Don't Stand So Close to Me: Spatial Contagion Effects and Party Competition

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In this article, we bring together elements from the literatures on economic voting and spatial voting to gain theoretical leverage on the combined role of clarity of responsibility, party policy positions, and economic performance in elections. Building on evidence of voter knowledge, we develop a theory of spatial contagion effects to explain how factors drawn from both of these literatures combine to shape changes in support for political parties. We test this theory with a spatial autoregressive model of party competition in 23 nations from 1951 to 2005. As expected, we find evidence of strong spatial contagion effects in elections with low clarity of responsibility.

The vast literatures on economic voting and spatial voting have each offered compelling theoretical insights into the determinants of election outcomes, and while scholars in these two research areas have been thinking about many of the same concepts, they have mostly ignored each other.[1] In this article, we bring together elements from these two major areas to gain theoretical leverage on the combined role of clarity of responsibility, party policy positions, and economic performance in elections. Building on evidence of voter knowledge, we develop a theory of spatial contagion effects to explain how these different factors combine to shape changes in support for political parties.

While studies on economic voting and spatial voting have each offered valuable insights into support for political parties, they each have limitations. Studies of economic voting have consistently demonstrated that the economy has the strongest effect on election outcomes in settings where responsibility for government policymaking is clear (Powell and Whitten 1993). Although this result is one of the most robust findings in comparative studies of elections, it says very little about what will affect elections when responsibility is not clear. Since more elections fall into this category than not, we are left with a substantial gap in our understanding of elections. Economic voting models also have ignored the role of elites in general, and ideological positioning in particular, in shaping election outcomes. In contrast, while spatial models have focused on these factors to explain voting, they have mostly ignored both economic performance and variations in clarity of responsibility.[2]

Through our theory, we gain valuable leverage on three important interrelated research questions. First, how does the relative spatial placement of political parties affect economic voting? Second, how does clarity of responsibility shape these processes? And, third, what determines party support in low-clarity settings? To address these questions, we advance a theory of spatial contagion effects in which the electoral fates of parties depend on a combination of economic performance and the relative ideological positions of parties in and out of government. We contend that there are ideological

[1]There are, of course, some models like those of Alvarez, Nagler, and Bowler (2000), Clarke et al. (2004, 2009), and Alvarez and Nagler (1995, 1998a, 1998b) that include spatial and economic voting variables additively in the same models of vote, but to date, we are not aware of any studies that examine how the relative spatial locations of parties shape economic voting relationships.

[2]Some notable exceptions are those spatial models that incorporate valence considerations (e.g., Adams, Merrill, and Grofman 2005).

neighborhood or brand-like effects that influence the relative electoral fortunes of parties. These effects underpin our basic theoretical premise that when a party has been in government and the economy has been doing well (poorly), parties that are ideologically proximate should benefit (suffer) from the success (failures) of their neighbors *regardless* of whether they have also been in government. We argue that these dynamics will work most strongly in electoral settings where responsibility for government policymaking is less clear, because voters in these settings are accustomed to using the relative ideological positions of parties to make nuanced electoral decisions.

Our theory contributes to the broader literature on electoral competition by explaining how accountability for economic performance works when voters are choosing which party to support from an ideologically crowded menu. In particular, we show how economic voting and spatial contagion effects operate together to shape party competition. Our models provide valuable inferences about the combined impacts of party positions, government status, and economic performance on party support.

In the next section, we discuss elements of the literature on spatial party competition and the literature on economic voting, showing how they can be brought closer together. We then present our theory of spatial contagion effects. To test our theory, we estimate a series of spatial lag models of party support in established democratic settings. In the remaining sections of the article, we discuss this model and our research design, present our results, and discuss the implications of our findings.

