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STATISTIK UND WISSENSCHAFT

Thomas Gschwend

Strategic Voting in Mixed Electoral Systems

Band 2

Statistisches Bundesamt

Bibliographische Information Der Deutschen Bibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliographie; detaillierte bibliographische Daten sind im Internet über http://dnb.ddb.de abrufbar.

Zugel.: University of New York at Stony Brook

Herausgeber: Statistisches Bundesamt, Wiesbaden

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Veröffentlichungskalender
der Pressestelle:
www.destatis.de/presse/deutsch/cal.htm

Erschienen im Oktober 2004

Bestellnummer: 1030802049004

Vertriebspartner: SFG Servicecenter Fachverlage
Part of the Elsevier Group
Postfach 43 43
72774 Reutlingen
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Vorwort

Bei der vorliegenden Untersuchung handelt es sich um die an der State University of New York at Stony Brook entstandene Dissertation von Thomas Gschwend zum Thema „Strategic voting in mixed electoral systems“. Sie wurde vom Statistischen Bundesamt auf Vorschlag eines unabhängigen Gutachtergremiums mit dem Gerhard-Fürst-Preis des Jahres 2002 in der Kategorie „Dissertationen“ ausgezeichnet.

Im nunmehr sechsten Jahr prämiert das Statistische Bundesamt herausragende Diplom- und Magisterarbeiten sowie Dissertationen mit dem Gerhard-Fürst-Preis. Die Arbeiten behandeln entweder ein theoretisches Thema mit engem Bezug zum Aufgabenspektrum der amtlichen Statistik oder haben die Untersuchung empirischer Fragestellungen unter intensiver Nutzung von Daten der amtlichen Statistik zum Gegenstand. Ein wichtiges Anliegen dieser jährlich vergebenen Auszeichnung ist es, die Arbeit der amtlichen Statistik stärker als bisher mit der Wissenschaft und den Hochschulen zu verbinden und junge Wissenschaftlerinnen und Wissenschaftler zu empirischen Forschungen mit Daten der amtlichen Statistik anzuregen.

Die Arbeit von Thomas Gschwend erscheint als zweiter Band der kürzlich in meinem Hause aufgelegten Veröffentlichungsreihe „Statistik und Wissenschaft“. Mit dieser Buchreihe möchte das Statistische Bundesamt eine Plattform für Kooperationsprojekte in Wissenschaft und amtlicher Statistik schaffen.

Wissenschaftlich hervorragende Nachwuchsarbeiten, die mit dem Gerhard-Fürst-Preis des Statistischen Bundesamtes ausgezeichnet wurden, können in dieser Reihe veröffentlicht werden.

Wiesbaden, im Oktober 2004

Der Präsident des Statistischen Bundesamtes

Johann Hahlen

Acknowledgement

The work of this project was finished in June 2001 with the defence of my dissertation at the Department of Political Science, State University of New York at Stony Brook, USA (now: Stony Brook University). In 2002, my dissertation won the Gerhard-Fürst-Preis. This award opened up the possibility to publish my work in a series of the Statistische Bundesamt. I am very grateful for this opportunity and would like to thank Simone Sesterhenn for subsequently accompanying the long and winding road of this publication process. Furthermore, I would like to thank the Mannheimer Zentrum für Europäische Sozialforschung for institutional support and, particularly, Axel Becker and Martin Elff for fixing parts of my original LaTeX code in order to conform to the layout of this series. There are only a few editorial changes in the present text compared to my dissertation. Most importantly I updated the bibliography wherever I cited working papers which got meanwhile published.

Many people have had an impact on my dissertation, most importantly my dissertation committee. I am very fortunate to had Helmut Norpoth as my principal advisor. This dissertation could not have been completed without the reliance on Helmut's substantive knowledge of voting behavior, comparative politics and, in particular, in dealing with German idiosyncrasies. He taught me to see the big picture behind the obsession we share in Stony Brook, namely to get correct standard errors. His valuable input into my various research projects and the experience from cooperative work we did have made me a much better scholar than I otherwise would have been. Moreover, I got to know him as skipper of the "Maize'n Blue" - I will miss the sailing trips on the Long Island Sound.

Stanley Feldman and Brad Jones have been an integral part of my dissertation. They took their role as advisors very seriously. Their methodological comments and critiques not only taught me the necessary skills in political methodology but also shaped substantively my research. Moreover, I would like to thank Alan Tucker from the Department of Applied Mathematics and Statistics for serving as an outside member on my committee and his support in sticking to my tight schedule. Besides my committee members, especially in early stages of this work before he left for Washington University, Andrew Martin was very influential in terms of setting up my research design. Without his guidance and suggestions, substantively as well as methodologically, this work would be clearly inferior.

Earlier parts of this work were presented as conference papers at the 1999 Southern Political Science Association meeting, the 2000 meetings of the Midwest and the American Political Science Association, the 2000 Methods Conference of the Society for Political Methodology

and at the 2000 meeting of the section "Elections and Public Opinion" of the German Political Science Association. I would like to thank all participants and discussants for valuable criticisms that helped to overcome several pitfalls. For particular helpful comments on various parts of the research progress I would like to thank Barry Burden, Andreas Broscheid, Frank Heiland, Leonie Huddy, Gary King, Michael Meffert, Jeff Segal and Paul Thurner. My office-mates Chad King and Scott Graves ("all your base are belong to us") not only read parts of my research but also had the most immediate exposure to my work. Also, many thanks to Kim Kramer and, particularly, Rob McCouch, for never giving up on my English - but do not blame them if you find any errors.

Moreover, I would like to thank the Germanistic Society of America, which supported this research through a grant, the Quadrille Ball Committee Scholarship, Harry Krajzar (Federal Statistical Office in Germany) for his support in merging aggregate and individual-level data, Volkmar Kroesch (Federal Office for Building and Regional Planning) for providing an ArcView shape-file to visualize my EI district-level estimates and Franz Pappi as well as Hans Rattinger for sharing data with me.

The last person I want to thank is the person to whom I would like to dedicate this work: my wife Nynke Zimmermann. Her companionship, humor, enthusiasm and, particularly, her perseverance to put up with me, especially during the rougher times of this project, has made the completion of this project especially gratifying.

Thomas Gschwend Mannheim, September 2004

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Chapter 1

The Contribution of Strategic Voting to the Field of Electoral Behavior

It appeared obvious even to the staunchest supporters of Ralph Nader, the Green Party candidate in the 2000 U.S. Presidential race, that their candidate could not get elected President. This prospect notwithstanding some voted for him anyway in order to show their support. While it is probably not a strong assumption that many Nader supporters preferred a President Gore to a President Bush, these supporters, however, could also have deserted Nader and instead cast a *strategic* vote for Gore. Particularly in close races - as was the case in many Midwestern states and in Florida - the strategy to support the "lesser of the two evils" might have been very influential. In this scenario, strategic voters could have changed the distribution of delegates in the Electoral College: A "Bush state" could flip over into the Gore "column" or alternately, if enough Nader supporter had been able to coordinate their voting behavior to prevent the election of a President Bush (i.e., by systematically deserting their own truly preferred candidate and instead casting a vote for Gore), these voters might have helped Gore maintain his lead in a particular state[1]. Apparently, there are good reasons not to vote for one's favored candidate. Nevertheless, does this not contradict the basic tenet of theories in electoral behavior?

The most compelling theories about electoral behavior try to explain how a voter makes up her mind, why she perceives candidates and parties in certain ways, what impact underlying values have on the structure of her belief system and on the salience of various campaign issues on her decision to vote. That said, competing models of electoral behavior focus on certain aspects, invariably emphasizing different factors at the expense of others.

Some scholars, for example, develop theories on the individual level, using experimental or survey methodology to try to test theories of what is "going on" in a voter's mind.

1) Similar to "log-rolling" on the elite level, some voters tried to coordinate their vote choices. As *THE NEW YORK TIMES* reported on Tuesday, October 31, page A20, some Internet sites provided the means to "swap" or even "trade" votes.

Generally, the status of these theories is in a much better position today than were its cruder predecessors a half-century ago. Theories today improve on older ones by identifying conditions under which we can predict deviations from previously expected behavior. Undoubtedly, there have been great theoretical strides in this field. Critics, however, still question whether and how these new insights into the reasoning and behavior of voters substantively matter for an election. Where is the "public" in public opinion?

At the aggregate level of analysis, other scholars have developed macro-theories that focus on electoral outcomes, or the output side, of the political system in general. Informed by insights stemming from the individual level, these scholars try to develop theories on the macro level using aggregate data to test their hypotheses. This research strategy is by no means uncontested either. The picture drawn by macro theories of a particular voter is questioned because it is oftentimes inconsistent with evidence from individual-level studies. Where is the "voter" in voting behavior?, one might ask.

Both sides remain in healthy competition with each other - and indeed, more symbiotically, inform one another intellectually. Furthermore, despite their fundamental differences, however, these models share an overarching assumption that, once a voter makes up her mind, she will invariably proceed to vote for her most preferred candidate. As the Nader example illustrates, however, this premise is not always tenable.

It is within this framework that the strategic voting phenomenon makes its contribution to understanding electoral behavior. Studies of strategic voting specify conditions under which a voter does not vote for her most preferred candidate or party. Instead, according to certain chains of reasoning, or what is called a "strategy", the voter casts her vote for another candidate or party in a way that by all appearances would seem to be counter-intuitive to her true preferences. Studies of strategic voting focus on electoral institutions and the public's perception of who is likely to win in an election, in order to determine the range of factors voters might consider in their voting calculus. These factors have not been considered before.

Most studies of strategic voting refer to the UK and some to the U.S. In terms of the range of electoral institutions covered, the focus of these studies is quite narrow. This narrowness is somewhat surprising, given the central importance of electoral institutions in this literature. These studies are based on essentially one set of electoral institutions: those found in the single-member district plurality system. There is less concern in this literature with how other electoral systems induce strategic behavior. It seems entirely reasonable that strategic voting should be observable in many other electoral systems as well. In my dissertation, I take a step out of the narrow focus of the current state of the strategic voting literature, and study the incentives that motivate strategic behavior outside the universe of single-member district plurality systems.

What sort of impact does the nature of a party system, or of electoral institutions, have on voters at the polls? In a system with only two parties or candidates, possible incentives not to vote for the preferred party or candidate are not very powerful. In this type of

political landscape, it might be that a voter simply abstains if she dislikes both choices. Having at least three choices, on the other hand, some voters might indeed settle for a "lesser evil" so as to prevent a worse outcome (i.e., their least preferred candidate winning the election) if their preferred choice is perceived to be without a chance of winning. In a multiparty system, the perception of who is going to win an election is arguably more ambiguous than in a two-party system, especially in systems with certain electoral institutions. Parliamentary systems with proportional representation, for instance, always have numerous parties competing in elections. Normally, therefore, effective government (i.e., in which the majority party's broad legislative agenda stands a chance of success) depends on the support of a coalition of parties, rather than the majority party alone. Herein lies the conundrum: Voters prefer certain coalitions, but ultimately they must choose just one party instead of a coalition. Coalitions to build a government are not formed until after the election. Although voters might anticipate the outcome of the coalition formation process, it is generally not obvious what the outcome turns out to be. Which parties will form the new government?

Thus, voters who are motivated to cast their vote effectively must somehow anticipate the uncertainty induced by the government formation process and vote accordingly. In order to do so, they must consider their most preferred coalition for their "calculus of voting". They should end up with a voting strategy that is most likely to produce their preferred coalition, but they might not cast a vote for their most preferred party. The nature of multiparty systems and the coalition calculus evokes another, more nuanced - and ultimately more complex - type of incentive for voters' decision-making that is different from that of the "lesser evil" tactic. Such incentives have an impact on an individual voter that cannot be accounted for by traditional models of electoral behavior.

Scholars of strategic voting are interested in explaining systematic deviations from predictions made by traditional theories of voting. They explicitly consider non-personal determinants that provide a certain incentive for a voter's decision calculus in order to model the vote situation more realistically. Instead, strategic voting studies account for institutional factors such as electoral rules and the nature of the party system, factors that determine the context in which an election is held. Thus, theories of strategic voting go a step further than traditional theories of electoral behavior, offering explanations of why behavioral deviations from classical models' predictions might be meaningful for understanding the motivations and constraints of "homo politicus".

Scholars of electoral behavior largely ignored strategic voting until the late 1980s. Since then, several factors can be identified, however, that account for the increasing interest in the study of strategic voting. On a theoretical level, the rise of rational choice theory stimulated scholarly interest in questions about the incentives voters face within certain institutional structures. Moreover, the rise of third-party candidates - and of viable third parties in general - are political developments that have spawned interest in explanations and political consequences of strategic voting behavior. Thus far, the focus of these studies has been quite narrow, on plurality systems. Obviously, there are other electoral systems

inducing different types of constraints for voters that lead them to deviate from their most preferred candidate or party.

Finally, in tandem with these theoretical and political developments, recent methodological developments within political science have had far-reaching implications for the strategic voting literature, and particularly the research comparing different institutional settings. Unlike two-party systems, voters in multiparty systems have several options that must be modeled simultaneously in order to develop a realistic vote choice theory. The 1990s stand for a new area in political methodology, the "Age of Maximum Likelihood". Since then, advances in computer technology have made it possible to program numerical estimators. By extension, maximum likelihood estimators enable us to model simultaneously the likelihood of a vote for various parties or candidates. Such, unordered variables cannot be modeled within the traditional OLS framework These advances are of great help in coming to grips with strategic voting in multiparty systems. The joint impact of theoretical, political and methodological developments have therefore placed strategic voting very prominently on the agenda of electoral behavior research at the beginning of the new millenium.

My focus will be on a type of institution with growing appeal, *mixed electoral systems*. The common characteristic of these systems is that they employ both single-member districts and multimember constituencies. Several countries, from New Zealand to Italy, have newly adopted a variant of this system.[2] Countries employing mixed electoral systems provide an especially interesting case for studying strategic voting because a two-ballot system is used; voters have the opportunity to split their vote in a strategic fashion. Which voting strategies are they using?

I have set forth four research questions that I wish to answer about mixed electoral systems. First, what strategies do voters employ in casting their votes for candidates or parties that are not their first choices? Second, to what extent do various forms of strategic voting occur? Third, given that there is widespread ticket-splitting, how can strategic voters be distinguished from non-strategic ticket-splitters? Finally, what are the political implications of strategic voting? In order to answer these questions comprehensively, it will be necessary to identify the various strategies at play, find ways to quantify them, and assess their impact on the electoral system.

My substantive contributions are twofold. First, I develop a theory of strategic voting in mixed electoral systems, including hypotheses about situations in which certain voters are particularly likely to behave strategically. Second, I present a solution to the problem of distinguishing ticket-splitters from strategic voters. My methodological contributions are also twofold. First, I will employ Gary Kings' *Ecological Inference* (EI) and show that EI offers a new opportunity to the analysis of strategic voting. Second, in order

2) In fact, a recent survey of different mixed electoral systems found that no fewer than 29 countries employ some form of mixed electoral system for elections to their (lower) chamber (Massicotte and Blais, 1999).

to simultaneously disentangle the effects distinguishing strategic from mere non-strategic voting, while controlling for alternative hypotheses, I will employ an appropriate-choice model.

The next chapter critically reviews the current state of the strategic voting literature. The third chapter presents my theory. Building on insights from this literature, I will define important terms, conceptualize *straight* and *split-ticket voting*, develop my theory about strategic voting and suggest possible ways to operationalize it. Chapter four constitutes a part of my methodological contribution to the literature on strategic voting. I will show that EI can be successfully applied in a multi-party context. In the following two analytical chapters I will test my hypotheses that I derived in the theory chapter. The fifth chapter employs EI to test my first hypothesis about strategic voting at the electoral district level. Chapter six presents another analytical chapter addressing all remaining hypotheses about strategic voting at the individual level. Finally, I will conclude this work by answering the above posed research questions and discus the generalizability of my results for the field of electoral behavior and comparative politics in general.

Chapter 2

A Framework for the Study of Strategic Voting

Various strands of the political science literature study strategic voting. The Nader example at the opening of the last chapter makes apparent how several of these strands of the literature would approach strategic voting. First, there is the institutionalist literature, which is surveyed in section 2.2. These studies focus on the influence of particular electoral institutions on issues like representation, their effects on the number of parties in a political system and on the effects of voting behavior more generally. Apparently, since it was widely expected that Ralph Nader could not even win a single state in the 2000 presidential election due to the plurality system, some of his supporters should have been motivated to strategically cast a vote for the "lesser evil", Gore, in order to prevent a Bush victory.

Second, there is the political behavior literature, which treats electoral institutions as exogenous factors. Instead, this strand of the literature focuses on how strategic behavior can be identified on the individual level. In the case of Nader, for instance, scholars in this field would identify a Nader supporter as strategic if she did not vote for Nader. Instead, she avoided "wasting" her vote, since Nader was expected to have no chance of winning the 2000 presidential election. With such a tight race between the two front-runners, on the other hand, she stood to lose a great deal by helping to usher Bush into office. Thus, besides *preferences* about candidates, voter *expectations* about the viability of candidates or the success of parties are also crucial determinants in strategic voting. I will review the strategic voting literature in the field of political behavior in section 2.3, in order to assess the influence of voter expectations about the outcome of an election on employing different strategies in the voting booth. The theories of these studies are based on the individual level. Since we cannot look in a voter's head, section 2.4 will also focus on the ticket-splitting phenomenon in the political behavior literature as *prima facie* evidence for mass strategic behavior at the polls.

Recent adoptions of mixed electoral systems around the world have stimulated interest in these kind of electoral institutions.[1] The fact that people in mixed electoral systems may cast two votes for the same level of governance at the same time is especially interesting for the study of strategic voting. Voters are inclined to employ multiple strategies because of the combination of plurality and proportional representation (PR) voting rules. I will focus my analysis on one particular country that originated this system: Germany.

Germany's version of a mixed electoral system render it a very good choice, because the country has an almost 50-year tradition of applying these rules in federal elections. In this time period, it is argued, the German electorate has mounted sufficient experience with this rather complicated electoral system, which allows for two votes to be cast in parliamentary elections. Thus, one would expect that whatever strategies voters can use in such systems, they are likely to be crystallized - and observable - within the voting patterns of recent German elections. My research will show how and why the specific electoral rules in this system motivate certain strategies, and what the political consequences of strategic voting will be. Presumably, similar strategies can also be expected in other mixed electoral systems of the same sort.

In summary, my review of the literature will be organized in three different sections. To aid the understanding of strategic voting in Germany as an example of a mixed electoral system, I provide a short summary of the most important electoral rules in the following section. I then take a closer look at the institutionalist literature on strategic voting in section 2.2 and revisit the political behavior literature, focusing first on questions about the role of voter expectations in section 2.3, and then on the ticket-splitting phenomenon in section 2.4.

2.1 Electoral Institutions of a Mixed Electoral System

Since 1953, German voters have used a two-vote ballot on Election Day for the election of one institution, the federal parliament (*Bundestag*). The first vote is for a local candidate in the district, within a single-member district system. I call this vote the *candidate vote*. Plurality rule determines the winner of every district seat for the *Bundestag*. Half of the seats in the *Bundestag* are allocated in this way. More important for the election outcome is the second vote, which is a vote for a party list. The second vote, what I call the *list vote*, proportionally allocates the total number of seats in the *Bundestag* to each party according to the share of votes it garners in the election. This proportion allocated to each party includes the district seats already won by member candidates in the candidate vote.

There are two deviations, however, within this "pure" proportional system. First, in order to be represented in the *Bundestag*, a party has to gain at least 5% of the national list votes.

1) For a recent survey of various mixed electoral systems, see Massicotte and Blais (1999).

This threshold assures that very small (read: fringe) parties cannot get into parliament. Thus, a party receives no seats at all if it gets less than 5% of the list votes nationally.[2]

Second, if a party gains more district seats with the candidate vote than it is entitled to based on its proportional share of the list votes, the party is allowed to keep these "surplus" seats (*Überhangmandate*). This comes about if a party consistently dominates the district races on the first ballot but is not successful to the same extent on the second ballot. Since the large parties win most of the district seats, they are the primary beneficiaries of this rule. In fact, traditionally, the large party in the government has won these surplus seats, thereby tacking on some more seats to a sometimes slim majority in the ruling coalition government. Theoretically, this can go the other way around and lead to a different majority of seats than the voters determined by the distribution of list vote shares. Thus far, however, this case has not arisen: Germany's "Florida" is yet to come!

The current party system in Germany consists of two large parties, the Social Democratic Party of Germany (SPD) and the Christian Democratic Union (CDU)/Christian Social Union (CSU)[3], each getting about 40% of the list votes, and three small parties - the Free Democratic Party (FDP), the Party of Democratic Socialism (PDS) and the Greens - each garnering just over 5% of the list votes. CDU and FDP are the "incumbent coalition" before the last federal election in 1998 for sixteen years. The parliamentary opposition that tries to challenge the CDU/FDP coalition is comprised of the SPD and the Greens.

Local party organizations nominate candidates for district races, while party lists are left up to the state party machine. For federal elections, Germany is divided into 328 electoral districts. These electoral districts are geographic units that have roughly the same number of eligible voters. Every electoral district elects one representative, the one who wins the most candidate votes. Electoral districts are the smallest politically relevant geographic unit because district seats are allocated at this level (Rae, 1971, p.19). An electoral district should not be mistaken for an electoral precinct, which is the smallest geographic unit in which voting returns are collected.

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2) The 5% hurdle is trumped, however, if at least three of its candidates win their district races. In this case the 5%-threshold does not apply and a party gains seats proportional to its list vote shares. The classic example for this rule is the 1994 election, where the PDS, the former ruling party of the German Democratic Republic (GDR), won four district seats in East Germany but failed to overcome the threshold of 5% of the list vote shares. The PDS earned only 4.4% of the list votes nationally, but since it won at least three district races, its list vote shares translated into 30 parliamentary seats. Thus, small parties with little national appeal that nonetheless enjoy a regional following can also gain representation.

3) I consider the CDU/CSU party alliance as inseparable. In fact, they do not compete in the same districts. The CSU runs candidates only in Bavaria and the CDU everywhere else. For simplicity, I use the CDU notation as a shorthand for this party alliance.

2.2 Strategic Voting and the Institutionalist Literature

It is widely acknowledged that electoral laws influence the number of parties competing in a polity. Electoral laws also determine the ways in which parties interact and form coalitions. This "institutionalist" line of research can be found in the works of scholars such as Duverger (1954), Downs (1957), Leys (1959), Wildavsky (1959), Rae (1971), Riker (1982), Taagepera and Shugart (1989), Lijphart (1994) and Cox (1997). An alternative account is provided by a more sociologically-oriented school of thought (Grumm, 1958; Lipset and Rokkan, 1967; Sartori, 1968; von Beyme, 1985). These scholars see the number of parties and the character of the party systems as predominately determined by the number of cleavages in a given society. The important difference between these accounts is in the presumed direction of causality: Do the social and economic cleavages within a given society determine the number of competing parties, and do these parties seek to manipulate the electoral rules to their advantage, or do the electoral laws determine the number of parties? Thus, do parties manipulate electoral institutions as the sociological school proposes or do electoral institutions determine the number of parties, as the institutionalist school contends? These questions raise an endogeneity problem: Parties can change electoral laws (Grumm, 1958; Bawn, 1993), and yet electoral laws determine the party system (Duverger, 1954). Although both schools of thought disagree over the direction of causality, both still acknowledge the close association between proportional representation with multiparty systems and single-member district elections with two-party systems.[4]

In his seminal treatment of political parties, Maurice Duverger (1954) connects party systems and electoral institutions with strategic voting in a fashion known as *Duverger's Law*. This process has two phases. The first phase is a "mechanical" one. Duverger argues that electoral laws, which translate votes into seats in parliament, tend to overrepresent large parties and, conversely, underrepresent small parties - an "inverse Robin-Hood-effect", so to speak. The effect is inverse because the rich get more than they should and the poor have to give instead.[5] The second phase is "psychological". He theorizes that under a certain electoral institution, namely plurality rule, voters feel that they will waste their vote if they vote for a minor party or candidate. In order to avoid wasting their vote, he argues, voters tend to vote for a lesser evil to prevent the greater evil from attaining victory. This behavior has come to be called *strategic* or *sophisticated* voting. I will define these concepts later in chapter 3. The process behind strategic voting in plurality systems is described by Duverger's psychological factor: Voters try to avoid wasting their votes.

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4) Certainly the best strategy to address this problem directly is to model it as a system of equations using 2SLS. This has not yet been done in the literature. The second-best option to reconcile both schools of thought is to use both sociological and institutional factors as separate independent variables (Ordeshook and Shvetsova, 1994; Powell, 1982) or as interaction terms (Neto and Cox, 1997).

5) Rae (1971) actually shows that such an "inverse Robin-Hood-effect" holds in many electoral systems, irrespective of particular electoral rules.

The first attempt to empirically analyze the impact of the "Duvergerian" logic of strategic voting over time was provided by Shively (1970). If the psychological factor works, according to this reasoning, third parties or candidates should be strategically "deserted". Shively measured this desertion by how successful third parties were in the subsequent election given that voters build expectations about the success of parties based on the previous election. However, using district-level data of the UK (1892-1966) and Germany (1871-1933) he found that the psychological factor had only a trivial impact. Spafford (1972) challenged Shively's findings because he had not directly distinguished between situations where more or less strategic voting was to be expected. Spafford predicted that third-party supporters should be more likely to desert their party and vote for another party if the district race was close. He introduced the district margin - the difference between the first two candidates or parties in that district - as an independent variable and found evidence for Duverger's psychological factor: The closer the district race between the two major parties, the smaller the vote shares of third parties.

The "desertion rate" stemming from plurality systems has to be adjusted to account for the two-ballot system in mixed electoral systems. In the case of Germany, a candidate is said to get *strategically deserted* (Barnes et al., 1962; Bawn, 1993, 1999; Cox, 1997; Fisher, 1973; Jesse, 1988) if the candidate gets fewer votes on the first ballot (the candidate vote) than the candidate's party does on the second ballot (the list vote). Barnes et al. (1962) point out that both large parties, the CDU and the SPD, receive more candidate votes than list votes, whereas the picture for the FDP is the other way around. Thus, small-party candidates seem to be strategically deserted on the candidate vote. They conclude that "... this seems to indicate a rather sophisticated understanding of the electoral law on the part of some small-party followers" (Barnes et al., 1962, p. 910).

