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Voter Strategies with Restricted Choice Menus

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Mixed-member electoral systems require voters simultaneously to cast ballots in single-member districts (SMD) and multimember, proportional representation (PR) constituencies. It may be that not all parties offer candidates in both electoral contexts, however. In this event would-be voters for some parties may find themselves 'frustrated' by the restricted choice menu on offer in the SMD, being effectively forced to split their vote between different parties. Here we explore the different behaviours of frustrated voters in the 1996 mixed-member election to Italy's Chamber of Deputies, characterizing these as being either in some sense *non-strategic* (concerned above all with the relative policy platforms of candidates) or *strategic* (concerned above all to influence the eventual composition of government). Using an extended method for ecological inference, we parameterize and estimate rates of different types of ticket-splitting at the district level, and link the degree of what we characterize as strategic voting to the relative policy distance between the respective local representatives of the Italian pre-electoral coalitions.

Split-ticket voting happens when voters choose, simultaneously or nearly simultaneously, to vote for different parties in different electoral contexts. This may occur in mixed-member electoral systems, run-off elections or simultaneous elections to different bodies – for example, when national elections take place at the same time as elections to subnational or supranational bodies. In such contexts, voters may chose to maintain a consistent 'ticket' by casting two or more ballots for the same party, or to split their ticket by voting for different parties on different ballots. How real voters exercise this choice has a range of theoretical implications for voting behaviour, relating among other things to: strategic voting;[1] divided government;[2] the impact of ballot mechanisms;[3] the efficacy of campaigning;[4] and the approval or rejection of potential governments.[5] The logic of split-ticket voting is thus central to many different accounts of voter motivation; discussions of this have occupied much space in the empirical and theoretical literature on electoral behaviour.

In most of these discussions, ticket splitting is assumed to be a matter of free strategic choice for the voter, yet this is not always the case. In particular, mixed-member electoral

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[1] Gary W. Cox, *Making Votes Count: Strategic Coordination in the World's Electoral Systems* (Cambridge: Cambridge University Press, 1997); Michael Laver, 'The Logic of Plurality Voting in Multiparty Systems', in Manfred Holler, ed., *The Logic of Multiparty Systems* (Dordrecht: Kluwer Academic Publishers, 1987), pp. 359–70.

[2] Morris P. Fiorina, *Divided Government*, 2nd edn (Needham Heights, Mass.: Allyn and Bacon, 1996).

[3] Paul Allen Beck, *Party Politics in America*, 8th edn (New York: Longman, 1997).

[4] Barry C. Burden and David C. Kimball, 'A New Approach to the Study of Ticket Splitting', *American Political Science Review*, 92 (1998), 533–44.

[5] Kaare Strøm, Ian Budge and Michael Laver, 'Constraints on Cabinet Formation in Parliamentary Democracies', *American Journal of Poltical Science,* 38(1994), 303–35.

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systems of their essence place voters simultaneously in two distinct political contexts. One is a proportional representation (PR) context in multi-member constituencies, where the ballot offers voters a choice from what is typically a comprehensive menu of party labels. The other is a single-member district (SMD) context, where the ballot presents a choice between individual candidates. Since the SMD elections typically use a plurality rule, strategic nomination decisions within sets of like-minded parties concerned not to split their vote and thereby lose the election typically mean that not all parties nominate candidates to SMDs. As a result the choice menu for a voter in any given SMD is typically far more limited than in the PR election. Clearly, *mixed-member electoral systems force some voters to split their tickets*, when the party they most prefer in the PR election is not on the menu in their SMD.

As mixed-member electoral rules gain in popularity,[6] ticket-splitting in this context has received increasing attention, typically as a study in voter response to the same menu of alternatives when these are offered in different electoral contexts.[7] Very few studies of ticket-splitting, however, have focused on the behaviour of voters in mixed-member systems who are *forced* to split their tickets because the same set of alternatives is unavailable in the two electoral settings. Pierce has examined election surveys from two-ballot run-off elections to model second choices made by what he terms 'thwarted' voters: those whose first round choice did not qualify for the run off.[8] Thwarted voters in the two-round elections, however, have the possibility of abstention from the second round of voting, an option not typically observed in mixed-member systems where both ballots are cast simultaneously. No previous study has systematically investigated the choices of voters in mixed-member systems who are forced to split their vote because the same party choices are not available on both ballots.

The analysis of voter behaviour in this quasi-experimental context does, however, yield potentially rich insights into the general logic of voting. Furthermore, new techniques of ecological inference now allow us to estimate, at the district level, actual split-ticket voting in mixed-member electoral systems, supplementing previous approaches drawn mainly from surveys. In what follows we model voting behaviour in settings where voters must choose simultaneously in two different contexts from the same general choice menu, yet where the menu in one of those contexts is a restricted version of the other. Our empirical context is Italy, where following electoral law reform in 1993, electoral competition has become a contest between two large pre-electoral coalitions formed by the Italian parties. By the 1996 election, the use of pre-electoral coalitions had developed into disciplined arrangements whereby the two coalitions – both vying for control of the government – each agreed to nominate only one candidate in each SMD. The pre-electoral coalition arrangement restricts the choice menu for voters in the SMD, since the supporters of all but one party from each coalition will be forced to split their tickets because their most

[6] Matthew S. Shugart and Martin P. Wattenberg, eds, *Mixed-Member Electoral Systems: The Best of Both Worlds?* (Oxford: Oxford University Press, 2001).

[7] Karen Cox and Leonard Schoppa, 'Interaction Effects in Mixed-Member Electoral Systems: Theory and Evidence from Germany, Japan, and Italy', *Comparative Political Studies*, 35 (2002), 1027–53; Thomas Gschwend, 'Ticket-splitting and Strategic Voting in Mixed Electoral Systems', MZES Working Paper No. 61 (Mannheim: Mannheimer Zentrum für Europäische Sozialforschung, 2003); Jeffrey A. Karp, Jack Vowles, Susan A. Banducci and Todd Donovan, 'Strategic Voting, Party Activity, and Candidate Effects: Testing Explanations for Split Voting in New Zealand's New Mixed System', *Electoral Studies*, 21 (2002), 1–22.

[8] Roy Pierce, 'Modelling Electoral Second Choices: Thwarted Voters in the United States, France, and Russia', *Electoral Studies*, 22 (2003), 265–85.

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preferred PR party does not also offer an SMD candidate. One possible choice is then to stick with their most-preferred party's coalition candidate, possibly displaying a strategic concern for electing a government and by implication for *policy outcomes*. The alternative is to split their vote across coalitions by voting for the rival coalition candidate, based on the *policy platform* of the rival candidate's party without effective regard to the eventual election outcome. Our framework first defines this choice matrix for each voter and outlines the quantities of coalition-sticking and coalition-switching among voters whose menu choices have been restricted. Using the 1996 Italian National Election Study (ITANES), we gain some initial insight into this problem by examining individual-level response items. After reaching the limits of the ITANES data, we then turn to district-level election data to generate district-level estimates of split-ticket voting along coalition and party lines, using Gary King's ecological inference (EI) technique.[9] Because our concern is not only to estimate splitting and sticking among thwarted voters, but also to estimate their strategic choices, we explain variation in coalition-splitters in terms of the relative policy positions of the SMD candidates in each district. This analysis thereby sheds empirical light on the relative concern of voters for policy outcomes versus policy platforms. Our findings suggest that voters are mainly concerned with policy outcomes, but defect increasingly from their coalitions as the distance from their policy ideal points to their own coalition candidate increases, and as distance to the rival coalition candidate decreases. In the specific Italian case, this confirms the conventional wisdom using precise, empirical methods that have never before been applied to that country's mixed-member system. Our account begins with a brief explanation of the context of split-ticket voting in Italy and our method for measuring this empirically.

TICKET-SPLITTING IN THE ITALIAN MIXED MEMBER SYSTEM

Under a law approved in August 1993, elections to the Italian lower chamber use a mixed-member electoral system. This involves 475 single-member districts in which candidates contest plurality elections, as well as twenty-six multi-member constituencies (*circoscrizioni*) from which a total of 155 seats are allocated by proportional representation (PR), giving a total legislature of 630 seats.[10] The new electoral system was expected by many to bring about profound structural change in the party system, notably a significant reduction in the number of parties. This was because the dominant plurality element in the system, responsible for the selection of more than 75 per cent of legislators, was expected to provide strong incentives for parties competing for the same pool of voters to combine into larger units, thereby avoiding the damaging effects under plurality elections of splitting the available vote between them.

Italian parties resisted this tendency, however, and maintained their distinct identities in a multiparty system. Rather than fusing permanently into larger units, many parties chose to organize into one of two opposing electoral pre-electoral coalitions. This process began loosely in 1994, but was not fully operative until the 1996 elections. In that context, electoral competition was structured around two major pre-election coalitions, the *Polo della Libertà* (The Pole of Liberty), on the right, and the *Ulivo* (Olive Tree), on the left

[9] Gary King, *A Solution to the Ecological Inference Problem* (Princeton, N.J.: Princeton University Press, 1997).

[10] For a brief but clear description, see Roberto D'Alimonte, 'Appendix: The Italian Elections of 1996', *European Journal of Political Research*, 34 (1998), 171–4.

