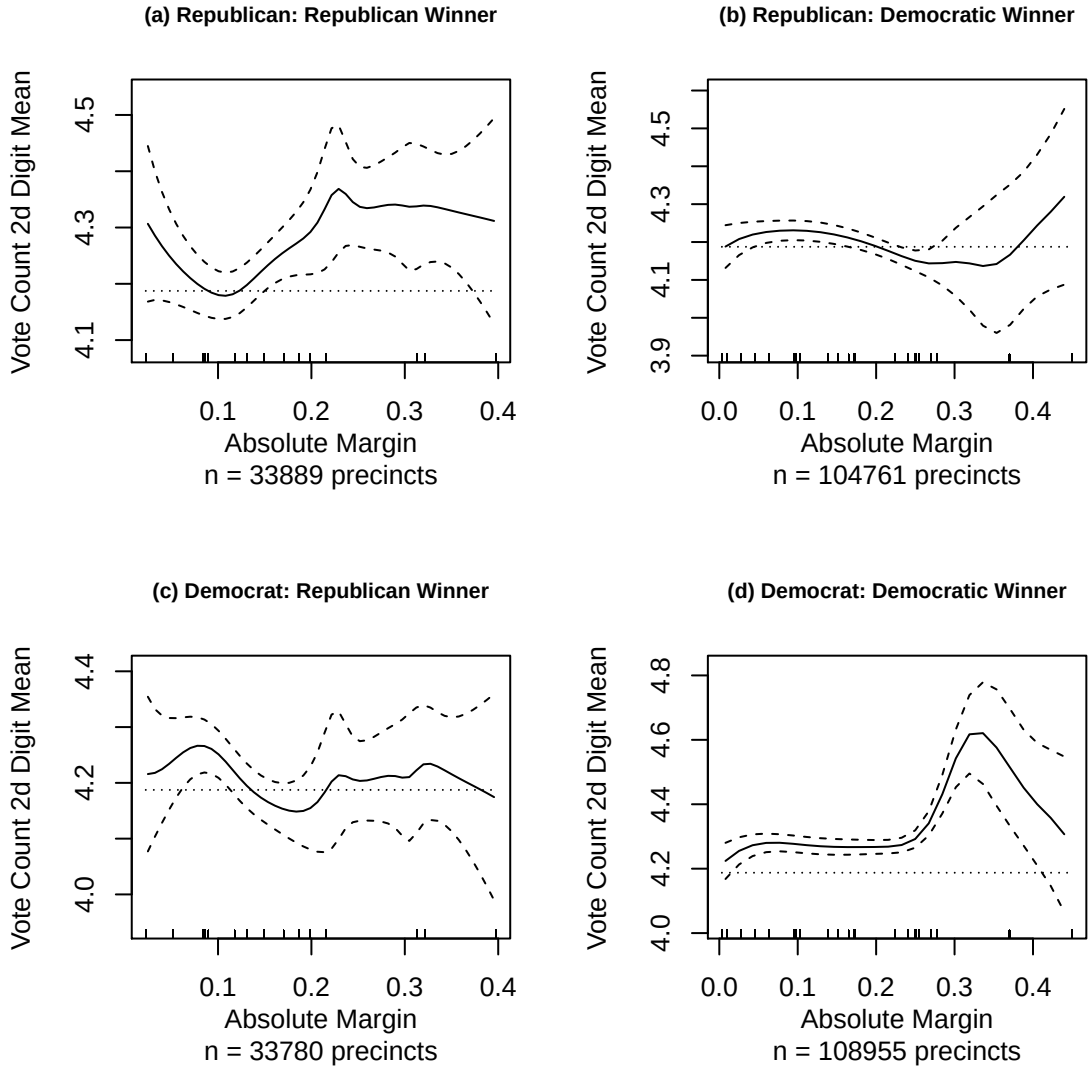
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 13: Vote Counts for State Senate, 2006



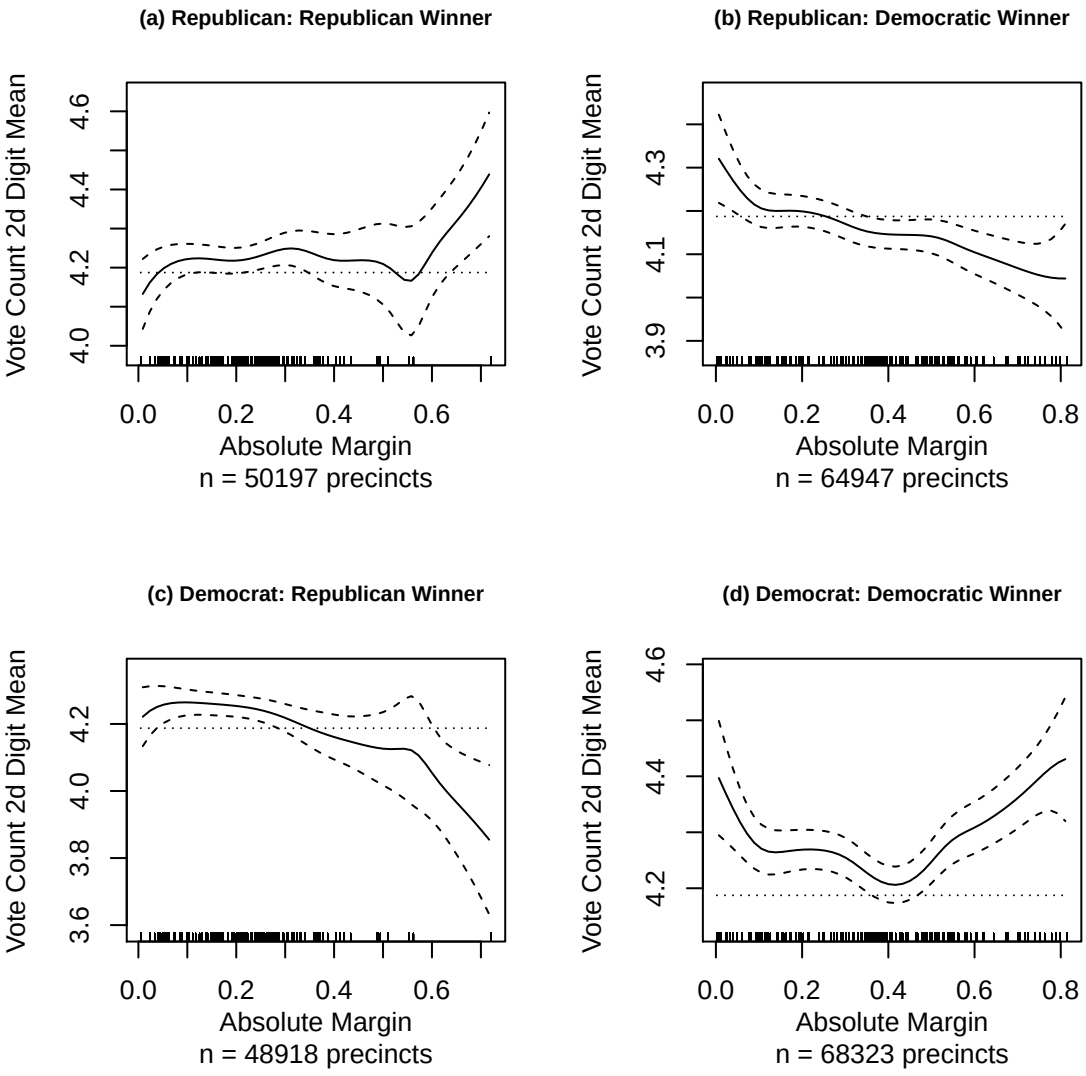