Economic and Spatial Models of Voting

Beginning with Downs (1957), spatial models of party competition have produced empirical expectations of party behavior with relatively simple assumptions. As this field has evolved, other scholars have replaced these with more realistic assumptions that have resulted in more accurate predictions of party-competitive spatial dynamics. At the heart of these models is a dynamic in which voters observe parties' ideological positions and make decisions about which party to support based on ideological proximity (Downs 1957), the direction of policy platforms relative to the status quo (Grofman 1985), party identification (Campbell et al. 1960), or some combination of these three (Adams, Merrill, and Grofman 2005). The unifying theme in these models is that voters support parties that occupy ideological policy positions proximate
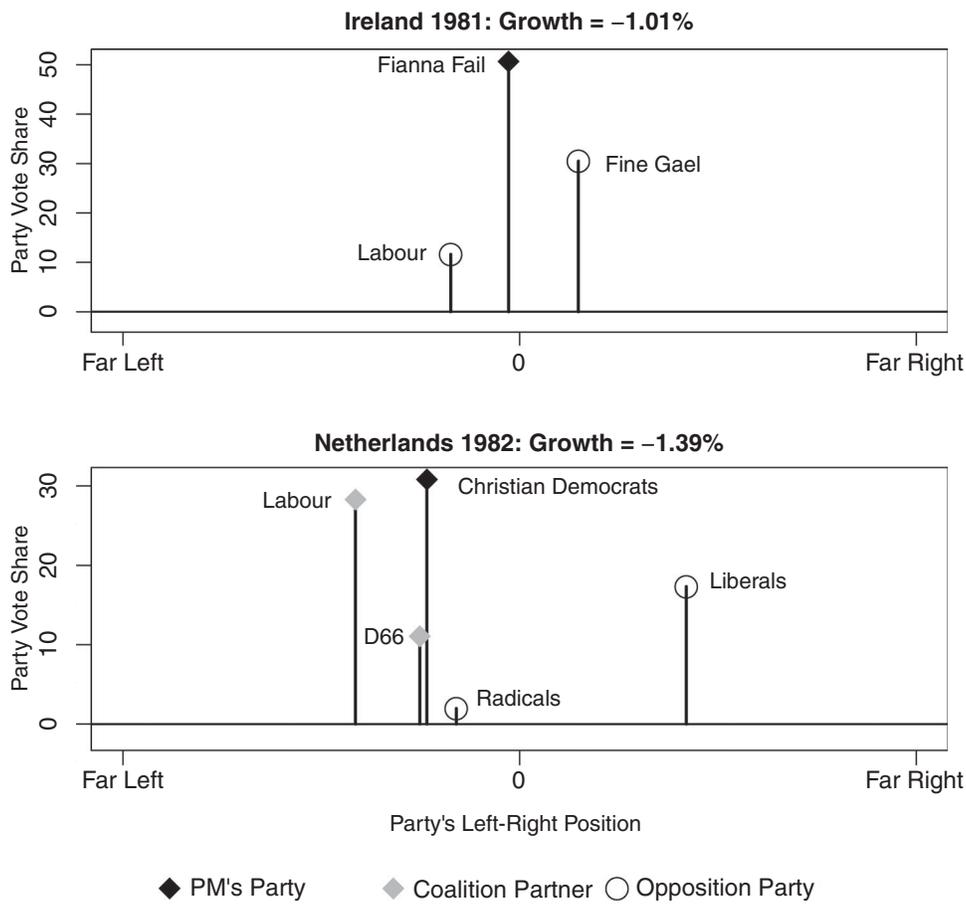
to their own. To the extent that researchers have incorporated incumbent performance into these models, it is almost an afterthought, and one that they lump into a vector of parameters broadly described as "nonpolicy" issues (e.g., Adams, Merrill, and Grofman 2005, 22; Grofman 1985, 232).

In contrast, the vast literature on retrospective economic voting has put the link between economic performance and incumbents' electoral support front and center (see Lewis-Beck and Stegmaier 2007 and Hibbs 2006 for excellent reviews of this literature).[3] Careful consideration of this dynamic has led to a series of modifications to take into account the factors that condition the relationship. These include institutional configurations that cloud responsibility (Duch and Stevenson 2008; Powell and Whitten 1993), the role of voters' perceptions of parties' competence in issue areas (Anderson 1995), international economic patterns (Hellwig 2001; Kayser and Peress 2012), and individual-level heterogeneity (Duch, Palmer, and Anderson 2000).

To illustrate the shortcomings of economic voting and spatial models in isolation, consider the two political and economic circumstances depicted in Figure 1. In this figure, we see data from the time prior to elections in Ireland in 1981 and the Netherlands in 1982. In both of these cases, voters were deciding which party to support at times of very poor economic performance. The vertical axis in each panel of Figure 1 shows the percentage of seats each party had won in the previous election, and the horizontal axis shows the left-right placement of the competing parties. The symbols at the top of the lines marking parties' positions on these two axes indicate the party of the prime minister, the other parties in government, and the parties in opposition. In terms of clarity conditions, Ireland in 1981 is among the clearest cases for attributing responsibility—a single-party majority with no institutional obstructions to its power. Under these circumstances, any credit or blame for economic performance can be expected to be attributed by voters to Fianna Fail. The economic voting literature tells us that because there is clear responsibility and such a poor economy, we should expect Fianna Fail to fair quite poorly at the polls. Turning to the Dutch case in 1982, we have a scenario where voters have a more complicated situation, with a fairly broad political menu from which to choose.

