Expressive vs. Strategic Voters: An Empirical Assessment*

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Abstract

Leading theories of how voters choose between candidates are rooted in two very different paradigms, with starkly different behavioral implications. Exploiting the incentive structure of Germany's electoral system, I develop a novel set of empirical tests that pit the canonical pivotal voter model against alternative accounts according to which individuals derive expressive utility from supporting their most preferred candidate. The results show that *neither* paradigm can explain the most-salient features of the data. In addition, the evidence suggests that voters cannot be neatly categorized into sincere and strategic "types."

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1. Introduction

Understanding how voters choose between different candidates is essential for understanding the democratic process. One influential school of thought casts voters as strategic agents whose choices are driven by the possibility of casting the decisive vote (e.g., Arrow 1951; Austen-Smith and Banks 1999, 2005; Satterthwaite 1975). Others, however, argue that pivot probabilities in large elections are generally so small that tactical considerations cannot possibly affect voters' decisions (see, e.g., Downs 1957; Green and Shapiro 1994). According to the leading alternative theory, individuals derive expressive utility directly from how they vote (see Brennan and Lomasky 1993; Hamlin and Jennings 2011). Hence, voters sincerely support their most preferred candidate, irrespective of her chances of winning.

How voters behave is ultimately an empirical question. Yet, there exists no consensus. Even the best journals regularly publish articles based on either paradigm (see Gerber et al. 2017 for a similar point). Whether voters are strategic is not only interesting in and of itself, but it is also important for developing accurate theories of electoral politics. *Any* model in which voters face more than two alternatives requires an *assumption* about the tactical sophistication of agents, and the conclusions from otherwise identical theories may depend critically on whether voters are taken to be strategic or sincere.[1]

I address the gap in knowledge by devising a novel set of empirical tests that pit the canonical pivotal voter model against its most prominent alternative. The difficulty in disentangling expressive and strategic behavior is that individuals' true preferences are unobserved. Without any additional structure it is impossible to know whether voters simply selected their most preferred candidate (see Degan and Merlo 2009). Even if one is willing to postulate that some voters did or did not act strategically—think, for instance, of Floridians voting for Ralph Nader in the 2000 presidential election—short of knowing the number of individuals who had an incentive to cast tactical ballots in the first place, it is unclear whether the observed behavior is quantitatively important. Yet, measuring the extent to which actual conduct violates a particular model's predictions is necessary for assessing the positive content of any theory. All formal models are abstractions from reality and will, therefore, mispredict the behavior of *some* individuals. Only if the deviations are large would we want to reject a paradigm.

To quantify contradictions of either of the two leading theories of voter behavior, I exploit the incentive structure of parliamentary elections in Germany, where individuals have two votes that are cast simultaneously but counted under different electoral rules. As explained below, these votes need to satisfy basic consistency properties in order to conform to the predictions of either the pivotal voter model or its expressive counterpart.

[1] Compare, for instance, Besley and Coate (1997) with Osborne and Slivinski (1996).

My results imply that neither paradigm provides an adequate description of reality. Specifically, I estimate that, on average, almost two thirds of individuals violate the predictions of the pivotal voter model, while about one third does not behave expressively. Based on this evidence, I conclude that the two most prominent theories of how voters choose between candidates should both be rejected. I also present evidence to suggest that voters cannot be neatly classified into strategic and sincere "types."

2. Related Literature

There exists a large literature concerned with detecting either expressive or strategic voting. Within this literature, laboratory experiments provide typically convincing evidence of tactical behavior by some, but not all, individuals (e.g., Bouton et al. 2016, 2017; Duffy and Tavits 2008; Eckel and Holt 1989; Esponda and Vespa 2014). How well existing results generalize to large, real-world elections, however, remains unknown.

Coate et al. (2008), for instance, argue that the pivotal voter model is unable to replicate winning margins in Texas liquor referenda. Yet, Reed (1990) and Cox (1994) find that the aggregate distribution of votes in Japan's multimember districts does conform to the predictions of canonical rational choice theory. The results of Cox (1997) are suggestive of strategic behavior in some electoral systems but not in others. More recently, Fujiwara (2011) shows that in Brazil third-place candidates are more likely to be deserted in races under simple plurality rule than in runoff elections. Pons and Tricaud (2018) document that, in French parliamentary elections, the presence of a third candidate reduces the vote shares of the two front-runners. Their results support the view that many voters have expressive concerns.

Even less is known about the actual *extent* of expressive and strategic voting. Degan and Merlo (2009) study under what assumptions strategic voting can be detected in observational data. They conclude that the behavior of voters in U.S. national elections is, for the most part, consistent with sincere voting. Spenkuch (2015) exploits a highly unusual by-election in Germany, which allowed a party to gain one seat by receiving fewer votes, to show that about 9% of voters did not behave expressively. Kawai and Watanabe (2013) estimate a fully structural model of voting decisions in Japan's general election, concluding that between 63% and 85% of voters are strategic. Quantifications like these are necessary to truly evaluate the strategic and expressive paradigms.

Recall, the fundamental difficulty in inferring (non)strategic behavior from naturally occurring data is that voters' preferences are not observed. A separate strand of the literature tries to circumvent this problem by using survey data on voting decisions and political orientations (see, e.g., Abramson et al. 1992; Blais et al. 2001; Gschwend 2007; Niemi et al. 1993; Pappi and Thurner 2002). Estimates of tactical voting in this tradition are often very low—a few percentage points. Wright (1990, 1992), however, points to important survey biases and raises serious doubts about conclusions based on self-reported votes. Alvarez and Nagler (2000) even show that, depending on the survey design, results differ by as much as a factor of seven. As pointed out by Kawai and Watanabe (2013), another reason for why estimates of strategic voting tend to be low is that some analyses do not account for the fact that the vast majority of voters has no incentive to cast strategic ballots. Kiewiet (2013) is an important exception. Analyzing individual survey responses and aggregate election results for British General Elections from 1983 to 2005, Kiewiet (2013) estimates that, on average, about one third of the supporters of nonviable parties vote tactically. His results are, therefore, remarkably similar to the estimated extent of strategic voting in this paper.