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 14: Vote Counts for President, 2008



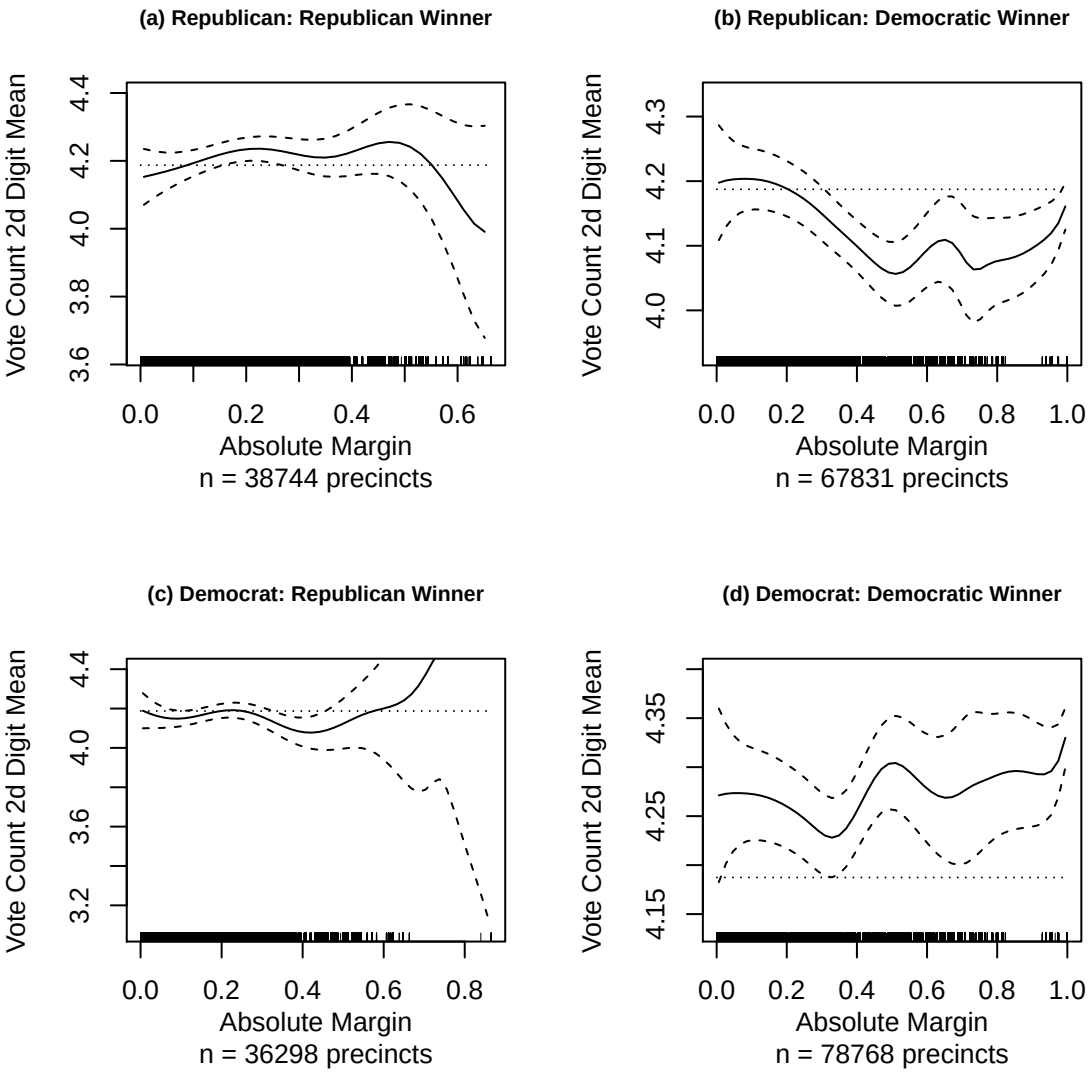
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the total of votes cast for president, using U.S. House Clerk official election returns data. Rug plots show the locations of state absolute margins.

