

Nonseparable Preferences and Issue Packaging in Elections

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1 Introduction

Suppose a candidate in a two-candidate plurality rule election faces an opponent who has adopted the policy position of the median voter. We know from work by Hotelling (1929), Black (1948), and Downs (1957), that in a one dimensional policy space the best the challenging candidate can do is to also adopt the policy position of the median voter, yielding a tied election. Suppose further that the candidates are restricted from moving freely in the policy space, perhaps due to party reputations on the issue or to voters penalizing the candidates for changing positions. A candidate who is pinned to a losing position in a one-dimensional policy space has no recourse but to accept defeat.

In this chapter we ask: what strategies are available to a candidate facing an opponent who is unbeatable in the current policy space? As Schattschneider (1960) observed, losers in a political conflict may benefit from expanding the scope of the conflict. Schattschneider originally conceived of this strategy as bringing new groups into the conflict. But his observation extends to bringing new issues into the election. Losing candidates can potentially win elections by introducing new issues.

Whether the strategy of introducing new issues into an election will succeed depends on the structure of voter preferences on the original policy space and the new

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issues. In particular, candidates can gain an advantage in an election by introducing issues over which voter preferences are nonseparable. When a voter has nonseparable preferences across issues, her preference for a candidate's position on one issue depends on the candidate's position on other, related issues. For example, a voter may prefer a candidate who promises to cut taxes only if that candidate also pledges to cut specific government spending programs. Or a voter may prefer a candidate who opposes abortion only if the candidate also pledges to increase federal assistance to single mothers and their children. When voters have nonseparable preferences, packages of issues carry greater weight in the voting booth than each issue separately. Conversely, a voter with separable preferences evaluates a candidate's position on each issue separately from the candidate's positions on other issues.

Nonseparable voter preferences open opportunities for candidates to package issues strategically in elections. We present a model of spatial competition between two candidates. The candidates begin competing on single issue on which candidates' positions are fixed and one candidate has an advantage. We show that the disadvantaged candidate can introduce a new issue and take a position that her opponent cannot beat, but only if some voters have nonseparable preferences for the issues. If all voters have separable preferences for the issues, then the disadvantaged candidate cannot find a position to beat her opponent. We then show that nonseparable preferences are more than a theoretical curiosity. Results from a 2004 election survey demonstrate that nonseparable preferences are held by a substantial portion of the voting public on a variety of issues. The complexity of public preferences on important policy issues can profoundly influence the logic of candidate competition.

2 Spatial Competition and the Number of Issues

Most of the research on electoral competition has been a search for electoral equilibria (Black 1948; Downs 1957; Plott 1967; Davis et al. 1970; McKelvey 1976; Schofield 1978; Enelow and Hinich 1984). This body of literature offers clear theoretical results. Two candidates in a single-winner plurality election compete for votes by seeking the position of the median voter when the policy space is one-dimensional, voter preferences are single-peaked, and candidates can move freely in the policy space (Hotelling 1929; Black 1948; Downs 1957). The result is that candidates converge to the position of the median voter, resulting in a tie. However, this *candidate convergence* prediction rarely fits reality. In most two-candidate elections, the candidates adopt distinct positions. Policy-motivated candidates, uncertain voters, probabilistic voting, and the need for candidates to appeal to activists for campaign contributions all create incentives for candidates to diverge. Probably the most interesting and realistic variant on the median voter model is a multi-dimensional policy space.

As voters and candidates take positions on more than one issue, the dimensionality of the issue space expands and an equilibrium position for candidates will not generally exist. Only in the rare case in which the distribution of voter ideal points produces a median in all directions will there be an equilibrium (Plott 1967; Davis

et al. 1972). In the absence of an equilibrium, candidates can adopt positions to beat their opponents in an almost endless cycle (McKelvey 1976; Schofield 1978). In multiple dimensions when a Condorcet winner does not exist, dislodging a winning candidate is easy since there is always another position in the issue space that will defeat any given position. However, a challenger who adopts a new position to defeat her opponent can also then be defeated by a new position that her opponent adopts. Although candidates can dance around the policy space to find new winning positions, no position is unbeatable except under the rare condition that it splits the voters exactly in half in every possible direction (Enelow and Hinich 1984).