3. Germany's Electoral System

The political landscape in Germany used to be dominated by five major parties: CDU/CSU (conservative), SPD (center-left), FDP (libertarian), Green Party (green/left-of-center), and The Left (far left). The CDU/CSU and the SPD each had nearly as many supporters as the three smaller parties combined. Neither party, however, could govern on the federal level without a coalition partner. Since the mid-1980s, the CDU/CSU's traditional partner has been the FDP, whereas the SPD has typically entered into coalitions with the Green Party. These "preferences" are well-known to voters.

My empirical strategy exploits the incentive structure of elections to the Bundestag, the lower house of the German legislature. Elections are held every four years according to a mixed-member system with approximately proportional representation. Except for minor modifications, the same system has been in place since 1953. In what follows, I describe the exact set rules as of the 2005 and 2009 parliamentary elections, which are the focus of the analysis below.[2]

As mentioned in the introduction, each voter casts two different votes.[3] The first vote, or *candidate vote* (Erststimme), is used to elect a constituency representative in each of 299 single-member districts. District representatives are determined in a first-past-the-post system. That is, whoever achieves the plurality of candidate votes in a given district is automatically awarded a seat in the Bundestag. Winners are said to hold *direct mandates*, and votes cast for any other candidate are discarded.[4]

The arguably more important vote is the *list vote* (Zweitstimme). It is cast for a party, and the total number of party members who enter the Bundestag is roughly proportional to

[2] The description borrows heavily from Spenkuch (2015).

[3] In principle, voters can cast only one vote and leave the other one blank. I practice, however, the fraction of ballots with only one valid vote is quantitatively negligible.

[4] Since the introduction of the two-ballot system in 1953, no independent candidate has won a district.

a party's share of the national list vote among parties clearing a 5%-threshold. To achieve approximately proportional representation despite potentially lopsided outcomes in the candidate vote, the German electoral system awards *list mandates*. First, all list votes are aggregated up to the national level, and a total of 598 preliminary seats are distributed on a proportional basis. Each party's allotment is then broken down to the state level and compared with its number of direct mandates in the same state. Whichever number is greater determines how many seats the party will actually receive.

More formally, let $d_{p,s}$ denote the number of districts that party p won in state s, and let $l_{p,s}$ be the number of mandates it would have received in the same state under proportional representation. The final number of seats that p retains in s equals $n_{p,s} = \max\{d_{p,s}, l_{p,s}\}$, and its total in the Bundestag is given by $n_p = \sum_s n_{p,s}$ (cf. Appendix C).

If $d_{p,s} < l_{p,s}$, then, in addition to the district winners, the first $l_{p,s} - d_{p,s}$ candidates on p's list are elected as well. Otherwise, only holders of direct mandates receive a seat. Parties are said to win *overhang mandates* (Überhangmandate) whenever $d_{p,s} > l_{p,s}$. In such cases, the total number of seats in the Bundestag increases beyond 598. Since the total number of mandates awarded under proportional representation, i.e., $\sum_p \sum_s l_{p,s}$, exceeds the number of districts, $\sum_p \sum_s d_{p,s}$, by a factor of two, situations in which $d_{p,s} > l_{p,s}$ are not as common as one might imagine. For instance, relative to its share of the list vote, the CDU/CSU received an additional seven mandates in 2005, whereas the SPD secured nine extra seats. In 2009, there were 24 overhang mandates, 21 of which accrued to the CDU.[5]

4. Disentangling Strategic and Expressive Behavior

To see why the German context is useful, first consider the null hypothesis of expressive voting. Under the null, list and candidate votes must reveal voters' true preferences over parties and candidates, respectively. Thus, if candidates were perfect representatives of their parties, then a candidate's own vote share in a given district or municipality should be equal to that of her party. Given that preferences over candidates and parties are unlikely to be perfectly correlated, it is unreasonable to expect an exact correspondence between candidate- and party-vote shares in every district. However, after carefully controlling for all candidate characteristics, we should see a relationship that is nearly one-for-one on average. Importantly for my purposes, under the null, the degree to which party and candidate votes track each other *cannot* be a function of the electoral incentives. After all, the expressive voter model stipulates that, in large elections, individuals simply choose their most preferred candidates and parties, regardless of strategic considerations.

[5]Starting with the 2013 election, the number of list mandates also increases when a party wins more direct than list mandates in a particular state. Given that my analysis focuses on the 2005 and 2009 elections, the 2013 electoral reform has no bearing on the results.

On a basic level, Germany's electoral system provides straightforward incentives. In years in which all major parties are expected to clear the 5%-threshold, it is optimal for instrumentally rational agents to cast their list vote for whichever party they would like to gain the marginal seat in parliament.[6] The key incentive associated with the candidate vote is common to *all* elections under plurality rule. If a particular candidate is known to be out of the race, then instrumentally rational agents can generally do better by voting for somebody else. This is because, in large elections, a tie is orders of magnitudes more likely to involve candidates believed to be front-runners than an underdog (Myerson 2000). As a result, only a subset of candidates can be in the race, and pivotal voters should behave as if their choice set consisted only of serious contenders. Supporting anybody else would amount to a wasted vote, which, by definition, pivotal voters do not do.