A more direct test for the presence of Duverger's psychological factor - and hence for strategic desertion - is provided in studies using district-level data (Cox, 1997; Bawn, 1999). Cox (1997) regresses the "desertion rate" among FDP and Green voters - the difference between their list vote and their candidate vote share in a district - on the margin of the district race. In close district races, we should expect a higher desertion rate and therefore more strategic votes, as strategic FDP or Green voters should feel a stronger incentive not to waste their candidate votes. They could make a difference and help elect the local candidate of the larger coalition partner. In fact, using district-level data from federal elections in 1987 and 1990, Cox does find that the desertion rate among FDP and Green voters is significantly higher as the district race gets closer. Bawn (1999) also employs the desertion rate concept, but with a different dependent variable, using district-level data from six federal elections between 1969 and 1987. Controlling for incumbency effects, she finds that the closer a district race is, the larger the desertion rate of major-party candidates.

So far I have only discussed rationales for strategic voting, and ways to operationalize it, for plurality-based systems. These rationales presumably apply to the plurality tier of mixed electoral systems as well. Mixed electoral systems, however, combine plurality and PR

mechanics. The literature has developed two rationales about the impact of proportional representation on strategic voting.

The first rationale is an extension of the strategic voting reasoning in plurality systems. Leys (1959) and Sartori (1968) suggest that, since parties depend on overcoming the national threshold to gain seats, the same "wasted-vote" logic from plurality systems should also apply to PR systems, albeit to a lesser degree. Schoen (1999a) finds no evidence for this dynamic in German national election studies from 1983, 1987 and 1994, however. Small party supporters do vote for "their" party on the second ballot, no matter what; there is no feasible alternative if they want to turn out. The "wasted-vote" logic only makes sense if a small-party supporter's second preferred party would definitely gain representation in parliament, and is almost tied with her most preferred one. Thus, I do not expect the process to avoid wasting a vote to be credible enough to motivate strategic voting in a PR system.

The second rationale for strategic voting in PR-type systems is qualitatively different from the first. Cox hypothesizes that the intention to vote strategically is fuelled by a "portfolio-maximizing" logic (Cox, 1997, pp. 194-202). Voters no longer simply try to affect the allocation of seats, for instance by strategically deserting trailing candidates. Instead, they seek to maximize the representation, or "portfolio", of their preferred party in the composition of the government. The empirical evidence for these kinds of behavior is very thin and convoluted with alternative explanations. Several scholars (Jesse, 1988; Roberts, 1988; Cox, 1997) have suggested that, for the PR tier of the German system, a certain ticket-splitting pattern - say, a candidate vote for the local CDU candidate and a list vote for the FDP - is not necessarily evidence that the FDP candidate is strategically deserted on the candidate vote as the "desertion rate" concept would predict. These authors submit instead that there might be a strategy to support smaller parties on the list vote in order to increase the chances for a certain coalition of parties to govern. This rationale undermines the "desertion rate" logic because a strategic ticket-splitting pattern is predicted that does not depend on the closeness of the district races - a necessary incentive to desert trailing candidates. Theoretically, either plurality or PR mechanics might induce certain ticket-splitting patterns that are seen as evidence for strategic voting. Thus, it remains unclear whether certain ticket-splitting patterns occur because trailing candidates are deserted, or because voters cast a strategic list vote to support a smaller coalition partner. Obviously, the institutional literature convolutes both strategies. My contributions to this literature will be to conceptually disentangle them and clarify the relationship between ticket-splitting and strategic voting.

Apart from strategic voting, there are two further alternative explanations for ticket-splitting. One possibility is that voters indeed deviate from the local candidate of their most preferred party if there is a more compelling candidate running in this district. This routine is called a "personal vote" (Cain et al., 1987). The result would be that voters split their ticket, casting a vote for their most preferred candidate and for their most preferred party. There are two studies about personal votes in Germany. Lancaster (1998)

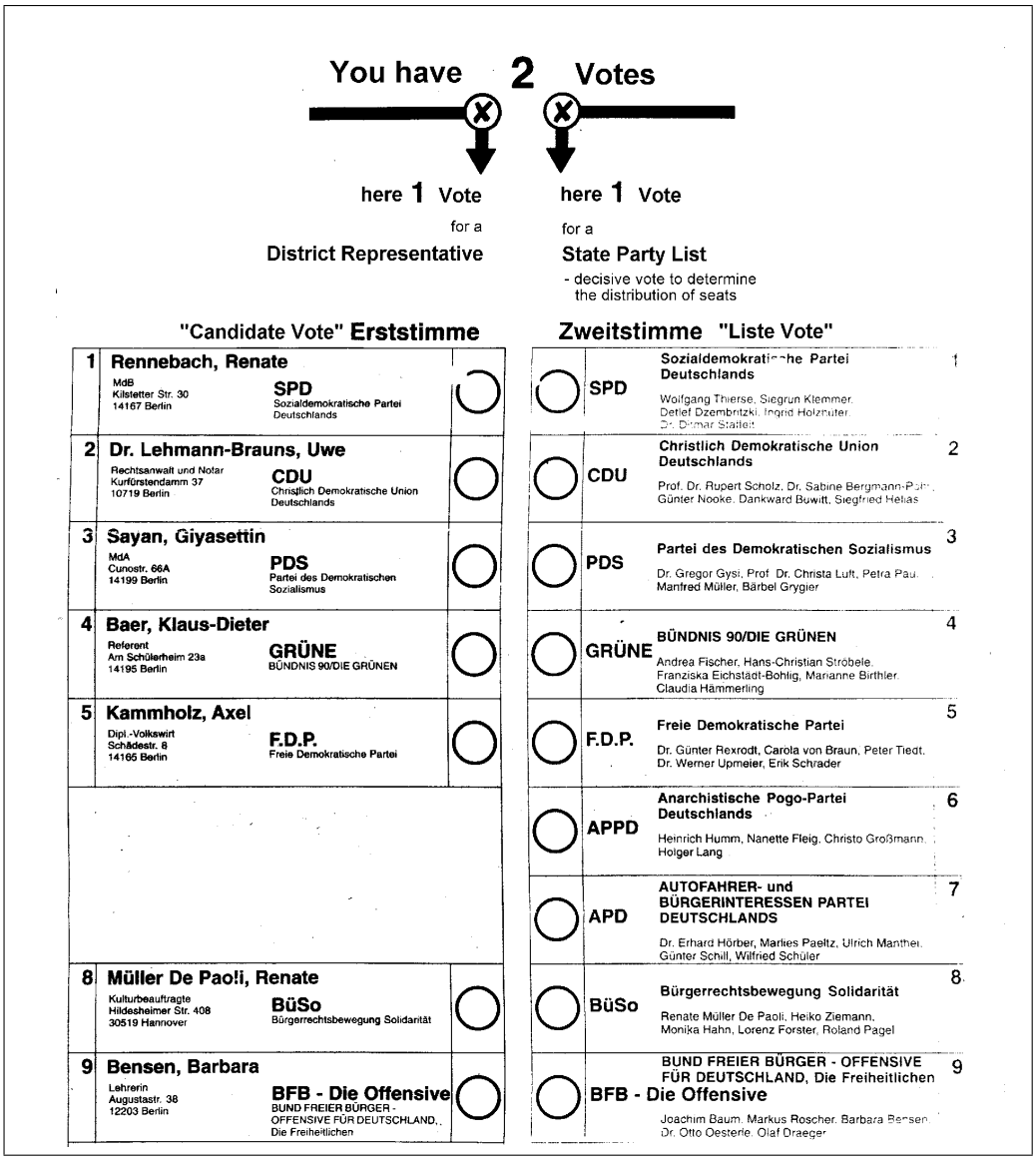
and Bawn (1999) use district-level data and show that there is an "incumbency effect" for local party candidates. However, their analysis does not control for party strength in the districts. A voter could simply vote for the candidate of her most preferred party without knowing anything about this particular candidate. If a party is traditionally strong in a district, that party's candidate should also do well in that district, no matter what. This does not necessarily mean that voters systematically cast a personal vote for this candidate. It is not clear whether such an "incumbency effect" is really due to personal votes or just rationalizations of party strength. If the district leans predominantly toward one party, such that the district race is a foregone conclusion, then some voters could instead vote for a hopeless candidate so as to send a "personalized issue message" or demonstrate some sort of protest to the major parties. For instance, a vote for a Green candidate who has no chance to win the district race could be seen as a "pro-environment message" (Cox, 1997, p. 83).

A second alternative explanation for ticket-splitting is that voters simply do not understand the electoral rules. Schmitt-Beck (1993) presents evidence from pre-election polls in 1990 that indicate that a majority of the respondents does not know whether the list vote is more important than the candidate vote. Since all parties remind voters during the campaign about the electoral rules, however, I expect that these numbers are quite different on Election Day. Moreover, as can be seen in Figure 2.1, a note is printed on the ballot to once again remind voters that they have two votes and that the list vote is the decisive one.[6]

Parallel to the empirical literature about the influence of electoral institutions on vote choice, there is a growing body of formal treatments of strategic voting. Although most of the work deals with strategic behavior in legislative bodies (Farquharson, 1969; Shepsle and Weingast, 1984; Austen-Smith, 1987), some scholars try to build formal models of voting behavior in mass elections (Tsebelis, 1986; Cox, 1997; Myatt, 2000). The common theme in these models is that rational voters have preferences about parties and candidates, that they form expectations or beliefs about the outcome of an election, and that they act within certain institutional constraints to maximize their expected utility. Constraints are usually conceptualized as a particular incentive structure determined by the electoral rules and characteristics of the electoral district, like the expectation about district-wide voter preference or the size of a district. The so-called "pivotal likelihood ratio" (Hoffman, 1982; McKelvey and Ordeshook, 1972; Myerson and Weber, 1993; Cox, 1994, 1997) is derived as a measure for the likelihood that a rational voter abandons her most preferred party or candidate, based on that voter's expectation surrounding other voters' behaviors. These studies predict a unique *Duvergerian* equilibrium, in which voters only support two candidates and, in order to avoid wasting their vote, strategically desert the others. Particularly, Cox (1994, 1997) also predicts a *non-Duvergerian* equilibrium, where no strategic voting occurs because it is not clear who the trailing candidates are.

6) In order to illustrate this, in Figure 2.1 I have translated the instructions on the ballot for district 253 (Berlin-Zehlendorf-Steglitz) into English.

Figure 2.1: *A Ballot from the 1998 Elections in Germany*



You have 2 Votes

here 1 Vote for a District Representative

here 1 Vote for a State Party List
- decisive vote to determine the distribution of seats

"Candidate Vote" Erststimme

1	Rennebach, Renate MdB Kilstetter Str. 30 14167 Berlin	SPD Sozialdemokratische Partei Deutschlands	◯
2	Dr. Lehmann-Brauns, Uwe Rechtsanwalt und Notar Kurfürstendamm 37 10719 Berlin	CDU Christlich Demokratische Union Deutschlands	◯
3	Sayan, Giyasettin MdA Cunostr. 66A 14199 Berlin	PDS Partei des Demokratischen Sozialismus	◯
4	Baer, Klaus-Dieter Referent Am Schülerheim 23a 14195 Berlin	GRÜNE BÜNDNIS 90/DIE GRÜNEN	◯
5	Kammholz, Axel Dipl.-Volkswirt Schädestr. 8 14165 Berlin	F.D.P. Freie Demokratische Partei	◯
8	Müller De Paoli, Renate Kulturbeauftragte Hildesheimer Str. 408 30519 Hannover	BüSo Bürgerrechtsbewegung Solidarität	◯
9	Bensen, Barbara Lehrerin Augustastr. 38 12203 Berlin	BFB - Die Offensive BUND FREIER BÜRGER - OFFENSIVE FÜR DEUTSCHLAND, Die Freiheitlichen	◯

Zweitstimme "Liste Vote"

◯	SPD	Sozialdemokratische Partei Deutschlands Wolfgang Thierse, Siegrun Klemmer, Detlef Dzembritzki, Ingrid Holzhüter, Dr. Dimar Staffelt	1
◯	CDU	Christlich Demokratische Union Deutschlands Prof. Dr. Rupert Scholz, Dr. Sabine Bergmann-Pohl, Günter Nooke, Dankward Buwitt, Siegfried Helias	2
◯	PDS	Partei des Demokratischen Sozialismus Dr. Gregor Gysi, Prof. Dr. Christa Luft, Petra Pau, Manfred Müller, Bärbel Grygier	3
◯	GRÜNE	BÜNDNIS 90/DIE GRÜNEN Andrea Fischer, Hans-Christian Ströbele, Franziska Eichstädt-Bohlig, Marianne Birthler, Claudia Hämmerling	4
◯	F.D.P.	Freie Demokratische Partei Dr. Günter Rexrodt, Carola von Braun, Peter Tiedt, Dr. Werner Upmeier, Erik Schrader	5
◯	APPD	Anarchistische Pogo-Partei Deutschlands Heinrich Humm, Nanette Fleig, Christo Großmann, Holger Lang	6
◯	APD	AUTOFAHRER- und BÜRGERINTERESSEN PARTEI DEUTSCHLANDS Dr. Erhard Hörber, Marties Paeltz, Ulrich Manthei, Günter Schill, Wilfried Schüler	7
◯	BüSo	Bürgerrechtsbewegung Solidarität Renate Müller De Paoli, Heiko Ziemann, Monika Hahn, Lorenz Forster, Roland Pagel	8
◯	BFB - Die Offensive	BUND FREIER BÜRGER - OFFENSIVE FÜR DEUTSCHLAND, Die Freiheitlichen Joachim Baum, Markus Roscher, Barbara Bensen, Dr. Otto Oesterle, Olaf Draeger	9

These predictions are challenged in several ways. Some have claimed (Benoit et al., 2000; Fisher, 2000) that neither equilibrium is empirically plausible, as these strong formal results are based on unrealistic assumptions about voters. Another challenge comes from formal modelers themselves. A very promising attempt to develop a more realistic model of strategic voting is provided by Myatt (2000). He allows that not everyone needs to have the same expectation about the outcome of the district race. Thus, he does introduce uncertainty about the district-wide support of the party or candidates in the model to make the assumption more realistic. Although far from answering the question of what the mechanisms of strategic voting are within certain institutional designs, formal models have improved the naive intuition about strategic voting based on Duverger's Law. The amount of strategic voting probably differs from system to system, and must be explained differently, depending on the respective electoral rules. It is one of the key achievements of Gary Cox's seminal treatment of the subject (Cox, 1997) to provide evidence that strategic voting occurs across many institutional settings. In addition to plurality systems, formal models also provide some rationales for strategic voting in PR systems as well. Cox and Shugart (1996) show that the wasted-vote logic comes in two types. First, hopeless parties with no chance of winning seats are deserted to avoid wasting votes. Second, even leading party lists are deserted to some degree because they do not need these "excess votes" (Cox and Shugart, 1996, p. 301).

2.3 Strategic Voting and Voter Expectations

With its emphasis on the individual voter's mindset going to the polls, the strategic voting literature in the field of political behavior conceptualizes voter expectations about the success of various parties and candidates as an incentive to behave strategically and to *not* cast a vote for their most preferred choice. The aforementioned Nader example demonstrates that voters not only form preferences about parties and candidates, as traditional theories of electoral behavior suggest, but also that they weigh the prospects of parties and candidates *within* the electoral rules before they go into the voting booth. Many voters might have preferred Nader over Gore, but ended up casting a vote for the latter because they did not expect Nader to be competitive, and moreover, because they expected the top two contenders to be neck-in-neck. Depending on their expectations, therefore, voters decide whether to stick with or to desert their most preferred candidate. Given a particular institutional setting, the questions then arise as to how voters derive their expectations about the outcome of an upcoming election, and why this should have a credible impact on their decision calculus.

There are two main processes by which voters derive expectations. First, attentive voters follow the discussions about coalition options, along with pre-election polls during the campaign. It seems clear, however, that this process can only have an impact on the decision calculus of attentive, and therefore political aware and informed, voters. Since voters do not face a *tabula rasa* situation in the voting booth, there is surely a second

process at play, through which even voters who do not follow the campaign closely can be seen to form expectations. They adopt what I call the *electoral history heuristic*. As "cognitive misers" (Fiske and Taylor, 1991), individuals frequently employ heuristics to simplify their decision-making processes. Voters look back to previous elections. Even if they cannot recall the correct result of these elections, they can easily form beliefs at least about the rough coordinates of the competitive electoral landscape. Inferences based on these beliefs need not to be particular accurate. It is sufficient that voters have an idea about who the strong contenders are or which coalitions are typically formed. So together, both of these processes help voters cope with the uncertainty of an election and generate their expectations about the success of parties and coalitions. Voters create new expectations or simply update their prior beliefs about the outcome of an election in Bayesian fashion.[7]

While the party or candidate with the most votes is the winner of an election in plurality systems, PR-type systems are less clear-cut. The most successful party might not necessarily form the government. In PR systems, the government depends on the support of more than just one parliamentary party because no party alone will have a reasonable chance to gain a majority of seats in parliament. Coalition politics, therefore, determine the government formation process (Austen-Smith and Banks, 1988; Laver and Schofield, 1990; Pappi and Eckstein, 1998). Voters are motivated to anticipate this fact and form expectations about the success of parties and coalitions. Expectations about the viability of certain candidates, parties or coalitions come into play when voters make a decision whether to desert their most preferred choice and for whom to vote instead. Thus, voters are no mere servants of their preferences, as traditional models of voting behavior would have us believe. Quite to the contrary, as in Goldoni's famous play, voters are "servants of two masters": their preferences *and* their expectations.

In order to assess the impact of voters' expectations about the success of parties and candidates, there are generally two conceivable measurement strategies. First, some scholars ask respondents directly about the prospects of parties or candidates at the election. Abramson et al. (1992), for instance, investigate strategic voting on Super Tuesday in the 1988 presidential primaries. They measure the probability that a given candidate will get the nomination via a normalization procedure from a hundred-point scale. Blais and Nadeau (1996) also rely on subjective measures for voter expectations. Using the 1988 Canadian Election Study, they employ a likelihood scale on which respondents indicate the probability that a certain party or candidate will win. The main problem with this approach is that subjective measures are prone to *projection* effects. That is, voters are wishful thinkers who perceive their favored candidates as having better chances to win than others (Bartels, 1988; Brady and Johnston, 1987). The social cognition literature offers three similar explanations of why projection effects come about. One of these, which stems from cog-

7) Formal theorists employ a similar argument to make plausible the assumption that voters form "rational expectations" (Cox, 1997; Cox and Shugart, 1996; Fey, 1997). There is also experimental evidence that the *electoral history heuristic* facilitates generating consistent expectations (Forsythe et al., 1993).

nitive balance theory (Heider, 1958), is that people try to avoid "cognitive dissonance" and therefore need to "balance out" their expectations with their preferences. Another explanation is that people falsely infer from self-relevant categories to others. "Since I like this party, others do so, too". This type of projection is also called "false consensus" effect (Fiske and Taylor, 1991; Conover and Feldman, 1989). A third explanation is based on the theory of "motivated reasoning" (Kunda, 1990; Lodge and Taber, 2000). Perceptions about the prospects of parties and candidates are biased, because if we like them, we want them to be successful, and therefore overestimate their likelihood for success.

One way to deal with this problem is to model projection effects directly using a systems-of-equations approach. Abramson et al. (1992) follow this strategy and use a 3SLS approach to purge their candidate probability scores to win nomination. This strategy requires strong assumptions about the factors that are, presumably, not contaminated with projection effects in order to model them. A more promising way to deal with projection is to simply design instruments that minimize such effects. Thurner and Pappi (1998, 1999), for instance, employ a 4-point Likert-scale to measure voters' expectation whether minor parties in Germany will gain seats in the next election. Presumably, projection effects are more prevalent on 100-point scales than on smaller scales.

Instead of "subjective" measures to gauge voters' perceptions that a candidate or party is likely to win, a second measurement strategy is to employ "objective" measures of voter expectations. Such context variables are based on actual election returns (Black, 1978, 1980; Cain, 1978). Alvarez and Nagler (2000) provide an interesting application of this methodology with data from the British general election in 1987. The basic crux of this approach is to construct a vote-choice model for sincere voting in a multiparty setting based on individual-level data, and to add the district-level results of the previous election as a measure for the "expected" closeness of the district race. Indeed, they find that third party supporters are more likely to desert their party if they "expect" a competitive district race.[8]

The implicit assumption in this model is that a supporter of a third party is *a priori* equally likely to vote for one of the other parties. This determinism stemming from simple three-party races in plurality systems like the UK makes their approach less appealing for application to the mixed electoral systems with usually more than three parties and a history of coalition between parties. Viable coalition options provide valuable information, both for

8) Some scholars prefer clearly exogenous measures for voter expectations and employ district results of the previous election. Presumably, this is readily available for voters. Other scholars prefer to employ results of the current election. The disadvantage is obvious: How could a voter know the outcome before the election? In response, supporters of using current-election data retort that using results from the very same election better approximates pre-election polls in that district than results from the previous election, which usually do not exist in mixed electoral systems. Data from earlier elections might not represent the current situation at all. The closeness of the race or the personality of the candidates might be different today than in prior elections. Using current results has the added advantage that it does not assume that people stayed in the same district since the previous election.

the theory-building process as well as the estimation process, that should not be eschewed. Besides, measures of expectations that assume cross-constituency variance will evidently not capture strategic incentives of the PR tier in a mixed electoral system.

Most of the studies about strategic voting in the political behavior literature refer to the UK, with some emphasizing the U.S. Apparently, since the underlying process of why strategic voters do not vote for their most preferred candidate or party seems to be identified, the dominant theme in the literature devolves to the "who-gets-the-numbers-right" game (Niemi et al., 1992; Evans and Heath, 1993a; Niemi et al., 1993; Franklin et al., 1994; Evans and Heath, 1993b; Alvarez and Nagler, 2000). Moreover, all these studies are build on a rather unrealistic understanding of the strategic *homo politicus*, according to which all voters seem to have the same *proclivity* to vote strategically. This premise might hold true within the confines of the Rochester school, but not in the real world. The prerequisites for strategic voting are that a voter understands the strategic rationales and that she be able and motivated to employ them. Given these constraints, it seems utterly certain that voters vary widely in their *proclivity* to vote strategically. Voting behavior, as every type of behavior, is not only situational but also dispositional determined.

Apart from this assumption, as well as the preoccupation with getting an accurate estimate of the amount of strategic voting, these studies have yet another characteristic in common. They are based on essentially the same electoral institutions: a single-member district plurality system. As such, there has been less concern in the literature of how different electoral systems might induce different types of strategic behavior. While there are some studies about strategic voting in PR systems (Thurner and Pappi, 1998, 1999), strategic voting in mixed electoral systems has not yet been addressed. My dissertation fills this gap in the literature.

2.4 Strategic Voting and Ticket Splitting

From the literature about electoral institutions and party systems in section 2.2, it seems reasonable to look at the group of ticket-splitters in order to identify strategic voters. Although this literature provides no individual-level evidence, the hypothesis is that at least some voters might anticipate the electoral rules and do not vote for their most preferred party or candidate, but for a lesser-preferred candidate with a greater chance of winning.

The study of split-ticket voting in mixed electoral systems has enjoyed a surge of attention in the last few years, especially about Germany (Hilmer and Schleyer, 2000; Schoen, 1999a,b; Thurner and Pappi, 1998, 1999). Ticket-splitting is hardly a new topic in the American political science literature (Beck et al., 1992; Burden and Kimball, 1998; Campbell and Miller, 1957; DeVries and Tarrance, 1972; Fiorina, 1992; Mebane, 2000), but here the understanding of ticket-splitting - i.e., voting for candidates of different parties for different levels of governance - differs from its meaning in mixed electoral systems.

The literature on ticket-splitting in Germany concentrates on the role of voter characteristics that facilitate this phenomenon. Baker et al. (1981) provide evidence at the aggregate level that the decline of partisan strength parallels the rise of ticket-splitting. On the individual level, at least based on bivariate analysis, Hilmer and Schleyer (2000) characterize ticket-splitters in the 1998 federal election as young, well-educated and highly interested in politics. They also find that self-employed voters are more likely to split their ticket.

The scholarly work on German ticket-splitting behavior has at least three major weaknesses. First, the studies are mostly descriptive, and thus data-driven. They develop no theory of why certain people are more or less likely to split their ticket. Second, ticket-splitters are always treated as a homogeneous group. This oversimplification of the ticket-splitting phenomenon obscures the more likely scenario that there are many different reasons why voters split their tickets, and presumably also strategic ones. The literature fails to acknowledge these subtleties. Instead, ticket-splitters are lumped together in one group and scholars focus solely on the attitudinal and demographic differences between them and straight-ticket voters. The third weakness is of a methodological nature. Scholars use inappropriate probability models (Schoen, 1999a) or rely on bivariate analysis (Hilmer and Schleyer, 2000). A choice model would allow disentangling non-strategic ticket splitters from strategic ticket-splitters while accounting for factors related to straight-ticket voting.

In summary, scholars in the political behavior literature employ various methodologies to study the impact on strategic voting of voter expectations about the outcome of an election. What seem to be missing in this literature are more detailed hypotheses about the proclivity to register a vote strategically, as well as its direction, as compared to registering a non-strategic vote. On a meta-theoretical level, almost all studies, no matter what particular methodology they employ, have a model of non-strategic or sincere voting as their null hypothesis and specify conditions under which it can be rejected. The central insight to be drawn from the political behavior literature is that only systematic deviation from sincere voting, as baseline behavior, can be considered strategic. Thus a theory of strategic voting must set forth a rationale for sincere voting and derive different strategies that motivate systematic deviations from the baseline behavior. By extension, the implication for mixed electoral systems is that only certain ticket-splitting patterns can be considered strategic. In order to model this appropriately, I have to distinguish between strategic and non-strategic ticket splitters as well as straight-ticket voters.

The review of the institutionalist literature further shows that there is no model yet addressing strategic voting in mixed electoral systems combining a plurality system and proportional system. My goal is to bridge these two worlds. While the process behind strategic voting in plurality systems seems to be identified, there is not much theoretical work and empirical evidence for strategic voting in PR systems.

Chapter 3

A Theory of Strategic Voting in a Mixed Electoral System

In this chapter I will develop my theory about strategic voting. To facilitate an understanding of the notion of strategic voting, the next section defines important terms like straight- and split-ticket voting. In the second section I will present my theory and derive several hypotheses from it. These hypotheses will speak to different level of analysis, on the electoral district level and the individual level. The third sections lays out how I will go about testing these hypotheses. What models must I estimate in order to test my hypotheses, and what are the data requirements for doing so? Since they speak to two different levels I will divide this section also into two subsections, one dealing with methods and test of the hypothesis on the aggregate level and the other one dealing with the remaining individual-level hypotheses.

3.1 Conceptualization

A two-ballot system provides ample opportunity for voters in a mixed electoral system to split their ticket in an election for the same level of governance. In federal elections in Germany, for example, voters have two votes: a candidate vote and a list vote. A voter is said to cast a *straight ticket* if she casts her candidate vote for the local candidate of the same party she casts her list vote for. Thus, the party of the candidate and party list she votes for are one and the same. Otherwise, she casts a *split ticket*.