The median voter result in one dimension and the general instability result in multiple dimensions form the foundation of research on electoral competition. Both results require that candidates can move freely in the policy space. In real elections, unrestricted candidate movement may not be plausible. Parties and their affiliated candidates develop reputations on issues that are difficult to change (Petrocik 1996). Activists and party leaders may confine a candidate to a position on an issue (Aldrich 1983). Voters may penalize candidates for “flip-flopping” on issues. All of these restrictions on candidate movement are substantively meaningful and empirically plausible. Yet little research to date has explored variations on the multidimensional model in which candidates are restricted in the policy positions they can adopt.

When candidates are constrained in their ability to change positions on the issues in an election, introducing a new issue or issues can help a candidate defeat a well-positioned opponent (Schattschneider 1960; Riker 1982, 1986). The conventional wisdom on expanding the issue space has been that candidates should try to split the support of their opponents (Riker 1982). A classic example in American politics is the Republican party’s adoption in the 1850s and 1860s of a platform to halt the expansion of slavery. The Republicans’ position on economic development mimicked the Whigs’, but their position on restricting slavery differentiated them from both the Whigs and Democrats, pulled voters away from the Whigs, and swept the Whig party from the American electoral landscape (Riker 1982).

As we will show, the introduction of new issues in an election can be a successful strategy depending on whether voter preferences are nonseparable across the issues. Much of the research in voting behavior and electoral competition assumes that voters have separable preferences across issues of public policy. The importance of nonseparable preferences was identified in the public choice literature years ago (Kadane 1972; Kramer 1972; McKelvey 1976; Schwartz 1977; Enelow and Hinich 1984). Little work since then has examined the implications of nonseparable preferences for candidate strategies or the extent of nonseparable preferences in the voting public. In this chapter we show that nonseparable voter preferences create opportunities for candidates to package new issues with old issues for electoral gain.

3 The Strategy of Issue Packaging

We present a model of issue packaging based on a spatial competition game between two candidates. Each candidate (or party) adopts a vector of issue positions

in n -dimensional Euclidean space. For purposes of illustration and without loss of generality, we restrict attention to two issues, X and Y . Candidates A and B adopt positions $A = \{X_A, Y_A\}$ and $B = \{X_B, Y_B\}$, respectively.

At the start of the election, $\{X_A, X_B\} \in \mathfrak{N}^1 \equiv X$, and $X_A \neq X_B$. Candidate A is in a winning position since a majority of voters are closer to A than to B. Candidate B then announces a position on a new issue, Y . Candidate A can then announce a position on issue Y . Candidates cannot change their positions on X as they adopt a position on Y .

A set of $M \geq 3$ voters each has ideal point $\theta_i \in \mathfrak{N}^n$ and a quasiconcave utility function. When confronted with a choice across two or more alternatives, a voter compares the generalized Euclidean distance (GED) from her ideal point to each of the alternatives and prefers the one that is closest to her (Enelow and Hinich 1984).

Separable preferences are indicated by indifference contours that are concentric circles or ellipses whose axes are parallel to the axes of the space. *Nonseparable preferences* are indicated by indifference contours whose axes are not parallel to axes of the space. Nonseparable preferences imply interdependence among issues, or that a person's preference on one issue depends on the choices available or the outcome on another issue.¹ Issues can be related to each other as either positive or negative complements. Positive complements are issues that are positively related to each other: a person wants more on one dimension as she receives more on another dimension (Black and Newing 1951).