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(see Appendix A). Each coalition's main function is to ensure that member parties do not compete in single-member districts against one another, as each coalition offers only one candidate per SMD. Coalition member parties retain distinct identities, however, and compete as individual parties in the PR constituencies. Italy's electoral reform has thus not led to a two-party system at the national level, although it has tended to generate two-candidate competition at the local level.[11]

This arrangement to limit competition in the Italian SMD elections means that many voters supporting their most-preferred party in a PR constituency will be *forced* to vote for a different party, to split their ticket, in the SMD. In the 1996 elections, arrangements by pre-election coalitions meant that only one of the five parties from the *Ulivo* coalition, and only one of the three from *Polo*, would offer a candidate in any given SMD. The net result was that 56 per cent of voters casting ballots for parties on PR lists were forced to split their ticket, since the party they voted for in the PR constituency did not offer a candidate in their SMD.[12] In what follows we describe voters who are prevented from voting in the SMD for the party they supported in the PR election as 'frustrated', and voters who are offered the opportunity to vote in the SMD for the first choice in the PR election as 'satisfied'. The empirical distributions of satisfied and frustrated voters are described in Appendix A, which summarizes the plurality contests in the 475 SMDs, highlighting the party sponsorship of candidates affiliated to the two pre-election coalitions, as well as other candidates.[13]

While the PR element fills a much smaller number of seats than the plurality element, it nonetheless plays a very important role in Italian politics. First, nearly every Italian party offers a list in the multi-member constituencies. Electoral preferences, furthermore, tend to be defined along party terms. While opinion data shows a growing identification within the electorate with the two main electoral coalitions, up to 1996 the primary focus of loyalty in Italian politics was still the party.[14] Secondly, while the two pre-electoral coalitions are in effect proposals for alternative coalition governments, the PR component provides each coalition with a direct measure of each member party's relative contribution to the coalition, information used in the bargaining process for coalition formation and the allocation of government jobs. Thirdly, for non-coalition parties, the level of PR support is the basis for representation in the parliament (provided that they pass the 4 per cent

[11] Stephen Reed, 'Duverger's Law Is Working in Italy', *Comparative Political Studies*, 34 (2001), 312–27. The coalition arrangement was also in effect in 2001, although the coalitions were slightly renamed and consisted of slightly different parties. We have chosen to focus on the 1996 contest as it represents the first election following the 1993 reform where the coalition system was fully operative. While there is no reason why our analysis could not be applied to the 2001 elections, given the complexity of our empirical estimation we believe that including additional elections would unnecessarily burden this article.

[12] The figure of 56 per cent is computed as the total number of voters who cast their PR votes for parties that did not also have candidates in that voter's district (21,182,440) divided by the total PR votes (37,494,964).

[13] Bargaining among party leaders determines which party will offer the SMD candidate from each coalition, and this bargaining is conditional on two criteria. First, using a proportionality rule, SMD candidacies are allocated to parties according to their proportional vote share in previous local and national elections. Secondly, there is a careful rating of each electoral district into 'safe', 'marginal' and 'lost' – again on the basis of the results of the previous elections at the national and the local level (Aldo Di Virgilio, 'L'offerta elettorale: la politica della alleanze si istituzionalizza', in Roberto d'Alimonte and Stefano Bartolini, eds, *Maggioritario finalmente? La transizione elettorale 1994–2001* (Bologna: Il Mulino, 2002), to ensure an acceptable distribution of winnable seats among coalition members.

[14] Marco Maraffi, 'Per che cosa si è votato il 13 maggio? Le mappe cognitive degli elettori italiani', in Mario Caciagli and Corbetta Piergiorgio, eds, *Le ragioni dell'elettore* (Bologna: Il Mulino, 2002), pp. 301–38.

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threshold). Finally, the PR vote share of parties determines the level of public funding for campaign reimbursement. Thus, while 'contamination effects' in some mixed-member systems may tip the balance in favour of the plurality component,[15] the Italian system has largely resisted these contamination effects and maintained voter affiliation primarily oriented towards parties.[16]

While all voters in mixed-member elections have the *option* to split their tickets, some Italian voters, whom we describe as frustrated, are *forced* to do this given the failure of their most preferred party to offer a choice on both ballots. There are two possible ways in which frustrated Italian voters may respond to this restricted choice menu. First, they may vote for the candidate sponsored by their most-preferred party's coalition. This increases the probability that their most-preferred party will be a member of the winning pre-electoral coalition, will go into government, will receive cabinet seats and will thereby have some impact on public policy and other benefits. Such voters in effect use their votes to influence which pre-electoral coalition wins the election. We describe these voters as *coalition-stickers*: they are frustrated voters who stick with the SMD coalition of the party they supported in the PR election. The other option for frustrated voters is to give their SMD vote to a candidate outside their first-choice party's coalition, either to the candidate from the rival coalition or to one of the several non-coalition candidates typically on offer. We describe these voters as *coalition-splitters*. Satisfied voters, of course, may also split their tickets – something we return to examine in detail below – but our key focus in what follows is on Italian voters who are *forced* to split their ticket.

MEASURING SPLIT-TICKET VOTING IN ITALY

Ticket-splitting choices are faced by individual voters. Ideally, this phenomenon would be analysed with individual-level data. Opinion surveys have been the most commonly used method to investigate voting decisions, offering a direct measure of voter behaviour and motivations with regard to voting strategy. Our analysis therefore begins with the Italian National Election Study (ITANES)[17] of 1996, a detailed survey of 2,502 respondents. The ITANES includes questions about party closeness, voter choice on both ballots and vote motivations.

As we have noted, in the proportional representation constituency elections, competition is organized around parties rather than pre-electoral coalitions. We have assumed that on this ballot, voters will sincerely support their most preferred party's list. The ITANES data allows us to explore this assumption empirically. The first panel in Table 1 (1a) shows the relationship of respondents' reports of 'closeness' to a party and their PR list vote. The figures represent the row proportions and (in parentheses) 95 per cent confidence intervals. As can be clearly seen, respondents tended to vote for the lists of the parties they felt closest to. (Here we have aggregated parties into coalitions for convenience but individual party sticking rates are similarly high.) From those reporting they are closest to an *Ulivo* coalition party, 95 per cent cast their PR ballots for an *Ulivo* party's list; from those reporting closeness to a *Polo* party, 92 per cent cast their PR ballots for a *Polo* party's list. Only 60

[15] Erik S. Herron and Misa Nishikawa, 'Contamination Effects and the Number of Parties in Mixed-Superposition Electoral Systems', *Electoral Studies*, 20 (2001), 63–86.

[16] Cox and Schoppa, 'Interaction Effects in Mixed-Member Electoral Systems', p. 1036.

[17] ITANES 1996, Italian National Election Study, Istituto Cattaneo; it is available from http://www.cattaneo.org/english/dati/itanes.html, and also in an English-language version from http://socrates.berkeley.edu:7502/CAT/INES/1996/EN/Doc/hcb.htm.

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TABLE 1 *Overview of Ticket Splitting in the 1996 Italian Elections*

(1a)	Coalition of party receiving PR vote		
Coalition of party respondent feels closest to	*Ulivo*	*Polo*	Other
Ulivo	0.95 (0.93, 0.97)	0.02 (0.01, 0.03)	0.03 (0.02, 0.05)
Polo	0.02 (0.01, 0.04)	0.92 (0.88, 0.95)	0.06 (0.03, 0.10)
Other	0.27 (0.19, 0.37)	0.13 (0.08, 0.20)	0.60 (0.50, 0.68)
Total	0.53 (0.50, 0.56)	0.34 (0.31, 0.37)	0.13 (0.10, 0.15)

(1b)	Coalition of party receiving plurality vote		
Coalition of party receiving PR vote	*Ulivo*	*Polo*	Other
Ulivo	0.98 (0.96, 0.98)	0.02 (0.01, 0.03)	0.01 (0.00, 0.02)
Polo	0.03 (0.01, 0.05)	0.95 (0.92, 0.97)	0.02 (0.01, 0.05)
Other	0.2 (0.13, 0.29)	0.18 (0.11, 0.27)	0.62 (0.53, 0.71)
Total	0.54 (0.51, 0.57)	0.37 (0.34, 0.40)	0.09 (0.07, 0.11)

Source: ITANES 1996, questions 131 and 154 (1a) and questions 154 and 151.
Note: Parties were recoded into coalitions, and all analyses are weighted by the ITANES weight variable. Figures in parentheses are 95 per cent confidence intervals.

per cent of those closest to a non-coalition party voted for a non-coalition PR list, however, with most switching to *Ulivo*. We will note these patterns since we will observe similar results when analysing the actual election returns. These results also lend credence to our view that the PR ballot most closely reflects the sincere preferences of voters. When asked which candidate they voted for in the plurality election, only 29 per cent of respondents could name the candidate (ITANES, question 146). When asked for the basis on which they voted in the plurality election, furthermore, 72 per cent stated that their choice was motivated by the candidate's political group; only 19 per cent stated that their vote choice reflected the candidate's personal qualities (ITANES, question 148).

The second part of Table 1 (1b) shows the cross-tabulation of voter choice on the PR and plurality ballots, by pre-electoral coalition. Overall reported coalition-sticking rates were very high as indicated by survey responses, with 98 per cent of *Ulivo* party-list supporters voting with *Ulivo* candidates, and 95 per cent of *Polo* party-list supporters voting for *Polo* candidates. Some 38 per cent of all voters supporting non-coalition party lists, however, switched their plurality votes to coalition candidates, more supporting *Ulivo* than *Polo* (54 to 37 per cent). Overall, Table 1 gives the impression that voters support the list of the coalition they most prefer, and that ticket splitting in the form of voting for the rival coalition's candidate in the plurality election is rare.

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While the ITANES data provide a general estimate of ticket splitting, we have taken these data about as far as they can go with regard to our analysis, which fundamentally concerns not vote splitting in general but rather *forced* vote splitting. Unless we know the precise (single-member) district context in which a voter participated, we cannot know whether that voter had the option to split her ticket, or was instead forced to do so by the pre-electoral coalition arrangement. While the ITANES data do contain an identifier for the respondent's *constituency* (the twenty-six PR districts), there is no similar identifier for *district* (the 475 SMDs). The result is that it is impossible to link the survey information with the respondent's strategic context from actual election data.[18] And even if it were possible to link the survey with district-level information, the upper limit of 2,502 survey respondents would have yielded an average of only five responses for each SMD, severely limiting the inferences we could make regarding the effects of strategic context. To investigate strategic and non-strategic behaviour with restricted choice menus, by contrast, we require sufficient observations at the local district level to allow for reliable estimation in the context where ticket splitting actually takes place. Not only are incentives for ticket-splitting typically highly localized, varying by district and constituency,[19] but also this holds particularly true in the Italian case.[20] In effect, in order to dig deeper into our research question, we must turn to a different source of data.