It is thus possible to quantify deviations from the canonical pivotal voter model by determining the share of voters who stick with a candidate who is out of the race, conditional on voting for the associated party. Simply put, agents who—*for whatever reason*—vote for a party whose direct candidate in a particular district is not in contention for victory violate the predictions of the theory if they also vote for said candidate. They play a dominated strategy.

Note, the contrapositive does not necessarily hold. Individuals who cast split tickets may, but need not, be strategic. Thus, without imposing further assumptions, my empirical strategy recovers a *lower bound* on the extent to which individuals' choices contradict the predictions of the pivotal voter model.

Figure 1 provides a graphical, high-level summary of my approach. The panels on the left entertain the possibility that all voters cast sincere ballots, as predicted by models of expressive voting. If this were indeed the case, then, after controlling for candidates' personal appeal, there should be a very close correspondence between party and candidate votes, *regardless* of whether a particular candidate is viable.

By contrast, the middle panels assume that all voters behave tactically. If individuals' behavior conformed to the predictions of the pivotal voter model, then only candidates believed to be in contention for victory would receive any votes. For noncontenders, the curve representing the relationship between party and candidate votes ought to be flat.

The panels on the right consider the case in which the electorate is composed of a *mixture* of expressive and pivotal voters. As before, expressive agents support their preferred candidate, but no pivotal voter chooses a nonviable nominee. Hence, the line relating noncontenders'

[6]Note, if voters take post-election coalition formation into account or if they live in a state in which overhang mandates may occur, then this party need not be the one they prefer based on their ideological convictions.

share of the candidate vote to their parties' list votes must have a slope between zero and one. It is this slope that identifies the fraction of individuals who fail to cast a tactical ballot despite having an incentive to do so. In sticking with a nonviable candidate, they deviate from the core prediction of the pivotal voter model. Conversely, one minus the slope estimate measures the share of voters whose observed choices are sensitive to the strategic incentives, and, therefore, violate the expressive paradigm.

Importantly, the results from my approach are informative even if people do not fully understand the algorithm that determines parties' final number of seats in parliament.[7] The three key requirements for my empirical strategy to go through are that: *(i)* voters know the district winner is determined by plurality rule, *(ii)* they can anticipate which candidates are and are not in contention for victory, and *(iii)* voters are not *perfectly* indifferent between the candidates who remain in the running.[8] If correct, then a pivotal voter would never support a nonviable candidate, but an expressive voter might.[9]

5. Testing the Null Hypothesis of Expressive Voting

To test the two leading theories of how voters choose between candidate, I rely on official results of the 2005 and 2009 federal elections. Restricting attention to 2005 and 2009 is useful because all important parties were widely expected to clear the national 5%-threshold.[10] Critical for my approach is that the data are disaggregated by polling precinct (Wahlbezirk). In Germany, precincts are the smallest administrative units in which votes are counted. Each precinct is fully contained within an electoral district and associated with one polling station. As of 2009, there were 299 electoral districts and almost 89,000 precincts, which handled

[7]Karp (2006) reports that the most common source of confusion among voters is that they *over*estimate the importance of the candidate vote for a party's total number of mandates.

[8]Arguably, a small preference for one candidate over another is realistic. After all, there is a small chance that the outcome in a particular district will affect the aggregate distribution of seats. Even conditional on the aggregate distribution of seats, voters may care about sending "good" local representatives to parliament, especially since representatives elected via the candidate vote are likely to become members of committees that allow them to serve their geographically based constituency (Stratmann and Baur 2002). Consistent with this argument, in the 2009 German Longitudinal Election Survey (GLES), almost three out of four respondents said that it is either "important" or "very important" that candidates represent the interests of their home districts.

[9]A potentially important caveat is that aggregate uncertainty might make it difficult for voters to predict which candidates are in contention for victory (Myatt (2007)). With aggregate uncertainty candidates that were *ex post* well separated from the two front runners might have looked like serious contenders *ex ante*. If correct, this would lead me to overestimate the fraction of voters whose behavior contradicts the predictions of the pivotal voter model. At the same time, for aggregate uncertainty to be a problem for my conclusion that most voters do not behave strategically, it would have to be the case that this kind of uncertainty is so large that even candidates who trailed the runner-up by double-digit percentage points appeared viable to voters (cf. the upper panel of Table 2 and Appendix Table A.2).

[10]For instance, more than 90% of adults sampled in the 2009 pre-election survey of the German Longitudinal Election Study expected the FDP and Green Party to receive more than five percent of the list vote.

about 615 votes on average.[11] Since races take place at the district level, these data allow me to exploit *within*-candidate variation, thereby *conditioning* on all observable as well as unobservable candidate characteristics.[12]

Recall, under the null hypothesis of expressive voting, list and candidate votes must reveal voters' true preferences over parties and candidates, respectively. Thus, after carefully controlling for candidate quality, precinct-level candidate- and party-vote shares should track each other almost one-for-one. The results in Table 1 show that this prediction holds in situations in which voters have no strategic incentive to abandon their favored party's nominee, but not when tactical voting might be beneficial.

The ordinary least squares estimates in the table are based on the following econometric model

$$(1) \qquad v^C_{k,r,t} = \chi_{m,k,t} + \phi v^L_{k,r,t} + \epsilon_{k,r,t},$$

where $v^C_{k,r,t}$ denotes contestant k's share of the candidate vote in precinct r during election year t, and $v^L_{k,r,t}$ is her party's share of the list vote in the same precinct. To allow for almost arbitrary forms of autocorrelation in the residuals as well as for correlation within and across districts, standard errors are clustered by state. Going from the left of the table to the right, the set of fixed effects grows steadily. The most inclusive specification contains $\chi_{m,k,t}$, a municipality- and year-specific candidate fixed effect. I, therefore, control nonparametrically for the appeal of individual candidates as perceived by the voters in a given town or village. The parameter of interest in equation (1) is ϕ. It measures the share of party supporters who also vote for the associated candidate.