Negative complements are issues on which a person wants less out of one dimension as she gets more on the other dimension. For issues with clear "directions" such as increases or decreases in taxes or education spending, the distinction between positive and negative complements is meaningful. For issues without a clear direction, such as privatizing Social Security or allowing same-sex marriage, the direction of complementarity in the issues is arbitrary.

If a voter has nonseparable preferences, her evaluation of a candidate's position depends on the candidate's stance on other issues. For example, a voter may initially approve of a candidate's announced position against abortion. But if the candidate also promises to end welfare support for unwed teenage mothers, the voter may disapprove of the candidate's position on abortion. Or, a voter may disapprove of a candidate's proposal to cut funding for education unless the candidate also promises to cut taxes.

We label voter ideal points by the voter number, $1, 2, \dots, m$. Define voter i 's induced ideal point z_i as the point of tangency of her indifference contours on the line \overline{AB} containing the candidates' positions. A voter votes for the candidate closest to her ideal point measured in generalized Euclidean distance. Therefore, voter i votes for the candidate whose position on \overline{AB} is closest to the voter's induced ideal point, z_i . A cutpoint, $\frac{A+B}{2}$ at the midpoint between A and B on \overline{AB} , divides the voters into those closer to A , who vote for A, and those closer to B , who vote for B.

¹Any pair of issues could be completely nonseparable or partially nonseparable. Partially nonseparable preferences occur when, for instance, issue 1 is nonseparable from 2 while 2 is separable from 1 (Lacy and Niou 2000; Lacy 2001).

Each voter chooses the candidate whose position falls on the indifference contour closest to her ideal point.

The model includes two additional assumptions. First, candidates cannot change their positions on the initial issue, X . Either the candidate positions are given exogenously on the issue due to constraints such as party reputation or activist demands, or voters penalize candidates for changing positions. Either way, candidate positions on issue X remain fixed. Second, we assume that one candidate, arbitrarily labeled A , has an advantage on issue X . Candidate A could be at the position of the median voter on X or closer to the median voter than candidate B . The purpose of both assumptions is to capture a realistic scenario in which one candidate has an advantage on an issue that the other candidate cannot overcome. Even if candidate B can move freely on issue X and confronts an opponent who has staked out the position of the median voter, the best that candidate B can do is to adopt A 's position and end up in a tie. But, candidate B can do better by introducing a new issue.

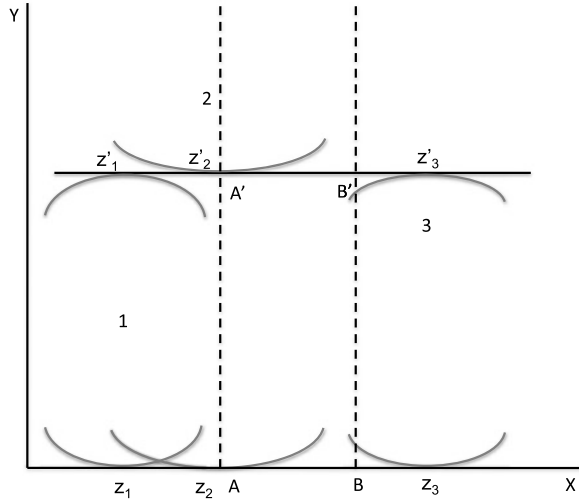
Proposition *In a two candidate plurality election, if a candidate is winning on one issue on which candidate positions are fixed, then that candidate can be defeated only if new issues are introduced over which some voters have nonseparable preferences.*

If a candidate is winning in a one dimensional issue space, then there is no way to beat that candidate when voter and candidate positions are fixed. If the winning candidate has adopted the position of the median voter, a more rigid assumption, then there is no way a challenging candidate can do any better than a tie even if the challenger can choose any position on the issue. When confronting a candidate who has staked out a winning position in a one dimensional issue space, the only recourse for a challenger is to introduce a new issue.