The only direct information about ticket splitting normally available to researchers in sufficient quantity, and freely available in the Italian context, is found in actual voting results aggregated at some unit of electoral geography, such as precinct, district, state or region. Because the theoretical matter of interest concerns individual behaviour, however, previous attempts to squeeze insight from aggregate election results have run into the well-known problem of ecological inference. The ecological inference problem occurs when the observed data are aggregate-level quantities – here, total district votes for each ballot – but when the phenomena of interest are individual-level quantities, such as the probability that a single Forza Italia PR voter will support an SMD candidate from the *Ulivo* coalition. In the Italian context, we can form a table in each district where rows are PR constituency party choice – ranging from a minimum of nine to a maximum of fifteen parties – and the three columns are coalition choice, one each for *Ulivo*, *Polo* and non-coalition candidates. In each district we observe only the table marginals, but it is the interior (unknown) cell values we wish to estimate. The large size of this table, and the correspondingly higher number of unknowns, makes the multiparty ecological inference problem substantially greater than in other split-ticket contexts where ecological inference techniques have been used.[21]

Work by Johnston and Pattie has applied an alternative entropy-maximizing procedure to estimate split-ticket voting in New Zealand's multiparty, mixed-member system to

[18] The geographical identifiers in the ITANES can be matched with census data but not with election data. Variable q235 reports PR constituency, but not plurality district; the average constituency contains more than eighteen plurality districts. Variable q236 reports municipality, but municipalities do not correspond to electoral districts. For instance, one municipality (e.g. Rome) may contain numerous districts.

[19] Michael Shin, 'The Politicization of Place in Italy', *Political Geography*, 20 (2001), 331–52; John A. Agnew, *Place and Politics: The Geographical Mediation of State and Society* (London: Allen and Unwin, 1987).

[20] Shin, 'The Politicization of Place in Italy' p. 333; Michael E. Shin and John Agnew, 'The Geography of Party Replacement in Italy, 1987–1996', *Political Geography*, 21 (2001), 221–42.

[21] Such as Burden and Kimball's application of King's method to the investigation of ticket splitting in the 1988 US elections (Burden and Kimball, 'A New Approach to the Study of Ticket Splitting'); King, *A Solution to the Ecological Inference Problem.*

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estimate unknown cells in 8×8 tables, and similar approaches have been applied to Germany's multiparty system by Gschwend, Johnston and Pattie.[22] In what follows, however, we employ a variant of King's procedure extended to 2×3 tables, collapsing the PR vote for each party *i* in each district into an observation of a vote for party *i* versus a vote for any other party.[23] This decision not only yields the numerous advantages of King's method, such as district-level estimates and confidence intervals, but also provides the ability to incorporate covariates that will later be used to relate patterns of systematic variation in ballot splitting to the policy configurations of candidates contesting each single-member district.[24]

VOTER BEHAVIOUR WITH RESTRICTED CHOICE MENUS

Our characterization of Italian voter choice starts with the assumption – later to be tested empirically – that voter choice is fundamentally party based, and that voters distinguish between parties in terms of the relative distance between their own policy ideal points and the perceived policy positions of parties. This is the classical spatial model of voter choice derived from Downs, extended by Enelow and Hinich, and by Hinich and Munger.[25] As Dow notes, however, despite the increasing theoretical sophistication of spatial theories of voting, spatial modelling is increasingly criticized for not having made commensurate contributions to the empirical study of electoral competition.[26] In multiparty electoral contexts, furthermore, spatial theory has provided even more limited empirical insight.[27] One of our key aims in what follows is to test empirically whether Italian voters who are forced to split their tickets do so in ways consistent with the general spatial model.

[22] Ron Johnston and Charles Pattie, 'Ecological Inference and Entropy-Maximizing: An Alternative Procedure for Split-Ticket Voting', *Political Analysis*, 8 (2000), 333–45; Thomas Gschwend, Ron Johnston and Charles Pattie, 'Split-Ticket Patterns in Mixed-Member Proportional Election Systems: Estimates and Analyses of Their Spatial Variation at the German Federal Election, 1998', *British Journal of Political Science*, 33 (2003), 109–27. Entropy maximization would indeed offer an alternative to King's method for estimating our main quantities of interest, although the properties of King's estimates have been explored much further when used as second-stage regressors.

[23] King, *A Solution to the Ecological Inference Problem*.

[24] Steven Voss, 'Using Ecological Inference for Contextual Research: When Aggregation Bias Is the Solution as Well as the Problem', in Gary King, Ori Rosen and Martin Tanner, eds, *Ecological Inference: New Methodological Strategies* (Cambridge: Cambridge University Press, 2004), pp. 69–96; Kenneth Benoit, Daniela Giannetti and Michael Laver, 'Multi-Party Split-Ticket Voting Estimation as an Ecological Inference Problem', also in King, Rosen and Tanner, eds, *Ecological Inference*, pp. 333–50.

[25] Anthony Downs, *An Economic Theory of Democracy* (New York: Harper and Row, 1957); J. M. Enelow and M. Hinich, *The Spatial Theory of Voting: An Introduction* (New York: Cambridge University Press, 1984); J. M. Enelow and M. Hinich, eds, *Advances in the Spatial Theory of Voting* (New York: Cambridge University Press, 1990); M. J. Hinich and M. C. Munger, *Ideology and the Theory of Political Choice* (Ann Arbor: University of Michigan Press, 1994); M. J. Hinich and M. C. Munger, *Analytical Politics* (New York: Cambridge University Press 1997).

[26] Jay K. Dow, 'A Spatial Analysis of the 1989 Chilean Presidential Election', *Electoral Studies*, 17 (1998), 61–76.

[27] Michael Laver and Norman Schofield, *Multiparty Government* (New York: Oxford University Press, 1990); T. Iversen, 'Political Leadership and Representation in West European Democracies: A Test of Three Models of Voting', *American Journal of Political Science*, 38 (1994), 45–74; Samuel Merrill III, 'Discriminating Between the Directional and Proximity Spatial Models of Electoral Competition', *Electoral Studies*, 14 (1995), 273–87; Samuel Merrill III and Bernard Grofman, *A Unified Theory of Voting: Directional and Proximity Spatial Models* (Cambridge: Cambridge University Press, 1999).

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The classical spatial theory of issue voting assumes that, *ignoring issues of post-electoral government formation*, voters support the party with the policy position closest to their ideal point. In the political context of Italian pre-electoral coalitions, this means that frustrated voters will cast their SMD ballot for a second-choice candidate whose party's policy position, *irrespective of coalition affiliation*, is closest to their own ideal point.[28] This may lead them to be coalition splitters, and can be seen as essentially *non-strategic* behaviour in the sense that it does not take the eventual outcome of the election into account. More strategic or 'instrumental' voters, by contrast, may vote on the basis of the distance between their own ideal points and the *policy outcomes* likely to result from each candidate's election.[29] Such voters 'use their vote more as an instrument to achieve preferred policy outcomes and not just to expressively voice support for one platform instead of another'.[30] In the Italian context, this means voting in the SMD for the candidate sponsored by the pre-electoral coalition of the voter's most-preferred party, *even when the rival coalition candidate's policy platform is closer to the frustrated voter's own ideal point*. This is done in order to increase the prospects of a government that contains the most preferred (PR) party and is hence more likely to implement policies closest to the voter's ideal point.

More precisely, we interpret coalition sticking and coalition splitting as follows. In the PR election, all voters support the party with the policy position closest to their own ideal points. They have no strategic incentive to do otherwise. In the plurality election, three possible strategic situations can arise for a given voter:

1. *The party in the PR election closest to the voter's ideal point is also on offer in the SMD*. Voters in this situation are *satisfied*. They have the chance to vote a straight party ticket. We label as '*party stickers*' voters who exercise this option, continuing to vote for the party with the policy position closest to their ideal point. We label as '*party switchers*' voters who for some reason choose to split their ticket and cast their SMD vote for a different party.
2. *The party in the PR election closest to the voter's ideal point is not on offer in the SMD; of the more limited menu on offer in the SMD, the party closest to the voter's ideal point comes from the same pre-electoral coalition as the party supported in the PR election.* Voters in this situation are *frustrated*. However, both the non-strategic incentive to vote for the closest party, and the strategic incentive to vote for the first-choice party's coalition, imply voting for the coalition party on offer in the SMD. All frustrated voters in this situation should therefore be '*coalition stickers*'.
3. *The party in the PR election closest to the voter's ideal point is not on offer in the SMD; of the more limited menu on offer in the SMD, the party closest to the voter's ideal point does not come from the same pre-electoral coalition as the party supported in the PR*

[28] Hinich and Munger, *Ideology and the Theory of Political Choice*, p. 46.

[29] We are acutely aware that there are many ways to be 'strategic' in most choice situations, and that which we focus on here is but one. Nonetheless, we do maintain that sticking with the coalition of your first choice party, when a party from a rival coalition is closer to your own ideal point, is 'more strategic' than switching coalitions in this context.

[30] Dean Lacy and Philip Paolino, 'Downsian Voting and the Separation of Powers', *American Journal of Political Science*, 42 (1998), 1180–99, p. 1197; see also Kathleen Bawn, 'The Logic of Institutional Preferences: German Electoral Law as a Social Choice Outcome', *American Journal of Political Science*, 37 (1993), 965–89.

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election. Voters in this situation are also *frustrated* and, depending on the strategic logic they bring to bear, can make one of two choices:

a. They can cast their SMD ballot for the candidate of their 'own' coalition – the coalition that contains the PR party closest to the voter's ideal point. They are exhibiting what we have called strategic behaviour in this context, in the sense that they are voting to get their most preferred (PR) party into government, rather than simply voting for the party on the more restricted SMD menu that they feel closest to. Frustrated voters choosing this option will be (strategic) *coalition stickers.*
b. They can cast their SMD ballot for the candidate of the rival coalition, supporting the party *on offer in the SMD election* that is closest to their ideal point, which will belong to a different coalition from the party they supported in the PR election. They are exhibiting what we have called non-strategic behaviour since, while they are supporting the party they most like on the more restricted SMD menu, they are if anything harming the prospect that their most-preferred (PR) party will get into government. Frustrated voters choosing this option will be (non-strategic) *coalition splitters*.

In what follows, we are mainly concerned with situations 2 and 3 above.[31] Based on the policy proximity to frustrated voters of candidates in the restricted SMD choice menu, we can distinguish between non-strategic and strategic voters in Italy, illustrated in Table 2 (ignoring the numeric estimates for now, which will be returned to later). Each frustrated voter has two choices, to stick with the coalition candidate in the SMD or to switch their SMD vote to a rival coalition's candidate. Depending on the relative proximity of the

TABLE 2 *Mean Proportions of Strategic and Non-strategic Frustrated Voters, by Coalition*

	Ulivo Coalition candidate proximity		*Polo* Coalition candidate proximity	
	Own closest	Rival closest	Own closest	Rival closest
Coalition-sticking	*Mixed strategic and non-strategic* F-UU 0.774 (0.0775)	*Strategic* F-UU 0.651 (0.1352)	*Mixed strategic and non-strategic* F-PP 0.667 (0.1059)	*Strategic* F-PP 0.535 (0.1224)
Coalition-splitting	*Non-policy* F-UP 0.213 (0.0747)	*Non-strategic* F-UP 0.335 (0.1306)	*Non-policy* F-PU 0.332 (0.1047)	*Non-strategic* F-PU 0.464 (0.1221)
	1,676	108	558	354

Note: Figures are mean quantities by party by SMD, with standard deviations in parentheses.