The upper panel of Table 1 restricts attention to the eventual winner and runner-up of each race. Voters who support the parties of these candidates have no strategic reason to cast split ballots. After all, surprises in large-scale elections are very rare, and partisans have no incentive to desert someone they should have believed to be in contention for victory. Consistent with the idea that party votes are heavily correlated with individuals' preferences over candidates, the results in column (4) show that an extra list vote results in about .989 additional candidate votes. Although the point estimate is quite precise, it is not possible to statistically rule out that it is exactly equal to one ($p = .544$).

By contrast, the middle panel focuses on candidates who finished in third place or worse. *At least some* individuals who supported the parties associated with these candidates had a strategic incentive to vote for someone else; and my estimates show that about one in three

[11] For descriptive statistics, see Appendix Table A.1.

[12] In Germany, the five major parties field candidates in almost all electoral districts. The 0.5% of district-year combinations in which they do not are excluded from the analysis.

did so.

In the bottom panel of Table 1, I test the null hypothesis of expressive voting by estimating the *difference* between the settings above, i.e., between situations in which voters do and do not have a strategic incentive to cast split ballots. Specifically, I estimate the augmented model

$$v^C_{k,r,t} = \chi_{m,k,t} + \phi v^L_{k,r,t} + \delta v^L_{k,r,t} \times \mathbf{1}\left[k \geq 3\right] + \epsilon_{k,r,t}, \tag{2}$$

where $\mathbf{1}\left[k \geq 3\right]$ is an indicator variable for whether candidate k finished third or worse. One can dismiss the null that all voters behave expressively if it is possible to statistically reject $H_0 : \delta = 0$. Clearly, δ is negative and statistically significant in all specifications ($p < .001$). In fact, taking the coefficient in column (12) at face value, the choices of almost a third of individuals are inconsistent with the expressive paradigm. Based on this evidence, I conclude that the expressive voter model should be rejected.

6. Quantifying Deviations from the Pivotal Voter Model

6.1. *Econometric Details*

In order to shed light on how frequently the predictions of the canonical pivotal voter model are violated, I estimate two related empirical specifications. The first one identifies the share of voters whose choices deviate from the theory by restricting attention candidates who, by any reasonable standard, were clearly not in contention for victory. For this set of candidates, I estimate

$$v^C_{k,r,t} = \chi_{m,k,t} + \lambda v^L_{k,r,t} + \epsilon_{k,r,t}, \tag{3}$$

where all symbols are as defined above. The parameter of interest is λ. Since I restrict attention to nonviable candidates only, λ denotes the fraction of party supporters who stick with the associated candidate despite her being out of the race. As long as there is no heterogeneity in λ, it is irrelevant if the set of candidates who are included in the sample used to estimate equation (3) is chosen too conservatively, i.e., if one fails to include some candidates who were also believed to be nonviable. Settling on a too narrowly defined set of noncontenders would only come at a loss of statistical power, but it would not prevent consistent estimation of λ.

If there is heterogeneity in λ *and* if this heterogeneity is systematically correlated with who remains in contention for victory, then restricting attention to supporters of parties that field candidates who trail far behind might lead to unrepresentative estimates. The second (and, therefore, preferred) empirical specification addresses this issue by adopting a data-driven approach to classifying contestants.[13]

Specifically, drawing from the literature on structural breaks in time series data, I estimate a cutoff value, κ, separating candidates into contenders and noncontenders. Since theory predicts that there are always at least two candidates in the race, even if one of them trails far behind (Myerson 2000; Myerson and Weber 1993), I classify candidate k as a contender if, and only if, the difference in support for her party and the district's second-most-popular one is less than κ percentage points. I, therefore, allow for equilibria in which voters perceive three or more candidates to be in contention for victory, as in Cox (1994).

In symbols, the second empirical model is given by

$$(4) \qquad v^C_{k,r,t} = \chi_{m,k,t} + \lambda v^L_{k,r,t} \times \mathbf{1}\left[\overline{v}^{L,2^{nd}}_{d,t} - \overline{v}^L_{k,d,t} > \kappa\right] + \gamma v^L_{k,r,t} \times \mathbf{1}\left[\overline{v}^{L,2^{nd}}_{d,t} - \overline{v}^L_{k,d,t} \leq \kappa\right] + \epsilon_{k,r,t}.$$

Here, $\overline{v}^L_{k,d,t}$ denotes the list-vote share of candidate k's party in district d, and $\overline{v}^{L,2^{nd}}_{d,t}$ is that of the second-most-popular one. If (4) is correctly specified, then searching for the value of κ that maximizes the R^2 yields a super-consistent estimate of the true break point (Hansen 2000). Moreover, under the null hypothesis that such a point exists, estimates of the model's other parameters are normally distributed, and standard errors need not be adjusted for sampling variability in the location of the break (Bai 1997).

Although intuitively appealing, there is no guarantee that this method classifies all candidates correctly. For this reason, in Appendix D, I report results from a series of robustness checks, demonstrating that my conclusions are qualitatively robust to more than 25 alternative assumptions on how voters form beliefs about which candidates are in contention for victory.

6.2. *Results*

Focusing on nominees of the five major parties, Table 2 present results for both empirical specifications. The upper panel is based on the first one, restricting attention to candidates who trailed the *runner-up* by more than ten percentage points. The lower panel is based on equation (4). Within each panel, the first row presents estimates of the share of voters who stick with a party's candidate despite her having virtually no chance of winning.