Figure 15: Vote Counts for United States Representative, 2008



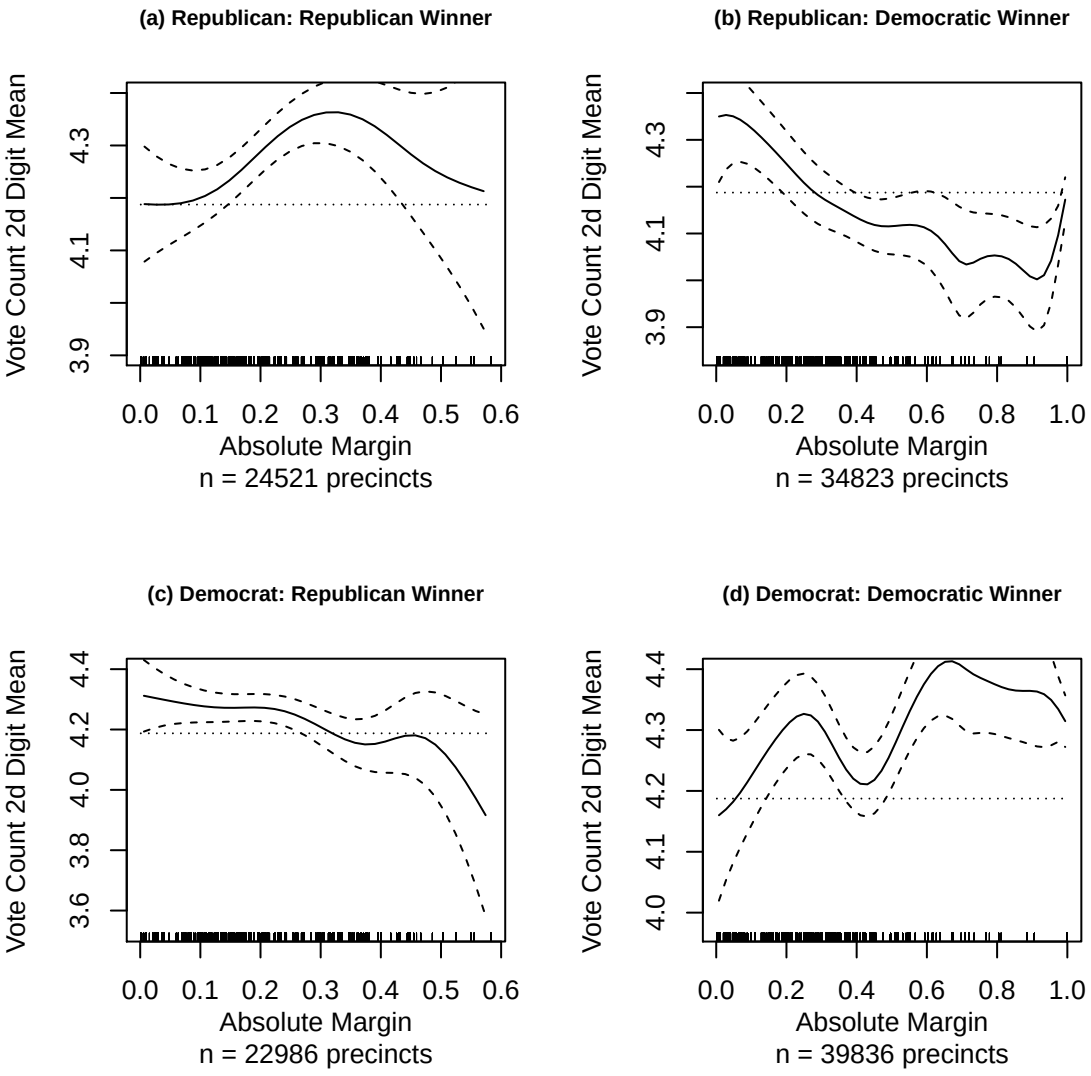
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 16: Vote Counts for State House, 2008



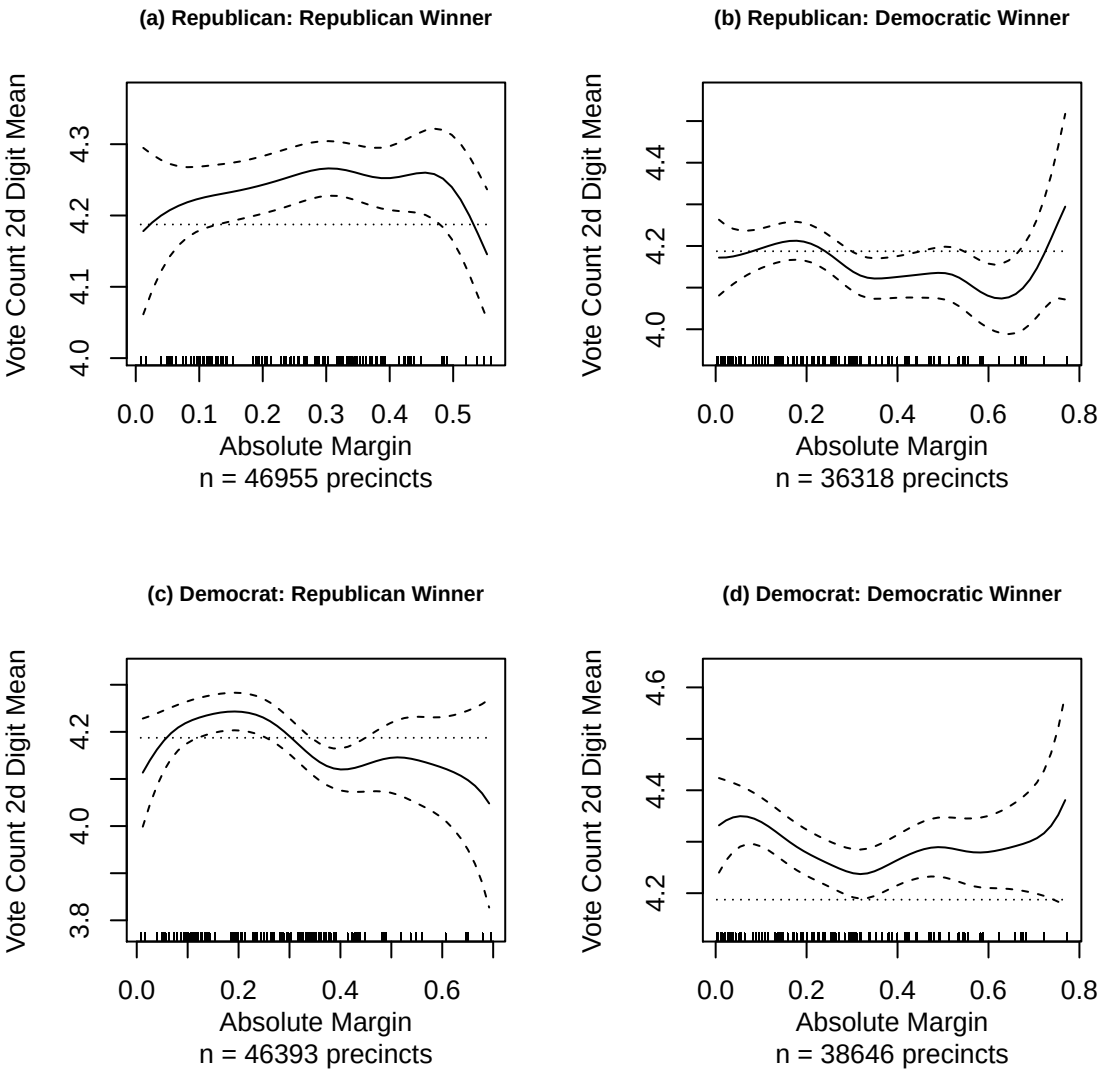
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 17: Vote Counts for State Senate, 2008