Since the list vote is *the* important vote - determining as it does each party's seat share in parliament - district races, which are determined by the candidate vote, are not very influential, and therefore not of utmost importance to many voters. In addition, it is often argued (Sartori, 1994; Thurner and Pappi, 1999) that in electoral systems in which people vote for a party list, a candidate's room to maneuver is diminished by strong party discipline, and therefore candidates are less prominent than the party itself. Consequently, surveys regularly show that respondents seldom know the names of their local party candidates

(Kaase, 1984). Moreover, research in social and political psychology (Fiske and Taylor, 1991; Lodge and Hamil, 1986) has shown that voters employ simplifying strategies, or short cuts, such as party schemas, to cope with their limited cognitive resources, rather than engaging in any systematic or formal "voting calculus". Figure 2.1 shows that on the ballot for the candidate vote in Germany, the name of local party candidates are presented with their respective party labels.

What is the particular impact of using the *party label heuristic* on the way people cast their two votes? Voters presumably employ this heuristic in order to facilitate their candidate vote decision. Instead of tuning into the local race and gathering information about the local party candidates, it seems more cognitively efficient to cast their candidate vote simply for the local candidate of their most preferred party. Voters have only to form preferences about parties. This type of voter casts a vote for a particular candidate simply because she likes the given candidate's party best among the available choices. She does not carefully compare various local candidates because she simply infers from the party label what candidate she prefers most. By this logic, a straight ticket consists of two *sincere* votes because it is a vote for the most preferred candidate as well as the most preferred party. A party's *loyal base*, as I call it, consists of straight-ticket voters like these.[1] A conclusion from the discussion, found in section 2.3, of previous work on strategic voting in the political behavior literature is that, in order to conceptualize strategic voting, one must set sincere behavior as a baseline in order to judge whether some type of behavioral pattern is a systematic deviation from this baseline. Given the dominance of parties, as compared to individual candidates in mixed electoral systems, a straight ticket is an obvious choice for such a sincere baseline behavior.[2] Since it seems reasonable to assume as baseline behavior that voters cast a *straight ticket*, why should people *split* their ticket in the first place? What are the motivations that lead some people to deviate from this baseline?

Indubitably, voters do not make their decisions in a vacuum. The individual voting act as determined by attitudes and personal preferences is always couched in a specific *context*. By context I mean non-individual factors that characterize the situation in which an election is held. Such a situation is not only characterized by the "supply" side of the political system, i.e., by salient issues or various parties and candidates. It is also determined by the electoral rules, because inevitably, voters form expectations about the election outcome or the chances of victory for certain parties and candidates. This assessment is made *within* the rules of an electoral system. Thus, because of the incentives induced by the

1) I assume that voters have one set of party preferences. In the end, whether voters have two different preference orders for parties and local candidates is an empirical question that had yet to be addressed in the literature.

2) This assumption is supported by survey data as well. According to recall questions in election studies, the majority of German voters at least cast straight tickets. Even if voters do not vote for their most preferred candidate or party but somehow still cast a straight ticket, it is reasonable to assume that this sooner exemplifies idiosyncratic reasoning than systematic behavior. I therefore do not bias my results in boldly defining straight-ticket voters as sincere voters.

electoral context, for some voters it is not rational to vote for their most preferred choice. Referring again to the Nader example, some of his supporters presumably did not vote for him because the plurality rule virtually guaranteed that Nader could not win any delegate in the Electoral College. Voters are defined as *strategic* if, because of contextual incentives, they end up *not* voting for their most preferred choice. Since it is conceptually not helpful to simply define any deviation from a sincere behavior baseline as strategic, it is reasonable to add some criterion to the definition of strategic voting to specify that only systematic deviations are considered strategic. The requirement of a systematic deviation implies for mixed electoral systems that only certain ticket-splitting patterns can be considered strategic. What form of strategic voting do voters employ in mixed electoral systems, and how does this relate to ticket-splitting? In order to conceptualize this appropriately, it is necessary to distinguish between at least three different types of voters: strategic ticket-splitters, non-strategic ticket-splitters and straight-ticket voters.

3.2 Theory and Hypotheses

Preferences for issues, parties and candidates - however they are formed - are not the only factors that determine a voter's decision at the polls as traditional studies of voting behavior would suggest. This study argues instead that voters also have reasons to take the electoral rules and possible coalitions of parties into consideration. Depending on their formed or updated expectations about the outcome of the election, voters might end up *not* voting for their most preferred candidate or party. They vote *strategically* instead. What kind of strategies do voters employ? I will demonstrate that in a two-ballot system, strategic voting comes in more than just one form.

The first strategy results in what, following Cox (1997), I will call an *ordinary strategic vote*[3]. The reasoning behind an ordinary strategic vote is the well-known Duvergerian logic of not "wasting" a vote on a hopeless candidate (Duverger, 1954). To make this point clear, assume that a voter most prefers the Free Democratic Party (FDP), a small party that usually garners around 5% of the total list-vote shares. I will call such a voter an FDP-*supporter*.[4] She would cast a sincere vote for the FDP with her list vote. But for whom should she vote with her candidate vote? It is unlikely that the FDP candidate will win the district race. Therefore, it is not rational (Downs, 1957) to vote for her most preferred candidate. In order to avoid wasting her candidate vote, she could vote strategically for the next most preferred candidate who has a chance to win. Since the FDP formed the governing coalition together with the Christian Democratic Union (CDU) before the last election, and since the CDU candidate has a much better chance to win, she casts her

3) This is similar to the logic behind strategic voting in the UK (Niemi et al., 1992; Evans and Heath, 1993a; Niemi et al., 1993; Franklin et al., 1994; Evans and Heath, 1993b).

4) Note being a party supporter is merely a predispositional characterization. It does not speak directly to observed behavior.

candidate vote strategically for the CDU candidate. Thus, this *wasted-vote strategy* leads to an ordinary strategic candidate vote and a sincere list vote. In shorthand, I call such voters *ordinary strategic* voters.

Figure 3.1: *Strategic Behavior of an FDP Supporter.*

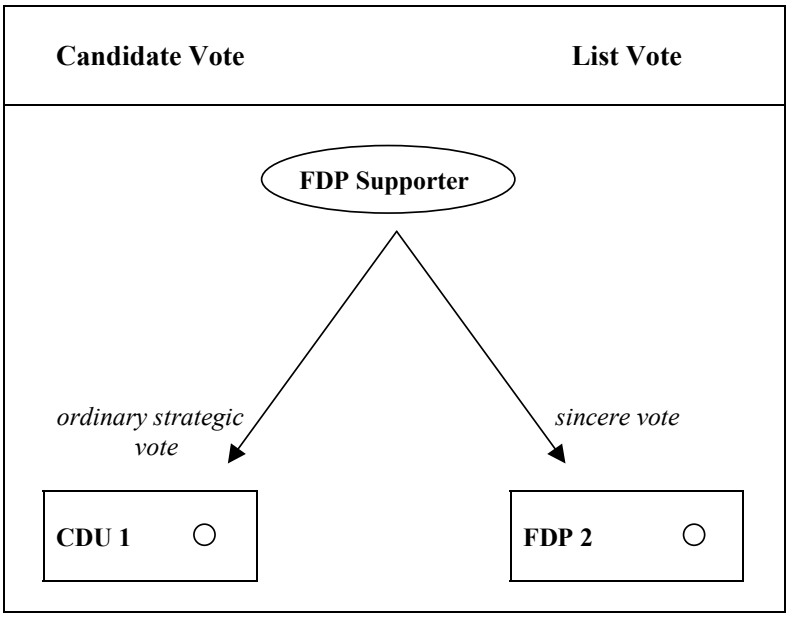


Figure 3.1 summarizes my theory about the type of voting behavior of an *ordinary strategic voter*. If an FDP supporter anticipates the odds that her candidate is not likely to win the district race, and if she does not intend to waste her vote, these incentives might be strong enough to lead her to deviate from her most preferred district candidate. Instead of casting a vote for the local FDP representative, she would cast an *ordinary strategic vote* for the CDU representative on the candidate vote. Thus, she would end up splitting her ticket strategically, since she will cast a sincere list vote for her party on the second ballot.[5]

The same reasoning applies to the SPD and the Greens as a viable coalition of parties on the left. Strategic Green supporters, like FDP supporters, would also split their ticket strategically. Since a Green candidate has no chance to win a district race, strategic Green supporters follow the *wasted-vote strategy* and cast an ordinary strategic vote on the candidate vote for the SPD candidate and a sincere list vote for the Greens.

5) A list vote for the FDP is not wasted. On the contrary, list-vote shares are aggregated on the national level and determine the total number of seats in parliament to which a party is entitled.

Besides the strategy for the candidate vote, there is a separate strategy at play in casting the list vote. Consider a voter who most prefers the CDU. As a CDU supporter, she votes sincerely for the CDU candidate with her candidate vote, but should she cast her list vote for the CDU as well? It is unlikely that the CDU get a majority of the seats in parliament to form a one-party government. Fuelled by prior experience, i.e., following the *electoral history heuristic*, the expectation is that the CDU needs a coalition partner.

Meanwhile, a small party like the FDP might have a hard time gaining the minimum of 5% of the list-vote shares. As suggested earlier, if the small party fails to overcome the 5%-threshold, it will not come into (or remain in) parliament and the CDU would have no partner to govern with. A hypothetical example helps illustrate this point.

Figure 3.2 shows two scenarios with similar election outcomes each with the same vote total for the CDU and FDP together but each with vastly different consequences for governing. In the first scenario, the FDP fails to overcome the 5% threshold, and as a result does not win any seats in parliament. Hence, there would be neither a CDU/FDP-coalition nor a majority for the CDU alone. A CDU supporter obviously does not want this outcome to happen. In the second scenario, the FDP overcomes the 5% threshold and gains 35 seats in parliament. Hence, the FDP can form a coalition with the CDU. This is the most preferred outcome not only for FDP supporters but also for CDU supporters, given that a one-party government is out of reach in multiparty systems.

Figure 3.2: *A Hypothetical Example. The Importance of Coalition Votes on List Vote Shares.*

	Scenario (1)			***Scenario (2)***	
	List Votes	***# of Seats***		***List Votes***	***# of Seats***
CDU 2	45.2%	306	- .2% →	45.0%	305
FDP 2	4.9%	---	+ .2% →	5.1%	35
Total	50.1%	306		50.1%	340
Outcome	*No Majority of Seats!*			*Majority of Seats!*	

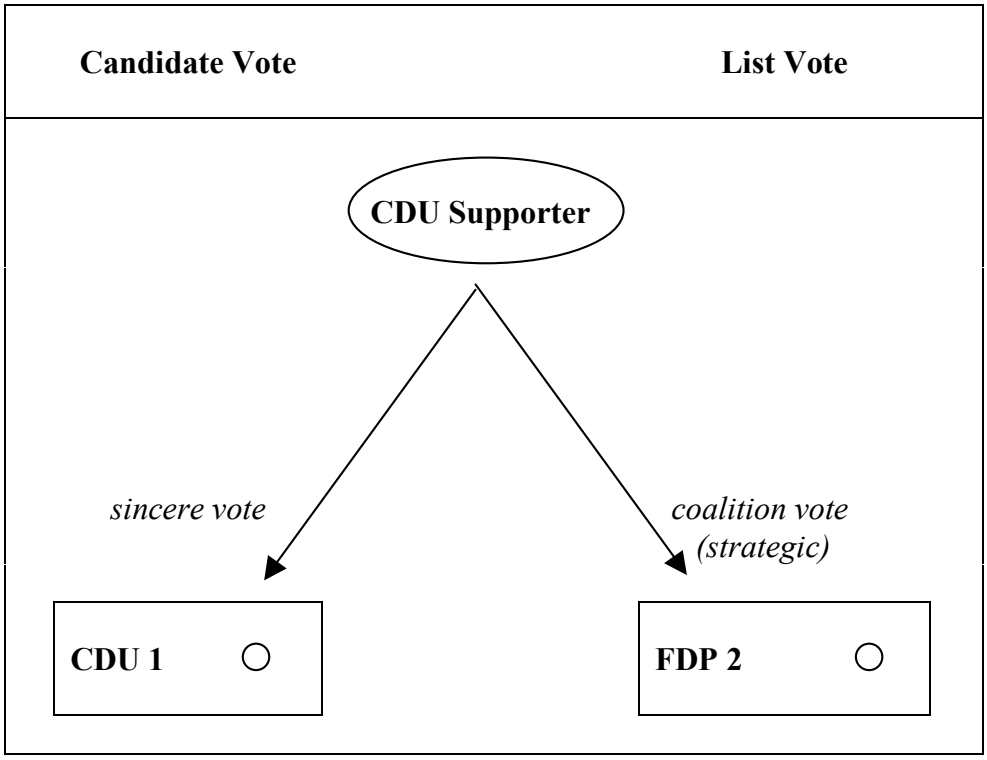
(Majority = 329 Seats, discounting "Surplus Seats")

What can our hypothetical voter do, since she most prefers the CDU? Instead of casting her list vote for the most preferred party, she would cast her vote strategically for the junior partner of her most preferred coalition, the FDP, to ensure that the party will overcome 5% and will be able to join the CDU in a coalition. This is a strategic vote because the FDP is not her most preferred party. I will call a vote to ensure the representation of a prospective

coalition partner in parliament a *coalition vote*. Thus, this strategy leads to a sincere vote on the candidate vote and a strategic coalition vote on the list vote. I call such strategic voters *coalition voters*. If the FDP is close to 5%, even a small number of coalition voters (in the above example about .2 %) can determine the fate of the CDU/FDP coalition.

Figure 3.3 illustrates the strategy for the list vote. A CDU supporter casts a *sincere* candidate vote for the local CDU candidate. If she supports a CDU/FDP coalition and expects that the FDP will have a hard time to overcome the national threshold of 5% of all list votes, these incentives might be so strong as to lead her to deviate from her most preferred party. She would strategically cast a *coalition vote* for the FDP in order to ensure that the smaller coalition partner, the FDP, is represented in parliament. Again, the same reasoning holds for an SPD supporter. Given the expectation that a one-party SPD government is out of reach, this SPD supporter rather supports a coalition with the Greens. She would cast a sincere candidate vote for the local SPD candidate but strategically casts a *coalition vote* for the Green party list in order to ensure the representation of the Greens as a potential coalition partner in parliament.

Figure 3.3: *Strategic Behavior of a CDU Supporter.*



In summary, I hypothesize that there are two types of strategic behavior in mixed electoral systems such as that found in Germany. Depending on their predisposition, strategic voters either choose a strategy for the candidate vote or for the list vote, but not for both votes simultaneously. Small-party supporters employ the *wasted-vote strategy* for the candidate vote following the Duvergerian logic. For supporters of a major party there is the *coalition insurance strategy* to support small coalition partners on the list vote. The nature of the party system, the history of past coalition formations, the *electoral history heuristic*, and the particular national threshold are all factors that converge to determine which coalitions are seen as viable. These factors vary across different mixed electoral systems, but the underlying strategies should apply uniformly to other mixed electoral systems as well. Voters employing the coalition insurance strategy are called coalition voters and voters trying to avoid wasting their candidate vote are called ordinary strategic voters.

Figure 3.4: *Hypothesized Strategies and Actual Voting Pattern.*

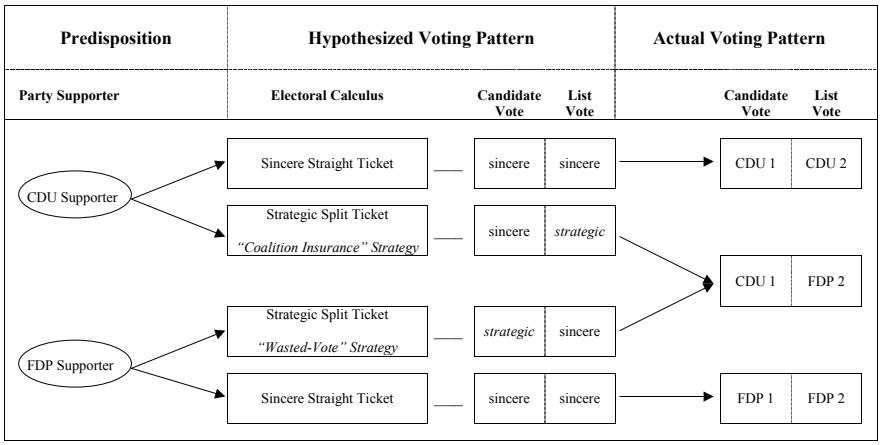


Figure 3.4 shows that major-party supporters use a different strategy than small-party supporters. As a major-party supporter, in the above example it is a CDU supporter, two different paths systematically describe a voter's decision calculus. One option is to cast a straight ticket for her party. Her candidate as well as her list vote would be sincere, because it supports her most preferred party and candidate. Another option is to strategically split her ticket. If she decides to go down this path she would casts a sincere vote for her most preferred candidate and a strategic coalition vote for the smaller coalition partner, that is apparently not her most preferred option. Thus, strategic voters who support one of the major parties employ the *coalition insurance strategy* in order to help the smaller coalition partner to overcome 5% and ensure a majority for her most preferred coalition. She would end up casting a candidate vote for the CDU and list vote for the FDP. The same reasoning applies to the SPD and the Greens. Note this strategy is similar to what

Cox calls "threshold insurance strategy" (Cox, 1997, pp. 197-198). The major difference, however, is that he does not conceptually distinguish strategies from actual voting patterns. Figure 3.4 shows that the same voting pattern is a result of various strategic considerations and not simply of a single strategy.

A minor-party supporter - in the above example, it is an FDP supporter - has a different decision calculus, the description of which also entails two systematic paths. She could cast a straight ticket for her party, the FDP, and thus her candidate vote as well as the list vote would be sincere, supporting as it does her most preferred party and candidate. She also could strategically split her ticket. If she takes this path, she casts an ordinary strategic candidate vote and a sincere list vote. Thus, strategic voters who support one of the minor parties in parliament employ the *wasted-vote strategy* in order to avoid casting her vote for a hopeless candidate. She would strategically support the CDU candidate and cast a list vote to support her most preferred party, the FDP. Again, the same reasoning applies to the SPD and the Greens. A supporter of the Greens could strategically cast her candidate vote for the SPD but her list vote for the Greens.

The informational requirements to vote strategically are very modest. Voter awareness of German coalition politics is very high, and the question of "who-goes-with-whom?" can be easily considered a by-product of everyday politics. They are in the realm of "folk politics", the popular understanding of politics in Germany. Adopting the *electoral history heuristic*, voters have similar expectations about the viability of certain coalitions. Election campaigns do the rest. They inform people about the electoral rules and make sure that people know that the list vote is the decisive vote. Especially campaigns of the smaller coalition partners allude to the strategic options of casting a coalition vote (Roberts, 1988). My theory of strategic voting takes into account coalition preferences and expectations about their success. For one, in a multiparty system strategic voters anticipate that no single party has a reasonable chance to win the majority of the seats in parliament; hence coalitions are necessary. The problem is that voters cannot choose a coalition formation with their vote. Instead, they vote for a single party. By implication, there is ordinarily a large margin of uncertainty in the government formation process. Voters cannot be too sure about how the coalition formation process of the political elite will turn out to be.

Strategic voters have expectations about the success of viable coalition formation and anticipate the incentives resulting from different electoral rules for the candidate and the list vote. For these voters there is no way to be better off than to split their tickets in a certain - by my theory - *a priori* defined way. By positing only certain split-ticket patterns as strategic, I explicitly develop a directional theory of split-ticket patterns as a systematic deviation from the (sincere) straight-ticket baseline behavior.

My theory addresses not only the amount of strategic voting, but also the process and direction of strategic ticket-splitting. In fact, the idea to use an *a priori* reduction of possible ticket-splitting patterns to define strategic voting is not uncommon. In a different context, Farquharson, for instance, defines a strategy as "sophisticated" (Farquharson,

1969, pp. 38-40), what I call strategic, that which produces a best outcome given certain incentives by successively eliminating other outcomes. I employ conceptually the same approach and *a priori* eliminate ticket-splitting patterns that do not make sense except for idiosyncratic reasons.

For the case of Germany, how tenable is the assumption that only a CDU/FDP and a SPD/Green coalition are *the* viable coalition formations? Some voters, in fact, might favor three-party coalitions. However, there is no way that, with only two votes, they could enhance the likelihood of such a coalition. But what about the "Grand Coalition" between the two main parties, the CDU and the SPD? Neither casting a straight ticket for the CDU or the SPD, nor splitting the ticket between these parties, will make supporters of these parties better off in order to achieve their favored coalition outcome. Although this coalition is always a theoretical option of last resort in German politics, the two major parties formed the government only between 1966 and 1969. Clearly, the party leadership of the major parties tries to avoid such a constellation. Rather they try to form a "minimum winning coalition" (Riker, 1962), given the ideological constraints within the party system. A major party will certainly have more influence over the government in a coalition with a small party than in the " Grand Coalition". The odds of forming a "Grand Coalition" depend on the size and the bargaining power of the smaller parties in the *Bundestag*. Of course, a voter who prefers such a coalition should vote for a major party but this only helps the party which gets her list vote and does not send a signal that this particular voter prefers the "Grand Coalition". Whether this voter casts a straight ticket or splits the ticket is also irrelevant in terms of her coalition preferences, since the candidate vote does not determine the distribution of the party seat shares in parliament. There is no strategy for a voter that can enhance the likelihood of getting a CDU/SPD coalition than a straight ticket for one of them, and this is not different from casting a sincere vote for one of these parties. Again, there is no equilibrium strategy that makes supporters of such a coalition better off. It is up to the respective party elites of each of the two main parties to determine whether this coalition is to be formed after the election. Voters cannot influence this decision. Furthermore, a coalition between two small parties could never win a majority. For all practical purposes, therefore, both a coalition of two major parties and of two small parties can be safely ignored.

Moreover, the *wasted-vote strategy* should apply to all minor-party supporters. They would waste their vote if they cast a candidate vote for their most preferred candidate because minor-party candidates are not likely to win a district race. Conversely, it is unreasonable to expect a major-party supporter to employ the *coalition insurance strategy* and cast a coalition vote for a minor party that has no chance of overcoming the 5% threshold. Thus, why should minority party supporters try to avoid wasting their vote if their party gets nothing out of it? They might be better off casting a straight ticket, thereby sending an issue or protest message to the established parties in parliament. Thus, I expect that both strategies should only be compelling for voters to support viable coalitions of parties. Undoubtedly, at least for the last elections, it is reasonable to consider *a priori* only two different two-party coalitions, namely a CDU/FDP and a SPD/Green coalition.

Another aspect deals with the application of my theory to the states of the former East Germany. While the Party of Democratic Socialism (PDS), the ruling party in the former GDR, is practically non-existent in West Germany but very strong in East Germany. The East German party system is therefore still in flux. Only three federal elections have been held since the fall of the Berlin Wall. There are no established coalition patterns involving the PDS as of yet. Nevertheless, for the other four parties, the logic for strategic voting also applies to East Germany. Summing up, I do not bias my results by looking only at *a priori* defined coalition constellations in order to conceptualize strategic voting.

What follows is a formulation of eight hypotheses. The first three hypotheses deal primarily with the specific impact of electoral rules on a voter's behavior. The remaining hypotheses acknowledge the fact that, contrary to what was previously thought, the impact of voting rules are not the same for every voter.

In my first hypothesis I seek to establish whether strategic ticket-splitting really matters substantively. Assuming the reasoning about strategic voting is correct, to what extent do strategic considerations enter into voters' decision calculus? Since the list-vote shares determine whether a party is represented in parliament, strategic voting should improve the success of minor-parties if it matters substantively. I expect that strategic ticket-splitters should systematically contribute to the success of these parties across electoral districts. Apart from the size of the *loyal base* of a party, the number of straight-ticket voters, I expect that the success of minority parties such as the FDP or the Greens depends on the number of strategic ticket-splitters across districts. The following hypothesis formally states this expectation.

Hypothesis 1 (Minor-Party Success) *The list-vote shares of a minor party in a district depend on the number of strategic ticket-splitters in that district. The more strategic ticket-splitters there are, the higher the list-vote shares of the FDP and the Greens.*

The second hypothesis deals with the strategy surrounding the candidate vote. Here, plurality rule provides the key incentive. From the literature on electoral institutions discussed in section 2.2, it is known that under plurality rule, the *wasted-vote strategy* is the mechanism behind strategic voting. According to my theory, this strategy should only apply to small-party supporters in mixed electoral systems. Stated succinctly, in a close race, small-party supporters should be more inclined to avoid wasting their candidate vote because they are more likely to make a difference than in a non-competitive district race. Hence, the incentive for small-party supporters to actually cast an ordinary strategic vote depends on the closeness of the district race. I expect to find more ordinary strategic voters if the district race is close than if the district race is essentially a foregone conclusion. Thus my second hypothesis is as follows.

Hypothesis 2 (Wasted Vote) *The closer the district race, the more likely voters are to follow the wasted-vote strategy and cast an ordinary strategic vote.*

The third hypothesis addresses strategic voting with the list vote. This strategy differs from the previous one in that here, it is electoral rules that provide voters with another rationale to vote strategically. List-vote shares are aggregated on the national level. The competitiveness of the district race should have no impact on voters employing the coalition insurance strategy on the list vote.

According to my theory, coalition voters are major-party supporters. They decide whether it is more effective to cast a coalition vote for the smaller coalition partner of their most preferred coalition or to simply cast a straight ticket for their most preferred party. It is presumably more effective to cast a coalition vote if major-party supporters are unsure whether the small coalition partner can overcome the national threshold. However, if major-party supporters expect that the smaller coalition partner will not overcome this threshold they would rather cast a sincere straight ticket. Likewise, if major-party supporters are absolutely certain that the smaller coalition partner will overcome the national threshold the incentive to cast a coalition vote should also rapidly disappear. These voters would cast a straight ticket as well. Thus, in general, the likelihood to cast a coalition vote should be curvilinear and highest if voters expect to be pivotal, that is if she expects that her vote is essential for the small coalition partner to garner just enough list votes to make it above the threshold. The incentives to follow the *coalition insurance hypothesis* are lowest for the two conditions described above, either if voters are certain that the party will make it or, on the contrary, if voters are certain that the party will not make it above the national threshold. Hence, my third hypothesis is as follows:

Hypothesis 3 (Coalition Insurance) *The more uncertain voters' expectations are whether or not the smaller coalition partner can overcome the national threshold, the more likely they are to follow the coalition insurance strategy and cast a coalition vote.*

The first three hypotheses deal with the impact of electoral rules on how voters behave at the polls. According to my theory, strategic voters split their ticket in the directions hypothesized above. Non-strategic voters cast either a straight ticket or split their ticket in a non-strategic way. The literature, however, lumps together all ticket-splitters into one group. Scholars focus solely on the attitudinal and demographic differences between ticket-splitters and straight-ticket voters, what I call the *loyal base*. This is certainly an oversimplification of the ticket-splitting phenomenon. There might be a variety of reasons why voters split their tickets. I do not expect this group to be homogeneous. Instead, I will disentangle this category into its constituent groups: strategic ticket-splitters employing one of two strategies, and non-strategic ticket-splitters.