The strategy of introducing a new issue hinges critically on whether voter preferences are separable or nonseparable. Suppose that all voters have separable preferences across the original issue, X , and any new issue, Y , that a candidate can introduce. In Fig. 1, voters are labeled by their ideal points, 1, 2, and 3, with induced ideal points on X labeled, respectively, z_1 , z_2 , and z_3 . There is no equilibrium in this election if candidates can move freely since the distribution of voter ideal points does not produce a median in all directions (Davis et al. 1972). At the start of the election, X is the only issue, candidate positions are given by A and B , and candidate A is positioned at the ideal point (induced on issue X) of the median voter, z_2 . The other voters have induced ideal points z_1 and z_3 on the candidate space \overline{AB} . The candidates are constrained by their positions on X and can move only along the vertical dashed lines anchored by their positions on X .

Candidate B introduces issue Y and can take any position. Suppose B takes position B' . The new candidate space is then $\overline{AB'}$, with new cutpoint $\frac{A+B'}{2}$. Voter 2's induced ideal point may well switch to B 's side of the cutpoint, in which case B wins. However, A can "mimic" B 's position on Y by adopting a position A' that matches B' on Y . Since all voters have separable preferences, their induced ideal points, $z'_i \in \overline{A'B'}$, are orthogonal projections of their induced ideal points, $z_i \in \overline{AB}$,

Fig. 1 All voters have separable preferences. Voters 1 and 2 are closer to Candidate A's position; voter 3 is closer to Candidate B's position. After B moves to B' , A can find another position, A' , that maintains her advantage on the distribution of induced ideal points, z'_i



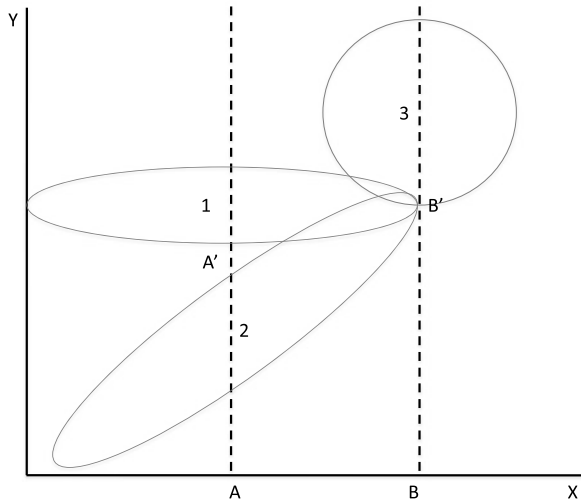
and thus preserve the positions of the voters relative to the candidates. Candidate A is closer to a majority of voters on $A'B'$ just as she was on AB . When all voters have separable preferences, candidate A can always adopt candidate B's position on the new issue and maintain the electoral advantage she had on the original issue. There is no position for B that can guarantee a victory over A when all voters have separable preferences.

When some voters have nonseparable preferences, then B can find a position that A cannot beat with any position on the new issue. In Fig. 2, voters 1 and 2 are closer to candidate A's position on issue X. When candidate B adopts position B' , voters 1 and 2 are closer to B' than to A. Voter 1's preferences are separable across the two issues, but voter 2's preferences are nonseparable. Candidate A cannot adopt a position on the vertical dotted line at A that allows her to win voters 1 and 2. For instance, voters 1 and 2 both prefer B' to A' since A' is outside of the voters' indifference contours that include B' . There is no position A can adopt that is closer to voters 1 and 2 than B' in generalized Euclidean distance. The positions for A that could beat B' are in the areas in which the indifference contours of any two voters overlap. But these areas are out of reach for A due to her position on X.

Voter 3 could be positioned anywhere in the issue space to the right of voter 2 and have preferences that are either separable or nonseparable as long as she prefers B' to any point on the dotted line at A. It is also noteworthy that B begins with a position on issue X that is more extreme than any voter's position. Candidate B is outside of the distribution of voter preferences on issue X but wins by finding a new issue over which voter 2 has nonseparable preferences. Candidate A loses the election and cannot adopt any position on Y that will allow her to win.