[31] Abstention from the SMD vote is also a possibility for frustrated voters, of course, although tests showed that there was no systematic pattern to the differences between total valid ballots in each context, and that the mean of these differences was statistically indistingiushable from zero.

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coalition candidates to their own ideal points, voters will be of several types. When voters find that the SMD candidate closest to their ideal point is from the rival coalition (Table 2, second column), yet stick with the coalition of their first-choice party (first row), we consider them to be *strategic*. They vote, not for the SMD candidate closest to their ideal point, but for the coalition candidate most likely to get their first-choice party, for which they are denied the opportunity to vote, into government. When voters find that the SMD candidate closest to their ideal point is from the rival coalition (second column) yet vote for that candidate anyway (second row) and become coalition splitters, we consider them *non-strategic*. Such voters support the party on the restricted SMD choice menu that is closest to their ideal point, despite the fact that the more successful this party, the less likely it is that their first-choice party will get into government.

It is more difficult without resorting to psychoanalysis to classify the motivations of frustrated voters finding that their own coalition candidate is the closest in the SMD election to their ideal point. Such voters are not put in the position of having to make a strategic choice between the SMD party closest to their ideal point and the SMD party most likely to help their first-choice party get into government. What we can say, however, is that, when a frustrated voter's own coalition candidate is the closest in the SMD election to his ideal point, *yet the voter nonetheless switches SMD vote to the candidate of a rival pre-electoral coalition*, we can only assume that the SMD voting choice is not driven by policy concerns. Not only is the rival coalition candidate's platform further from the voter's ideal point than his own coalition candidate's, but supporting the rival coalition candidate increases the chance that the government will exclude the voter's first-choice party. Voters in this category must thus either be irrational, or be driven by non-policy concerns, such as specific candidate characteristics or protest voting.[32] If Italian voters do rationally distinguish between parties and candidates on the basis of their policies, however, then we expect this category to be small.[33]

Underpinning our model of voter choice is the assumption that the PR vote is a sincere expression of voters' policy preferences. In this context, note that the PR element election does provide a strong incentive for voters to vote 'sincerely' for their most-preferred parties. Voting to increase support for a most-preferred party increases the probability that this party will get into government and change both policy outputs and other anticipated payoffs. It also increases the most-preferred party's claim on cabinet seats should it succeed in getting into government, further increasing its impact on policy outputs and other payoffs. Finally, increasing a most-preferred party's support in the PR election increases the party's expectation of receiving, from the intra-coalition allocation, more SMD candidacies in the next election, thereby increasing its chances of success in the future.

The assumption of sincere, policy-based voting in PR constituencies can be evaluated empirically, since it has a directly observable implication for the behaviour of satisfied

[32] Another possibility, of course, is that voters may have differing, possibly mistaken, perceptions of party platforms; or that policy preferences are multidimensional and that the choice table is more complicated than the unidimensional proximity model we implicitly assume in Figure 1. Finally, the lack of a perfect fit could be caused by measurement error, since our assumption that PR voting is sincere and that voters prefer the party whose position is closest to their ideal points does not provide a perfect measure of voter ideal points, only the party closest to the precise (unknown) voter ideal points.

[33] We are aware that one of the parties in the 'Other' category, the Northern League, is more important than others both in terms of vote share and in terms of its strategic role in the formation of electoral coalitions. However, we also believe that this party is better understood in a two-dimensional model of Italian politics where our analysis uses more simplified one-dimensional spatial assumptions.

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voters, among whom we should observe almost perfect party sticking. Voters whose most preferred party also offers a candidate in their SMD will face strong incentives to support this party in the SMD election and no incentive not to do so. This will be true in all constituencies except those where some third-party candidate is predicted to have a serious chance of success, where we might witness the classic type of strategic voting identified by Cox in which electors avoid wasting votes by deserting their most-preferred candidate in favour of a less-preferred candidate with a higher chance of defeating an even lesser-preferred rival.[34] In constituencies where such incentives do not exist, however, we expect satisfied voters to stick with the party they most preferred in the PR election. In such cases, the assumption that the PR vote is a sincere revelation of first preference implies that the rate of *party splitting* will be close to zero.

OPERATIONALIZING STICKING AND SPLITTING

A Partition of Voter Choice

Before the key quantities of coalition and party sticking and splitting can be estimated, we must first define them operationally in the context of the available data and characterize the full range of choice outcomes facing voters. Strategic options facing voters whose most-preferred parties are coalition members can be exclusively and exhaustively partitioned into the choice matrix shown in Table 3. Satisfied voters either support their PR-choice party in the SMD election (party stickers), or vote for some other SMD candidate, either from a rival coalition or from a non-coalition party (party splitters). We label subsets of voters by their coalition-specific choices. For example, an S-UU party sticker is a satisfied voter (S) with a most preferred party in the *Ulivo* coalition, supported in both PR and SMD elections (UU). An S-UP voter, however, is a satisfied (S) party splitter with a most-preferred party in the *Ulivo* coalition, who, despite finding a candidate from the same party running in the SMD election, votes for a candidate from the *Polo* coalition (UP). Likewise, an S-PO party-splitter voter's most-preferred party belongs to

TABLE 3 *Choice Partition When Voter's First-preference Party Belongs to a Coalition*

	Voter supports SMD candidate of:		
Voter category	Most-preferred party's coalition	Rival coalition	Neither coalition
Frustrated voter Most-preferred party has no SMD candidate	COALITION STICKER F-UU F-PP	COALITION SPLITTER F-UP F-PU	COALITION SPLITTER F-UO F-PO
Satisfied voter Most-preferred party has SMD candidate	PARTY STICKER S-UU S-PP	PARTY SPLITTER S-UP S-PU	PARTY SPLITTER S-UO S-PO

[34] Cox, *Making Votes Count*, p. 72.

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the *Polo* coalition, but votes for a non-coalition SMD candidate despite finding the same party running in the SMD election.

Frustrated voters either support a candidate from the same coalition as their PR-choice party (coalition stickers), or vote for some other SMD candidate (coalition splitters). Thus an F-PP coalition sticker is a frustrated voter (F) with a most preferred party in the *Polo* coalition, who votes for a *Polo* candidate from some other party in the SMD election (PP).

In the 1996 Italian election, 14.6 per cent of Italian voters cast their PR ballots for parties outside of the *Ulivo* and *Polo* electoral coalitions. While these parties consist of a diverse group – including regional parties, far-left parties, and a neo-fascist party – they have in common small nationwide vote support and a rejection of the two major pre-electoral coalition arrangements. For the simple reason of separating them from the coalitions, we have grouped non-coalition parties into an 'Other' category. For those voters not supporting a coalition party, there is a slightly different choice matrix since there was frequently more than one non-coalition candidate in a SMD (this happened in 160 districts in 1996). However, we can still classify voters with a first preference for a non-coalition party in terms of whether they are satisfied or frustrated, and can still identify the SMD voting strategies open to both frustrated and satisfied PR voters for non-coalition parties. Each choice category has the same interpretation as in Table 3, except that two new categories are added, S-OO′ and F-OO′, describing non-coalition voters who support two different non-coalition parties – O and O′ – in the PR and SMD elections.

Estimating Party Policy Positions

The data used to estimate the key quantities of interest from Table 3 are aggregate election results from the 1996 Italian election, measured at the SMD level. In order to assess the policy proximity of the coalition candidates, we also need some external measure of party policy positions. For this purpose we draw on estimated positions of the Italian parties on the left–right dimension of economic policy. These measures are derived from a mass survey carried out immediately after the 1996 elections by ISPO, one of the leading institutes for the study of public opinion in Italy. We selected those survey questions relating to economic policy to create a measure of party positions. These left–right measures provide a widely accepted uni-dimensional placement of the parties as they would have been perceived by voters.[35] While other policy dimensions have been identified within contemporary Italian politics, and are important in their own right, the left–right scale of economic policy is widely identified as the most visible and salient dimension by which voters distinguish between parties.[36]

Figure 1 portrays the policy scores, showing clearly that the two coalitions spanned substantial sectors of the left (*Ulivo*) and right (*Polo*) of the policy space. The policy position 0.04 on this dimension divides the two coalitions.[37] Measured in terms of this

[35] For computer-based content analysis and expert survey-based estimates of policy positions for Italian parties in 1996 which are highly correlated with those employed here, see Miranda de Vries, Daniela Giannetti and Lucy Mansergh, 'Estimating Policy Positions from the Computer Coding of Political Texts: Results from the Netherlands, Italy and Irish Government Declarations', in Michael Laver, ed., *Estimating the Policy Positions of Political Actors* (London: Routledge, 2001), pp. 193–216.

[36] Giacomo Sani and Paolo Segatti, 'Fratture sociali, orientamenti politici e voto: ieri e oggi', in D'Alimonte and Bartolini, eds, *Maggioritario finalmente,* pp. 249–81.

[37] It just so happens that the two coalitions meet at the 0.04 policy position, but nothing in this analysis depends upon such an overlap.

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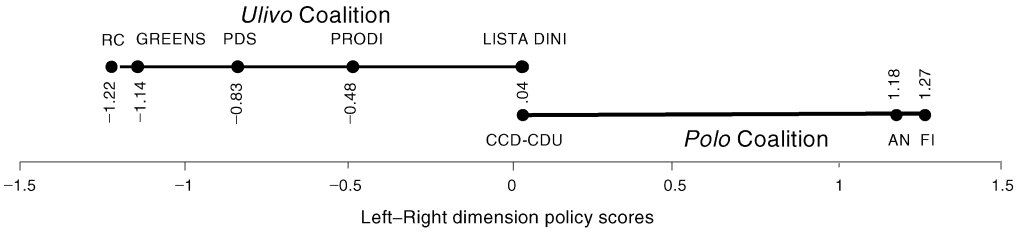


Fig. 1. Policy postions of parties from Italian electoral coalitions
Note: Scores are normalized ISPO factor scores as described in the text. Scores for non-coalition parties were not available.

dimension, voters to the left of this position should prefer the *Ulivo* coalition, and voters to the right of the line should prefer *Polo*. We define the inter-coalition midpoint (ICM) in each SMD as representing the point halfway between the positions of the parties of the candidates offered by each coalition in the constituency in question. This dividing line will represent our partition of voters in a simple policy proximity model for each constituency.[38] Non-strategic behaviour implies that frustrated voters whose ideal points are to the left of the ICM should vote for the *Ulivo* coalition candidate, and those whose ideal points are to the right of the ICM should vote for the *Polo* coalition candidate.