Electoral institutions provide certain incentives. Whether or not these incentives are strong enough to encourage a voter to deviate from her preferred choice, employing either the *wasted-vote* or the *coalition insurance strategy*, is likely to differ from voter to voter. Some voters are more likely to cast a strategic vote because they have a higher *proclivity* to vote strategically. I will argue that the factors responsible for this *proclivity* depend on at least two factors: the *motivation* to cast a strategic vote and the *capability* to understand the strategic implications of the electoral rules and the nature of the party system. Just the preference of certain parties or coalitions should be enough to motivate a voter to cast a strategic vote in a particular fashion. I wish to extrapolate four motivational hypotheses based on this observation.

According to my theory, a certain party preference order motivates voters in a particular fashion to cast a strategic vote. The fourth hypothesis is that small-party supporters, like supporters of the FDP and the Greens, are more motivated to employ the *wasted-vote strategy* and cast an ordinary strategic vote than other party supporters. They essentially know that their local party representative will not win the district race. Furthermore, major-party supporters, like supporters of the CDU and the SPD, are more motivated than others to employ the *coalition vote strategy* because they also know, that their party will not gain a majority of the seats in parliament without the help of a smaller coalition partner. Hence the fifth hypotheses is that they are more likely to cast a coalition vote than to split their ticket in some other, non-strategic way.

Both my sixth and seventh hypotheses deal with the strength of a voter's partisanship as a motivational factor. From the literature on strategic voting and ticket-splitting in political behavior, we know more about motivational differences that might explain whether voters cast a straight ticket, split their ticket or cast a strategic vote. The standard finding is that voters who split their ticket have weaker partisan attachments than straight-ticket voters. In concordance with this literature, my sixth hypothesis is that the stronger someone's partisanship is, the more likely she is to cast a straight-ticket vote.

However, strategic ticket-splitting is a special type of ticket-splitting. In mixed electoral systems, a government depends on the support of more than just one party. The *wasted-vote strategy* provides a rationale for minor-party supporters to deviate from their most preferred candidate, whereas the *coalition insurance strategy* provides a rationale for major-party supporters to deviate from their most preferred party. In both cases, strategic voters support their most preferred coalition by strategically splitting their tickets instead. Both rationales indirectly support a strategic voter's most preferred party. Presumably, strategic voting is, therefore, a more partisan act than simply splitting the ticket in some other fashion. My eighth hypothesis is that, if strong partisans split their ticket, they are more likely to split it strategically than non-strategically. In brief, the implications of the motivational factors, such as partisanship and the its extremity, leading to a strategic vote are summed up in hypotheses 4 through 7.

Hypotheses 4 - 7 (Motivation)
4) FDP and Green supporters are more likely to cast an ordinary strategic vote than to split their ticket non-strategically.
5) CDU and SPD supporters are more likely to cast a coalition vote than to split their ticket non-strategically.
6) The stronger a voter's partisanship, the more inclined she is to cast a straight ticket.
7) The stronger a ticket-splitter's partisanship, the more likely she is to split her ticket strategically.

The remaining factor that determines a voter's proclivity to vote strategically is her capability to understand the implications of her choices. Besides motivation, the *proclivity* to vote strategically depends on the voter's capability to engage in a task so cognitive in nature. Even if voters are non-partisans, such that they do not feel motivated to vote strategically to the same degree as partisans, they might "rationally" calculate that in order to support a certain government, one way to cast their votes is more efficient than other ways. Voters have to be politically aware (Zaller, 1992; Zaller and Feldman, 1992) and sophisticated (Luskin, 1987) enough to comprehend (Tourangeau and Rasinski, 1988) various options that the electoral rules offer them. Thus, my eighth hypothesis is as follows.

Hypothesis 8 (Capability) *The higher a voter's level of political awareness, the more likely she will be to cast a strategic vote.*

The following section lays out how I will go about testing the hypotheses enumerated above. Two interrelated questions are at the center of the following section: What models must I estimate in order to test my hypotheses, and what are the data requirements for doing so?

3.3 Methods and Data

The hypotheses presented here speak to different levels of analysis. From the discussion of the electoral rules, it is reasonable to expect that the intensity of strategic voting varies across electoral districts, since the incentives to vote strategically likewise vary across districts. The test of the *Minor-Party Success Hypothesis* with aggregate-level data is a first step toward establishing whether my theory about strategic voting is reasonable, and facilitates an assessment of the political consequences of strategic voting. According to my theory, the list-vote shares of the FDP and the Greens consist of three different groups. The first is that of the party's *loyal base*, the straight-ticket voters for the FDP and the Greens, respectively. The second group consists of ordinary strategic voters, who cast strategically their candidate votes and vote sincerely with their list vote. The third

group consists of coalition voters, who strategically cast their list vote but cast a sincere candidate vote. Since ordinary strategic voters and coalition voters exhibit the same voting patterns, they cannot be distinguished with aggregate-level data. This can only be achieved with the individual-level data.

In the following sections I will first discuss how I am going test my first hypothesis, the *Minor-Party Success Hypothesis*, on the aggregate level. In the second part I will focus on how I go about testing the remaining hypotheses and how to distinguish different strategic from non-strategic behavior at the individual level.

3.3.1 Test on the Aggregate Level

Evidently, strategic voting is an individual-level phenomenon. To test it with aggregate data, I employ a relatively new statistical model, Gary King's Ecological Inference (King, 1997). Ecological Inference (EI) is the process of using aggregate data to draw inferences about individual-level behavior. Since the lack of individual-level information causes problems for cross-level inferences, what is widely known as "ecological fallacy", no attempt to solve this problem will always produce accurate results. Compared to other approaches, however[6], King's solution has at least three advantages: It includes *a priori* more information in the model-building process, uses several diagnostic procedures to check underlying assumptions of the model, and allows for refining these assumptions[7]. Therefore, King's EI approach minimizes potential difficulties, and thus generates more realistic estimates for the unobserved individual-level relationships of interest.[8]

According to my conceptualization, I use *EzI* in the first stage of my analysis to estimate the size of the loyal base, FDP or Green straight-ticket voters, separately for both parties in every electoral district.[9] In order to test the *Minor-Party Success Hypotheses*, I need estimates for strategic ticket-splitters as well. Thus, I also estimate the number of strategic voters in every district, ordinary strategic and coalition voters together, who vote for the CDU (or SPD) representative with their candidate vote and for the FDP (or the Greens) with their list vote.

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6) Achen and Shively (1995) provide a nice overview.

7) See Voss and Lublin (1998) for an attempt to provide the intuition behind these assumptions

8) For the analysis of amount and direction of split-ticket voting, I use *EzI* (Version 2.23), written by Kenneth Benoit and Gary King, which is publicly available on King's homepage at `http://Gking.harvard.edu`

9) Burden and Kimball (1998) use a similar research design.

The data used for this analysis is provided by the Federal Statistical Office of Germany. It contains official election results of candidate and list votes for all German districts from the 1998 federal election. Since the political landscapes in two former states, East and West Germany, are very different, I will estimate each separately. Table 3.1 illustrates the EI-estimates of interest.

Table 3.1: *Ecological Inference Problem.*

Straight Ticket Estimation	Party A's List Votes	not Party A's List Votes	
Party A's Candidate Vote	σ_i	$1-\sigma_i$	$A1_i$
not Party A's Candidate Vote	σ_i^n	$1-\sigma_i^n$	$1-A1_i$
	$A2_i$	$1-A2_i$	

Ticket Splitting Estimation	Party A's List Votes	not Party A's List Votes	
Party B's Candidate Vote	τ_i	$1-\tau_i$	$B1_i$
not Party B's Candidate Vote	τ_i^n	$1-\tau_i^n$	$1-B1_i$
	$A2_i$	$1-A2_i$	

The ecological inference problem must be reduced such that only two cell values of a 2×2-table are estimated for every district from the distribution of the known marginal values in order to apply EI.[10] Generally, the true values of the quantities of interest τ_i and τ_i^n, the ticket-splitting estimates in district i, are somewhere within the [0,1]-square. Fortunately, there are more restrictions to that. Information about the marginal distribution, the absolute number of candidate votes ($B1_i$ for CDU or SPD candidates) and list votes ($A2_i$ for FDP or the Greens) can be employed to narrow down the space where the true values lie. Obviously, there cannot be more strategic ticket-splitters than candidate or list votes for that party in a particular district. Observing $A1_i$ and $B2_i$, the quantities of interest are deterministically related (without measurement error) by the following accounting identity:

$$B2_i = \tau_i \cdot A1_i + \tau_i^n \cdot (1 - A1_i) \tag{3.1}$$

10) Since the absolute number of valid candidate and list votes is never the same in a district, I imported the number of candidate votes for a particular party ($\tilde{A1}_i$) weighted by a ratio of the valid list ($N2_i$) and valid candidate votes ($N1_i$) in that district. Thus, $A1_i = \tilde{A1}_i \cdot \frac{N2_i}{N1_i}$. The same number of votes for candidate and list votes in a district is a necessary data requirement for using *Ezl*.

Rearranging the above equation, the true quantities of interest define a point somewhere on the following line.

$$\tau_i^n = \left(\frac{B2_i}{1 - A1_i}\right) - \left(\frac{A1_i}{1 - A1_i}\right)\tau_i \tag{3.2}$$

Since $A1_i$ is always positive, the slope coefficient in the equation of the above line is always negative. Moreover, from this linear relationship one gets more information about the spread of all τ_i's and all τ_i^n's, respectively. Since there is a unique line for every district "i",both the slope and the intercept of this line will vary only within a fixed interval. Therefore, one can obtain deterministic bounds in which the true values of the quantities of interest must lie.[11]

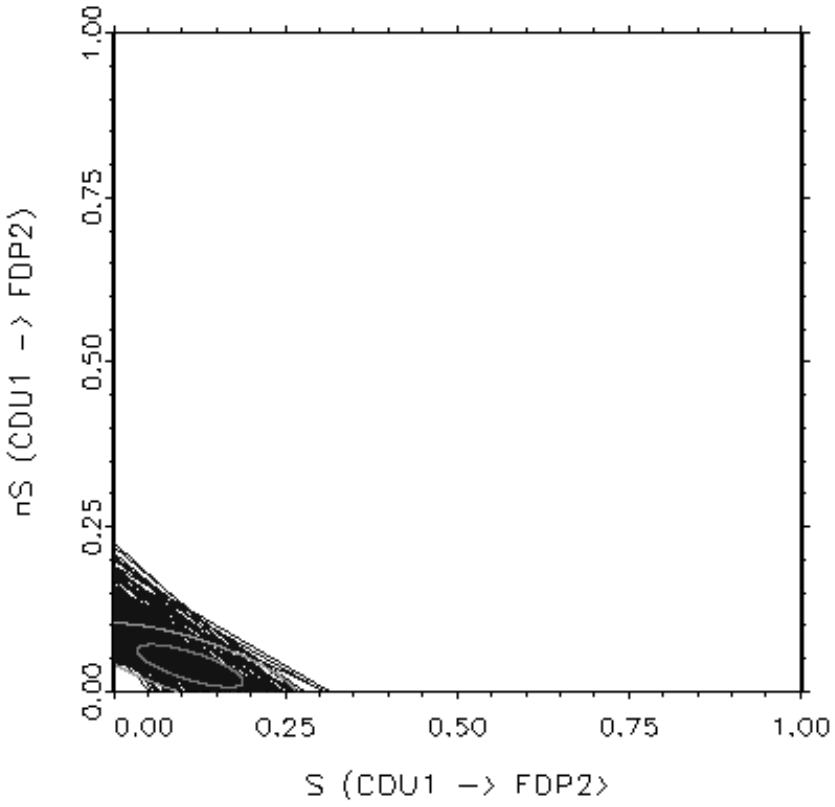
The basic assumption of King's EI is that the quantities of interest are normally distributed within their bounds, hence (τ_i, τ_i^n) is distributed truncated bivariate normally (TBN). Specifically, this assumption means that the quantities of interest are not constant but still have something in common. The TBN distribution has a single mode, indicating where the most values (τ_i, τ_i^n) fall. The five parameters of this joint distribution - two means, two variances and a covariance - are finally estimated by maximum likelihood. To obtain the estimates for the quantities of interest in every district, I take the point on the line described by equation 3.2 for each district which is closest to the estimated mode of the TBN, since the true value is most likely to lie at this point.[12]

King's EI is not uncontested (Freedman et al., 1998, 1999; Herron and Shotts, 2003; King, 1999; McCue, 2001; Rivers, 1999; Tam, 1998). The main critiques in this vein focus mainly on two other assumptions. EI assumes, for instance, that the estimated parameters ($\hat{\tau_i}$, $\hat{\tau_i}^n$ or $\hat{\sigma_i}$, $\hat{\sigma_i}^n$) do not correlate with the marginal values $A1_i$, i.e., there is no "aggregation bias". Cho (1998) shows via Monte Carlo simulations that EI estimates are inconsistent in the face of aggregation bias. Moreover, EI assumes that there is no spatial correlation in the data. This assumption is, of course, criticized by political geographers (Anselin and Cho, 2002; O'Loughlin, 2000), who try to explain spatial contiguity. The discussion boils down to a question of how robust EI is in the face of violations of its underlying assumptions. One simple diagnostic tool is the *tomography plot*. The following figure 3.5 presents one of these plots for the ticket-splitter between the CDU and the FDP in West Germany.

11) The same logic applies to the model for straight tickets (σ_i and σ_i^n) if $B2_i$ is replaced by $A2_i$.

12) Moreover, if one wishes to estimate more ticket-splitting patterns, one must divide the estimation process into several steps, such that the quantities of interest can be estimated successively by reducing the problem into 2×2-tables. However, this implies that the Variance-Covariance Matrix of the underlying truncated normal distribution is blockwise diagonal. This feature works only if we assume that the errors of estimating two different 2×2-tables are uncorrelated. A better way to estimate $R \times C$-type models such as these has recently been developed (Rosen et al., 2001; de Mattos and Álvaro Veiga, 2001).

Figure 3.5: *Tomography Plot of CDU-FDP Ticket Splitter.*



It can be clearly seen that the different intercepts of the lines fall within a very narrow interval. This information helps the estimation process a great deal. The additional information gained by restricting the possible parameter space is enormous and, fortunately for this analysis, seems to be one of the major characteristics of my data.

Employing EI point estimates derived from the first stage as dependent or independent variables in a second-stage analysis is not straightforward, and just recently drew more attention (Lewis, 2000; Herron and Shotts, 2003). Herron and Shotts are especially critical of this strategy, and remind us that EI-based point estimates of district level quantities $\hat{\tau_i}$ and $\hat{\tau_i}^n$ are inconsistent. This will be less of a problem, as they show, if the predicted values $\hat{\tau_i}$ and $\hat{\tau_i}^n$ are very accurate. There is no direct way to assess the accuracy of the district-level estimates, for if we could observe this accuracy, there would be no need to employ some version of an ecological inference technique in the first place. Nevertheless,

the best case scenario for very accurate predictions is when the deterministic bounds are very informative - that is, very tight. Since the estimates must lie within these bounds, and if these bounds are very tight, the residuals of the predicted values cannot be large.

Fortunately, as it can be seen from the above tomography plot, the list-vote shares of the FDP (and the Greens) do not vary much. The verification of my results with survey data will provide an answer to whether these bounds are indeed tight enough.

There is another point worth noting. Treating EI point estimates simply as dependent or independent variables does not account for the uncertainty that every prediction entails. Since these point estimates are not observations, they should not be treated as such. Thus, in order to account for the uncertainty in the EI point estimates, I use a multiple imputation strategy, which is introduced to a political science audience by King et al. (2001). Instead of imputing values for missing data, I run several simulations. In fact I run six *EzI* simulations and create six data sets. I then run my second-stage model, predicting the list-vote shares of the FDP and the Greens, with independent variables based on EI point estimates for every data set. The resulting multiple imputation point estimates are the averages across the coefficients of these six separately estimated models. The appropriate standard errors are derived from the variance of the point estimates. The variance of the resulting multiple imputation point estimates is simply the average of the estimated variances within each of the six data sets, plus the simulated sample variance in the point estimates across all data sets. The estimated "across-variance" has to be corrected for bias by a factor $(1 + 1/6)$ since this estimate is only asymptotically unbiased, but I employ merely six simulations (see equation 3 in King et al. (2001)). The main crux of this design is that the simulated sample variance is *added to* the average of the estimated "within-variance". Thus, the estimated variance of the resulting multiple imputation point estimates gets wider, accounting for the uncertainty in my independent variables since they are based on EI point estimates and not on observations.

In order to test my first hypothesis, the *Minor-Party Success Hypothesis*, I run OLS regressions with the list-vote shares for the FDP and the Greens as dependent variables and EI-estimates for the loyal base ($\hat{\sigma}_i$) and for strategic ticket-splitters ($\hat{\tau}_i$) as the independent variables. Moreover, I will validate these EI predictions with individual-level data from post-election surveys. I cannot, however, disentangle ordinary strategic voters and coalition voters without applying strong assumptions. With district-level data, these two groups of strategic voters are observationally equivalent.

The very same fact also makes a direct test of the *Wasted-Vote Hypothesis* impossible with aggregate-level data. The group of strategic ticket-splitters consists of coalition voters and ordinary strategic voters. While the number of ordinary strategic voters should depend on the closeness of the district race, as should the number of strategic ticket-splitters, the group of coalition voters should not. We need a further assumption in order to identify ordinary strategic voters and coalition voters separately with aggregate data.

One must also be creative in order to test the *Coalition Insurance Hypothesis*. Since the 5%

threshold does not apply to the states, but does to the national level, I cannot use variations of coalition votes across to get some mileage here. The only way to test this hypothesis with aggregate-level data is across several elections. However, the same problem occurs as before: How can I get an estimate for the number of coalition voters? To construct a dependent variable I could take the number of strategic ticket-splitters in an election as published in the representative electoral statistics (*repräsentative Wahlstatistik*[13]). To decide whether the FDP or the Greens are actually seen as being close to the 5% threshold, one could use "vote intention" marginals of pre-election polls as an independent variable. The difficulty associated with this approach, of course, is to get these polls for all 12 federal elections in order to have enough degrees-of freedom for a regression analysis. Obviously, I could only use data from West Germany. Also, since the Greens are a relatively new party, the analysis must exclude this party, and instead focus only on the FDP. I could also control for the absolute number of ticket-splitters in order to make sure that this relationship does not depend on a general rise of ticket-splitting, signaling times of dealignment. Thus, it seems that the more direct way to test these hypotheses is with individual-level data instead.

3.3.2 Test on the Individual Level

All remaining hypotheses should be tested simultaneously. In order to do so, I will first employ a dependent variable with three categories in order to distinguish ordinary non-strategic ticket-splitters from strategic voters, while accounting for factors related to sincere straight-ticket voting and controlling for alternative explanations. I will also disentangle coalition voters from ordinary strategic voters, depending on whether they most prefer the smaller or the bigger coalition partner. This would result in a dependent variable with four categories. To estimate a three- or even a four-choice model, I shall estimate a multinomial logit model (MNL). This model yield only consistent estimates if the *independence of irrelevant alternatives* (IIA) assumption holds in the data. Since the probability of casting a straight ticket should theoretically be unchanged if one of the other categories is removed, the IIA assumption should not be violated. Nevertheless, I will test for that.

Since individual-level models of strategic voting (Alvarez and Nagler, 2000) typically create a model of sincere voting, and include some measures indicating varying degrees of incentives to deviate from the sincere baseline behavior, they only test whether voters are more

13) The *repräsentative Wahlstatistik* is unique to the German political system. Beginning with the second federal election in 1953, the German Federal Statistical Bureau administered a stratified sample of precincts, the lowest possible unit of analysis, and marks the ballots according to gender and age. One thus gets a representative sample of eligible voters and has information about the actual split-ticket behavior, as well as the distribution across age groups and gender. Unfortunately, the published results are aggregated on the state level. Data collection was suspended, however, for the 1994 and 1998 elections. Otherwise, this data could be used for validation attempts. A well-executed study also employing this kind of data is provided by Schoen (1999b).

likely to deviate from their most preferred party under certain conditions. My approach is superior because it also predicts the *direction* of strategic votes. Where do these voters depart from, and for whom do they vote for instead? My conceptualization of strategic voting also allows for a more refined test of sincere straight-ticket voting, strategic ticket-splitting and non-strategic ticket-splitting. I will use the 1998 German National Election Study (German NES) to test my individual-level hypotheses. All Motivation Hypotheses and the Capability Hypothesis must be tested on the individual level. I will construct typical measures for a voter's level of strength of partisanship and awareness.

To test the *Wasted-Vote Hypothesis* with individual-level data, I impute the actual district margins from official election returns. The closer the margin, the more likely a small-party supporter is to cast an ordinary strategic vote. The *Coalition Insurance Hypothesis* can be tested with individual-level data because respondents have different expectations about the possibility that the FDP or the Greens do not surpass the national threshold of 5%. A question concerning the closeness to 5% is not available in 1998 German NES, however. I will impute appropriate values from different data sources. There is a pre-election survey in 1998 that asks respondents about their expectations, rated on a four-point scale, of whether the FDP or the Greens will overcome the 5% threshold.

The "personal vote" (Cain et al., 1987) is an alternative explanation I also plan to control for. Personal voters are sincere ticket-splitters. They vote for their preferred candidate but do not support their candidate's party. No strategic reasoning is involved here. In order to distinguish such voters empirically from ordinary strategic voters, I would expect that personal voters know at least the name of the candidate they vote for. Ordinary strategic voters do not necessarily have to focus on the personality and the name of the local candidate. Their strategy short-circuits that.

Chapter 4

Iterative EI Estimation and Its Internal Consistency Problem

The publication of King's "A Solution to the Ecological Inference Problem" in 1997 has received recognition that is quite extraordinary for a social science project, much less a book in the field of political methodology. While the *New York Times* and the *Boston Globe* have waxed on about his solution of an old problem in social science, many scholars in statistics (Freedman et al., 1998, 1999; McCue, 2001), political geography (Anselin and Cho, 2002; O'Loughlin, 2000) and political methodology (Herron and Shotts, 2003; Rivers, 1999; Tam, 1998) have taken issue with King's model, particularly its assumptions and the robustness of EI estimates. The bottom line of this discussion in various fields seems to be that, for one, the formulation of the model's assumptions are to a large extent a matter of taste, and second, that King's model is indeed not *the* solution but (as is clearly stated in the title of his book) *a* solution to this problem. Authors might object to - and hence like to refine - some assumptions he made. Arguably, however, no one wishes to restrict progress on this issue. Furthermore, King's EI has a very practical advantage for substantive research: He provides free and easy-to-use software to run these kinds of models. That said, however, there is one "real" issue here that is often been overlooked in substantive applications of King's model. I will call this EI's *internal consistency problem*. In this chapter I seek to elaborate on this problem, because it potentially undermines every inference based on EI estimates, even if all of the requisite assumptions are met.[1]

In a two-ballot system such as mixed electoral systems, the district-level result of candidate and list vote distributions can be represented in a $R \times C$ contingency table, whereas the vote shares of R fielded candidates are represented by the marginal Rows values and the shares of C party lists are represented, consequently, by the marginal value in every Column. Scholars of strategic voting, according to my theory, are interested in values of particular inner cells of a contingency table such as this one, because it indicates how many voters

1) Parts of this chapter are meanwhile published in German (Gschwend, 2003).

split their ticket between a particular candidate and a certain party list in every district. Since these values are represented by parameters, they are called "parameter of interest". These parameters of interest are generally unobserved, and hence must be estimated.

Ideally, in assessing different ticket-splitting patterns, one would like to estimate all inner cells of a $R \times C$-table. The size of these tables is not constant, because the number of candidates or parties varies across districts. The typical strategy, therefore, is for scholars to reduce the dimension of rows and columns, i.e., to collapse various categories such that every table has the same number of candidates and parties. This technique also facilitates a comparison of these contingency tables across districts. Even if I restrict my attention to the theoretically relevant parties, with the data at hand the row and column variables would have 5 categories (CDU, SPD, FDP, Greens and "Other Parties"), forming a 5× 5-table. To simultaneously estimate an $R \times C$-table such as this is a burgeoning, young area of inquiry for statisticians as well as political methodologists (Rosen et al., 2001; de Mattos and Álvaro Veiga, 2001). These models are very sophisticated and consume quite some computer power. For the time being, one must collapse categories successively to reduce the problem to a 2×2-table, and thus apply King's model.

Since EI is essentially a "seemingly unrelated regression" (SUR) model this might not be a problem at all if the distributions of the categories across districts that get collapsed do not covary. This is not generally the case, though. Ferree (2004) shows that lumping together different categories might violate underlying EI assumptions. Even if the original data fulfills the EI data requirements, the parameters of interest of the reduced 2× 2-table are not necessarily (truncated) normally distributed. Thus, collapsing categories might introduce aggregation bias. Previous applications of EI that are published in the foremost political science journals (Burden and Kimball, 1998; Cho and Gaines, 2004) do not address this problem.

As I set forth in the previous chapter, I will also follow the strategy to collapse categories such that the estimation problem is reduced to a 2× 2-table. The question the researcher must address is therefore, to what degree does this strategy yield the same estimates as a simultaneous estimation of the corresponding 5× 5-table? This is a hypothetical question, of course, for if it were a straightforward estimation, no one would ever consider collapsing the categories. Nevertheless, scholars with substantive interests facing ecological inference problems have to deal with this issue. To estimate the parameters of interest iteratively is certainly not the most efficient way of getting an understanding of what is going on in the data as a consequence of collapsing categories. Thus I estimate, iteratively, the shares of CDU, SPD, FDP, Green and candidate voters for candidates of other parties who cast their list vote for the FDP. The same procedure is employed for the Greens. For every party in every district I obtain five values. Given the data, EI yields *internally consistent* estimates to the degree to which the sum of these iteratively estimated cells equals the observed list vote shares of the FDP and the Greens, respectively. One can have more confidence in estimates derived from 2×2-tables, as I will undertake, if this iterative procedure yields internally consistent results.

In the remaining part of this chapter I will provide an empirical justification of my research design. I will provide evidence that iteratively computed EI estimates are internally consistent. This implies that my strategy to reduce *a priori* the estimation problem in theoretically meaningful 2×2 -tables yields consistent estimates of the parameter of interest - at least given the characteristics of my data. Again, previous work that employed EI (Burden and Kimball, 1998; Cho and Gaines, 2004) has not explicitly provided such an comprehensive assessment of the sensitivity of EI estimates.