Controlling for the appeal of individual candidates, estimates of λ range from .613 to .696 and are quite precise.[14] Moreover, it is worth noting that the evidence from both specifications

[13] Pre-election surveys in Germany are too small to derive reliable estimates of voters' expectations. For instance, in only 50 electoral districts did the German Longitudinal Election Study—the best available data source—survey more than 15 adults prior to the 2009 elections.

[14] In Appendix D, I show that local party strength is essentially uncorrelated with the estimated share of voters who stick with the respective candidate. It is, therefore, not the case that the results in Table 2 are

lines up remarkably well. Taken at face value, the results indicate that (at least) 61% of voters do not behave in accordance with the canonical pivotal voter model. Thus, as a general, positive theory of voter behavior, it should be dismissed.[15]

7. Comparative Statics and Learning

In sum, neither of the two leading theories of how voters choose between different candidates accords well with real-world behavior. An important question is, therefore, whether an alternative theory is needed to rationalize the most-salient features of the data, or whether each model explains the behavior of some voters, but not others. That is, there may be different "types" of agents, which are well-described by the pivotal and the expressive voter model, respectively.

One suggestive piece of evidence against a theory with immutable types is that voters appear to learn to cast strategic candidate votes over time. To provide evidence of learning, I rely on the German Reunification as a natural experiment.[16] Although the German Democratic Republic (GDR) held regular, formal elections to the *Volkskammer* (People's Chamber), they were effectively meaningless. East Germans could only choose from candidates on a single list controlled by the Socialist Unity Party (SED), and it was customary to cast one's ballot in public, simply accepting all nominated candidates. In stark contrast, citizens of the Federal Republic of Germany had the opportunity to participate in free elections since 1949, and, from 1953 on, under a two-ballot system almost identical to the current one. They had thus more than 40 years of democratic experience by the time the GDR joined the West.

The first parliamentary elections in unified Germany were held in December of 1990 and were subject to (essentially) the same rules that had previously been used in the West and that continued to be in place thereafter. If experience does, indeed, lead voters to behave more strategically, then we would expect large initial differences in the share of agents whose choices are at odds with the pivotal voter model, which should disappear over time.

This prediction is borne out in Figure 2. For each election since 1990, the figure plots the estimated difference between East and West German voters. Negative values indicate more violations of the pivotal voter model among residents of the former GDR.[17] The results

driven by parties fielding weak candidates in districts where they expect to perform poorly.

[15]In Appendix G, I estimate a structural model of voting decisions. At the cost of imposing additional assumptions, this model allows me to estimate the share of instrumentally rational voters, rather than obtaining bound on the fraction of individuals whose conduct is (in)consistent with the pivotal voter model. The results accord well with the reduced-form evidence. I also assess the impact of strategic voting on the distribution of seats in parliament.

[16]For related evidence on learning to vote strategically among U.S. Senators, see Spenkuch et al. (2018).

[17]The specification on which the estimates are based is akin to equation (4) but allows for different slopes

show that just two months after reunification, East Germans were almost 16 percentage points more likely to stick with a noncontender than their Western counterparts. By 2005, however, the gap had vanished. Although none of the point estimates is very precise, one can nevertheless reject the null hypothesis of a constant difference ($p < .01$).

In order to speak more directly to the possibility that there may be sincere and strategic types of voters, I present comparative statics based on the regression models in equations (2) and (4). If there are, indeed, strategic and expressive types, then we would expect to find an approximately constant share of individuals who violate each theory, irrespective of other circumstances. The reason is that strategic (expressive) types would *always* (*never*) abandon their favorite candidate if she happened to be nonviable. By contrast, systematic heterogeneity in the extent of (non)strategic behavior rules out a type-based explanation and provides new evidence that helps to narrow down the set of alternative theories.

Table 3 compares estimates across a number of different settings. The first set of results demonstrates that the extent to which observed behavior violates the pivotal voter model depends on *who* remains in contention for victory. That is, conditional on voting for a party whose candidate is nonviable, voters are about 25 percentage points less likely to stick with a noncontender when the candidate of an allied party is still in the race than when faced with the choice between two evils, i.e., less palatable alternatives.[18] A test for equality of coefficients rejects the null hypothesis of equal point estimates at the 1%-level.

Moreover, distinguishing between districts in which the race for the direct mandate ended up being close and those in which it was not, violations of the pivotal voter model appear to have been less prevalent in the former—though the difference is not statistically significant—and disaggregating the data by election year shows that desertion of noncontenders was significantly more common in 2005 than in 2009 ($p < .001$).

The latter finding may not be surprising. The 2005 election followed a failed motion of confidence that triggered the dissolution of the Bundestag and was widely perceived to be a "critical election," in which differences between parties and, therefore, the stakes were significantly higher than usual (see, e.g., Korte 2009).[19] In line with the results in Table 3, official statistics show a substantially larger fraction of split tickets in 2005 and an approxi-

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and cutoff values in East and West Germany. A qualitatively similar picture would emerge if one were to restrict the cutoff to be the same in both regions.

[18] The following parties are defined as allies: CDU and FDP, as well as SPD and Green Party. The results are qualitatively similar if supporters of The Left are assumed to consider SPD candidates to be close substitutes.