Prior Expectations

Consider first those voters whose ideal points are close to the parties near either end of the economic policy dimension – RC, Greens and PDS on the left, AN and Forza Italia on the right.[39] Clearly, supporters of these parties can never find themselves in the strategic dilemma forcing a choice between strategic coalition sticking and non-strategic coalition splitting. Such voters support their closest party in the PR election and, whatever party their coalition puts up in the SMD election, this party will be closer to these voters' ideal point than any party the rival coalition could possibly put up. We therefore expect all such voters to be coalition stickers, since strategic and non-strategic choice both imply this. *This implies that we should observe levels of coalition splitting among PR supporters of RC, Greens, PDS, AN and Forza Italia that are very small.*

This situation is rather different, however, for voters whose ideal points are closer to the positions of the other three parties. Supporters of the Prodi list, Lista Dini and the CCD-CDU in the PR election might well find themselves in a local strategic situation in the SMD in which 'their' coalition puts up a candidate from a more extreme party, while

[38] Because the party mechanism for selecting SMD candidates, furthermore, is independent of the policy position of the rival coalition candidate, the ICM is also determined exogenously to potential coalition-splitting.

[39] To see this for the PDS, note that a PDS supporter must have an ideal point to the left of the midpoint between the PDS and Prodi lists (− 0.65), placing her closer to the most left-wing *Ulivo* party (RC at − 1.22) than to the most left-wing *Polo* party (CCD-CDU at + 0.04). Strictly, there is a tiny area of potential AN support for which this might not be true, since the midpoint between AN and CCD-CDU is 0.610 and the midpoint between the most right-wing *Ulivo* party (Lista Dini at 0.04) and the most right-wing *Polo* party (Forza Italia at 1.27) is 0.655. *Polo* voters with ideal points between 0.610 and 0.655 on this economic-policy scale would marginally prefer CCD-CDU in an SMD contest between CCD-CDU and Forza Italia and have an 'expressive' incentive to be coalition splitters. But this zone is so small and so deeply within the realms of measurement error that we ignore it in this context.

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the rival coalition puts up a more moderate candidate. Thus a Lista Dini PR voter in an SMD, forced to choose between an RC candidate from the *Ulivo* and a CCD-CDU candidate from the *Polo*, could have an ideal point much closer to the CCD-CDU and would need a strongly instrumental rationale to be a coalition sticker and support the RC in the SMD election. Such a voter would have a stronger non-strategic incentive to be a coalition splitter. *This implies we expect the highest levels of coalition splitting for PR supporters of CCD-CDU and Lista Dini, with higher levels of coalition splitting for supporters of the Prodi list than for the more extreme parties.*

Finally, we expect the position of the inter-coalition midpoint – the policy halfway mark between the parties of each coalition's SMD candidates – to affect the level of coalition splitting. If *Ulivo* fields a left-wing candidate in a given SMD and the *Polo* fields a centrist candidate, then the ICM will be to the left of centre. There will be less incentive for coalition splitting by voters who supported *Polo* parties in the PR election and more incentive for coalition splitting by those who supported *Ulivo*. The converse will be true if *Ulivo* fields a centrist candidate and the *Polo* fields a right-wing one – the incentives for coalition splitting will be with those who voted for a *Polo* party in the PR election. *Thus we expect to find that the rate of F-UP coalition splitting will be negatively related, and the rate of F-PU coalition-splitting positively related, to the position of the ICM in the SMD.*[40] In the section that follows we estimate levels of coalition sticking and splitting and attempt to explain variations in these rates at the district level, in order to see whether our expectations are confirmed.

ESTIMATING POLICY MOTIVATIONS AMONG FRUSTRATED VOTERS

Overall Coalition Sticking and Coalition Switching

To measure splitting and sticking at the individual level, we use King's technique of ecological inference.[41] Our estimation is based on using the extended EI method applied to 2×3 sub-tables of the full partition of voter choices described in the previous section. Working from observable marginal quantities in the voter choice table shown in Table 3, this technique allows us to estimate the unobserved cell quantities S-UU, S-PP, S-UP, S-PU, etc. Complete details of this estimation are provided in Appendix B.

Table 4 reports estimated rates of coalition sticking and coalition splitting in the SMD elections obtained by using King's extended EI method, aggregated from individual SMDs in a procedure that weights the averages by the number of voters. The aggregate estimates allow us to see that there were significant levels of coalition splitting for each of the big coalitions. The rate of coalition splitting for those voting for a *Polo* candidate in the PR election (F-PU) was nearly twice as high (at 35 per cent) as the rate of coalition-splitting (21 per cent) for frustrated *Ulivo* voters (F-UP). This relative inability on the part of the *Polo* coalition to hold on in the SMD elections to voters who voted for *Polo* candidates in the PR election would have been a significant source of weakness for *Polo* in the election as a whole.

Patterns in coalition splitting involving non-coalition candidates are also striking. First, frustrated voters for coalition PR candidates *almost never switched their support to non-coalition candidates* (F-UO and F-PO) in the SMD election. Coalition splitting in this

[40] Operationally, a higher score means a more right-wing ICM.
[41] King, *A Solution to the Ecological Inference Problem.*

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TABLE 4 *Aggregate Estimates of Coalition Sticking and Splitting in SMDs for Frustrated Voters*

Quantity	Point estimate	s.e.	*N*
Ulivo			
F-UU (Coalition-sticker)	0.78	0.012	1,784
F-UP (Coalition-splitter)	0.21	0.011	1,784
F-UO (Coalition-splitter)	0.01	0.000	1,784
Polo			
F-PP (Coalition-sticker)	0.65	0.012	912
F-PU (Coalition-splitter)	0.35	0.012	912
F-PO (Coalition-splitter)	0.00	0.000	912
Non-Coalition			
F-OO′ (Coalition-sticker)	0.03	0.001	1,356
F-OU (Coalition-splitter)	0.49	0.013	1,356
F-OP (Coalition-splitter)	0.48	0.013	1,356

Note: For estimation details, see Appendix B.

context almost invariably took place between the two big coalitions. Secondly, frustrated non-coalition voters almost invariably become 'coalition' splitters. If the non-coalition party they supported in the PR election was not available in the SMD, then they only rarely voted for another non-coalition party in the SMD (F-OO′). Most switched to a candidate from one of the big coalitions (F-OU and F-OP). We regard this result as entirely plausible given the ideological diversity of non-coalition parties – generally either extreme or oriented towards specific policy or regional interests – who consequently have little mutual attraction for supporters.

Coalition Splitting and Policy Proximity

Our explanation of coalition splitting and sticking among frustrated voters is driven by party policy. The expectation is that supporters of more extreme parties will exhibit the highest rates of coalition sticking, and voters for centrist parties the lowest. Figure 2 vindicates these theoretical expectations, summarizing district-level estimates of coalition sticking by party and coalition. The patterns strongly support the argument that PR supporters of more extreme parties have few strategic incentives for coalition splitting. Within the *Ulivo*, rates of coalition sticking by PR supporters of RC, the Greens and PDS were highest, with the median district-level coalition-sticking rate for PDS being nearly 80 per cent. Rates of coalition sticking were lowest for frustrated PR supporters of the centrist *Ulivo* parties, the Prodi list and the Lista Dini. The same pattern in coalition sticking is even clearer for frustrated PR supporters of *Polo* parties, although overall levels of sticking were lower than for *Ulivo* party supporters. Supporters of the more extreme parties, Forza Italia and AN, had significantly higher rates of coalition sticking, with median rates around 64 and 67 per cent, while supporters of CCD-CDU had much lower rates of coalition sticking, with a median rate of 55 per cent. The overall patterns shown in Figure 2 are remarkably consistent with our theoretical expectations, given that the rates of

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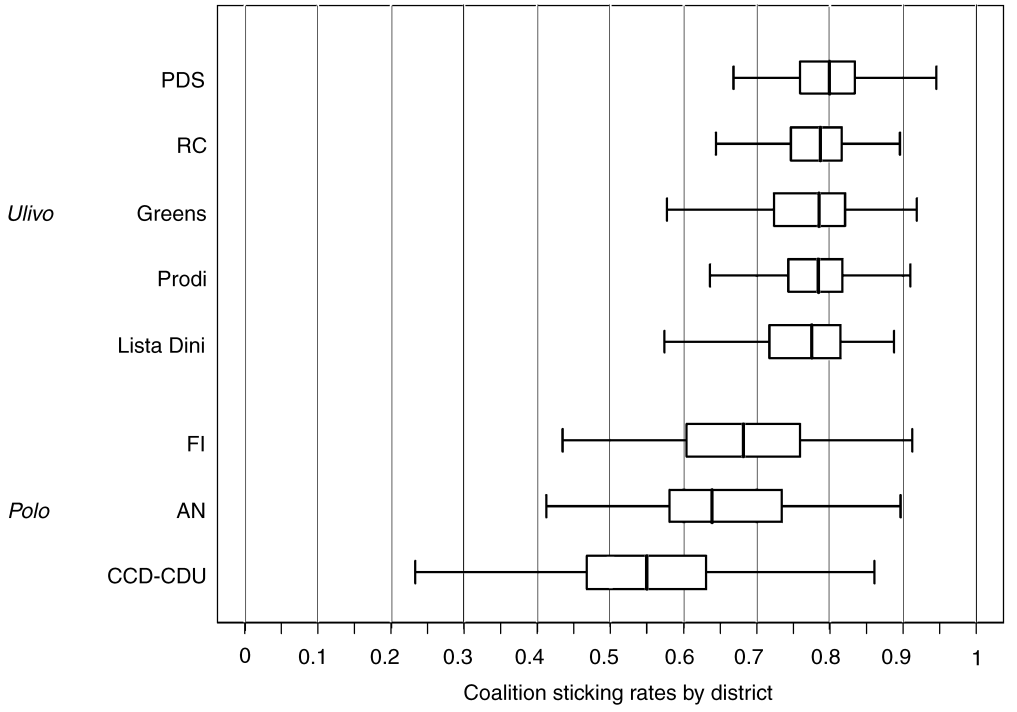


Fig. 2. Coalition-sticking among frustrated voters by party and coalition
Note: Outside values have been excluded.

coalition sticking among different groups of party supporters were ranked in almost precisely the same order as the 'extremity' of the policy position of the party in question.