Some preliminary remarks are in order before I address the validity of the EI estimates. As with every estimation, substantive knowledge of the problem might help to eliminate the greatest pitfalls. Moreover, one has to think hard about the nature of the underlying data-generating process. Two points are worth noting here. First, one of the real strengths of King's model is that it includes deterministic information about the possible ranges of the parameters of interest in the estimation process. For instance, there cannot be more strategic ticket-splitters than list votes for a party. Since the list vote shares for the Greens and the FDP fall within a very narrow interval (because, after all, these are minor parties), the parameters of interest *can* only vary within a small range. The inclusion of this type of deterministic information in the model makes the estimation process much easier and is likely to produce more precise estimates. Most importantly, even massive violations of the underlying assumptions of King's EI can only have weak impact on the estimates because these assumptions are solely needed to shrink the already narrow (deterministic) bounds in which the estimated parameters can possibly vary.

The second point concerning the underlying data-generating process relies on the nature of party competition in Germany. Party competition differs greatly in East and West Germany. The Greens as well as the FDP are more successful in the West while the PDS is a major force only in the East. In order to reduce spatial correlation and possible aggregation bias, I divide the data into two parts and estimate all models separately for East and West. This also makes the remaining assumption of EI - unimodal distribution of the parameters of interest - imminently more plausible.

Besides these substantive measures of precaution, I will take two more technical steps to assure that EI yields reasonable estimates in the first stage of my analysis. First, I will run several internal consistency checks to ensure that despite the simplification of the estimation problem, EI produces the same parameters of interest if one would instead estimate the more general $R \times C$-problem. Second, I will focus on the estimation of the parameters of interest and employ visual diagnostic tools and post-estimation tests for aggregation bias.

As stated in my theory, I am only interested in the columns representing list votes of the FDP and the Greens in a hypothetical 5×5-table. Ideally, I would like to estimate the five inner cells in these columns simultaneously to get estimates of the fraction of candidate voters of a particular party (CDU, SPD, FDP, Green and "Other") who cast a list vote for the FDP and the Greens, respectively. Since this is not yet tractable, I iteratively run

five EI's. Each time, I collapse four different rows to reduce the problem into a 2× 2-table and estimate the fifth cell representing the fraction of candidate voters of the fifth party candidate who cast a list vote for the FDP and the Greens, respectively. Thus, after every step, I fill in one of the five inner cells in the columns of the FDP and the Greens. If such an iterative procedure yields internally consistent results, however, we can have more confidence in EI estimates derived from a simplification of the problem to a 2× 2-table.

Let τ_i^{PF} denote the estimated fraction of candidate voters for the local candidate of party "*P*" in district "*i*" who cast a list vote for the FDP.[2] Consequently, to obtain the shares of FDP list voters with this splitting behavior, τ_i^{PF} must be multiplied by $Party1_i$, the candidate vote share of party "*P*" in that district. "*P*" stands for either the CDU, SPD, FDP, the Greens or the PDS, which is combined with votes of the Other candidates in a district. Analogously, the same procedure is done to obtain estimates of the shares of Green list voters who cast their candidate vote for the candidate of party "*P*". I will estimate 5 (number of party candidates considered) × 2 (East, West) × 2 (FDP, Greens) separate EI's.

One way to see whether the reduction of the estimation problem yields internally consistent estimates is to simply add up the five estimated shares of FDP (or the Green) list voters with a particular splitting behavior. One would like to see whether they are statistically different from the official list vote shares of the FDP (or the Greens) across districts. Hence, I derive the estimated list vote share of the FDP (or the Greens) by summing up five estimated shares from iterative EI estimations as follows:

$$\widehat{FDP2}_i = \tau_i^{CF.} CDU1_i + \tau_i^{SF.} SPD1_i + \tau_i^{GF.} Green1_i + \tau_i^{FF.} FDP1_i + \tau_i^{OF.} Other1_i \quad (4.1)$$

whereas $Other1_i = 1 - (CDU1_i + SPD1_i + Green1_i + FDP1_i)$. A similar equation with different parameters can be obtained analogously in order to estimate the list vote shares of the Greens as the sum of five groups of Green list voters with these types of splitting behavior. Every EI point estimate is also accompanied by a standard error to assess the precision of the estimation.

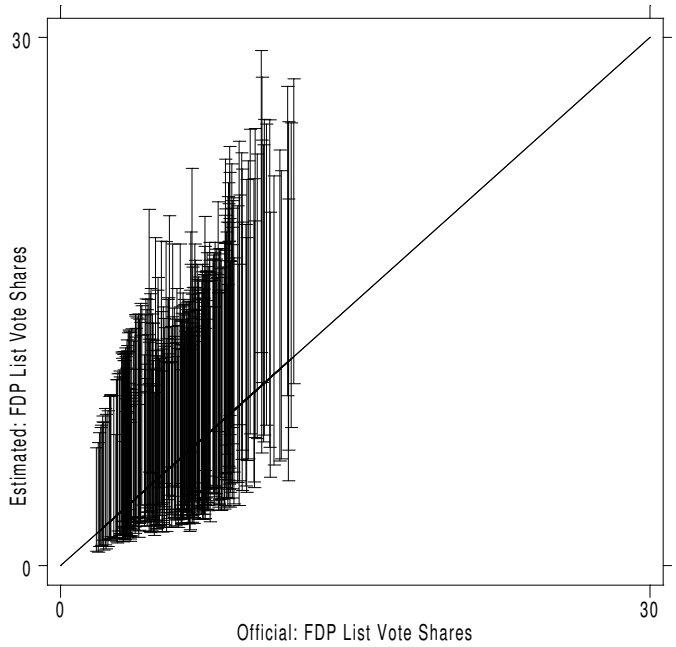
Summing up all five sets of point estimates also require summing up the uncertainty measures, in order to construct a valid 95% confidence interval around the estimated list vote shares of the FDP and the Greens, respectively, as a sum of five estimates. Reducing the problem to a 2×2-table to make it more tractable does yield internally consistent estimates, if the estimated values are not different from the actual values.

Thus, a plot of the estimated list vote shares on the official list vote shares across districts should visualize the degree to which this iterative procedure introduces bias in the estimation. Figure 4.1 shows the 95% confidence intervals of the estimated list vote shares for

2) Although the τ's are estimated, I drop the "hat" to simplify notation.

the FDP for every district. An estimated district level value for FDP or Green list vote shares is not significantly different from the official result if the 95% confidence interval crosses the 45-degree line. This indicates that the estimated district level values and the official results in the district are not different.

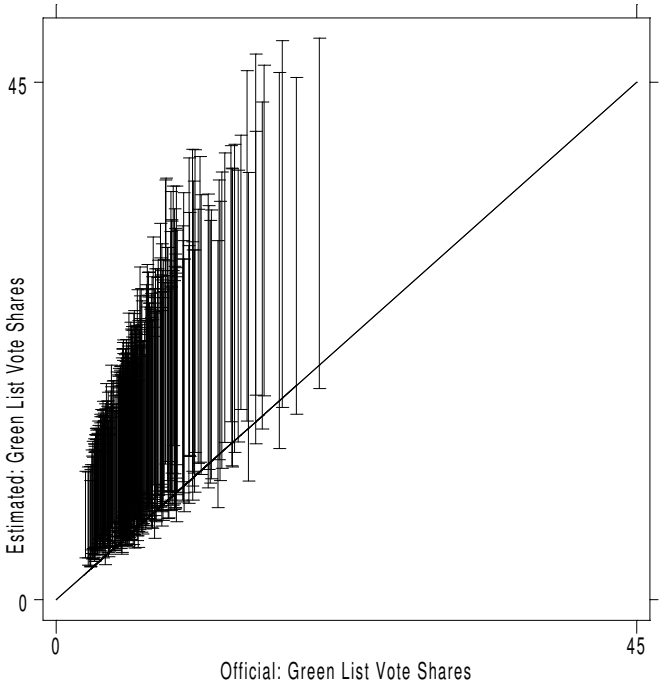
Figure 4.1: *Internal Consistency Check of iterated EI Estimations for FDP List-Vote Shares.*



Clearly, the list vote shares of the FDP vary only within a narrow interval. This party does not get more than 15% in a district. Almost every confidence interval intercepts the 45-degree line, although it seems that the estimates exert a small upward bias. Obviously, this procedure is not very efficient, since the confidence intervals are relatively large. It might be not advisable to just fill in all inner cells of a higher dimensional contingency table with estimated values for the τ's derived from iterative generated 2×2-tables. But this is not the goal, of course. Instead, this figure provides evidence that, in fact, we can have confidence in EI predictions derived from the theoretically motivated reduction of the

general problem, the $R \times C$-case, in to a 2×2-table. Figure 4.2 shows a similar picture for the Greens.

Figure 4.2: *Internal Consistency Check of iterated EI Estimations for Green List-Vote Shares.*



The list vote shares of the Greens vary a bit more than the ones of the FDP across districts, although compared to that they could theoretically vary between 0 and 100%, they still cover only a much more narrower range. This is information that is been used in the estimation process of EI. Moreover, the estimated district values as a sum of five point estimates also seem to overestimate the actual result a little bit. This indicates that collapsing categories introduces a slightly positive aggregation bias. Nevertheless, in most districts the confidence intervals intercept the 45-degree line indicating that the estimated list vote shares of the Greens are statistically indistinguishable from the official count.

The results I draw from the above figures for the FDP and the Greens are quite comforting. Although collapsing categories seem to overestimate the district-level estimates slightly, this type of bias is modest at best, since in most districts the official and the estimated results are statistically indistinguishable. This is the first step to assure that an *a priori* reduction of the estimation problem yields reasonable estimates.

Another way to assess the internal consistency, following King's suggestion (King, 1997, chapter 15.1), is to generalize the accounting identity of the 2×2 case - whereby $A1$ is the candidate vote share of party A and $B2$ denotes the list vote shares of Party B, τ_i^{AB}, τ_i^{AB} are the parameter of interest in district *"i"* and

$$B2_i = \tau_i^{AB} \cdot A1_i + \tau_i^{nAB} \cdot (1 - A1_i) \tag{4.2}$$

One then derives several equations to compute parameters of interest based on the accounting identity for five parties in equation 4.1. Since $5\times$ 5-tables are not an option, I have to collapse categories to estimate the inner cells of a $2\times$ 2 table. For instance, to estimate the share of strategic ticket-splitters, i.e. the fraction (τ_i^{CF}) of CDU candidate voters in a district ($CDU1_i$) casting their list vote for the FDP, equation 4.1 simplifies as follows:

$$FDP2_i = \tau_i^{CF} \cdot CDU1_i + \tau_i^{nCF} \cdot (1 - CDU1_i) \text{ whereas} \tag{4.3}$$

$$\tau_i^{nCF} \cdot (1 - CDU_i) = \tau_i^{SF} \cdot SPD1_i + \tau_i^{GF} \cdot Green1_i + \tau_i^{FF} \cdot FDP1_i + \tau_i^{OF} \cdot Other1_i \tag{4.4}$$

In this run of EI, I estimate τ_i^{CF} and τ_i^{nCF}, the fraction of CDU candidate voters who cast a list vote for the FDP as well as non-CDU candidate voters in a district casting their list vote for the FDP. The remaining four unobserved parameters in equation 4.1 - $\tau_i^{SF}, \tau_i^{GF}, \tau_i^{FF}, \tau_i^{OF}$ - are analogously estimated in successive runs of EI in which four other categories are collapsed together. Thus every quantity of interest can be calculated deterministically in five different ways.

Take, for instance, the number of FDP straight-ticket voters $\tau_i^{FF} \cdot FDP1_i$. If all four appropriate 2×2 tables are estimated, then equation 4.1 can be rearranged to yield

$$\tau_i^{FF} \cdot FDP1_i = FDP2 - \tau_i^{CF} \cdot CDU1_i - \tau_i^{SF} \cdot SPD1_i - \tau_i^{GF} \cdot Green1_i - \tau_i^{OF} \cdot Other1_i \tag{4.5}$$

Note that all terms on the right-hand side are known. The same quantity can be calculated after rearranging equation 4.4 as follows.

$$\tau_i^{FF} \cdot FDP1_i = \tau_i^{nCF} \cdot (1 - CDU1_i) - \tau_i^{SF} \cdot SPD1_i - \tau_i^{GF} \cdot Green1_i - \tau_i^{OF} \cdot Other1_i \tag{4.6}$$

While τ_i^{nCF} is the second parameter of the EI run to estimate the fraction of CDU candidate voters who cast their list vote for the FDP, τ_i^{SF}, τ_i^{GF} and τ_i^{OF} are taken from separate EI runs estimating the fraction of candidate voters of either the SPD, the Greens or the candidate of another parties who cast a list vote for the FDP.

$$\begin{aligned}
\tau_i^{FF} \cdot FDP1_i &= \tau_i^{nSF} \cdot (1 - SPD1_i) - \tau_i^{CF} \cdot CDU1_i - \tau_i^{GF} \cdot Green1_i - \tau_i^{OF} \cdot Other1_i && (4.7)\\
&= \tau_i^{nGF} \cdot (1 - Green1_i) - \tau_i^{SF} \cdot SPD1_i - \tau_i^{CF} \cdot CDU1_i - \tau_i^{OF} \cdot Other1_i && (4.8)\\
&= \tau_i^{nOF} \cdot (1 - Other1_i) - \tau_i^{SF} \cdot SPD1_i - \tau_i^{CF} \cdot CDU1_i - \tau_i^{GF} \cdot Green1_i && (4.9)
\end{aligned}$$

In summary, equations 4.5 to 4.9 represent five different ways to calculate the same parameter of interest using five iterative EI estimations. In a analysis not presented here, I calculated two different parameters for all five equations (namely $\tau_i^{FF} \cdot FDP1_i$ and $\tau_i^{OF} \cdot Other1_i$ as well as $\tau_i^{GG} \cdot Green1_i$ and $\tau_i^{OG} \cdot Other1_i$) yielding nearly identical results up to two decimal points. Hence, based on these internal consistency checks, I conclude that it is reasonable - at least with the data at hand - to decompose the estimation process in several EI estimations. Most importantly, however, this implies that I can have confidence in my estimates even if they are obtained by reducing the ecological inference problem *a priori* into several 2×2 tables of theoretically relevant cells to construct measures to test my first hypothesis, the *Minor-Party Success Hypothesis*. This is only a first step toward assuring that my EI estimates are reasonable.

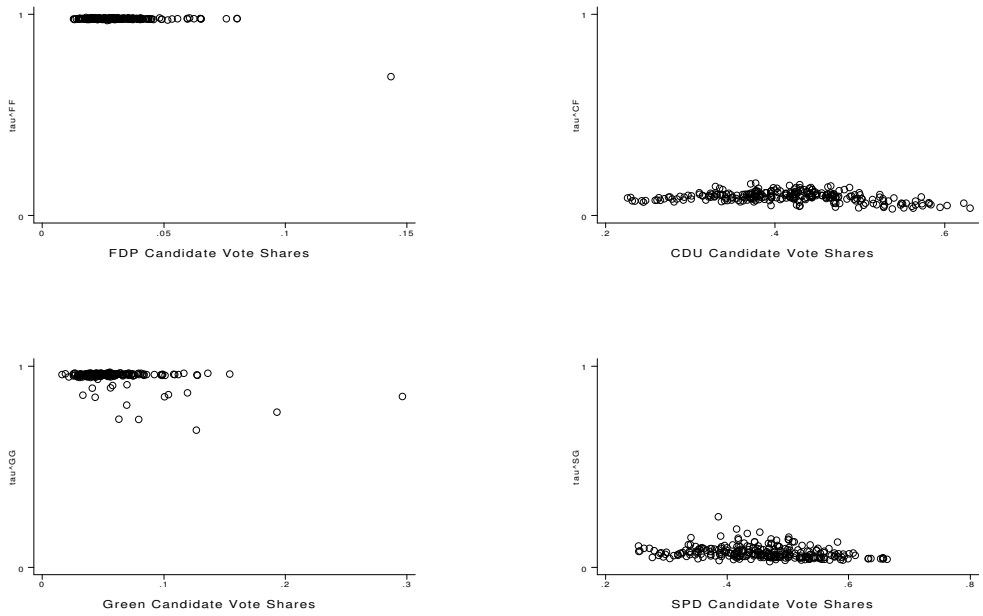
Since the iterative estimation of the parameter of interest is internally consistent, I focus my diagnostic analysis on the substantively interesting parameter estimations. This are the EI estimations to get on the one hand the fractions of CDU (or SPD) candidate voters who cast a list vote for the FDP (or the Greens), and, on the other hand, the fraction of FDP (or Green) candidate voters who cast a list vote for the FDP (or the Greens). As a second step toward assuring that this estimation strategy is reasonable, I will employ visual diagnostic tools and post-estimation tests for aggregation bias. A good way to understand aggregation bias is to think about its substantive implications for the data at hand. Aggregation bias only occurs with this data if a party's candidate vote shares are correlated with the estimates of the inner cells, the parameters of interest. What does this mean substantively? Suppose we observe that the Greens get many list votes in districts where their candidate is also very successful. If aggregation bias is no issue, a first scenario would be that the more successful the district candidate of the Greens is, the more straight-tickets there will be, and therefore the more list votes the party gets. This inference could be heavily biased, however, because the observed candidate vote shares are presumably strongly correlated with the estimated district-level shares of Green straight-ticket voters.

Instead, a second - and probably a more realistic - scenario would be that such strongholds of the Greens, electoral districts where the party is able to gain many list votes, exist independently of the success of their local candidate. For instance, it could instead turn

out that such Green strongholds are in fact "manufactured" by disproportionately higher numbers of voters who cast only their list vote for the Greens but cast their candidate vote for the SPD candidate in the district. This inference would be substantively quite different from the first one noted above. Strongholds of the Greens could be independent from the success of the Green party candidate on the candidate vote in these districts, but depend on the number of strategic ticket-splitters in favor of the Greens. If this were the "real" story, then the number of straight ticket voters would be overestimated. The estimates for the number of straight-ticket voters across districts would be attenuated by aggregation bias.

A straightforward *ex post* diagnostic procedure is to graph a scatter plot of the parameters of interest by the respective candidate vote shares. The size of the slope of a hypothetical regression line through the data points is a measure of the severity of aggregation bias of a particular EI estimation.

Figure 4.3: *A Visualized Aggregation Bias Check of the Parameter of Interest.*



Consequently, one wishes to see essentially horizontal lines as best fitting regression lines. Figure 4.3 shows such scatter plots presenting all four parameters of interest on the y-axes

and the respective candidate-vote shares on the x-axes. To facilitate comparison, I scaled all y-axes the same, while the x-axes vary according to the success of the party candidate in the district which is obtained from the official election returns. Note that this figure is based on the West German districts; however, the graphs representing East Germany look essentially the same.

On first inspection, no severe aggregation bias can be detected. The points in every graph scatter around an essentially horizontal regression line. The hypothetical slope coefficient must be around zero, indicating that aggregation bias is not an issue here. Furthermore, the variation of all parameter of interest along the y-axis is very restricted. The random effects of the parameters of interest across districts are very small. This indicates that much deterministic information about the narrow intervals of the observed candidate and list-vote shares in these estimations were included. Thus, assumptions of EI that might be violated are used to a much lesser degree to derive the district-level predictions. Even if these violations are present, they can only have a minor impact on the estimates because the deterministic information does the main work in reducing the possible parameter space.

For a closer look at the slope estimates, table 4.1 provides the regression results of the parameters of interest on the respective candidate vote shares. An inspection of the scatter plot, moreover, helps to detect possible violations of OLS assumptions. In order to get correct slope estimates, I deleted the clearly visible outlier district for the estimation of the FDP straight-ticket shares. The estimation of τ^{GG} yields many outlier districts. Therefore, I estimate it by a Biweight regression to provide robust estimates in the face of highly leveraged outliers instead of OLS.

In order to diagnose aggregation bias, one must focus on the slope coefficients of these regressions. The overall tendency of the results is quite clear. Three out of four slope coefficients based on the East German sub-sample are not significant, nor is one slope coefficient for the regressions based on the West German sub-sample. Even when significant, these slope coefficients are very small, indicating only a minor attenuation of the estimates.

The strongest impact of aggregation bias among all eight regressions can be found in the regression based on strategic split-ticket estimates in the model of the Greens in East Germany with SPD candidate vote shares as independent variable. The slope coefficient in the last row of the table is $-.089$. This indicates that in a district with an SPD candidate ten percentage points stronger than average, for instance, the fraction of strategic ticket-splitters casting a list vote for the Greens is underestimated by .89 percentage point. By any means, even considering the most extreme case, this can hardly be seen as substantively influential. I, therefore, conclude the discussion of the internal consistency problem.

Table 4.1: *Ex-Post Aggregation Bias Check.*

	Dependent Variable		Coefficient	Standard Error
West	τ^{FF}	Constant	.997	.002
$N = 254$ (OLS)		$FDP1$	.006	.011
	τ^{CF}	Constant	.127	.008
$N = 255$ (OLS)		$CDU1$	-.084	.020
	τ^{GG}	Constant	.953	.001
$N = 255$ (Biweight)		$Green1$	.044	.010
	τ^{SG}	Constant	.113	.008
$N = 255$ (OLS)		$SPD1$	-.088	.017
East	τ^{FF}	Constant	.861	.022
$N = 68$ (OLS)		$FDP1$	-1.26	.999
	τ^{CF}	Constant	.063	.005
$N = 68$ (Biweight)		$CDU1$	-.023	.015
	τ^{GG}	Constant	1.00	.030
$N = 68$ (OLS)		$Green1$	-1.04	.992
	τ^{SG}	Constant	.081	.009
$N = 68$ (OLS)		$SPD1$	-.089	.020

In summary, I took several precautionary measures to assess the impact of possible violations of EI on the estimates and provided several steps to assure that my estimation strategy is reasonable. With my data set, reducing the general problem into theoretically derived simplification yields consistent results. Although I detected small aggregation bias in certain cases, this bias does not appear to be very substantial. Overall, the sensitivity analysis of EI estimates yields encouraging results. Thus, the next logical steps are to, first, construct my independent variables, the number of straight and strategic split-ticket voters per district, and second, to test my *Minor-Party Success Hypothesis* on the district-level. This will be done in the next chapter.

Chapter 5

Strategic Voting at the District Level

In the previous chapter, I discussed the internal consistency problem that arises if one applies King's EI model to an estimation problem that would actually require researchers to estimate the inner cells of an $R \times C$-table simultaneously. Since this problem is currently intractable, I provided empirical evidence that one can have confidence in EI estimates obtained from collapsing categories to make the estimation problem manageable, given the data at hand. I will use these EI estimates to characterize variation across electoral districts in order to study strategic voting at this level. This chapter, then, deals exclusively with the strategic voting phenomenon across electoral districts. Since I deal with official vote counts aggregated at the district level, I will also address the political implications of strategic voting. Choosing this level of analysis, I seek to establish whether strategic ticket-splitting really matters substantively.

Since the list-vote shares determine whether a party is represented in parliament, strategic ticket-splitting should improve the success of minor parties if strategic voting matters substantively. I expect that the success of minority parties like the FDP and the Greens depends on the number of strategic ticket-splitters across districts. The following *Minor-Party Success Hypothesis* formally states this expectation.

Hypothesis 1 (Minor-Party Success) *The list-vote shares of a minor party in a district depend on the number of strategic ticket-splitters in that district. The more strategic ticket-splitters there are, the higher the list-vote shares of the FDP and the Greens.*

The challenge with analyzing district-level vote counts is that ticket-splitting cannot be directly observed because the official statistics merely report the total number of candidate and list votes for any fielded candidate or party. Since the ballots cannot be accessed, no individual-level information is available to see how many voters cast their candidate vote for X and their list vote for party Y. I compensate for this loss of information by relying heavily on sophisticated statistical models to extract this information from official district-

level counts of candidate and list votes. I will use EI to construct measures for the number of straight-ticket voters and strategic ticket-splitters in a district. As eluded to in chapter 3 I will run two separate EI estimations - one for the FDP and one for the Greens - to construct a district-level measure for the number of straight-ticket voters and strategic ticket-splitters in the first stage of my analysis. The *Minor-Party Success Hypothesis* will be tested in the second stage of the analysis, employing these district-level measures as independent variables that are constructed in the first stage of the analysis.

No one has used EI for the analysis of strategic voting before. In order to make sure that the results based on these measures are substantively meaningful, I take some precautionary steps. First, I will assess the construct validity of all independent variables constructed in the first stage of my analysis. Second, I will use an multiple imputation strategy to address the critique that EI does not yield robust results (Cho and Gaines, 2004; Freedman et al., 1998) by appropriately accounting for the uncertainty inherent in these EI estimates that constitute my independent variables in the second-stage analysis. Third, I will verify my results with estimates derived from independent data sources, and show that my second-stage model predictions are entirely consistent with these results. This strategy should effectively attenuate all remaining doubts inherent in conclusions based on variables constructed by EI.

In the previous chapter, I provided evidence that the strategy employed in the first-stage of my analysis - namely, of running EI separately to obtain estimates for straight and strategic ticket-splitting - is reasonable. I will now construct the district-level measures of interest. Recall that from King's EI, I obtain estimates of the parameters of interest (see table 3.2). These are the estimated fractions of straight-ticket and split-ticket voters casting a vote for a particular candidate. Both independent variables should be on the same scale as the dependent variable, in order to facilitate interpretation of the coefficients. I therefore multiply the estimates of these fractions - the τ's - by the respective share of candidate votes in that district to transform them into fractions of list-vote shares. Since these values are very small, I then multiply this product by 100 to get percentages as units for the independent variables. This also eases interpretation. For the FDP model, my measure for the shares of straight tickets in district "i" is $\tau_i^{FF} \cdot FDP1_i \cdot 100$ and for strategic ticket-splitting shares it is consequently $\tau_i^{CF} \cdot CDU1_i \cdot 100$. The same logic applies to the model of the Greens. My measure for the shares of straight-ticket voting is $\tau_i^{GG} \cdot Green1_i \cdot 100$ and $\tau_i^{SG} \cdot SPD1_i \cdot 100$ for strategic ticket-splitting, respectively.

After establishing that measures based on first-stage EI estimations are valid in a technical sense, and after finally constructing the independent variables, one important question has to be answered: Are these variables measuring what they are supposed to measure? One way to assess the construct validity of these measures is to present the district values of these variables in a map and see whether they fit expectations that are derived from qualitative knowledge of the problem. It would be interesting to see whether EI recovers well-known strongholds of the parties. A valid measure should certainly reflect this verity.