[19] Campaigning to stay in office, Chancellor Schröder and his SPD–Green coalition promised to undo some of their unpopular labor market and welfare reforms while raising taxes on the rich. In stark contrast, led by Angela Merkel, the conservative–libertarian bloc sought to further increase the pace and scope of deregulation, slashing income taxes and public spending in the process.

mately 7 percentage points higher turnout than in 2009 (Bundeswahlleiter 2006, 2010). The change in turnout, however, is too small to account for the entire difference in λ. Estimating the share of individuals who did not behave according to the pivotal voter model for each municipality-year combination separately and regressing the resulting $\lambda_{m,t}$ on turnout in the respective village in the same year yields a point estimate of $-.698$ (with a standard error of .173). A 7 percentage point increase in turnout would, therefore, be predicted to lead to an approximately 4.9 percentage points lower fraction of nonstrategic agents. Although the available evidence does suggest that inframarginal voters are considerably more likely to deviate from the pivotal voter model than marginal ones, the difference in turnout is far too small to cause a near 50% change in the estimated extent to which the theory is violated. Some simple back-of-the-envelope calculations show that this conclusion holds even if every single marginal voter were strategic.[20]

Importantly, the results in Table 3 are at odds with a type-based explanation. A theory in which a particular voter is either strategic or sincere can neither explain why defection of weak candidates is more common when the stakes are higher nor why it depends on which other candidates remain in contention for victory. The evidence in this section suggests that individuals can learn to vote strategically and that they trade off tactical and expressive considerations according to the electoral circumstances.

8. Conclusion

The scientific method requires that formal theories be rigorously tested and, if necessary, rejected. This paper develops a novel set of empirical tests in order to directly pit the canonical pivotal voter model against the most prominent alternative according to which individuals derive expressive utility from supporting their most preferred candidate. The results indicate that about two-thirds of individuals deviate from the predictions of the pivotal voter model, while almost one third do not behave expressively.

In light of a plethora of anecdotal evidence, one might not have expected literally all voters to abide by a particular theory. Nevertheless, the results above are noteworthy because they carefully measure the extent to which voter behavior violates either of two leading paradigms. Without proper quantification, there would be no basis to conclude that the gap between actual conduct and theory is so large that neither paradigm is empirically tenable.

[20] In 2005, about 13.3 million voters chose a party whose direct candidate is estimated to be "out of the race," and almost half of them also abandoned the respective nominees. Suppose that every single one of the approximately 4 million additional voters in 2005 chose a party whose direct candidate was not in contention for victory *and* deserted the respective direct candidate. If this were, indeed, the case, then about 70% of the inframarginal voters, i.e. 6.5 out of 9.3 million, would not have behaved in accordance with the pivotal voter model. Even under these extreme assumptions, the difference in turnout cannot account for the entire change in λ.

The evidence further suggests that voters cannot be neatly categorized into strategic and sincere types. Instead, individuals' tendency to vote tactically varies substantially with the electoral circumstances. A promising alternative theory of voter behavior may be one in which individuals *endogenously* decide whether to act strategically.

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Figure 1: Theoretical Predictions under Expressive and Strategic Voting