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[3]We confine our considerations of economic voting to theories of retrospective economic voting. Although there has certainly been some important work on prospective economic voting in single-nation studies, studies of cross-national economic voting have concentrated on retrospective theories. Also, as with most models of aggregate-level economic voting, we concentrate on national-level objective economic indicators.

FIGURE 1 How Do Voters Decide Which Party to Support?

Ireland 1981: Growth = −1.01%

Netherlands 1982: Growth = −1.39%

◆ PM's Party   ◆ Coalition Partner   ○ Opposition Party

This is a case with low clarity of responsibility: There was a coalition government in power, and the Netherlands has a powerful committee system within its legislature where opposition parties are given proportional control of chairmanships. The economic voting literature predicts that without clear responsibility for policymaking, there will be little or no economic voting. In contrast, the predictions from the Downsian spatial models do not consider clarity of responsibility; therefore, they are quite straightforward. In both of these cases, voters will vote for the party occupying the ideological position closest to their own. By ignoring each other's key insights, we find the expectations for party competition from these literatures to be lacking.

Recent works by Adams and Somer-Topcu (2009) and Ezrow (2005) have explored the electoral consequences of party shifts toward the ideological center and the mean of the voter distribution, respectively. While these studies represent a step forward in that they honor the importance of spatial positions in party competition (Downs 1957), their empirical methods constrain their efforts.

Through their model specifications, both studies assume that voters at the next election will reward movement by one party toward the center (though this effect may be moderated by elapsed time and party type), ceteris paribus. Unfortunately, this proposition demands holding the ideological positions of all the other parties constant, which violates the strategic nature of party competition and the emphasis on relative ideological positioning that are at the core of spatial models of party competition.

Scholars studying the connection between incumbent performance and electoral support should realize that voters' decisions do not occur in an ideological vacuum; rather, voters make their decisions after observing signals from carefully thought-out platforms that reflect party strategy. At the same time, a critical element of party strategy that the spatial literature has neglected thus far is the role of elections as sanctioning devices to hold leaders accountable for policy performance. One notable exception to this is the work by Harold Clarke and his coauthors, in which they have examined the impact of relative spatial positions and performance evaluations at the individual

level (e.g., Clarke et al. 2009, 2004; Clarke, Scotto, and Kornberg 2009). While these studies have provided valuable evidence that both types of variables are statistically significant predictors of individual-level voting, they have not explicitly modeled the combined impact of government status, relative party placements, and performance evaluations on support.

A Theory of Spatial Contagion Effects

In our theory of spatial contagion effects, both economic voting and spatial forces are at work. We start with two general assumptions:

(1)   Voters know the relative ideological placement of political parties in their country.
(2)   Voters know the party of the prime minister.

Both of these assumptions have strong empirical support. Recent survey research on political knowledge (Stevenson and Vohnamme 2012) has demonstrated that remarkably large numbers of European voters are able to place accurately all of the political parties in their country on a left-right scale. Somewhat surprisingly, voters seem to be particularly good at this task in countries with more complicated political menus, such as Denmark and the Netherlands. These same surveys also provided substantial evidence that voters know the party of the prime minister (Fortunato and Stevenson, 2013).[4]

With these two empirically bolstered assumptions in hand, we make the following four theoretical propositions:

(1)   When voters evaluate a party poorly, it will have an impact on support for not just that party but also those parties in the same ideological range.
(2)   When clarity of responsibility is high, we expect stronger economic voting and smaller spatial contagion effects.
(3)   When clarity of responsibility is low, we expect weaker economic voting and larger spatial contagion effects.
(4)   Regardless of clarity of responsibility, we expect economic voting to be strongest for the party of the prime minister.

Our main theoretical focus in this article is on the effects of spatial contagion that underpin Propositions 1, 2, and 3. Voters link parties together based on ideology. When one party in an ideological neighborhood performs poorly, we should expect that it has soiled its ideological brand and that this will have negative effects not only on its support but also on the support for other parties close to it. Our arguments about the microlevel mechanics that shape this macrolevel process are similar to those of Wlezien's (1995) characterization of the public as having thermostatic responses to policy outputs. When voters evaluate the performance of the economy as being poor, they move their preferences for brands of economic policymaking away from the parties currently in government. Since ideology is a key heuristic for economic management (Hibbs 1977), we expect to find these spatial contagion effects shaping economic voting relationships.