Figure 5.1: *EI District-Level Predictions: Green Straight Ticket Shares for West Germany.*

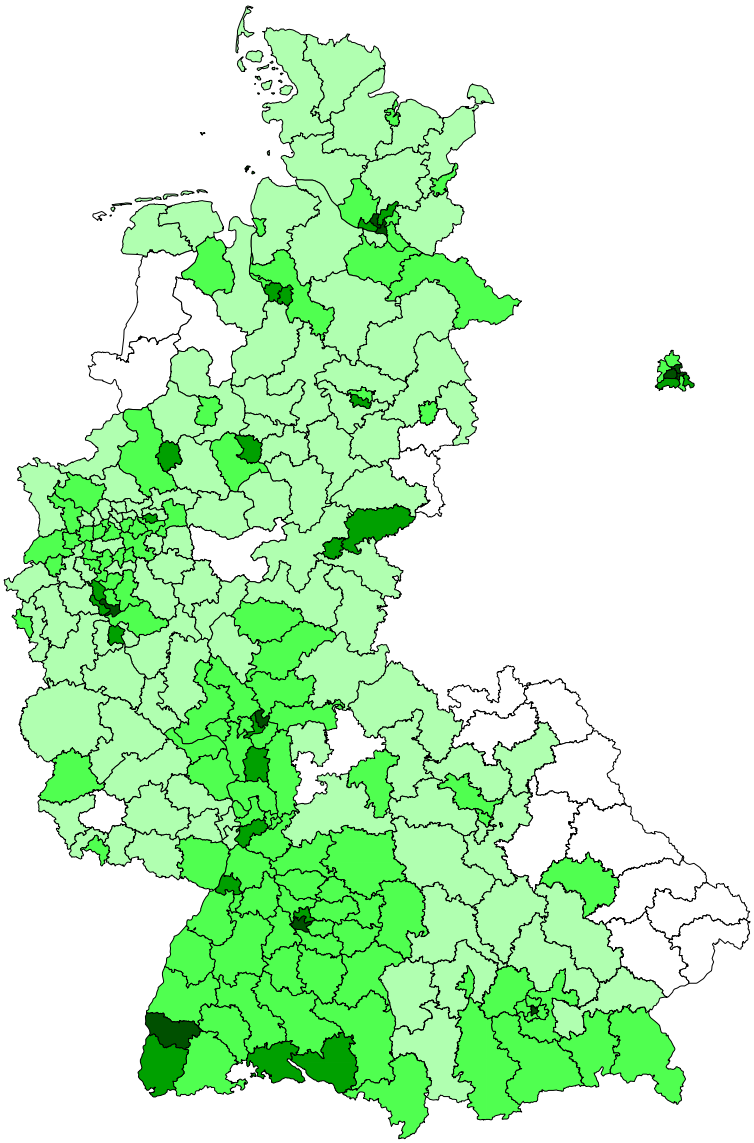


Figure 5.1 maps the measure of Green straight-ticket shares for West Germany based on the EI point estimate τ_i^{GG}. The darker the district is shaded, the higher the share of straight tickets, i.e. the stronger the loyal base is estimated in that district.

The map of all German electoral districts shows[1] some very dark spots that have a less-than-coincidental characteristic in common: Every dark spot represents a district with a university town. This is of course what one would expect, for the Greens enjoy an especially strong *loyal base* in university towns. Furthermore, the map shows that the Greens have a very weak loyal base in well-known conservative districts in Bavaria, which also conforms to a "folk-political" intuition of the facts, the popular understanding of politics in Germany. Similar inspections can be undertaken for the other variables as well. It is quite comforting that EI is able to recover typical strongholds, implying that the constructed measures do, in fact, measure what they are supposed to measure.

How strong are the *loyal bases* of the FDP and the Greens? Do they vary much? And perhaps more importantly, how many strategic ticket-splitters are there? Such descriptive questions can be answered by looking at the actual values of the independent variables across districts. Since the EI estimation in the first stage of the analysis is done separately for both parts of the country, I also present the summary statistics separately. As noted above, I employ a multiple imputation strategy to deal with the uncertainty of these estimates stemming from the first-stage analysis. Moreover, this strategy directly addresses the recent critique that EI does not yield robust results (Cho and Gaines, 2004; Freedman et al., 1998) across replications. If these first stage EI point estimates are not "similar enough", the variance across several simulations grows and appropriately enlarges the standard errors around the multiple imputation point estimates. Thus, this strategy accounts for the lack of robustness of the first stage EI estimation.

Table 5.1 provides an overview of first-stage EI estimates of straight-ticket and split-ticket voters in East and West Germany. The overall estimates are the weighted average of all district-level estimates. Since the districts vary in the number of validly cast list votes, the individual district-level estimates from the first stage of the analysis must be weighted by 1 over the number of valid list-vote shares. The weighted average thereby derived provides correct aggregate-level estimate for the number of straight-ticket and strategic split-ticket voters in both parts of the country.

Both parties do better in West Germany than in East Germany. These estimates show that the loyal base for both parties is smaller in the East than in the West. In fact, most prominently only the Greens in the West get enough straight tickets to overcome the institutional threshold of 5%. Nevertheless, since this threshold has to be reached on the national level, the low shares in the East keep not only the FDP but also the Greens under

1) I would like to thank Volkmar Kroesch (Federal Office for Building and Regional Planning) for sharing an ArcView shape-file (Bundesamt für Bauwesen und Raumordnung, 1998) that defines the geographical boundaries of the electoral districts.

Table 5.1: *Descriptive Statistics of first-stage EI Estimates*

		F.D.P.		Green	
	Overall Estimates, weighted	Mean	Std.Err.	Mean	Std.Err.
WEST	Straight Tickets	3.00	1.18	5.10	2.35
	Strategic Split Tickets	4.50	1.85	2.90	2.71
EAST	Straight Tickets	2.19	0.74	3.26	1.11
	Strategic Split Tickets	1.74	0.46	2.57	0.77

Note. Values are measured in percent.

5%.[2] These estimates clearly show that the *loyal base* of both parties, i.e. the straight-ticket voters for the FDP and the Greens - is not strong enough to ensure that these minor parties overcome the national 5% threshold. The substantive conclusion I draw from this table, therefore, is that both parties need the support of strategic voters in order to be represented in parliament and to be able form a coalition with one of the major parties.

Although the nature of the party system is not the same in East and West Germany, the logic of strategic voting should hold in both parts of the country - presumably at a different level, however. I will combine the districts for East and West Germany and estimate one model with FDP list-vote shares as a dependent variable and one model predicting list-vote shares of the Greens. Since both parties fare better in the West than in the East, I include a dummy to allow for the hypothesized logic of straight-ticket and strategic split ticket voting to operate at different levels.

According to my theory, certain split-ticket patterns - a candidate vote for the CDU and a list vote for FDP, or a candidate vote for the SPD and a list vote for the Greens - reflect either the *wasted vote strategy* or the *coalition insurance strategy*. The more strategic voters in a district, the higher the list-vote shares for the FDP and the Greens. In order to disentangle this effect from mere sincere voting, I wish to control for the size of the parties' *loyal base* in the districts because the numbers of sincere straight ticket voters for these parties are also obviously related to their list-vote shares. The stronger the*loyal base*, i.e., the higher the share of FDP or Green straight-ticket voters in a district, the higher the parties' list-vote share should be.

Thus far, the model includes a dummy variable and two independent variables (one measuring the number of straight-ticket voters and the number of strategic split-ticket voters

2) Since approximately 80% of the valid list votes are cast in the West, the EI estimate for the loyal base of the Greens on the national level would be 4.74% ($= 5.10 \times .8 + 3.26 \times .2$).

in a district, respectively). Moreover, one can be sufficiently assured that, although it took an extra step to construct two of them, these variables measure what they are supposed to measure. The question remains, however, of what the appropriate functional form is that describes the underlying data-generating process. Assuming that the *wasted-vote strategy* and the *coalition insurance strategy* are reasonably good abstractions of what is going on in the head of a strategic voter, then, the relationship between straight-ticket voters and strategic ticket-splitters is not simply additive but multiplicative.

This notion requires some clarification. According to my theory, there are four types of voters: straight-ticket voters, ordinary strategic voters, coalition voters and non-strategic ticket-splitters. Not every one of these groups can be adequately described with district-level data. Instead, this will be done with individual-level data in the next chapter. Voters can only be distinguished by the way they cast their ballots. Thus, even with district-level data, one can distinguish between three groups: straight-ticket voters, strategic ticket-splitters that combine ordinary strategic voters and coalition voters, and voters who neither cast a straight ticket nor split their ticket strategically. These voters fall in the residual category of non-strategic ticket-splitters. Furthermore, the particular electoral institutions of mixed electoral systems provide various incentives to vote strategically. What does this imply for the relationship of the number of straight-ticket voters and strategic ticket-splitters?

First, take a hypothetical FDP supporter, for instance. She most likely casts a straight ticket to support her most preferred party, the FDP. Since the local FDP representative is not likely to win the district race given plurality rule, she might as well anticipate this fact and cast her candidate vote strategically for the CDU candidate. The *wasted-vote strategy* is especially attractive in close races between the CDU and the SPD candidates. Thus, the more voters who cast an ordinary strategic vote, the fewer people there will be to cast a straight ticket. This logic obviously holds for the Greens and the SPD as well.

Second, take another hypothetical voter, this time a CDU supporter. As in the case of the FDP, this voter also most likely casts a straight ticket to support her most preferred party, the CDU. Nevertheless, she might as well cast a coalition vote to ensure that that the smaller coalition partner overcomes the national threshold. Depending on her particular expectation about the success of the smaller coalition partner, the *coalition insurance strategy* provides incentives in varying degrees. Thus, the more voters who cast a coalition vote, the fewer people who cast a straight ticket. Like the case of the FDP, this logic holds for the Greens and the SPD as well.

Taking these two observations together, I conclude that the more voters behave strategically, in either way, the less there are straight ticket voters for the FDP and the Greens in the district.[3] Therefore, the effect of strategic ticket-splitting for the list-vote share of

3) The relationship between non-strategic ticket-splitters and either straight ticket voters or strategic ticket-splitters is not clear, because there is no theory of how they might relate to one another.

the FDP and the Greens, respectively, should vary according to the amount of straight tickets in the same district. The appropriate way to model a multiplicative relationship between the size of the *loyal base* and the number of strategic ticket-splitters is to include an interaction term in the model. Hence, I estimate the following model for the FDP and the Greens, respectively.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 (X_2 \times X_3) + \epsilon_i;\ \epsilon_i \sim N(0, {\sigma_i}^2)$$

My dependent variable is the list vote share of the FDP and the Green party[4]. Although at a different level, the logic of strategic voting should hold in both parts of the country. Since both parties fare better in the West than in the East, I include a "West"-dummy X_1, with 1 indicating that the district is in West Germany and a 0 indicating that it lies in the former GDR. Since both parties fare better in the West than in the East, I expect β_1 to be positive in the FDP and the Green Model. I further hypothesize that the amount of both straight-ticket (X_2) and strategic split-ticket voting (X_3) has a positive impact on the dependent variable. I expect the regression coefficients β_2 and β_3 to be significantly greater than zero. Since I hypothesized that the number of strategic ticket-splitters in a district is conditional on the size of the *loyal base* - and vice versa - I expect β_4 to be negative.

After running several diagnostic procedures, I rejected the OLS assumption that the error variance is constant across the districts. This is not out-of-the-ordinary with aggregate data. There are substantive reasons to expect that the mean component of the model is a better predictor in some circumstances than in others. These uncertainties have a name. I will model them directly by specifying the following link function (Franklin, 1991; Harvey, 1976; King, 1989) for the variance component of the model that predicts the spread around the regression line.

$$ln(\sigma_i^2) = \gamma_0 + \gamma_1 Z_1 + \gamma_2 Z_2 + \gamma_3 Z_3 + \gamma_4 Z_4$$

The first factor that introduces introduce systematic uncertainty in the model is the level of competitiveness in the district. A close district race should discipline voters' intention to split their ticket in a non-strategic manner. Voters form expectations about the competitiveness of a district race, and are more likely to behave in a predictable fashion - voting either for the candidate of their most preferred party, or cast a strategic candidate vote to help the competitive candidate of the larger coalition party to win the district race - if the race is close. Similar to many studies of strategic voting (Black, 1978, 1980; Cain, 1978), I measure the expected competitiveness of the district race by the margin of the district race. The advantage of this measure, as opposed to employing the margin of the race in previous elections, is that the candidates of the district race might change. Furthermore,

4) An argument can be made that the dependent variable should be logistically transformed, because it is bounded by 0 and 100 ($Y = ln(\frac{\tilde{Y}}{100-\tilde{Y}})$, with $\tilde{Y}$ being the list-vote shares of that party). Although I obtain substantively the same results, I choose to present the results with the untransformed version of the dependent variable to ease interpretation.

the margin of the current election is closer in time to the point when voters actually form their expectation about the race, and therefore captures this factor better than alternative measures. Z_1 is the absolute value of the difference in candidate vote shares between the two top contenders in a district race. Since open races should introduce more uncertainty in the strategic logic that is tested by the mean component of the model, I expect γ_1 to be positive. Districts with open races should spread wider around the regression line than very competitive races.

The remaining three factors add an institutionalist flavor to the model of the variance component. The second factor Z_2 explaining the non-constant variance across districts has to do with the varying experience people have with the strategic logic in mixed electoral systems. I have already hypothesized that the strategic logic operates at different levels, depending on the nature of party competition in both parts of the country. Moreover, this logic should describe the circumstances in the West better than in the East, because the overwhelming majority of voters in the East have the experience of only two Federal Elections (1990 and 1994) since Reunification. Moreover, the "PDS factor" is likely to distort the strategic logic between the SPD and the Greens in East Germany.[5] For both reasons, I expect the model predictions for list-vote shares of the FDP and the Greens in the East to be less precise than in the West. Consequently, γ_2 should be negative.

Furthermore, the greater the variety of parties, the less precise my model predictions will be. In districts where more parties are fielded than the four parties I am hypothesizing about, I expect wider distribution of list-vote shares and split-ticket patterns than accounted for by my theory and captured by the mean component of the model. Z_3 represents the natural logarithm of the number of parties that are running in a particular district. I choose the logarithm, because I expect diminishing returns. Whether 15 or 16 parties are running should increase the error variance to a smaller degree than whether 5 or 6 parties are fielded.[6] Thus, I expect γ_3 to be positive.

Finally, the fourth factor influencing the error variance is the number of valid list votes. Although the electoral law requires that the number of eligible voters does not vary "too much" across districts, the number of valid votes, which corresponds to 100%, might vary considerably across districts. All else equal, I expect more precise model predictions in a district with a higher number of valid list votes, and therefore a negative γ_4. I divided the valid list votes in every district by 10,000 to construct Z_4 in order to ease interpretation of its coefficient.

5) The PDS, as a party on the left of the political spectrum, attracts voters who otherwise cast their votes for the SPD or the Greens or who split their ticket between the two.

6) Even if I use the absolute number of parties, the substantive result stay the same.

Table 5.2: *ML Heteroscedastic Regression across 6 simulated data sets with the Parties' List-Vote Share as Dependent Variable*

	Dependent Variable: F.D.P. List Vote Shares											
N = 323	Simulation 1		Simulation 2		Simulation 3		Simulation 4		Simulation 5		Simulation 6	
Ind. Variables	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.
Mean Component												
West	0.806	0.053	0.845	0.051	0.741	0.054	0.815	0.050	0.857	0.050	0.877	0.050
Straight Tickets	0.480	0.043	0.465	0.042	0.474	0.043	0.435	0.041	0.433	0.041	0.427	0.040
Strategic Split Tickets	1.135	0.028	1.118	0.026	1.103	0.027	1.103	0.024	1.100	0.024	1.060	0.022
Straight x Strategic Split	-0.060	0.007	-0.058	0.007	-0.057	0.007	-0.053	0.007	-0.052	0.007	-0.051	0.006
Constant	0.522	0.106	0.570	0.101	0.706	0.104	0.674	0.100	0.643	0.101	0.762	0.096
Variance Component												
Competitiveness	0.021	0.009	0.021	0.009	0.027	0.009	0.035	0.009	0.034	0.009	0.042	0.009
West	0.026	0.313	0.242	0.305	0.320	0.318	0.165	0.306	0.150	0.303	0.260	0.318
ln (# Parties)	0.907	0.500	0.200	0.496	0.335	0.494	0.577	0.490	0.616	0.481	-0.318	0.500
Valid # List Votes	-0.063	0.037	-0.039	0.037	-0.058	0.036	-0.094	0.035	-0.105	0.035	-0.055	0.036
Constant	-4.339	1.397	-2.875	1.367	-3.056	1.369	-3.306	1.338	-3.229	1.313	-1.459	1.385

	Dependent Variable: Green List Vote Shares											
N = 323	Simulation 1		Simulation 2		Simulation 3		Simulation 4		Simulation 5		Simulation 6	
Ind. Variables	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.	Coeff.	Std.Err.
Systematic												
West	2.453	0.105	2.635	0.105	2.851	0.101	2.826	0.104	2.610	0.103	2.799	0.101
Straight Tickets	0.439	0.038	0.449	0.038	0.425	0.039	0.425	0.039	0.431	0.038	0.434	0.038
Strategic Split Tickets	1.017	0.031	1.004	0.031	1.006	0.032	1.020	0.033	1.000	0.031	1.008	0.032
Straight x Strategic Split	-0.019	0.003	-0.019	0.003	-0.018	0.003	-0.018	0.003	-0.018	0.003	-0.019	0.003
Constant	0.119	0.124	-0.080	0.123	-0.221	0.118	-0.157	0.121	-0.064	0.122	-0.170	0.117
Variance												
Competitiveness	0.030	0.010	0.030	0.010	0.023	0.010	0.026	0.011	0.029	0.010	0.029	0.011
West	-1.332	0.252	-1.293	0.252	-0.979	0.252	-1.020	0.256	-1.394	0.249	-1.130	0.252
ln (# Parties)	3.137	0.400	3.263	0.408	3.420	0.411	3.239	0.412	3.400	0.416	3.526	0.419
Valid # List Votes	-0.085	0.036	-0.086	0.036	-0.093	0.037	-0.086	0.036	-0.083	0.037	-0.102	0.037
Constant	-8.211	1.332	-8.592	1.348	-9.147	1.364	-8.687	1.377	-8.981	1.367	-9.287	1.373

I will use an multiple imputation strategy to address the critique that EI does not yield robust results (Cho and Gaines, 2004; Freedman et al., 1998) and to appropriately account for the uncertainty of the first-stage estimates, since these are not true observations. Since I first run six EI simulations - i.e., six runs of the model based on the same data file - I generate six different data sets (one for each EI simulation) and estimate both the mean and the variance component of the regression model simultaneously by Maximum Likelihood (ML). The ML results of the second-stage analysis based on six first-stage EI-simulations with *EzI* are presented in table 5.2.

Table 5.2 provides an overview of the estimated coefficients, their robustness, as well as their uncertainty measures across all simulations. The very same model is estimated for different data sets based on different simulations. Clearly, the coefficients and their standard errors stay almost the same from one simulation to the next. The only exceptions to this pattern are some coefficients of the variance component in the FDP model. It is important to note that variation across these six models is only due to variations of the first-stage EI point estimates, since all other variables of the mean or variance component are the same across data sets. This implies that the criticism of (Cho and Gaines, 2004; Freedman et al., 1998) that EI estimations are not robust might generally be very important and their robustness should be analyzed routinely for diagnostic purposes. Nonetheless, the instability of EI estimates seems instead to depend on the data set at hand and not on the particular estimation method. At least the estimation results with my data suggest that "unrobust" estimates are *not* intrinsic to EI.

Nevertheless, second-stage inferences based on independent variables that are essentially predicted values of a first-stage analysis (the most prominent examples include applications of NOMINATE scores as predictor variables in studies about the U.S. Congress, see Poole and Rosenthal (1997)) systematically overestimate the confidence associated with these coefficients. In order to capture the uncertainty that is involved if we treat predicted values as observations, I use a multiple imputation strategy. If the estimates vary too much from one simulation to another, then the standard errors will explode. The resulting multiple imputation estimates with appropriate standard errors that account for the uncertainty involved in using first-stage EI point estimates in a second-stage analysis are presented in table 5.3.

As should be the case, the standard errors of the multiple imputation estimates are slightly bigger as compared to those based on a single simulation in table 5.2, since the simulated "across-variance" is added to the average of the estimated "within-variance" (King et al., 2001). Nevertheless, table 5.3 shows that every coefficient in the mean component is in the expected direction and is significant. As hypothesized, the number of strategic ticket-splitters is systematically related to the success of minor parties like the FDP and the Greens, accounting for this logic to play at different levels in East and West Germany.

The second-stage results show that the impact of strategic voters on the list-vote shares is similar for the Greens and for the FDP. The coefficients for the impact of the size of the *loyal base* on the list-vote shares are not systematically different from each another. Nevertheless, these effects are conditional on one another, since the interaction term is significantly different from zero. Thus it shows that the number of strategic ticket-splitters in a district depends on the size of the *loyal base* - and vice versa.

Table 5.3: *Resulting Multiple Imputation Estimates of the second-stage Analysis*

	F.D.P.			Greens		
Ind. Variables	Coeff.	Std.Err.	*p*	Coeff.	Std.Err.	*p*
Mean Component						
West	0.824	0.073	0.000	2.696	0.198	0.000
Straight Tickets	0.452	0.049	0.000	0.434	0.039	0.000
Strategic Split Tickets	1.103	0.037	0.000	1.009	0.033	0.000
Straight x Strategic Split Ticket	-0.055	0.008	0.000	-0.018	0.003	0.000
Constant	0.646	0.139	0.000	-0.096	0.177	0.597
Variance Component						
Competitiveness	0.030	0.013	0.030	0.028	0.011	0.011
West	0.194	0.330	0.558	-1.191	0.314	0.000
ln (# Parties)	0.386	0.672	0.571	3.331	0.439	0.000
Valid # List Votes	-0.069	0.045	0.133	-0.089	0.037	0.018
Constant	-3.044	1.692	0.080	-8.818	1.427	0.000
N	323			323		
Cor (Y,Yhat)^2	0.98			0.94		

Note. *p*- values are for two-tailed tests.

The same one-percentage-point increase in the number of strategic ticket-splitters per district has on average less influence on the list vote shares of the FDP or the Greens as the loyal base grows. Since the interaction term is negative, the effect of ticket-splitting for list-vote shares of these has a greater weight if the loyal base of the party is smaller. This underscores the importance of strategic voters for both parties.

In addition, every coefficient in the variance component of the Green model is significant and in the expected direction. The closer the district race, the more precisely the systematic model component performs. This also holds true in the FDP variance function, where there is much less heteroscedasticity to begin with. Since the experience argument should also predict the FDP variance component, but and since only the "West" dummy coefficient in the Green model is significant, this hypothesis must be rejected. The conclusion would be

that it is merely the existence of the PDS as another viable party on the left that seems to distort the strategic logic described by the mean component of the model for the Greens. The variable capturing the number of parties running in a district has a strong impact on the variance function for the Green variance component but not for the FDP variance component. In general, CDU-FDP coalitions are easier to establish as a viable coalition in a voter's mind, because these parties run as the incumbent governing coalition and have a long history of working together. This should facilitate that list voters of the FDP split their ticket in a predictable manner, more so than list voters of the Greens. Thus, for the predictability of the strategic logic in the Green model, factors like the number of parties running in a district should have a stronger impact in the first place. Finally, the effects of the number of valid list votes is essentially the same for both parties, although because of the size of the multiple imputation standard error they are only significant in the Green model.

In summary, both models show that voters of these parties behave in a predictable fashion. Despite non-strategic ticket-splitting and sincere straight-ticket voting, the share of strategic ticket-splitters is systematically related to the list-vote shares of these parties. FDP list voters as well as list voters of the Greens behave in a predictable fashion, as suggested by the model of the mean component. The results provide strong evidence in support of the *Minor-Party Success Hypothesis*.

As a third and last precautionary measure, I take to task whether these results are reasonable, I will verify the model predictions with an independent data source. Ideally, I would like to verify my estimation results with individual data on the district-level. Although if such data were available, there would be no need for any ecological inference. Thus, I use survey data from the 1998 German National Election Study instead. Since this survey is designed to be representative of voters in both parts of the country, I will employ aggregated estimates for strategic ticket-splitters in West and East Germany separately. This allows for an independent verification of the regression predictions for East and West Germany.

Verification of the model predictions is relatively straightforward. The official results of the election do exist, and are measured (hopefully) without error. For the model prediction of the list-vote shares I compute a weighted average of the second-stage predictions. I also compute the 95% confidence intervals for the model predictions[7], with weights accounting for the unequal number of valid list votes in each of the 255 electoral districts in West Germany and the 68 electoral districts in East Germany. Table 5.4 provides an overview of the results in West Germany and East Germany, respectively.

7) The standard errors are based on "mean predictions" for the first simulation.

Table 5.4: *Verification of Model Predictions for West and East Germany.*

			F.D.P.			Greens		
				95% CI			95% CI	
				Lower	Upper		Lower	Upper
WEST	List Vote Shares	predicted	6.98	6.91	7.05	7.39	7.26	7.53
		official	6.97			7.32		
	Strategic Split Tickets	predicted	4.50	4.27	4.73	2.90	2.57	3.24
		survey	4.39	2.97	5.81	4.23	2.83	5.63
EAST	List Vote Shares	predicted	3.30	3.22	3.38	3.99	3.83	4.16
		official	3.30			4.17		
	Strategic Split Tickets	predicted	1.74	1.63	1.85	2.57	2.38	2.75
		survey	1.63	0.77	2.49	2.28	1.27	3.29

Note. Values are measured in percent.

Table 5.4 shows that the official results of the 1998 election in both parts of Germany are within the 95% confidence intervals of the aggregated model predictions from my second-stage model. In fact, the predicted list vote shares for the FDP are nearly identical with the official result. The same is true for the predicted list vote shares for the Greens in West Germany. For East Germany, the model also performs extremely well, both for the second vote shares of the Greens and the FDP. In fact, the FDP prediction is exactly the official results until the second decimal point.

In order to verify the model predictions for strategic voters directly one must show more creativity, since official records are not available about the distribution of various split-ticket patterns. Particularly, I use weighted marginal values derived from vote intention questions about the candidate and the list vote in order to get an unbiased estimate for the amount of strategic split-ticket voting between the CDU and the FDP and the SPD and the Greens. Obviously, since these surveys do not represent the different populations at the district level, I can only verify them at a higher aggregated level, namely for East and West Germany.

Generally, the predictions from the FDP model are more accurate than from the Green model because the confidence intervals of the FDP point estimates are tighter. Again, the predictions of the amount of ticket-splitting between CDU and FDP for West Germany are almost perfect, while the ticket-splitting prediction from the Green-model is a bit off but still within the 95% confidence interval derived from survey data. In East Germany the model performs very well, too. The predictions of the FDP model are also slightly better than for the Green model, which slightly underestimates the official result. Overall, based on the model predictions for West Germany, I estimate that 7.40% ($= 290\% + 4.50\%$) of all voters cast their vote strategically and in East Germany 4.31% ($= 257\% + 1.74\%$) adding up to a total of 11.71% of strategic voters in the 1998 election. Overall, the

accuracy of the model predictions is quite remarkable. The 95% confidence interval for the strategic voters overlaps with the corresponding confidence interval around the point estimate for these strategic voters derived from survey data. This provides further evidence that my district-level predictions are valid.