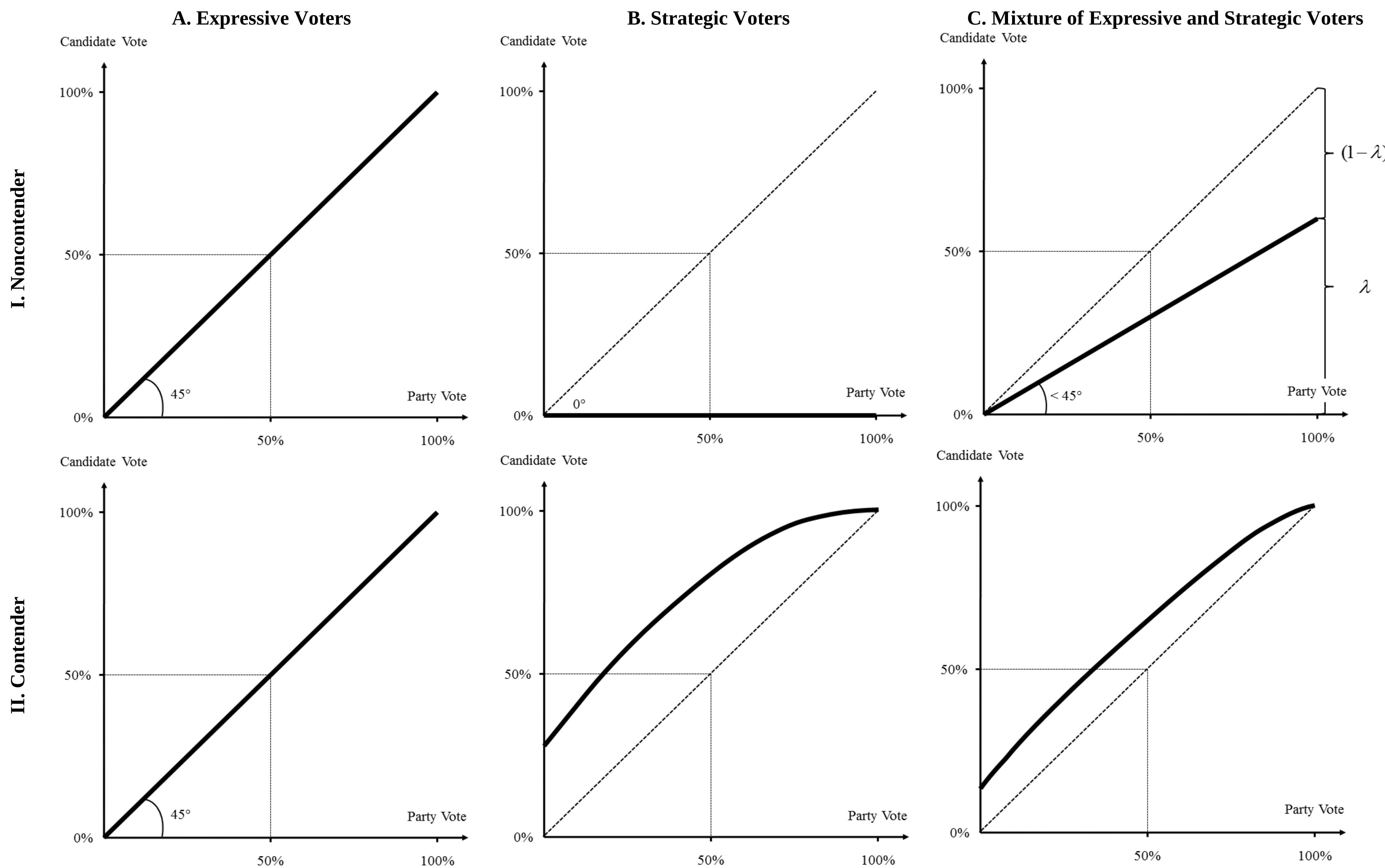
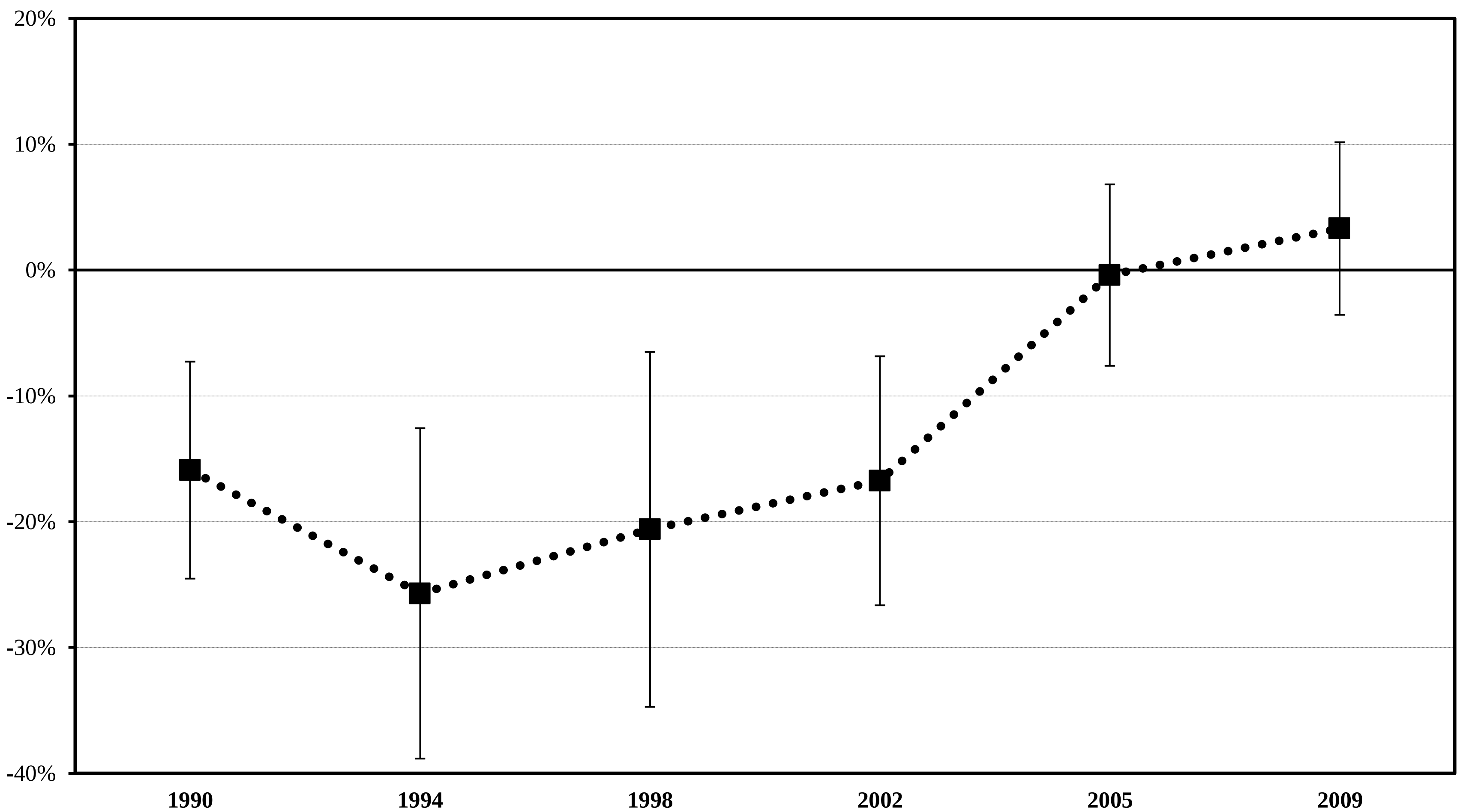


Figure 2: Difference in the Incidence of "Wasted Votes" between East and West Germany, 1990–2009



Notes: Figure shows the percentage point difference in the incidence of nonstrategic voting between East and West Germany for each federal election from 1990 to 2009 as well as the associated 95%-confidence intervals. Negative values indicate more ballot combinations that violate the pivotal voter model among residents of the former GDR. The null hypothesis of a constant difference across all years can be rejected at the 1%-significance level, and that of an equal difference in 1990 and 2009 is rejected at the 1%-level as well.