The example does not require that the median voter have nonseparable preferences. Similar examples are possible when a moderate voter 2 has separable pref-

Fig. 2 A pivotal voter has nonseparable preferences. Voters 1 and 2 are closer to *A* than to *B* on issue *X*. Voters 1 and 2 switch to supporting candidate *B* after she moves to *B'*. Candidate *A* cannot find a position on issue *Y* to win back both voters 1 and 2 given her position on issue *X*



erences while a more extreme voter 1 has nonseparable preferences. Candidate *A* does not have to be located at the position of the median voter on *X* as long as she is closer to the median voter than *B*. Candidate *B* does not have to adopt the position of the median voter on issue *Y*.

Figure 2 illustrates that a candidate can move from a losing position to a winning position by introducing an issue on which voter preferences are nonseparable from the original issues in the election. Only one of three voters in the example has nonseparable preferences. There is not a critical number of voters who must have nonseparable preferences in order for the result to hold. The one pivotal voter with nonseparable preferences gives candidate *B* an opportunity to find a winning position.

Political candidates frequently present voters with packages of issues. Ronald Reagan in 1980 told American voters that if they agreed with him on any issue of taxing, spending, national defense, and deficit reduction, then they agreed with him on the whole set of issues. Bill Clinton and Tony Blair advocated a “Third Way” of free trade combined with job training and social insurance programs to aid workers whose jobs disappeared due to globalization. The Republican party during the 1850s and 1860s quickly rose from a minor party to one of the two major parties on a platform of restricting the Westward expansion of slavery while promoting infrastructure development that would help Western farmers ship their products to markets in the East. The combination of opposition to slavery and support for internal improvements linked the interests of voters in the North and West, giving the Republicans a national electoral majority for decades. Candidates’ strategies are made richer by the possibility of exploiting voters’ nonseparable preferences to engineer packages of issues that appeal to voters when the issues individually might not.

4 Do Voters Have Nonseparable Preferences?

Are nonseparable preferences a theoretical curiosity or empirical reality? Few public opinion surveys include questions designed to measure whether voter preferences are nonseparable across issues. Questions designed to detect nonseparable preferences appeared on a 2004 survey of US citizens.² The survey contained questions about twelve different issues that figured prominently in candidate debates and commentary about the election. Although each of the twelve issues could be nonseparable from all of the remaining issues for some voters, detecting nonseparable preferences across all combinations of issues would have been impossible in a 20-minute survey. To make the survey manageable, questions paired each issue with only one other issue—some obviously related, some not—to uncover nonseparable preferences. For instance, taxes and education spending were paired. For the issue of taxes, respondents first answered a question similar to existing surveys. We label this type of question “unconditional” since it asks a respondent’s opinion on an issue in isolation, without reference to the outcome of other issues. Later in the survey respondents answered two “conditional” questions to detect whether preferences on taxes are nonseparable from spending on education. The questions were:

(unconditional) Do you want the amount of money that people pay in taxes to the US government to

- go up a lot, say to 50 % more than we spend now
- go up somewhat, say to 25 % more than we spend now
- go up a little, say to 10 % more than we spend now
- remain at current levels
- go down a little, say to 10 % less than we spend now
- go down somewhat, say to 25 % less than we spend now
- go down a lot, say to 50 % less than we spend now

(conditional) If the government reduces the amount of money it spends on education to 25 percent less than it spends now, then would you want the amount of money that people pay in taxes to the US government to

- go up a lot, say to 50 % more than we spend now
- go up somewhat, say to 25 % more than we spend now
- go up a little, say to 10 % more than we spend now

²Knowledge Networks recruited over 50,000 subjects nationwide to participate in surveys administered by WebTV. The computer format of the survey allows respondents to complete surveys at their leisure, and often results in more reliable and valid responses than telephone interviews (Chang and Krosnick 2009). A random sample of the Knowledge Networks panel was chosen to participate in a three-wave survey, with Wave 1 conducted April 27–May 31 (N = 1308); Wave 2, September 17–October 7 (N = 947); and Wave 3, November 19–December 3, 2004 (N = 717). A sample of 211 new respondents also completed interviews in Wave 3. Completion rates were 76 percent in Wave 1, 85 percent in Wave 2, and 77 percent in Wave 3.