This chapter not only provides overwhelming support for the *Minor-Party Success Hypothesis* that the number of strategic voters in a district are related to the success of minor parties. Rather, it also translates into very strong results, most importantly about the dependency of the survival of these parties on strategic voters. The EI estimates suggest that, without the support of strategic voters, these parties could not make it above the institutional threshold of 5%. Although there is still a sizable group of non-strategic ticket-splitters, especially in the Green model, it is not clear how to systematically win over these voters. Party strategists must court on strategic voters to ensure that the FDP and the Greens are represented in parliament since the behavior of non-strategic ticket splitters is unpredictable.

Although the political implications of strategic voting are potentially enormous, even if the group of strategic voters is relatively small, in order to disentangle strategic voters in ordinary strategic voters and coalitions voters and to explain this type of behavior I will rely on survey data. This will be done in the following chapter.

Chapter 6

Strategic Voting at the Individual Level

The last chapter provided strong evidence for the *Minor-Party Success Hypothesis*. Strategic voting clearly matters substantively. Across electoral districts, the list-vote shares of the FDP and the Greens depend not only on their loyal base of straight-ticket voters, but also on the number of strategic ticket-splitters. In fact, the size of their loyal base is not strong enough to overcome the national threshold without the support of these strategic ticket-splitters. In order to disentangle the group of strategic ticket-splitters, I use individual-level data. Particularly, I formulated several hypotheses in chapter 3 pertaining to the individual level that I propose to test in this chapter. Toward this end, I will first focus on my choice of two specific dependent variables. Second, I will discuss the operationalization of my remaining hypotheses in sequence, in order to set the stage for the analysis. In this regard it is important to note that all individual-level hypotheses are tested simultaneously, because conceptually, they should all funnel into a voter's decision-making calculus. Finally, I will present the analysis and the interpretation of the results.

In a mixed electoral system like Germany's, voters have the opportunity to cast two votes: a candidate vote for the local party representative on the first ballot, and a list vote for a particular party on the second ballot. There are many conceivable possibilities of how voters could split their tickets. The 1998 German NES study on which this analysis is based was conducted right after the election, and has two vote-recall items for the candidate and list vote. Since I am interested in explaining why some voters cast a strategic vote as opposed to a straight ticket, or whether they split their tickets in a non-strategic fashion, any dependent variable employed must be polytomous. Some of my hypotheses try to disentangle both types of strategic behavior - that is, an *ordinary strategic vote* from a *coalition vote*. I will therefore use two different dependent variables.

My first dependent variable has three categories: (a) respondents casting a straight ticket, (b) those who split their ticket in a non-strategic way, and (c) those who split their ticket strategically. In chapter 3 I laid out a theory why some ticket-splitters are considered strategic. Thus, respondents who cast a candidate vote for the CDU representative and

a list vote for the FDP are considered strategic, as are respondents who cast a candidate vote for the SPD representative and a list vote for the Greens.

Since several hypotheses are tailored around disentangling both types of strategic voting, I divide the group of strategic voters into two separate categories. My second dependent variable has, therefore, four categories: (a) respondents casting a straight ticket, (b) those who split their ticket in a non-strategic way, (c) respondents who cast an ordinary strategic vote, and (d) respondents who cast a coalition vote. By comparing respondents' feeling thermometer scores measured toward various political parties on an 11-point scale, I distinguish both types of strategic voting according to my theory. If a strategic voter likes[1] the smaller party more, then she is considered an *ordinary strategic voter*, and if she likes the major party better, then she is classified as a *coalition voter*.[2]

As argued earlier, electoral institutions provide certain incentives to vote strategically that some voters might take into account before making their decision. Given the electoral rules in mixed electoral systems, voters employ either the *wasted-vote strategy* or the *coalition insurance strategy*. These incentives describe the context in which an election is held. Nevertheless, I hypothesize that these institutional incentives to vote strategically should not be the same for all voters. Rather, I expect them to differ from voter to voter in a predictable manner. Some voters are more likely to cast a strategic vote because, according to my theory, they have a higher *proclivity* to vote strategically. The *proclivity* to vote strategically depends on motivational factors as well as on a voter's capability to understand the manifold implications of the electoral rules. In chapter 3, I developed several hypotheses to test this theory simultaneously. While the first hypothesis was tested in the previous chapter, in the present chapter I will test the remaining hypotheses pertaining to the individual level. Hypotheses two and three summarize institutional incentives to vote strategically in mixed-electoral systems.

Hypothesis 2 (Wasted Vote) *The closer the district race, the more likely voters are to follow the wasted-vote strategy and cast an ordinary strategic vote.*

The *Wasted Vote Hypothesis* addresses the strategy at play for the candidate vote. The competitiveness of the district race is usually measured by the (candidate) vote margin between the top two contenders (Black, 1978, 1980; Cain, 1978). Since not every district is highly competitive, it is reasonable to assume a nonlinear relationship between the district margin and the likelihood to vote strategically. I measure the competitiveness of

1) The German codebook actually refers to *liking* and not to *feeling close* to these parties, in contrast to the American National Election Study questions.

2) In 19 cases I had to use party identification as a tie-breaker because two parties were tied and ranked first. Moreover, I had to delete 139 observations because these respondents reported that they had not voted.

the district race, x_1, by the square root of the candidate vote margin between the top two contenders of the district race. This measure accounts for the fact that a hypothetical additional increase of an already large margin should have a smaller impact on providing incentives to avoid wasting the candidate vote than in highly competitive races with small margins.[3] My expectation is that the more competitive the district race is - that is, the smaller the squared root of the district margin - the higher the incentive will be for voters to avoid wasting their candidate vote on an uncompetitive candidate. Thus, the coefficient of x_1 should be negative for the choice between casting an ordinary strategic voting as opposed to a non-strategic split ticket.

Hypothesis 3 (Coalition Insurance) *The more uncertain voters' expectations are whether or not the smaller coalition partner can overcome the national threshold, the more likely they are to follow the coalition insurance strategy and cast a coalition vote.*

In order to test the *Coalition Insurance Hypothesis* and to find evidence for the strategy on the list vote, one has to assess the impact of voters' expectations about the success of the two possible small coalition partners, the FDP and the Greens. The 1998 German NES, unfortunately, includes no question about expectations. There is another pre-election survey, however, where respondents are asked for their subjective expectations about whether the FDP and the Greens would get 5% of the list votes. The answer categories run from "absolutely certain that the party will exceed the 5% threshold" to "absolutely certain that the party will not". Two middle categories are for respondents who are unsure.[4]

3) Moreover, taking the square root of the actual margin also stabilizes the variances and makes the distribution of these values approximately symmetrical.

4) This survey is not yet publicly available and is conducted by the Mannheim Center for European Social Research (MZES) at the University of Mannheim together with the Center for Survey Research and Methodology at Mannheim (ZUMA). I am thankful to Franz Pappi and Paul Thurner for sharing this data with me.

My strategy to construct an expectations measure for the 1998 German NES is to "impute" (i.e., predict) it with the help of the pre-election survey that includes all the requisite information (King et al., 2001). In constructing an imputation model for expectations in the pre-election survey data set, I am limited to variables that are also in the 1998 German NES. [5] Overall the "adjusted R^2" of the imputation model predicting respondents' expectations about the FDP and the Greens is smaller than .13.

In order to account for the uncertainty involved in using predicted values from the imputation model, in lieu of actual observations, I generate six different sets of imputed values for the expectations and will report the multiple imputation estimates based on these six data sets. While the observed values are the same across all data sets, the imputed values differ and thereby reflecting the uncertainty inherent in predicted values. These variables are continuous because the imputed values can theoretically take on every value, not only values between 1 and 4. Since the likelihood of a coalition vote should be highest if voters are unsure whether the small coalition partner can overcome the national threshold, the likelihood to cast a coalition vote should be curvilinear and highest if voters are at the theoretical middle position between both extremes. I therefore fold the imputed expectation scales at 2.5. Hence small values indicate that respondents are predicted to be unsure about either outcome. High values indicate that respondents are certain that these parties either make it above the threshold or not and, thus, are less likely to cast a coalition vote. I expect that the more unsure the expectation is that the FDP or the Greens garner 5% - i.e., the lower the score on the folded expectation scale x_2 and x_3 - the more likely voters are to cast a coalition vote. I therefore expect the coefficients for x_2 and x_3 in the comparison of the probability in the four-choice model of a coalition vote versus the baseline, to be negative.

I also developed four motivational hypotheses because if voters are motivated in one way or the other to cast a strategic vote, they have a higher proclivity to think, and therefore to vote, strategically.

5) I used the following predictor variables: age, level of education, gender, a "West" dummy (coded as in the previous chapter), a dummy in which 1 signifies a respondent list vote for the CDU, another dummy in which 1 signifies a respondent list vote for the FDP (and to predict the expectations for the Greens I included two dummies in which 1 signifies that the respondent cast a list vote for the SPD and the Greens instead), and a dummy for self-employed respondents. Moreover, I included the following interaction terms: age × "West" dummy, gender × "West" dummy, and two interactions of the vote-intention dummies (FDP and CDU for the "FDP" model and SPD and Greens for the "Green" model) with the "West" dummy. For multiple imputation I use Amelia (Honaker et al., 1999), a Windows-program. This software can be downloaded from `http://gking.harvard.edu/stats.shtml`

Hypotheses 4 - 7 (Motivation)
4) FDP and Green supporters are more likely to cast an ordinary strategic vote than to split their ticket non-strategically.
5) CDU and SPD supporters are more likely to cast a coalition vote than to split their ticket non-strategically.
6) The stronger a voter's partisanship, the more inclined she is to cast a straight ticket.
7) The stronger a ticket-splitter's partisanship, the more likely she is to split her ticket strategically.

I operationalize the concept of a "party supporter" to be a voter who identifies with that particular party using the standard party identification item. In order to test my fourth hypothesis about the impact of partisanship, I include a dummy variable for small party supporters, x_4, coding as a 1 those who identify either with the FDP or the Greens and as a 0 otherwise. To test the fifth hypothesis, I constructed another dummy, x_5, coding as a 1 those respondents who reported a party identification for either the CDU or the SPD and as a 0 otherwise. By implication, the excluded category is comprised of voters who identify with other parties or do not identify with any party at all. My expectations are that voters who identify themselves with the FDP or the Greens should be more likely to cast an ordinary strategic vote and voters who identify themselves with either CDU or FDP should be more likely to cast a coalition vote than to split their ticket non-strategically. Hence, I expect a positive coefficient for both x_4 and x_5 in the four-choice model.

Another motivational factor is the strength of partisanship. The impact of extremity of partisanship is addressed in the sixth and the seventh hypothesis. As in American NES surveys, respondents of the German NES have to rate their strength of partisan attachment as weak (= 1), moderate (= 2) or strong (= 3). Respondents without any partisan identification or people who refuse to report it are recoded as a 0. Finally, I divide every score by 3, such that the strength of partisanship scale, x_6, ranges from 0 to 1 in order to facilitate comparison of the estimated coefficients. My expectation for hypothesis six is that the stronger a voter's partisanship - that is, the higher the value of x_6 - the more motivated she will be to cast a sincere straight ticket for her most preferred party. My expectation for hypothesis seven is that even if a voter splits her ticket, then the stronger her partisanship will be - that is, the higher she will score on this variable, the more likely she is to split her ticket strategically. Thus, I expect the coefficients of x_6 in the three-choice model to be positive. The same expectation holds for the four-choice model as well. Hypothesis 7 predicts that the respective coefficient in the first as well as the third set of estimates should be positive in the four-choice model.

Finally, the *proclivity* to vote strategically depends also on a voter's capability to comprehend various options that the electoral rules offer her. I expect that the level of a respondent's political awareness should reflect a voter's capability to use these rules most effectively.

Hypothesis 8 (Capability) *The higher a voter's level of political awareness, the more likely she will be to cast a strategic vote.*

The literature on public opinion is replete with more or less creative attempts to measure some facet of political awareness, ranging from political participation (such as participating at rallies, contributing campaign money and engaging in political discussions) to political interest, political sophistication, educational attainment or media usage (Luskin, 1987; Zaller, 1992). The theoretical justification to prefer one measure over the other is not always spelled out. Moreover, some concepts are especially prone to response set biases. Who, after all, wants to appear uninformed in an interview situation? Thus, on theoretical as well as on methodological grounds, I prefer factual knowledge questions about politics in constructing a political awareness scale (x_7). Like Zaller (1992), to measure political awareness I rely on the ability to place the main political parties "correctly" on a left-right scale.[6] In order to get a score of 1 for a "correct" answer, respondents must place parties on this left-right scale in a meaningful way. Placements are only assessed relative to one another, for instance, whether one party is located to the right of another party.[7] All nine scores are summed, then divided by the total number of items such that the scale ranges from 0 to 1. Respondents who either get a location test item wrong, as well as those who have missing values because they did not place a particular party, score a 0 on this item. My expectation is that political knowledge should facilitate strategic considerations, and hence strategic voting. The coefficient of x_7, determining the choice between a strategic vote versus the baseline in the three-choice model as well as in the four-choice model for the probability of casting an ordinary strategic voting versus the baseline and of casting a coalition vote versus the baseline, should be positive.

In addition to the independent variables stemming from operationalizations of the hypotheses, I also include two control variables in the model. An alternative explanation to strategic voting for certain types of ticket-splitting is the one of a "personal vote". The understanding in the literature is that personal factors, beyond mere partisanship, influence voters to cast a vote for a particular candidate. While there are no appropriate measures to operationalize this idea directly, it is reasonable to assume that voters who cast a personal vote as opposed to an ordinary strategic vote have to know at least the name of the candidate they vote for. This criterion does not clearly disentangle personal voters from ordinary strategic voters, however. Strategic voters might know the name of the candidate they

6) The German NES has three political knowledge questions that, somewhat curiously, do not scale together on the same scale.

7) The "correct" answers of the 9 "location tests" are as follows: CDU to the right of the Greens, DVU to the right of SPD, Republicans to the right of the middle position, PDS to the left of DVU, FDP not at the extremes (placed neither 1, 2, 3 nor 9, 10, 11), CDU to the right of SPD, SPD to the right of PDS, FDP to the left of Republicans, and CDU to the left of Republicans. The answers conform to a standard spatial representation of political parties in Germany. These nine comparative placement items have an *average inter-item correlation* of .46 and the additive awareness scale has an *alpha reliability* of .88.

vote for as well, especially since ordinary strategic voters are more likely to be political aware. This is not a necessary condition, however, since the strategic reasoning "kicks in". Even if they do not know the name of the candidate they might vote for, ordinary strategic voters can simply rely on the fact that the candidate of the coalition partner is more competitive than the candidate of their most preferred party. Erring on the conservative side, and to avoid falsely attenuating the other model coefficients, I control for whether respondents are able to correctly report the name of candidate for whom they voted, and then construct a name recognition dummy x_8 coded as a 1 if they did the name correctly and a 0 otherwise.

Finally, I include a "West" dummy x_9 to account for the fact that the logic of strategic voting operates on different levels in the two regions of the country, since the nature of the party system is different in East and West Germany. Generally, I expect the coefficient of x_9 to be positive throughout all sets of coefficients in both models, since the logic of casting a sincere straight-ticket or splitting the ticket strategically should describe the situation in the West better than in the East. This would also replicate a result of my district-level analysis in chapter 5 that in the Western part of the country the model predictions are more precise.

Since the categories of both dependent variables are unordered I will estimate a choice model in order to test all remaining hypotheses simultaneously. Since all independent variables are "individual-specific" - that is, they vary across respondents - estimating a multinomial logit model (MNL) is appropriate. Nevertheless, MNL models yield only consistent estimates if the *independence of irrelevant alternatives* (IIA) assumption holds in the data. Since the probability of casting a straight ticket should theoretically be unchanged if one of the other categories is removed, the IIA assumption should not be violated. Several Hausman tests support this conjecture.[8]

The MNL model, as many choice-models, is based on the idea of respondents as expected utility maximizers. In them, ith respondent's utility to cast either a straight ticket, a non-strategic split-ticket or a strategic vote is unknown and treated as a random variable. According to my theory, however, a respondent's utility is a function of X_i, a vector of nine independent variables x_k, $k \in \{1, \ldots, 9\}$. A voter is predicted to choose one of the three choice alternatives (straight ticket, non-strategic split-ticket, strategic split-ticket) for the first dependent variable or one of four choice alternatives (straight ticket, non-strategic split-ticket, ordinary strategic or coalition vote) for the second dependent variable that has the highest utility to her. Thus, for respondent $i \in \{1, \ldots, N\}$ and choice alternative $j \in J_1 = \{0, 1, 2\}$ in case of the first dependent variable, Y_1, or $j \in J_2 = \{0, 1, 2, 3\}$ for

8) Removing one of two larger categories, Hausman tests failed to reject the null hypothesis that IIA holds in this data. However, removing one of the smaller categories violated basic assumptions of the Hausman test. Therefore, I removed both categories and compared the estimated coefficients in a 4-choice model with the ones in a 2-choice logit model. The logit coefficients were not significantly different from the ones of the 4-choice model, thereby supporting the null hypothesis that IIA holds in this data.

the case of the second dependent variable, Y_2, one gets the probability of the ith individual choosing the jth alternative from a set of J_1 alternatives is given by

$$P_i(Y_1 = j) = \frac{e^{X_i\beta_j}}{\sum_{j=0}^{2} e^{X_i\beta_j}}$$

and for $j \in J_2$ alternatives analogously

$$P_i(Y_2 = j) = \frac{e^{X_i\beta_j}}{\sum_{j=0}^{3} e^{X_i\beta_j}}$$

whereby $X_i\beta_j = \sum_{k=1}^{K} \beta_{ji\,k} x_{i\,k}$ and $x_{\cdot k}$ denotes the kth independent variable. In order to identify the model, the coefficients of one category have to be set to zero as a baseline against which the coefficients of the other response categories are compared. Note that I set the coefficient vector β_1 for non-strategic ticket-splitters to zero such that all other β's are estimated relative to this baseline. This is entirely appropriate because my theory addresses conditions under which voters choose to cast a straight ticket or a strategic vote, as opposed to splitting their ticket non-strategically.

Since the folded expectation scales x_2 and x_3 are not observed but rather imputed, I estimate the very same model six times, one for each simulated data set. These data sets vary only in that they have slightly different expectation scales, thereby accounting for the uncertainty inherent in making the assumption of *what* respondents would have reported *if* they had been asked the expectation question. Recall that three of my hypotheses, the two *Motivation Hypotheses* about the strength of partisanship as well as the *Capability Hypothesis*, should be tested in a three-choice model. Table 6.1 presents the MNL coefficient estimates based my first dependent variable, Y_1, with three categories in order to provide some validity check whether my reasoning about strategic voting can also be empirically justified and to test the above-mentioned hypotheses.

Overall, across all six data sets, the model correctly classifies on average 65.9% of all respondents. Note that all significance tests are based on the conservative multiple imputation variance estimates. Moreover, all reported standard errors are White-Huber robust standard errors and clustered by electoral district to account for the fact that respondents in the same electoral district react not independently to the incentives provided by the electoral rules. Focussing only on the test of these three hypotheses, all coefficients for which I had prior expectations are in the predicted direction and statistically significant at least at their mean levels, given that all other variables are at their sample mean. In terms of interpreting these results substantively, the coefficients are generally not very helpful in and of themselves, since MNL is a non-linear and non-additive. Instead, in the more

interesting four-choice model I will compute later, I will generate predicted probabilities to assess the impact of changing one independent variable on the likelihood to cast a strategic vote, holding all other variables constant at a meaningful value.

Table 6.1: *Multiple Imputation Estimates of a MNL 3-Choice Model.*

	Straight Ticket vs. Ticket Splitting			Strategic Voting vs. Ticket Splitting		
Independent Variables	Coeff.	Std.Err.	*p*	Coeff.	Std.Err.	*p*
Competitiveness (x_1)	-0.043	0.039	0.276	-0.156	0.080	0.051
Expectation FDP (x_2)	-0.030	0.167	0.859	0.077	0.364	0.836
Expectation Greens (x_3)	0.070	0.206	0.738	0.709	0.263	0.012
PID small parties (x_4)	-0.224	0.370	0.545	1.725	0.432	0.000
PID major parties (x_5)	0.892	0.194	0.000	0.216	0.372	0.562
Strength of PID (x_6)	1.516	0.213	0.000	1.133	0.429	0.008
Political Awareness (x_7)	0.085	0.167	0.611	1.262	0.428	0.003
Name Recall (x_8)	0.925	0.194	0.000	1.016	0.300	0.001
West (x_9)	0.363	0.114	0.002	0.918	0.227	0.000
Constant	-0.073	0.247	0.766	-3.720	0.538	0.000
N		1872				
Correctly Classified (average)		65.9%				

Note. *p* -values are for two-tailed tests. Coefficients are averaged across six estimations. Standard errors of multiple imputation estimates account for the variance across all six estimations.

Nevertheless it is important to point out that strong partisans are in fact either voting a straight ticket or, if they split ticket, are splitting their ticket strategically. This finding supports two of my motivational hypotheses, particularly hypotheses six and seven about the strength of partisanship, and stands in especially stark contrast to the reasoning and findings in the ticket-splitting literature, which still believes in the notion that "all ticket-splitters are created equal". This is clearly not the case! Instead these findings lend support to the idea that strategically motivated ticket-splitters behave differently from non-strategic ticket-splitters. Thus, these results provide evidence to refine a longstanding claim in the ticket-splitting literature that shared considerations are responsible for why people split their ticket. My theory of strategic voting, if read within the context of this literature, adds the notion that *not* every ticket-splitter is motivated equally. Even strong partisans might end up splitting their ticket in mixed electoral systems. This is a new argument and is supported by the data that explains in part why some people split their ticket in the voting booth.

The substantively more interesting model is based on my second dependent variable, Y_2, which disentangles the group of strategic voters into a category of ordinary strategic voters

and in another category of coalition voters. Before I present and interpret the results of this model, I would like to draw the reader's attention to the distribution of the dependent variable. An inspection of the distribution of several independent and the dependent variables reveals that having a partisan attachment for either of the major parties, CDU or SPD, or for their smaller coalition partners, FDP or the Greens, does not vary across *all* categories of the dependent variables. It fact, the respective cell size is zero (or essentially zero) in exactly the categories of the dependent variables where these predictors should not operate at all.

In order to identify this model I have to constrain these two coefficients to zero. This strategy is followed for the model estimation based on each of the six data sets. The resulting multiple imputation estimates with non-strategic ticket-splitting as baseline are shown in table 6.2.

Again, all three sets of estimates are accompanied with robust White-Huber standard errors that are also clustered for respondents from the same electoral district and, of course, account for uncertainty of the imputed variables. The four-choice model is more appropriate to disentangle factors that determine which strategy voters might follow. It is an appropriate model to test both the *Wasted Vote Hypothesis* as well as the *Coalition Insurance Hypothesis*. Overall, the model fit averaged across six estimations classifies two-thirds of all respondents correctly.

Table 6.2: *Multiple Imputation Estimates of a MNL 4-Choice Model.*

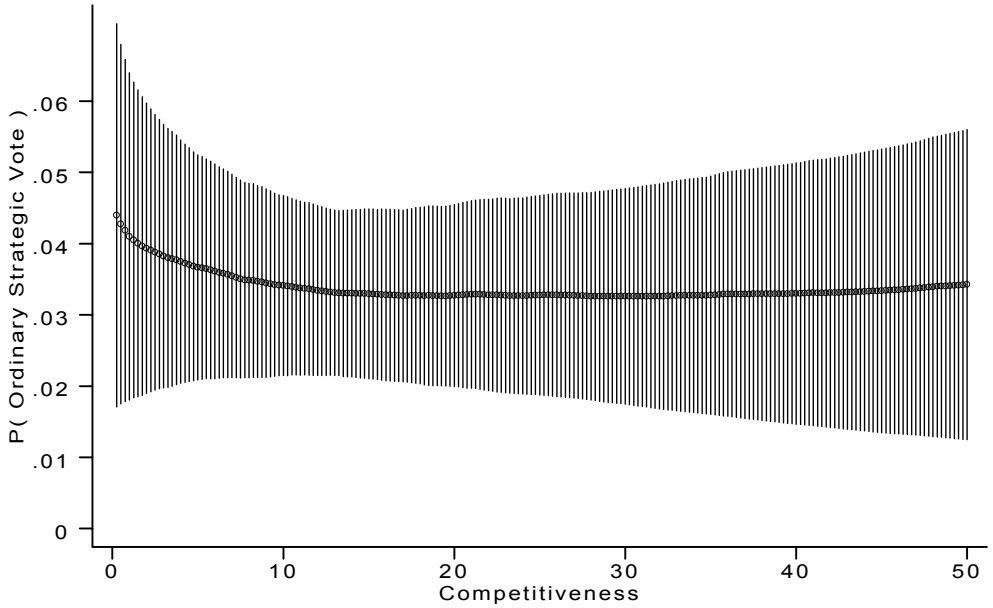
	Straight Ticket vs. Ticket Splitting			Ordinary Strategic vs. Ticket Splitting			Coalition Vote vs. Ticket Splitting		
Independent Variables	Coeff.	Std.Err.	*p*	Coeff.	Std.Err.	*p*	Coeff.	Std.Err.	*p*
Competitiveness (x_1)	-0.043	0.039	0.280	-0.224	0.107	0.037	-0.081	0.110	0.458
Expectation FDP (x_2)	-0.030	0.166	0.859	0.044	0.572	0.939	0.113	0.336	0.736
Expectation Greens (x_3)	0.070	0.207	0.735	0.745	0.298	0.013	0.690	0.398	0.083
PID small parties (x_4)	-0.039	0.368	0.916	2.749	0.443	0.000	0	fixed	
PID major parties (x_5)	1.040	0.192	0.000	0	fixed		1.348	0.462	0.004
Strength of PID (x_6)	1.429	0.204	0.000	0.526	0.465	0.258	0.891	0.621	0.151
Political Awareness (x_7)	0.084	0.168	0.616	2.045	0.657	0.002	0.593	0.519	0.253
Name Recall (x_8)	0.922	0.194	0.000	1.332	0.351	0.000	0.616	0.405	0.129
West (x_9)	0.317	1.302	0.808	1.012	0.295	0.001	0.727	0.306	0.018
Constant	-0.070	0.248	0.778	-4.866	0.826	0.000	-4.125	0.706	0.000
N		1872							
Correctly Classified (average)		65.8%							

Note. *p*-values are for two-tailed tests. Coefficients are averaged across six estimations.
Standard errors of multiple imputation estimates account for the variance across all six estimations.