Taking this analysis further, we now use the ICM to classify frustrated voters from each coalition into those whose own coalition candidate's policy position is closest, and those for whom the rival coalition's candidate is closest. Returning to the numeric quantities in Table 2, we have presented the mean estimates of coalition-sticking (F-UU and F-PP) and coalition-switching (F-UP and F-PU) for each party in each district, classified by coalition candidate proximity. The totals at the bottom of each column refer to how many parties, from all SMDs, found their voters in this situation.

The estimates in Table 2 strongly confirm expectations. First, levels of coalition sticking for both coalitions are substantially higher – about 77 per cent as opposed to 65 per cent for *Ulivo* and 67 per cent as opposed to 54 per cent for *Polo* – among voters whose *own coalition* candidate's policy position was closest as opposed to those for whom the *rival coalition* candidate's position was closest. Secondly, the proportion of voters we have characterized as 'strategic' coalition stickers is higher for *Ulivo* (65 per cent) than for *Polo* (54 per cent), implying that frustrated *Ulivo* voters acted more instrumentally in the SMDs to get 'their' party's coalition into power. This greater degree of coalition cohesion is clearly consistent with *Ulivo*'s eventual victory in the elections. Finally, there is a non-negligible amount of apparently non-policy coalition splitting among frustrated voters. These are the voters whose own coalition candidate is closest to their own ideal point, but who switch coalitions nonetheless. (Such voting behaviour could be generically

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thought of as reflecting non-policy *candidate* preferences.) About a fifth (0.213) of *Ulivo* PR voters whose own coalition candidate was closest to their own ideal point nonetheless voted in the SMD for a candidate from a rival coalition. About a third (0.332) of those who voted for *Polo* in the PR election fell into this category.

Policy Proximity as a Stochastic Effect

A more precise way to use relative policy positions to explain variations in voter responses to the local strategic situation involves a probabilistic model of switching and splitting. This approach treats the degree of non-strategic coalition splitting as a random variable whose variation across districts is influenced by the relative distance between a frustrated voter's most preferred party's policy position, and the relative policy positions of the two coalition candidates actually on offer. This moves beyond the simple dichotomous categorization of voters in the previous subsection. The implication is that, when a voter's own coalition candidate is relatively far away in policy terms, and the rival coalition candidate is relatively close, the psychological 'cost' of strategic behaviour (voting for a party that is relatively disliked when a party that is relatively liked is on offer) is higher, increasing the temptation to vote non-strategically for the most preferred candidate on the restricted SMD choice menu.

To estimate the relative influence of policy on coalition sticking and coalition splitting, we use weighted least-squares regression to estimate the effect of changes in the ICM on the switching and splitting quantities F-UU, F-UP, F-PP and so on. While recognizing potential limitations in relation to both estimation technique and measurement error, we nonetheless feel that the finding of a theoretically consistent, significant relationship will provide strong evidence of a relationship between policy and vote choice among frustrated voters. We also feel that our approach represents the best available methodological option, given our substantive lack of firm knowledge about coalition splitting patterns in Italy as well the methodological limitations of using EI estimates in second-stage regressions.[42]

Table 5 presents the results of the second-stage regressions, weighted by the standard errors from the EI estimation. We expect coalition splitting by frustrated *Ulivo* supporters (F-UP) to decrease, and by *Polo* supporters (F-PU) to increase, as the position of the ICM moves rightwards (and its scale position thus increases). Conversely, coalition sticking by frustrated *Ulivo* supporters (F-UU), and by frustrated *Polo* supporters (F-PP), should move in the opposite direction. From the coefficient estimates on the ICM variable in the columns headed F-UU and F-PP, we see that this is in fact precisely what happens. As the ICM shifts

[42] The practice of using quantities estimated from EI as dependent variables in second-stage regressions is known in the methodological literature as 'EI-R'. We are aware of and have tried to follow carefully the prescriptions of the most recent methodological literature on 'EI-R', using King's EI estimates as dependent variables in second-stage regressions. First, we do not include as independent variables in EI-R any quantities not originally included as covariates in the first-stage EI estimation. This directly follows the advice of Christopher Adolph, Gary King, Michael C. Herron and Kenneth W. Shotts, 'A Consensus on Second Stage Analyses in Ecological Inference Models', *Political Analysis*, 11 (2003), 86–94. Secondly, we employ weighted least squares (WLS) using the estimated EI standard errors as weights, as recommended by Adolph *et al*. Finally, we conducted the specification test for inconsistency described in Michael C. Herron and Kenneth W. Schotts, 'Logical Inconsistency in EI-Based Second-Stage Regressions', *American Journal of Political Science*, 48 (2004) 172–83. Our analysis passes the Herron and Schotts test, which does not necessarily indicate consistency, but fails an attempt to detect it. We recognize limitations in our approach but the robustness of our estimates across a variety of specifications, as well as our best attempt to address the methdological concerns associated with EI-R, lead us to believe our estimates are valid.

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TABLE 5 *Second-Stage WLS Regressions Using Estimated Coalition Sticking and Switching as Dependent Variables*

	Dependent variable					
Variables/Quantities	F-UU	F-UP	F-PP	F-PU	F-OU	F-OP
Inter-coalition midpoint	0.156*	− 0.158*	− 0.259*	0.258*	0.124*	− 0.125*
(s.e.)	(0.0064)	(0.0062)	(0.0119)	(0.0118)	(0.0079)	(0.0080)
Constant	0.729*	0.258*	0.653*	0.345*	0.468*	0.499*
(s.e.)	(0.0021)	(0.0020)	(0.0039)	(0.0039)	(0.0025)	(0.0025)
N	1,784	1,784	912	912	1,346	1,346
Adj. R^2	0.25	0.27	0.34	0.34	0.15	0.15
Root MSE	0.080	0.077	0.098	0.097	0.082	0.083

Note: Units are groups of frustrated party voters in each SMD. Weights are the estimated and transformed standard errors from the EI/EI2 estimations (see Appendix B for details).
*Statistically significant at the $p < 0.001$ level.

to the right by one unit (on a scale ranging for all parties from − 1.22 to 1.27, Figure 1) the average rate of *Ulivo* coalition sticking increases by 15.6 per cent, a highly significant result in both statistical and substantive terms. For frustrated *Polo* voters, the effect is even more dramatic: a one-unit shift to the left in the ICM results in an increase in coalition sticking of 25.9 per cent. The ICM coefficient estimates for the F-UP and F-PU also strongly confirm our expectations. (They provide nearly mirror images of the estimates for the coalition sticking quantities F-UU and F-PP because, as we have noted already, nearly all vote splitting takes place between coalitions rather than between a coalition party and a non-coalition candidate.)

Finally, we also observe an effect on switching by non-coalition voters in response to the movement of the ICM. As seen previously, frustrated voters whose most preferred party did not belong to a coalition vote in large proportions for coalition candidates. As the ICM moves to the right, this increases switching in favour of the *Ulivo* candidate – by about 12.4 per cent for a one unit positive shift of the ICM. Conversely, as the ICM moves to the left by one unit, 'other' voter switching to the *Polo* candidate increases by 12.5 per cent. In essence, voters increased their rate of switching to *Ulivo* parties (F-OU) in the SMD when the ICM was more to the right of the economic policy dimension, and to increase their switching to *Polo* parties in the SMD (F-OP) when the ICM was more to the left.

In sum, the results strongly support the notion that the willingness of voters to engage in strategic behaviour is a function of the policy distance from the voter's ideal point and the policy positions of the two coalition candidates on offer in the restricted SMD choice menu. The striking pattern shown in Table 5 is that, as the policy position of a voter's own-coalition candidate in the SMD moves farther away from the voter's most preferred party – and by implication the voter's own ideal point – the psychological costs of strategic coalition-sticking increases, shifting voter emphasis away from strategic concern with policy platforms and increasing the rates of coalition-splitting expressive voting. Strategic vote splitting, therefore, is directly affected by the relationship between voter ideal points and the policy positions on offer in the restricted SMD choice menu.

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VOTING PATTERNS AMONG 'SATISFIED' VOTERS

As a final test of the impact of policy on the strategic choices of Italian voters, we estimate analogous quantities for *satisfied* voters, to verify whether their patterns of party sticking and party splitting are consistent with the model of voting behaviour in mixed-member sysems that we set out above. As noted previously, satisfied voters who nonetheless split their vote cannot be said to be voting primarily on the basis of spatial models of either party policy platforms or anticipated government policy outputs. If we were to find high levels of party splitting among satisfied voters, this would suggest strongly that a policy-driven model of voting behaviour is missing something very important when applied to the Italian mixed-member system. If we find high levels of party-sticking satisfied voters, however, this is certainly consistent with our policy-driven model of Italian voting behaviour. Low levels of party splitting, furthermore, provide empirical support for the assumption that the PR vote is a sincere revelation of the voter's first-preference party.

Table 6 presents aggregate EI estimates of party sticking and splitting among satisfied voters and strongly confirms our theoretical expectation that nearly all satisfied voters are party stickers. Overall, 96 per cent of *satisfied Ulivo* voters – those offered the same party in both PR and SMD elections – chose to stick with the same party in the two elections (S-UU), while only 4 per cent split their ballot and supported a different party in the SMD election (S-UP or S-UO). Very similar results were observed for supporters of *Polo* parties in the PR election. Aggregate *Polo* party sticking (S-PP) was estimated at 97 per cent, meaning about 3 per cent of *Polo* coalition party PR voters having the option to vote for the same party in the SMD, chose instead to cast their SMD ballot for the *Ulivo* candidate (S-PU). On the aggregate level, it was estimated that virtually no voters preferring a

TABLE 6 *Aggregate Estimates of Party Sticking And Party Splitting in SMDs (for Satisfied Voters)*

Quantity	Point estimate	s.e.	*N*
Ulivo			
S-UU (Party Sticker)	0.96	0.009	464
S-UP (Switcher to *Polo*)	0.04	0.009	464
S-UO (Switcher to Other)	0.00	0.000	464
Polo			
S-PP (Party Sticker)	0.97	0.001	464
S-PU (Switcher to *Ulivo*)	0.03	0.001	464
S-PO (Switcher to Other)	0.00	0.000	464
Non-Coalition			
S-OO (Party Loyal)	0.97	0.001	629
S-OO′ (Switching Voting Other)	0.06	0.002	629
S-OU′ (Switching Voting *Ulivo*)	0.42	0.027	629
S-OP′ (Switching Voting *Polo*)	0.52	0.029	629

Note: For estimation details, see Appendix B. S-OO refers to the satisfied Other party voters that chose to stick with their most preferred party by voting for that party's SMD candidate. S-OO′ refers to the proportion of non-coalition satisfied voters who switched their vote to a different Other party candidate, and S-OU′ and S-OP′ the analagous estimated proportions switching to the respective coalition candidates.