- remain at current levels
- go down a little, say to 10 % less than we spend now
- go down somewhat, say to 25 % less than we spend now
- go down a lot, say to 50 % less than we spend now

(conditional) If the government increases the amount of money it spends on education to 25 percent more than it spends now, then would you want the amount of money that people pay in taxes to the US government to

- go up a lot, say to 50 % more than we spend now
- go up somewhat, say to 25 % more than we spend now
- go up a little, say to 10 % more than we spend now
- remain at current levels
- go down a little, say to 10 % less than we spend now
- go down somewhat, say to 25 % less than we spend now
- go down a lot, say to 50 % less than we spend now

Similar questions appeared on the survey for education spending conditional on different levels of taxes. The two conditional questions reveal whether preferences are separable or nonseparable. In a crosstabulation of responses to the conditional questions, all responses on the diagonal do not change on the issue of taxes depending on the level of education spending. Responses above the diagonal indicate nonseparable positive complements: a person wants taxes to increase as education spending increases but wants taxes to decrease as education spending decreases. Responses below the diagonal indicate nonseparable negative complements: as education spending increases, a person wants taxes to decrease; as education spending decreases, a person wants taxes to increase. In a split-half sample, some respondents answered the two conditional questions before the unconditional question, others answered the questions in reverse order.

While nonseparable preferences should be expected for taxing and spending issues, many other issues are nonseparable to some people. Respondents answered questions that paired defense spending and health care spending, Social Security and free trade, same sex marriage and same sex adoption, immigration and a national health insurance plan, and, in wave 2 only, background checks for gun owners and a ban on assault weapons.

Table 1 shows the percentage of respondents with nonseparable preferences (both positive and negative complements) for all twelve issues in the survey. The remaining percentages of responses are separable. The issues are ordered from the largest to the smallest combined percentage of nonseparable preferences. For half or more of the issues, at least 20 percent of respondents have nonseparable preferences. Issues such as taxes, education spending, Medicare, defense spending, trade, and immigration all show significant percentages of potential voters with nonseparable preferences. Recall that even a small percentage of voters with

Table 1 Percentages of respondents with nonseparable preferences. Source: 2004 panel survey of nonseparable preferences

Issue	Conditional on	N	Positive complements	Negative complements
May 2004, N = 735				
Taxes	Education spending	623	46.7 %	7.2 %
Education spending	Taxes	620	42.2	8.2
Medicare spending	Defense spending	621	18.5	17.6
Defense spending	Medicare spending	622	12.2	22.3
Immigration	National health care	628	8.6	16.2
Free Trade	Privatize Social Security	623	14.8	8.7
National health care	Immigration	622	2.3	15.8
Assault weapons ban	Background checks	448*	4.2	9.5
Privatize Social Security	Free Trade	617	6.3	3.6
Adoption	Marriage	626	6.8	2.1
Marriage	Adoption	621	3.8	0.8
Background Checks	Assault weapons ban	451*	1.6	1.6

*Questions from wave 2, N = 462

nonseparable preferences create opportunities for candidates to package issues strategically.³

Table 2 shows the percentage of respondents who have nonseparable preferences broken down by the voter's self-placement on a standard seven-point ideological scale. Voters who described themselves as ideological moderates, at the midpoint of the scale, are more likely to have nonseparable preferences on most issues than voters who are more ideologically extreme. This finding suggests that the example in Fig. 2 may not be far off from real elections where voters in the middle of the issue space are the ones who have nonseparable preferences. In a one dimensional issue space or a multidimensional space in which all voters have separable preferences, the ideal points of moderate voters always remain in the middle of the space. But in a multidimensional space, moderate voters who have nonseparable preferences may have induced ideal points that make them more extreme on bundles of issues.