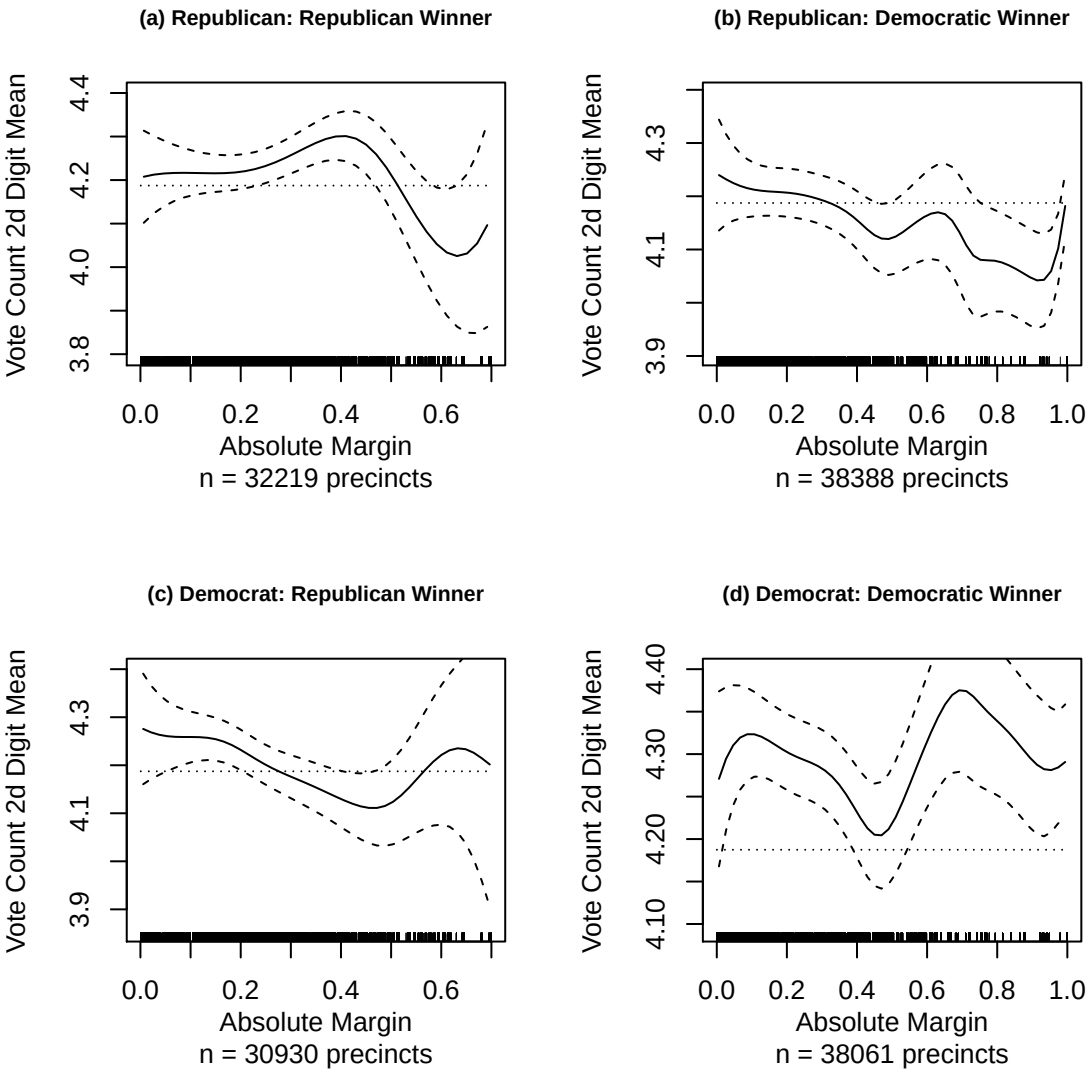
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 18: Vote Counts for United States Representative, 2010



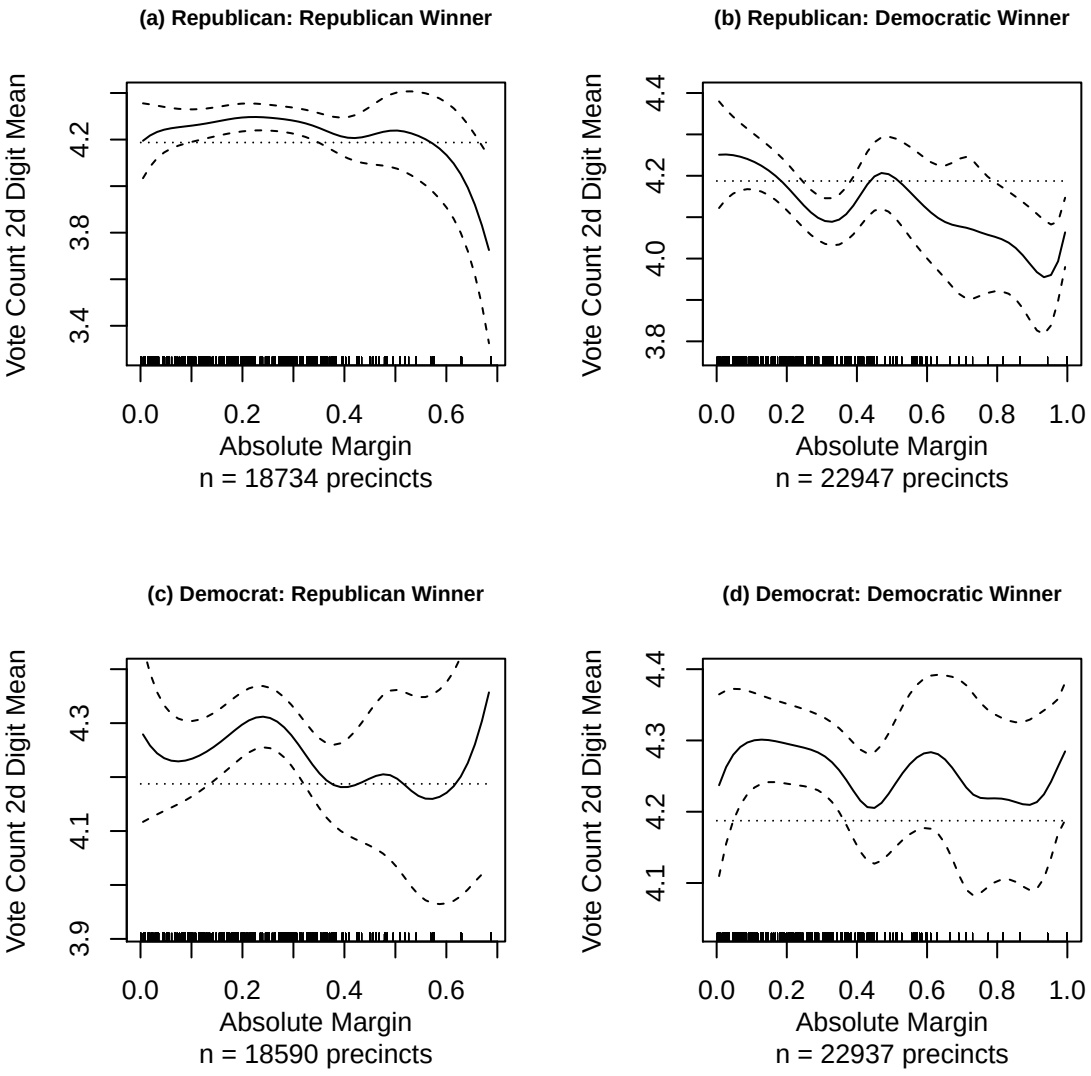
Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes, using U.S. House Clerk official election returns data. Rug plots show the locations of district absolute margins.

Figure 19: Vote Counts for State House, 2010



Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.

Figure 20: Vote Counts for State Senate, 2010



Note: Nonparametric regression curve (solid) with $\pm 1.96 \times$ s.e. curves (dashed). The dotted line shows the location of the second-digit mean expected under Benford's Law. "Vote Count 2d Digit Mean" is based on precinct data. "Absolute Margin" is based on the ratio of votes for the Democrat minus votes for the Republican divided by the sum of those two categories of votes based on district totals computed from the precinct data. Rug plots show the locations of district absolute margins.