At least if all independent variables are held at their sample mean, the square root of the district margin as a measure of district competitiveness is a credible incentive for voters to cast an ordinary strategic vote as opposed to split the ticket non-strategically. As

predicted by the *Wasted Vote Hypothesis* the coefficient for competitiveness coefficient is statistically significant in the second set of coefficients in support of this hypothesis. As should be the case, this variable only has a significant impact for the comparison between ordinary strategic voters and non-strategic ticket-splitters, indicating that in competitive districts, voters behave more predictably - that is, they do not split their ticket in a non-strategic fashion. To ease the interpretation of this coefficient, consider the following figure 6.1.

Figure 6.1: *Simulated Impact of District Competitiveness on the Probability to Cast an Ordinary Strategic Vote.* The horizontal axis indicates the competitiveness of the district race. The vertical lines represent the 95% confidence intervals around the simulated predicted probabilities.



For this figure I simulated the predicted probabilities, along with their 95% confidence intervals, of casting an ordinary strategic vote conditional on the competitiveness of the district race, that is the candidate vote margin of the top two contenders in each district, in the western part of the country, whereby all other variables are set to their mean. Clearly the impact of the wasted vote strategy is non-linear and is strongest in close election. This supports the *Wasted Vote Hypothesis*. Apparently the most precise predictions are obtained if the top two contenders in the district are between 10 and 15 percentage points from one another. The point predictions increase strongly if a district margin is below five percent. Unfortunately, the length of the confidence intervals increase, too, because the respondents in this data set lived in districts that were often not closely contested.

Going back to the MNL estimation results in table 6.2, the *Coalition Insurance Hypothesis* for viable coalition structures in Germany predicts that the expectation coefficients should be negative in the third set of estimates. Although election campaigns provide anecdotal evidence for it, at least with this data set the hypothesis has to be rejected. Two reasons might be responsible for that. First, since the fit of the imputation model is not great, it is likely that multiple imputation procedure does only produce very noisy predictions. It might be asking too much of the data to get strong results if there is not a lot information in the data to begin with. Second, the mechanism behind the *coalition insurance strategy* might be only partly described by voter's expectation that the small coalition partner is in danger of falling below the national threshold. I will investigate this question in future research.

Moreover, I formulated several *Motivation Hypotheses* (hypothesis four to seven). If small party supporters split their ticket, they should be more likely to cast an ordinary strategic vote. The respective coefficient in the second set of estimates is indeed significant and positive supporting hypothesis four about the impact of party identification for small party supporters. The fact that I had to constrain the respective coefficient to zero in the third set of estimates, since there is *no* small party supporter in the data set casting a coalition vote, is also another indication that small party supporters behave in a predictable manner consistent with my theory. Major party supporters, according to my fifth hypothesis, should be motivated to cast a coalition vote instead of splitting their ticket non-strategically. This is exactly what the significantly positive estimate in the third set of estimates indicates supporting the fifth hypothesis about the motivation that major party supporters have to cast a strategic vote. As before, and consistent with my reasoning, I had to constraint the respective coefficient for voters who identify with one of the two major parties to zero because there is no respondent in the data set who identifies with a major party casting an ordinary strategic vote.

Not only whether voters identify with a party but also how strong this attachment is should motivate voters to cast their votes in predictable ways. The sixth hypothesis states that strong partisans should be more motivated to cast a straight-ticket than to split their ticket non-strategically. In support of this hypothesis the respective coefficient in the first set of estimates is positive and highly significant. Hypothesis seven states that if strong partisans split their tickets then they should be more motivated to split it strategically. Recall that the evidence stemming from the 3-choice model already supports this hypothesis. The fact that in the four-choice model the respective coefficient in the second and the third set of estimates is not significant indicates that disentangling the group of strategic ticket-splitters into ordinary strategic voters and coalition voters reduces number of observations in these cells and therefore decreases the power of the test. Presumably, with more observations in these cells these coefficients should be also significant and positive, replicating the findings of the three-choice model in table 6.1.

Finally, my eighth hypothesis, the *Capability Hypothesis*, which is also already supported by the estimation results of the three-choice model in table 6.1, does not speak directly to both types of strategic voting separately. Although I had no predictions for the respective

coefficient in the second and the third set of estimates it is interesting to note that political awareness does only play a role in determining an ordinary strategic vote but not a coalition vote. Thus, this hypothesis could be refined for further studies. Apparently it is more difficult to grasp the incentive behind an ordinary strategic vote than a coalition vote. This is not inconsistent with my theory because people have generally not a hard time to figure out viable coalition formations but it is harder to asses the competitiveness of the district race because it is often below the radar screen of many voters. Beyond information about possible coalitions during electoral campaigns, people rely on the *electoral history heuristic*. In the case of Germany, both viable coalitions have developed a history of working together across state legislatures and across time in the *Bundestag*.[9]

In summary, the last *Motivation Hypothesis*, hypothesis seven, and the *Capability Hypothesis* are supported by the three-choice model and the *Wasted Vote Hypothesis* as well as the remaining *Motivation Hypotheses*, that is, hypotheses four to six, are supported by the four-choice model. This model also suggests a refinement of the *Capability Hypothesis* for further analysis. Apparently, even political unaware voters are able to grasp the logic of the *coalition insurance strategy*. Thus, with the exception of the *Coalition Insurance Hypothesis*, all hypotheses are supported by the model results, given that all estimates are conditional on the sample mean values of the remaining predictor variables.

Coefficient estimates, however, are not all that helpful in assessing the substantive impact of a particular independent variable on one of the four possible outcomes: straight-ticket, ticket-splitting (non-strategically), ordinary strategic vote or coalition vote. One way to provide an overview about the substantive impact of the estimated coefficients is to inspect marginal effects of a change in independent variables on the dependent variable. Table 6.3 presents the marginal effects of each independent variable on the probability to vote a straight-ticket, split the ticket non-strategically or cast either an ordinary strategic vote or a coalition vote.[10]

9) Compelling arguments can be made that the level of motivation that determines a voter's proclivity to vote strategically is *conditional* on her capability to comprehend the implications of these options. Moreover, I expect the incentives to vote strategically to be more credible among high sophisticates (respondents who score high on the political awareness scale) than among low sophisticates. Unfortunately, the respective cell sizes are very small. This indicates that there cannot be much statistical power to begin with in reaching statistical significance for the coefficient of the hypothesized interactions, as the cell sizes for the strategic voting categories are very small. In fact, including these interactions in the model neither does not improve the model fit significantly nor do the associated coefficients come out significant. I will test these ideas more rigorously in future work by pooling cross-sectional data over several elections.

10) The estimated marginal effects are based on the first out of six data sets since the coefficients are pretty stable across all six data sets.

Table 6.3: *Marginal Effects on the Probability of different Outcomes.*

	Straight Ticket			Ticket Splitting			Ordinary Strategic			Coalition Vote		
Independent Variables	dy/dx	Std. Err.	*p*	dy/dx	Std. Err.	*p*	dy/dx	Std. Err.	*p*	dy/dx	Std. Err.	*p*
Competitiveness (x_1)	-0.005	0.008	0.517	0.009	0.007	0.209	-0.003	0.002	0.100	-0.001	0.003	0.736
Expectation FDP (x_2)	-0.031	0.022	0.159	0.032	0.021	0.126	-0.006	0.006	0.296	0.005	0.007	0.512
Expectation Greens (x_3)	-0.009	0.022	0.674	-0.022	0.021	0.301	0.010	0.005	0.029	0.020	0.006	0.000
PID small parties (x_4)	-0.153	0.072	0.034	-0.048	0.056	0.391	0.206	0.059	0.001	-0.005	0.006	0.398
PID major parties (x_5)	0.167	0.030	0.000	-0.168	0.025	0.000	-0.014	0.003	0.000	0.015	0.013	0.246
Strength of PID (x_6)	0.273	0.040	0.000	-0.260	0.037	0.000	-0.010	0.009	0.230	-0.002	0.015	0.863
Political Awareness (x_7)	-0.023	0.034	0.486	-0.027	0.031	0.379	0.039	0.012	0.001	0.012	0.012	0.324
Name Recall (x_8)	0.140	0.027	0.000	-0.149	0.026	0.000	0.013	0.008	0.107	-0.004	0.008	0.631
West (x_9)	0.046	0.022	0.039	-0.072	0.020	0.000	0.016	0.006	0.011	0.011	0.007	0.132

Note. *p* -values are for two-tailed tests. Marginal effects are computed if all other independent variables are set to their sample mean.

The interpretation of these marginal effects is relatively straightforward. Take for instance the effects for political awareness. Holding all other variable at their sample mean, a one-unit increase on the awareness scale increases the probability of an ordinary strategic vote by almost 4%. Interestingly, being a major-party supporter as well as an increase in the strength of partisanship decreases the likelihood of a hypothetical voter to split her ticket non-strategically but increases the probability to cast a straight-ticket enormously. The most interesting information that marginal effects are able to provide is a comparison of the importance of certain predictors in terms of facilitating certain types of voting behavior. Overall, all hypothesized effects are generally not huge if considered in isolation. The exceptions are the motivational factors, which show the strongest impact on the way voters cast their votes.

For a substantive more fruitful interpretation it is necessary to define theoretically interesting scenarios and predict possible outcomes. One way to assess the impact of a particular independent variable is to compute the predicted change in probability - so-called "first differences" - to cast either a straight ticket, a split ticket, an ordinary strategic vote or a coalition vote if this independent variable changes from one value to the next. What would happen if one changes a particular independent variable from its minimum to its maximum in the sample? The difference in predicted probabilities, the size of the "first-differences" for certain types of voting behavior, is another way to assess the substantive impact of various factors on casting a strategic vote or casting a straight-ticket or splitting the ticket non-strategically. The following table 6.4 summarizes predictions of various theoretically relevant scenarios.

The values in table 6.4 represent the change in predicted probability for three different outcomes if one particular independent variable is changed from its minimum to its maximum for respondents in the Western part of the country, while all other variables are set to their mean value. The respective values for a hypothetical voter in East Germany are similar.

Table 6.4: *Simulated Predicted Probabilities of Relevant Scenarios.*

	Simulated Change in Predicted Probability: if Independent Variable changes from Minimum its Maximum					
	Straight Ticket		Ordinary Strategic		Coalition Vote	
Independent Variables	Mean	Std.Err.	Mean	Std.Err.	Mean	Std.Err.
Expectation FDP (x_2)					-0.066	0.042^+
Expectation Greens (x_3)					-0.077	0.044
PID small parties (x_4)			0.254	0.062		
PID major parties (x_5)					***	
Strength of PID (x_6)	0.227	0.034	***		***	
Political Awareness (x_7)			0.039	0.015	***	
Name Recall (x_8)			***			
Combined Effect	0.227	0.034	0.394	0.104	0.233	0.125

*** indicates a factor that is not significant although hypothesized.

All other hypothesized factors are significant at p<.05 (and + = p<.1).

I computed these "first differences" only for theoretically relevant scenarios, which have been hypothesized to have an impact on casting a straight-ticket, an ordinary strategic vote or a coalition vote.

First, I will discuss the substantive impact of factors facilitating to cast a straight-ticket. Recall that, for the likelihood to vote a straight ticket, there was only one (motivational) hypothesis formulated, namely hypothesis six about the motivation as an extreme partisan to cast a straight-ticket. An average voter in West Germany - i.e. she has a mean value on all remaining individual level characteristics - is 23% more likely to vote a straight ticket if she is a strong partisan than if she is a non-partisan. Apparently, extremity of partisanship has a very strong impact on casting a straight ticket. This finding is hardly surprising because it helps to establish the idea that, all else equal, voters rely on partisanship and the extremity thereof to cast a straight ticket. It seems that this is a reasonable baseline against which systematic deviations can be judged in order to identify strategies in voters' decision-making.

Second, several hypotheses address factors instrumental for casting a strategic candidate vote. Identifying with either the FDP or the Greens alone makes a hypothetical voter in the West 28.4% points more likely to cast an ordinary strategic vote, supporting the fourth hypothesis about the motivation as a partisan of a small party. Moreover, there is evidence for the *Capability Hypothesis*. An otherwise average voter is almost 4% points more likely to cast an ordinary strategic vote if she is very political aware as opposed to a politically total unaware voter. It takes some effort to realize the implication of this strategy and,

presumably, the impact of the competitiveness of the district race. The name recognition dummy to get at the idea of a "personal vote" has also significant impact employing this strategy. Note this measure not only measures personal voters but also all voters who know at least the name of the district candidate they vote for.

Third, there are factors facilitating a coalition vote. In some ways, the relevant scenarios replicate the null findings from table 6.2. It is somewhat troublesome, however, that the motivational factor of supporting one of the major parties, as suggested by hypothesis five, does not have a significant impact on its own. Nevertheless, table 6.2 shows that identifying with a major-party does facilitate a coalition vote as opposed to split the ticket non-strategically.

In this statistical model the impact of various factors cannot be assessed independently from the level of other independent variables. Typically voters have expectations about the success of parties' *as well as* some motivation *and* are somewhat sophisticated. Thus, it is also substantively interesting how well all the hypothesized factors operate conjointly. This dynamic will be simulated below. In order to assess the combined effect, which is represented for each category in the last row of the table, I simulate the change in probability of an otherwise average voter in the Western part of the country if all hypothesized motivational factors as well as political awareness change from their minimum to their maximum value and the expectation scales, conversely, from their maximum to their minimum value simultaneously. This simulates how much more likely it is that a strong, knowledgeable major-party supporter, who is certain whether both small parties to get over the threshold, will cast a coalition vote, as compared to an unaware voter without partisan identification and unsure about the success of both small parties. The combined effect of all five hypothesized effects, unfortunately, does not show any impact. This suggests that not only the imputation model is to blame because the other characteristics do not facilitate this kind of behavior either. More research has to be done to determine refined hypotheses about the functional form of how expectations about the success of small coalition partners provide incentives to cast a coalition vote.

The combined effect of a simultaneous change in four characteristics on the probability to cast an ordinary strategic vote is very large. A knowledgeable, strong small-party supporter in a close contested district race, even if she does not know the name of the local candidate, is almost 43% points more likely to cast an ordinary strategic vote than a unaware voter in an uncompetitive district without partisan identification, but who at least knows the name of the candidate she is voting for. Finally, for casting a straight ticket, I hypothesized only one factor such that a combined effect is the same as the single effect.

In summary, with the exception of the *Coalition Insurance Hypothesis*, all hypotheses are supported by the model results. The simulations of substantive interesting scenarios in table 6.4 further draw a similar picture. Although not all the factors I hypothesized make a significant difference on their own in terms of voter decision-making, the analysis of theoretically relevant combined effects supports my theory except the *Coalition Insurance*

Hypothesis. At least the fact that no small party supporter casts a coalition vote, and I therefore had to constrain the respective coefficient to zero is at least some indication that the idea behind the *coalition insurance strategy* is not off-base. The evidence presented here shows that electoral institutions provide certain incentives, particularly for the*wasted-vote strategy*. But voters do respond quite differently to these incentives. As the combined effects above make plain, if voters are appropriately motivated to understand the implication of electoral rules, and cognitively capable of doing so - in short, if they have a high*proclivity* to vote strategically - they are in fact much more likely to cast a strategic vote.

The idea that voters respond differently to institutional incentives is contrary to the "common wisdom" in the strategic voting literature but, nevertheless, well supported by the data. This result brings to an end my analysis of strategic voting in mixed electoral systems. The next chapter summarizes and concludes the findings of the previous chapters and, particularly, will focus on the generalizability of the results.

Chapter 7

Conclusion

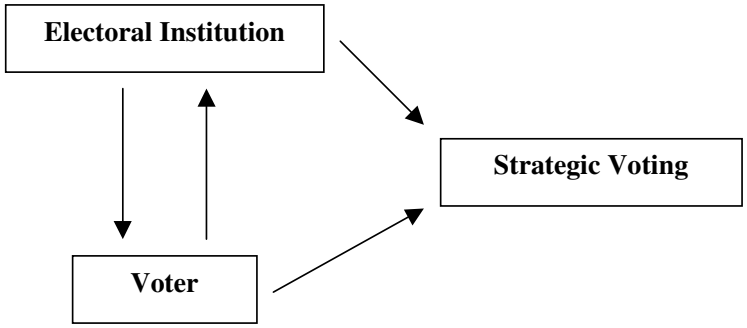
This work has attempted to refocus the discussion about strategic voting from its narrow focus on single-member district systems. The literature on strategic voting agrees that institutional incentives are the driving force that spurs strategic voting. That said, it is somewhat surprising that this literature has not looked more closely at variations in the main independent variable and studied the impact of a variety of the institutional settings on the extent and nature of the strategic voting phenomenon. My focus on mixed electoral systems allows me to assess the incentives provided by various electoral rules at play simultaneously. Similar to a natural experiment, using mixed electoral systems offers the opportunity to study influences of electoral rules by holding individual factors constant: The same voter, after all, cast two separate votes under different rules. There is the single-member district tier, where only the candidate wins, namely the one who garners a plurality of the votes. And there is the PR tier that gives many parties a chance to attract voters, gain representation, and thereby present themselves as credible alternatives to the major parties.

The results of this endeavor should by now be clear: Electoral institutions matter for strategic voting. They provide incentives and thereby determine the degree to which voters behave strategically. My first contribution to the strategic voting literature is to allow the electoral institutions to vary, thereby opening up the possibility to provide different incentives to operate at the same time for the same voter. I offer a theory that particular institutions not only determine the *degree* of strategic voting, but also the *kind* of strategies voters systematically employ to make their decision. Through this analysis, it became manifestly clear that mixed electoral systems are indeed an ideal choice of an electoral institution to demonstrate this variability. This is represented in figure 7.1 by the arrow from "Electoral Institution" to "Strategic Voting".

My second contribution is to have conceptually introduced variation in the degree to which people anticipate the impact of these institutions. Although electoral institutions provide incentives to vote strategically, these incentives vary in their impact on voters' decision-

making process. A voter's *proclivity* to vote strategically determines the degree to which the incentives provided by various electoral institutions are systematically anticipated in a voter's decision calculus. Since the *proclivity* to vote strategically varies across voters, their impact on voter's decisions varies, too. In figure 7.1, this dynamic is represented by the reciprocal arrows between "Electoral Institution" and "Voter". This work provides strong empirical evidence on various levels of analysis supporting both contributions. Variations in electoral institutions as well as voter characteristics determine the decision-making process.

Figure 7.1: *Explanation of Strategic Voting: A Schema*



Strategic voting has two facets in mixed electoral systems. These facets are different because mixed electoral systems employ a two-ballot system, whereby the first ballot is counted differently than the second ballot. In a single-member plurality system, the mechanism behind strategic voting is the Duvergerian logic to avoid wasting a vote on an uncompetitive candidate. Strategic voters employ the *wasted-vote strategy* and cast what I call an *ordinary strategic vote*. A PR system, however, offers another rationale for voting strategically. The fundamental question here is, who will have a chance to gain a majority of the seats to build a government? Ordinarily, systems with a PR tier have more than just two parties in parliament, and leading up to an election it is not fully obvious to voters whether one party will get enough votes to form a single-party majority. In order to be most effective, therefore, strategic voters consider several viable coalitions of parties and try to support their most preferred coalition if the party they otherwise like most has no chance of gaining a majority of seats in parliament. Strategic voters employ a *coalition insurance strategy* and cast what I call a strategic *coalition vote*. The prior two chapters

lend strong evidence at the district level, as well as the individual level, for these types of strategies to operate in a particular mixed electoral system.

At the district level, the empirical analysis in chapter 5 reveals that strategic voting occurs systematically across electoral districts. Furthermore, supported by verification with independent data sources, the district-level analysis clarifies to what extent strategic voting actually occurs. In contrast to plurality systems, strategic voting in mixed electoral systems is politically very influential because it determines the fate of certain viable coalitions.

At the individual level, the empirical analysis in chapter 6 finds evidence that people vary in their *proclivity* to vote strategically, as determined by various motivational factors as well as their capability to comprehend the strategic implications that are offered by particular electoral rules. In contrast to the conventional wisdom of the ticket-splitting literature, this analysis reveals that ticket-splitters differ on several characteristics and should, therefore, not simply be collapsed into a single residual category as is typically done in this literature. Adding my theory to this literature makes it possible - and indeed, preferable - to disentangle this residual category of voters in order to extract more information. This was accomplished by employing an appropriate choice-model.

In summary, all four research questions posed in the introduction have been duly answered. I have identified (Question 1) and quantified (Question 2) two strategies that are systematically used in electoral systems. Furthermore, I have distinguished strategic voters from non-strategic ticket-splitters (Question 3) both conceptually and empirically, and determined the political implications of strategic voting in a particular mixed electoral system (Question 4).

Methodologically, this is the first application of ecological inference to the study of strategic voting. King's EI undoubtedly offers new opportunities for this field. In this vein, my main methodological contributions reveal that critics are mistaken in attributing the lack of robustness of EI estimates to the particular model or the estimation method itself. Rather, the analysis in chapter 4 shows that EI can be successfully applied to the study of multiparty systems (or to data with multiple categories in general). It seems that the lack of robustness of EI estimates is a function of the data at hand, rather than the estimation method.

An obvious direction for future research is to provide empirical evidence for these electoral strategies across several countries. Both strategies should be observable in other mixed electoral systems as well. Parliamentary systems most similar to the German system studied here are those of New Zealand, Italy, Venezuela, Bolivia and the new electoral system in Wales. At the individual level, the *proclivity* to vote strategically theoretically does not depend on particular electoral rules. It should be possible to make comparisons across countries as well. At the district level, it would be interesting to examine common characteristics of districts in which people vote strategically in disproportionate numbers. Aspects of political geography and spatial analysis (Anselin, 1988) might factor into any potential variance in this regard.

Moreover, the *coalition insurance strategy* should also apply to all PR systems in general. Thus, there is a variety of countries to choose from that might be systematically studied together. In this regard, however, the devil is in the details. As the term already implies, whether voters employ this strategy, how frequently they do so, and what the political consequences of this kind of strategic behavior are, are always to some degree conditional on the nature of a party system. Diverse part systems offer the possibility of various viable coalitions. What coalitions of parties are viable? And can voters identify these coalition options consistently, such that a systematic deviation from sincere behavior can be observed?

It is more likely to find evidence for the *coalition insurance strategy* throughout different electoral systems if voters have similar expectations about the viability of several coalitions. The presence of at least three characteristics should facilitate this: first, when number of possible coalition partners is small, similar to Riker's "minimum winning coalition" notion (Riker, 1962); second, when coalitions already exist, such that even inattentive voters could follow what I have terms an *electoral history heuristic* to form an expectation about the viability of several coalitions; and third, when the probably coalition options consist of partners that are ideologically not too far apart from one another. Given a particular structured party system, the more prevalent the *coalition insurance strategy* is, the more voters should behave strategically and cast a coalition vote. Thus, there are many ways to refine these ideas, not only across several elections but also across several countries with slightly different electoral institutions.

Studies of mixed electoral studies can also inform the literature on strategic voting in plurality systems. The mechanism behind the *wasted-vote strategy* might vary across countries as well. For instance, compared to plurality systems, Duverger's "psychological effect" (Duverger, 1954) operates a bit differently in Germany. According to the pure doctrine as well as the Cox model (Cox, 1994, 1997) one would expect that the Duvergerian logic favors two-candidate competition on the district level. The empirical evidence of actual district level results, however, speaks a slightly different language. Even minor-party candidates get a considerable number of candidate votes. Why does this happen?

Germany's two-ballot system, and I suspect so-called "correction systems" (Massicotte and Blais, 1999, p. 353) - in which the distribution of PR seats tries to correct the distortions created by the plurality rule on the candidate vote - generally undermines the classical Duvergerian logic. This might be an example of the interaction between different rules in mixed electoral systems, so-called "contamination effects" that are now more systematically discussed in the electoral systems literature (Herron and Nishikawa, 2001).

There is probably less strategic voting in a mixed electoral system than one would otherwise expect if plurality and PR tiers are considered independently of one another. The "contamination" of the strategic voting logic in mixed electoral systems, particularly prevalent in "correction systems" such as that of Germany, stems from the interaction of different

rules for candidate and list votes. First, apart from the surplus seat calculus[1], which is too esoteric to be considered by voters, there is little incentive to avoid wasting the vote. If the candidate vote is considered not to be very important, why does a voter not express loyalty to her party, rather than employing the *wasted-vote strategy*? In fact, Jesse (1988) argues that voters, at least a majority of them, are indeed innocent of any strategic calculus concerning the district race. Second, voters might feel a moral obligation (Meehl, 1977) to turn out, and if this obligation is fulfilled, a vote is an end in itself. It is never wasted. Third, since the list vote is more important, the ballot encourages straight-ticket voting by having the party label next to the party name of the first ballot, and thereby discourages ticket-splitting and hence strategic voting. Fourth, cognitively speaking, straight tickets are least burdensome (in terms of required effort), since voters can follow the *partisan label heuristic*. They need only know which party they are going to vote for and then cast a vote for the local party candidate of their preferred party.

Given the tendency of voters to simply cast a straight ticket in mixed electoral systems, it might be especially in the interest of small parties to field a candidate in every district although their candidates are not competitive, thereby undermining the Duvergerian "psychological effect". This is, of course, quite a logistic endeavor for small parties. It might pay off, though, in terms of giving voters the opportunity to cast a straight ticket. This implies that small parties would gain more list votes than they would otherwise.

Since it seemed obvious that Ralph Nader, the Green Party candidate in the 2000 U.S. Presidential race could not be elected President, presumably, only his staunchest supporters ended-up voting for him. This was probably the first time that strategic voters could have made a difference in a plurality system, like the U.S. If the main arguments of this study are true then strategic voters are much more influential to the outcome of an election in mixed electoral systems.

1) Recall that a party is allowed to keep all seats won in district races in a state even if the proportion of list-vote shares would indicate a lower number of seats. For instance, if the CDU wins all district races in a state like Saxony, because of FDP supporters who cast ordinary strategic votes for the CDU candidate in the district, they automatically get half of the seats in the *Bundestag* for the state Saxony. However, since these voters cast their list vote for the FDP and some CDU supporters likewise cast a coalition vote in favor of the FDP, the CDU itself will end up with less than 50% of the list-vote shares. According to pure proportional representation, the CDU should, therefore, get less than half of the seats for Saxony. The CDU, however, is entitled to keep all their won district seats by the candidate votes because of the surplus seat rule. Thus, if the strategic coordination among voters for one coalition works, strategic ticket-splitting can produce surplus seats, thereby undermining the principle of proportional representation and favoring the major parties in a particular coalition (Kaase, 1984). The same reasoning applies to the SPD and the Greens, respectively.

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