The results may also explain evidence of the disappearing center in electoral politics. Much has been written about the rise in polarization among voters and elected officials (Abramowitz 2010). But other evidence suggests that most voters remain moderate on most issues and that voter preferences are normally distributed rather than bimodal (Fiorina 2005). As Fig. 2 shows, moderate voters with nonseparable preferences over issues can have induced ideal points that are more extreme.

³The percentages of respondents with nonseparable preferences for taxes conditional on education does not have to match the percentage with nonseparable preferences for education spending conditional on taxes since voters may have partially nonseparable preferences (Lacy 2001).

Table 2 Percentages of respondents with nonseparable preferences. Source: 2004 panel survey of nonseparable preferences

Issue	Conditional on	Ideological moderates	Ideological non-moderates
Taxes	Education spending	59.5 %	48.5 %
Education spending	Taxes	54.8	47.1
Medicare spending	Defense spending	40.1	31.7
Defense spending	Medicare spending	37.1	32.8
Immigration	National health care	24.2	26.0
Free Trade	Privatize Social Security	23.9	23.0
National health care	Immigration	19.1	16.7
Assault weapons ban	Background checks	13.0	14.2
Privatize Social Security	Free Trade	11.5	8.0
Adoption	Marriage	9.0	8.6
Marriage	Adoption	7.5	2.4
Background Checks	Assault weapons ban	3.0	3.3

Voter 2, for instance, has an ideal point on issue *X* that makes him the median voter on *X*. But when issue *Y* is introduced, he supports candidate *B*'s extreme position on *X*. Even though voter 2's ideal point may be moderate on *X*, his induced ideal point given the constraints of the options before him—candidate positions *A* and *B'*—is extreme. Debates about whether voters are extreme or moderate, polarized or centrist, are based on interpreting the distribution of voter ideal points issue by issue (Fiorina 2005; Abramowitz 2010). We need more information about voter preferences across issues to draw conclusions about whether voters are moderate or extreme. Nonseparable preferences may make moderate voters appear extremist or extremist voters appear moderate depending on the constraints imposed by other issues or the candidates' positions.

5 Conclusion

As E.E. Schattschneider wrote, “Political strategy deals... with the inclusion and exclusion of contestants because it is never true that the balance remains the same if the number is changed” (1957, 941). The same may be said of political issues as contestants. Changing the issues can tip the balance of a close election. We already know that moving from one issue to multiple issues fundamentally alters the nature of elections. As we show in this chapter, moving to a multi-dimensional issue space can be a strategic choice in an election. Introducing new issues may be a candidate's only hope of unseating an entrenched opponent. But simply introducing a new issue is not alone a path to victory. For a disadvantaged candidate to have any hope of winning an election by introducing new issues, some voters must see the issues as linked.

In the one dimensional spatial model, two competing candidates will converge to the position of the median voter. This theoretical result does not fit reality, primarily because politics is multidimensional. In a multidimensional model with two candidates, an equilibrium will not generally exist and candidates will change positions on issues in a never-ending quest for an electoral advantage. This prediction also does not appear to fit real elections. Imposing some additional realistic structure on the multidimensional spatial model of electoral competition produces new and surprising results.

When candidates have fixed positions in an issue space, a candidate can take a position on a new issue in order to beat an advantaged opponent. Instead of changing positions on existing issues, a potentially costly strategy if voters penalize “flip-floppers,” candidates can compete by expanding the scope of conflict to include new issues. But only when some voters have nonseparable preferences will the strategy of introducing a new issue prove beneficial for a disadvantaged candidate. Issue packaging is a fundamental strategy of electoral politics, part of what William Riker called “heresthetics,” or the art of political manipulation (Riker 1986).

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