Table 1: Testing the Null Hypothesis of Expressive Voting

A. Voters with No Strategic Incentives to Cast Split Ballots

	Share of Candidate Vote			
Independent Variable	(1)	(2)	(3)	(4)
Share of Party Vote (ϕ)	1.061	1.001	1.021	.989
	(.010)	(.009)	(.011)	(.018)
H_0: ϕ=1 [*p* -value]	< .001	.933	.064	.544
Fixed Effects:				
Party	Yes	No	No	No
Candidate	No	Yes	No	No
Candidate × Year	No	No	Yes	No
Candidate × Municipality × Year	No	No	No	Yes
R-Squared	.903	.946	.950	.968
Number of Observations	354,642	354,642	354,642	354,642

B. Voters with Strategic Incentives to Cast Split Ballots

	Share of Candidate Vote			
Independent Variable	(5)	(6)	(7)	(8)
Share of Party Vote (ϕ)	.798	.730	.695	.663
	(.026)	(.023)	(.029)	(.029)
H_0: ϕ=1 [*p* -value]	< .001	< .001	< .001	< .001
Fixed Effects:				
Party	Yes	No	No	No
Candidate	No	Yes	No	No
Candidate × Year	No	No	Yes	No
Candidate × Municipality × Year	No	No	No	Yes
R-Squared	.813	.888	.897	.934
Number of Observations	527,419	527,419	527,419	527,419

C. Difference Between Settings with and wihout Strategic Incentives

	Share of Candidate Vote			
Independent Variable	(9)	(10)	(11)	(12)
Share of Party Vote (ϕ)	1.040	.972	1.021	.989
	(.010)	(.013)	(.011)	(.018)
Share of Party Vote ×	-.221	-.182	-.326	-.326
Incentive to Cast Split Ballot (δ)	(.032)	(.042)	(.035)	(.037)
H_0: δ=0 [*p* -value]	< .001	< .001	< .001	< .001
Fixed Effects:				
Party	Yes	No	No	No
Candidate	No	Yes	No	No
Candidate × Year	No	No	Yes	No
Candidate × Municipality × Year	No	No	No	Yes
R-Squared	.965	.980	.982	.989
Number of Observations	882,061	882,061	882,061	882,061

Notes: Entries are coefficients and standard errors from estimating equations (1) (upper two panels) and (2) (lower panel) by ordinary least squares. The upper panel restricts the sample to candidates who finished first or second, giving supporters of the associated parties no strategic incentives to cast split ballots. The middle panel considers only candidates who finished third or worse, meaning that at least some supporters of the associated parties had a strategic incentive to cast split ballots. The lower panel pools the data from both settings. Heteroskedasticity robust standard errors are clustered by state and reported in parentheses. To account for the small number of clusters, reported *p* -values are based on the wild bootstrap procedure suggested by Cameron et al. (2008) with 10,000 iterations. See the Data Appendix for the precise definition and source of each variable.

Table 2: Quantifying Deviations from the Pivotal Voter Model

A. Candidates Trailing Far Behind the Runner-Up

	Share of Candidate Vote			
Independent Variable	(1)	(2)	(3)	(4)
Share of Party Vote (λ)	.682	.670	.632	.613
	(.013)	(.010)	(.014)	(.016)
H_0: λ=1 [*p*-value]	< .001	< .001	< .001	< .001
H_0: λ=0 [*p*-value]	< .001	< .001	< .001	< .001
Fixed Effects:				
Party	Yes	No	No	No
Candidate	No	Yes	No	No
Candidate × Year	No	No	Yes	No
Candidate × Municipality × Year	No	No	No	Yes
R-Squared	.717	.816	.832	.885
Number of Observations	463,544	463,544	463,544	463,544

B. All Candidates

	Share of Candidate Vote			
Independent Variable	(5)	(6)	(7)	(8)
Share of Party Vote	.765	.696	.657	.656
× Noncontender (λ)	(.022)	(.021)	(.019)	(.026)
Share of Party Vote	1.060	.982	1.004	.978
× Contender (γ)	(.010)	(.010)	(.012)	(.021)
Noncontender	3.664	-3.887		
	(.433)	(.614)		
Contender	6.477	-.742		
	(.717)	(.140)		
Structural Break	.021	.065	.064	.023
H_0: λ=1 [*p*-value]	< .001	< .001	< .001	< .001
H_0: λ=0 [*p*-value]	< .001	< .001	< .001	< .001
Fixed Effects:				
Party	Yes	No	No	No
Candidate	No	Yes	No	No
Candidate × Year	No	No	Yes	No
Candidate × Municipality × Year	No	No	No	Yes
R-Squared	.965	.980	.982	.989
Number of Observations	882,061	882,061	882,061	882,061

Notes: Entries are coefficients and standard errors from estimating equations (3) (upper panel) and (4) (lower panel) by ordinary least squares. The upper panel restricts the sample to candidates who finished more than 10 percentage points behind the one in second place, whereas the lower panel includes all candidates. Heteroskedasticity robust standard errors are clustered by state and reported in parentheses. To account for the small number of clusters, reported *p*-values are based on the wild bootstrap procedure suggested by Cameron et al. (2008) with 10,000 iterations. See the Data Appendix for the precise definition and source of each variable.

Table 3: Comparative Statics

Sample Restriction	Deviations from Expressive Voting	Violations of the Pivotal Voter Model
Baseline	.326	.656
	(.018)	(.026)
By Availability of Close Substitute:		
Allied Party's Candidate in the Race	.399	.556
	(.039)	(.024)
Only Rival Parties' Candidates in the Race	.123	.817
	(.012)	(.014)
By Difference between Winner and Runner-Up:		
< 1%	.342	.606
	(.056)	(.034)
1% and 5%	.312	.621
	(.048)	(.028)
> 5%	.332	.662
	(.037)	(.026)
By Year:		
2005	.399	.488
	(.018)	(.016)
2009	.271	.726
	(.029)	(.021)

Notes: Entries in the are coefficients and standard errors on δ in equation (2) (left column) and λ in equation (4) (right column), using different subsamples of the data. The respective restriction is indicated on the left of each row. All specifications control for candidate-municipality-year fixed effects. See the Data Appendix for the precise definition and source of each variable.