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coalition party split their vote by supporting a non-coalition candidate (S-UO or S-PO), when a candidate from their most-preferred party was available in the SMD. Similar estimates for non-coalition voters also indicate an extremely high level of party sticking among non-coalition satisfied voters. Approximately 97 per cent of voters most preferring a non-coalition party also voted for that party's SMD candidate. Among the 3 per cent who split their vote by choosing another party, all but 6 per cent voted for coalition candidates, with slightly more switching their vote to a *Polo* candidate than to an *Ulivo* candidate.

Our theoretical expectation of party sticking by satisfied voters is overwhelmingly supported by the estimated voting patterns, buttressing our contention that a voter's PR vote can be taken as a sincere revelation of preference. Furthermore, the rates of party sticking were virtually the same between *Ulivo*, *Polo* and non-coalition voters, although some variation was observed at the district level and between parties (not shown). In those local situations in which it is possible for them to do so, we conclude that satisfied voters tend overwhelmingly to stick in the plurality election with the party they supported in the PR election, suggesting at the very least a highly structured pattern of voting choice among Italian voters, and being entirely consistent with the model we have set out in this article.

CONCLUSIONS

The policy distance between a frustrated voter's PR party and the policy positions of available candidates in the restricted SMD choice menu influences whether they 'strategically' stick with their coalition – thereby enhancing the chance that their first-choice party will get into government – or switch to the rival coalition – thereby voting 'non-strategically' for the SMD candidate whose policies they prefer. Estimated at the district level, our evidence shows that voter strategy under restricted menu choice depends not only on policy proximity, according to the classical spatial model, but also on the policy *outcomes* associated with the restricted menu choice. Voters in each district, our findings indicate, combined primarily strategic and policy non-strategic motivations, with the relative levels varying according to coalition and to party. Furthermore, our results show critically that strategic coalition-sticking is strongly influenced by the closeness of a frustrated voter's ideal point and the policy platform of the coalition candidate to be supported under strategic coalition sticking. When such strategic behaviour involves voting for a candidate who is much farther away in policy terms than the most preferred alternative on the restricted SMD choice menu, then frustrated voters are much more likely to become coalition switchers, and thereby vote 'non-strategically', presumably because of the higher costs associated with choosing a strategic policy vote versus a sincere policy vote. The evidence seems to fit the classical Downsian characterization of a voter who does 'not merely compare platforms [but] instead must estimate in his own mind what the parties would actually do were they in power'.[43] When the perceived policy costs of a strategic coalition-switching vote are too great for a frustrated voter, that voter is more likely to revert to comparing platforms and vote according to policy proximity. Although the context is quite different, our research suggests interesting extensions to research on Lacy and Paolino's finding that presidential vote choice may be influenced more by concerns with outcomes such as policy balancing than by direct preferences for policy platforms.[44] The technique may also be capable of being deployed to throw empirical light on debate

[43] Downs, *An Economic Theory of Democracy*.
[44] Lacy and Paolino, 'Downsian Voting and the Separation of Powers'.

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between those assuming classical Downsian 'proximity' voting and those assuming 'directional' voting, under which a voter supports parties advocating policies on the same 'side' of the status quo as s/he is.[45]

The high rates of 'strategic' coalition sticking also confirm the importance of pre-electoral coalition politics in Italy, organizing voters to vote instrumentally even when the temptation to switch coalitions, given the particular candidates on offer in the SMD, is compelling. Pre-electoral coalitions organize the vote in SMDs and offer choices between alternative government coalitions, but preferences for parties continue to characterize voter preferences. In the 1996 election that we have analysed, for instance, our results confirm the observation of Bartolini that the defeat of the centre-right *Polo* coalition was caused by its incapacity to control its 'peripheral fringe'. *Polo* coalition voters, writes Bartolini, felt 'less pressure to rally against the centre-left and more willingness, therefore, to split their votes when unhappy about the centre-right candidate they find in their district'.[46] Our results have added precise empirical support to this observation and added considerable new insight into the problem, showing that not only internal policy coherence, but also the policy distance between coalition candidates in SMDs, affects rates of coalition sticking among frustrated voters. The substantive implication for Italian politics is to suggest that an improved strategy for candidate nomination by coalitions in the single-member districts would be to take into account not just the position of their own candidates, but also their positions relative to those of the rival coalition. Furthermore, the firm evidence is that Italian voters – at least those with restricted menu choice – engage in voting based on policy proximity, adding a new dimension to knowledge about the Italian voter.[47] Finally, our separation of satisfied and frustrated voters – distinguishing those with the *option* to split their tickets from those who are forced to do so – suggests that nearly all of the ticket splitting in the Italian mixed-member system comes from pre-electoral coalition arrangements and that, when not forced to do so, Italian voters tend not to split their tickets. This is a aspect of ticket splitting in the Italian context that has not been previously explored.

As an exercise in estimating individual voter transition rates from aggregate data, our investigation of Italian split-ticket voting also offers a new type of application of King's EI model. As King points out, however, there is ultimately no solution to the ecological inference problem, and estimates are still only estimates.[48] Our estimates of policy instrumental and policy expressive voting are not free from these limitations, despite their numerous advantages over other methods of estimating rates of split-ticket voting. First, we have collapsed the multi-dimensional table in each district into two rows, a necessary

[45] See, for example, George Rabinowitz and Stuart Elaine Macdonald, 'A Directional Theory of Issue Voting', *American Political Science Review*, 83 (1989), 93–121; and Merrill and Grofman, *A Unified Theory of Issue Voting*. The application of our method to directional voting in the Italian context would, however, require significant new and 'hard to test' assumptions about voter perceptions of the status quo under a mixed-member system with party coalitions and coalition governments.

[46] Stefano Bartolini, 'The Political Consequences of the Italian Mixed Electoral System (1994–2001)' (paper presented at the Conference on Elections and Democracy, Social Science Institute (ICS), University of Lisbon, February 2002).

[47] Italian voting behaviour has frequently been considered to be based on non-rational or party-loyal motivations. See Chiaramonte Alessandro, 'L'effetto mancato della riforma maggioritaria: il voto strategico', in Roberto D'Alimonte and Stefano Bartolini, eds, *Maggioritario per caso (*Bologna: Il Mulino, 1997).

[48] King, *A Solution to the Ecological Inference Problem*.

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but not optimal choice given cell interdependencies and other possible interactive effects.[49] Future work in multiparty contexts would be well served by the ability to estimate unobserved cell quantities in fully $R \times C$ tables. Future work applying ecological inference to the study of ticket splitting might also consider testing for spatial auto-correlation effects, perhaps using geographically-weighted regression,[50] since our examination – similar to the majority of political science work in electoral studies – has not dealt directly with potential problems of spatial dependence. Our estimation has also relied heavily on several key assumptions to parameterize the ticket splitting in a manner that can be estimated, although we have attempted to justify these empirically – as in the case of sincere PR voting – whenever possible. Our measurement of vote ideal points is also a general benchmark that is hardly free from error in specific cases, both for voters and at the district level for assuming that all candidates in all constituencies and districts have positions identical to their party's. Finally, Italian politics is more highly dimensional than can be fully represented by a single economic policy scale. Yet we would expect all of these limitations to result in the lack of significant findings, rather than producing such clear and robust results as we have found in our analysis. Our strong findings, consistent with both theoretical expectations and a plausible explanation as to why *Ulivo* won the 1996 election, indicate convincingly that, despite the imperfections of our estimation procedures, the relationships we have measured do in fact characterize Italian voting behaviour.

Finally, while our results are of interest in the context of Italian elections, the method and type of analysis we set out here clearly have broader applications. The EI method for larger tables we have used here can be applied to other mixed-member elections in Italy and elsewhere. Furthermore, every democratic country has elections to more than one tier of representation, whether local, regional, national or supranational. These situations will put the same voters in different strategic contexts for the different elections, possibly held simultaneously.[51] Furthermore, political arrangements also frequently restrict voter choice in other national contexts, as with the mixed-member systems in Lithuania and Hungary, and in two-round systems such as in Hungary and France, where parties agree to withdraw eligible candidates from run-off contests. Here, we have presented a framework for setting out the different strategic choices facing voters in such situations and have demonstrated how to estimate the key quantities from observed voting behaviour using ecological inference techniques, allowing actual election data to provide a direct link between strategic context and individual-level voting behaviour.

[49] King, *A Solution to the Ecological Inference Problem*; Ori Rosen, Wenxin Jiang, Gary King and Martin A. Tanner, 'Bayesian and Frequentist Inference for Ecological Inference: The R × C Case', *Statistica Neerlandica*, 55 (2001), 134–56.

[50] For instance, see Ernesto Calvo and Marcelo Escolar, 'The Local Voter: A Geographically Weighted Approach to Ecological Inference', *American Journal of Political Science*, 47 (2003), 189–204.

[51] Non-simultaneous elections add a large additional level of complexity, not addressed here, which arises from the need to deal with turnover in the set of voters.

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APPENDIX TABLE A. DISTRICT FREQUENCY OF PARTIES WITH SATISFIED AND FRUSTRATED VOTERS

	Satisfied			Frustrated		
Party	*Ulivo*	*Polo*	Other	*Ulivo*	*Polo*	Other
PDS	226			250		
POP-SVP-PRI-UD-Prodi	138		7	329		
RI – Lista Dini	40			407		
Federazione Dei Verdi	34			440		
Rifondazione Comunista	26		1	448		
Forzai Italia		232			242	
Alleanza Nazionale		162			312	
CCD-CDU		80			394	
Lega Nord			228			31
Movimento Sociale Tricolore			179			204
Mani Pulite			34			73
Pannella-Sgarbi			27			385
Partito Umanista			27			84
Socialista			16			199
Other	8		110			446
Total	472	474	625	1,871	948	1,422
Total Satisfied Districts			1,564			
Total Frustrated Districts						4,104

Note: This table lists all of the single-member districts (from the total of 475) in which the party listed either had a candidate ('satisfied') or did not ('frustrated'). The three subcolumns in each major column also indicate the coalition to which each party belonged. In 1996, *Ulivo* consisted of Federazione Dei Verdi (Greens), Pop-SVP-PRI-UD-Prodi (including Italian Popular Party/PPI, Sudtiroler Volkspartei/SVP, Italian Republican Party/PRI, a centrist faction called Unione Democratica/Democratic Union (UD) and electoral committees supporting Romano Prodi as prime minister (Per Prodi); PDS (Partito Democratico della Sinistra/Democratic Party of the Left), RI-Lista Dini (Rinnovamento Italiano)/Italian Renovation-Dini List from the name of its leader, the outgoing Prime Minister Lamberto Dini) and Partito Sardo D'Azione/PS D'AZ (a local party). Although not formally part of the *Ulivo* coalition, RC (Communist Refoundation) is also included because of the nature of their exclusivity pacts in 1996, which functioned like the formal coalition agreements (generally under the Progressisti '96 label). *Polo* consisted of Centro Cristiano Democratico/Christian Democratic Centre (CCD)-Cristiani Democratici Uniti/United Christian Democrats (CDU), Forza Italia/Let's go Italy (FI), and Alleanza Nazionale/National Alliance (AN).

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APPENDIX B. METHODOLOGICAL DETAILS: KING'S EXTENDED EI METHOD

Estimations of sticking and switching use King's method of ecological inference, extended for 2×3 tables.[52] The details of each set of estimations are as follows.

Party Sticking and Switching Estimates

Partitioning voters for coalition parties according to their PR and plurality votes, we obtain a 2×3 table of vote choice for voters of each party p, using notation from King's extended EI model.[53]

	Vote for non-party p candidate: Vote for rival coalition's candidate	Vote for non-party p candidate: Vote for non-coalition candidate		Vote for party p candidate	
Vote for party p's list	λ_i^b Party-splitting S-UP, S-PU	$1-\lambda_i^b$ Party-splitting S-UO, S-PO	β_i^b	$1-\lambda\beta_i^b$ Party-sticking S-UU, S-PP	X_i
Vote for a non-p list	λ_i^w	$1-\lambda_i^w$	β_i^w	$1-\beta_i^w$	$1-X_i$
	V_i		T_i	$1-T_i$	N_i^*

We can observe the following quantities from our dataset, for each SMD i:

T_i the sum of the *plurality* vote proportions of the rival coalition candidate and the non-coalition candidate(s)
V_i the *plurality* vote proportion of the rival coalition candidate as a fraction of the of the sum of the *plurality* vote proportions of the rival coalition candidate and the non-coalition candidate(s)
X_i the proportion of party p's *list* vote in district i
N_i^* the adjusted number of valid votes in this SMD (mean of total list and plurality valid votes).

Here we are concerned with the b-superscripted values (β_i^b and λ_i^b), since our focus in each analysis is for party p. The use of N_i^* as a mean between total list and plurality votes is simply to equalize the ballots cast in the mixed-member system, since these are never exactly equal in any given constituency because of differential rates of invalid or unused ballots.

One constituency-level covariate (z^b) was used in the estimation procedure: the inter-coalition midpoint (ICM) between the policy scores of the coalition candidate parties. All other EI parameters remained at default values.

The aggregate measures reported in Tables 4 and 6 were obtained by transforming the quantities to yield row proportions for the full table. For instance, the constituency-level estimate of S–UO above would be $(1-\lambda_i^b)(\beta_i^b)$. To compute the aggregate totals and their standard errors, we extracted the district-level simulated quantities, performed the transformation at the constituency level and used the remaining vector of simulated (transformed) quantities to obtain standard errors and confidence intervals. The small size of the standard errors relative to the parameter estimates reflects the high number of constituencies coupled with informative bounds, as evidenced in the tomography plot (see Figure A1). Because of the high density of overlapping lines in the region of highest posterior density, we consider this tomography plot – in this case for β^b, or the estimate of (1 − F-UU) – to be informative.[54] Likewise, we have also visually inspected the key parameters of interest for aggregation bias, and find no visual evidence of this problem (Figure A2). Aggregation bias seems to have been either not present or controlled by the inclusion of the ICM as a covariate z^b, as discussed above.

[52] King, *A Solution to the Ecological Inference Problem*.
[53] King, *A Solution to the Ecological Inference Problem*, p. 30.
[54] We therefore consider that we have been 'cautious' with regard to our inference from this data, as suggested by Wendy K. Tam Cho and Brian J. Gaines, 'The Limits of Ecological Inference: The Case of Split-Ticket Voting', *American Journal of Political Science*, 48 (2004), 152–71. This also applies to our inspection of the relationship between X_i and the bounds on β^b (see Figure A2).

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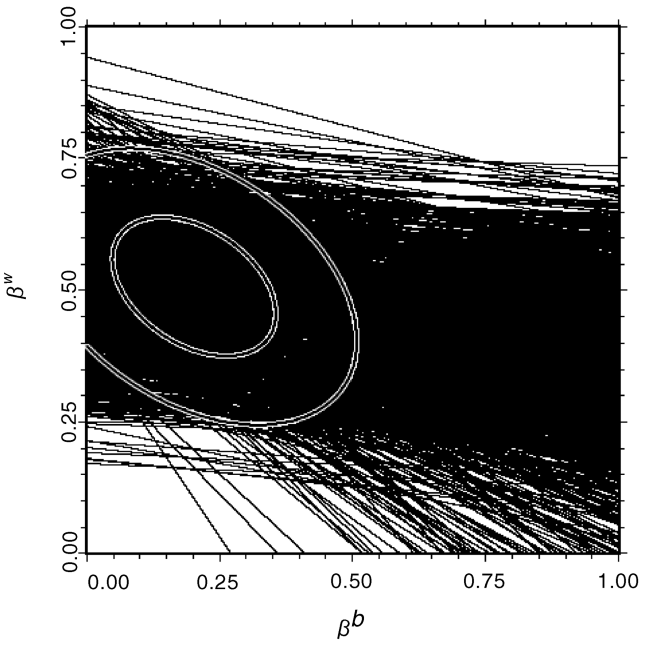


Fig. A1. Tomography plot of β^b versus β^w (Ulivo coalition)
Note: Circles represent mean posterior contours. In an 'informative' tomography plot, the tomography lines will intersect at the region of highest posterior density.

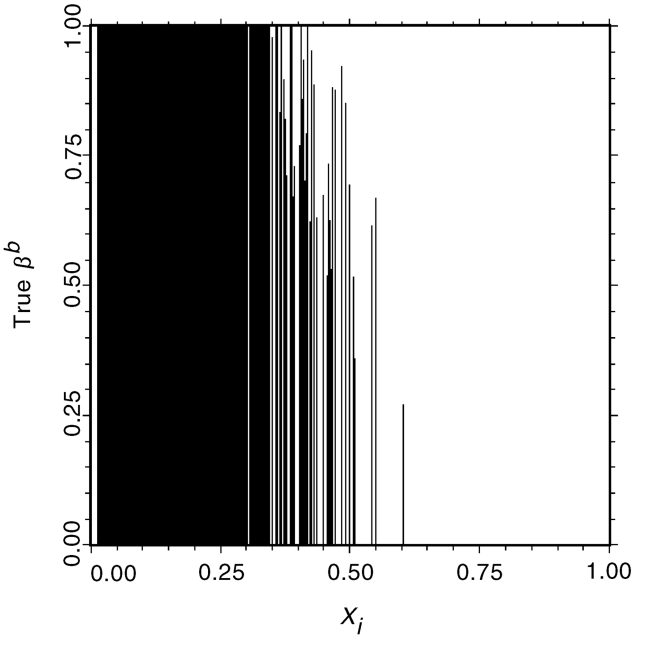


Fig. A2. Plot of X_i by the bounds on β^b (Ulivo coalition)
Note: A systematic relationship between X_i and the β^b bounds – not evident in this plot – would indicate the presence of aggregation bias.

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For voters who did not support a coalition party in the PR election we used a very similar framework, replacing the top row quantities with S-OU, S-OP, and S-OO; or S-OO′, S-O[U/P], and S-OO depending on how many non-coalition candidates were competing (full details are available upon request).

Coalition Sticking and Switching Estimates

For frustrated voters supporting coalition parties the 2×3 choice table is:

	Vote for candidate of rival coalition	Vote for non-coalition candidate		Vote for candidate of party p's coalition	
Vote for party p's list	λ_i^b COALITION SPLITTER F-UP, F-PU	$1-\lambda_i^b$ COALITION SPLITTER F-UO, F-PO	β_i^b	$1-\beta_i^b$ COALITION STICKER F-UU, F-PP	X_i
Vote for a non-p list	λ_i^w	$1-\lambda_i^w$	β_i^w	$1-\beta_i^w$	$1-X_i$
	V_i		T_i	$1-T_i$	N_i^*

We can observe the following quantities from our dataset:

- T_i the sum of the *plurality* vote proportions of the rival coalition candidates and non-coalition candidate(s), after removing the estimated plurality votes received by these candidates from satisfied voters
- V_i the *plurality* vote proportion of the rival coalition candidate as a fraction of the sum of the *plurality* vote proportions of the rival coalition candidate and the non-coalition candidate(s), after removing the estimated plurality votes received by these candidates from satisfied voters
- X_i the proportion of party p's *list* vote in district i, after removing satisfied voters
- N_i^* the adjusted number of valid votes in this SMD (mean of total list and plurality valid votes), after subtracting the total satisfied voters.

For frustrated voters supporting non-coalition parties, the top row quantities are replaced by F-OU, F-OP, and F-OO′. The methods for estimating the 2×3 tables were identical to those used in the estimation of party sticking and switching, except that the satisfied voters were first removed from N_i^*. The ICM was used as the z^b covariate for the β^b parameter.

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