Our theory of spatial contagion effects is thus about how spatial considerations shape economic voting as voters choose which party to support. For example, imagine a pair of parties, A and B, that are among those competing in an election. We would expect the fates of these two parties to depend on recent economic performances and assessments of political responsibility for each party *together with* their relative ideological positions. The performance assessments for each party would influence not just that party's support but also the support for those parties in its ideological neighborhood. We expect this to occur in a fashion that we call "spatial contagion," where a policy success or failure of one political party in the eyes of voters similarly affects those parties that are ideologically proximate. In our example, then, we would expect a loss or gain in popularity for Party A to have a similar impact on Party B, contingent on the ideological distance between Party A and Party B. Thus, if Party A is in government during an economic downturn, voters would be expected to support a change in the brand of economic policymaking. If Party A loses votes and Party B is close by, we would expect Party B to also lose votes. But the further Party B is from Party A, the less we would expect this contagion effect to occur.[5]

Propositions 2 and 3 reflect our expectations of how clarity of responsibility is likely to shape spatial contagion effects. While we expect such effects to be present in all settings, they should be less strong in high-clarity settings where economic voting should dominate. In low-clarity settings, we expect that voters have more experience in shifting their support among various parties of the same

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[4]In addition, there is Michael Lewis-Beck's classic article titled "Who's the Chef ?" which demonstrated that French voters shift responsibility for economic policymaking from the president to the prime minister during cohabitation in France (Lewis-Beck 1997). This indicates that voters not only know the party of the prime minister, but they also are able to use this information appropriately in their assessments of responsibility.

[5]Regardless of whether voters' utility is derived as a linear loss function or a quadratic loss function (Enelow and Hinich 1984), the expectation is that vote shares of proximate parties should be positively correlated.

ideological family than do voters in high-clarity settings, so we would observe stronger connections between the electoral support of ideologically similar parties in low-clarity settings.

To illustrate this, compare how votes are translated into policy action in high- and low-clarity settings. In high-clarity settings that tend to produce single-party majority governments, there is strong congruence between the policy priorities emphasized by the parties during the campaign and the implementation of policies once in office. Economic outcomes can provide a stronger signal of the government's performance in terms of accountability (Duch and Stevenson 2008; Powell and Whitten 1993). Alternatively, in low-clarity elections, it is less obvious that votes for parties will translate into policies that match parties' promises. Rather than voting for a party to be the government, voters are choosing the parties that will then negotiate to be in government (Austen-Smith and Banks 1988). Cross-national evidence suggests that voters can accurately predict coalition possibilities (Armstrong and Duch 2010) and "condition their vote choices accordingly in order to maximize the likelihood that a coalition government forms that best represents their policy preferences" (Duch, May, and Armstrong 2010, 699).[6] Thus, we expect that voters respond to different clarity scenarios by varying their calculations of which party to support, leading to the proposition that when clarity is low, there will be greater spatial contagion effects.

Proposition 4 is consistent with the expectations and empirical evidence in Duch and Stevenson (2008, 267–71). We expect that economic voting will be strongest for the party of the prime minister because it has a "greater share of the status quo distribution of administrative responsibility" (252).

If we return to the scenarios depicted in Figure 1, we can use these propositions to modify our expectations. There is not a lot of change in our expectations for the Irish case because we still anticipate that Fianna Fail will lose a lot of votes. But now we also expect that Labour might be hurt, since it was slightly closer to Fianna Fail than was Fine Gael. Turning to the case of the Netherlands, we would predict that the Christian Democrats should

lose the most votes while D66 and the Radicals should also lose votes because of their proximity to the Christian Democrats. The expected contagion effects could also hit the Labour Party. Whether or not this happens depends on the reach of these effects. As we discuss in more detail below, the spatial voting literature provides a range of theories on the impact of spatial distances. Because we do not have precise expectations about which of these theories is most apropos to the current context, we used several different variations of spatial measures based on the extant literature to specify our models. Our hypotheses are as follows:

(1) *Spatial Contagion Hypothesis (H1)*: The closer a pair of parties is to each other ideologically, the more positively correlated the vote shares will be.

(2) *Spatial Contagion Clarity Hypothesis (H2)*: Spatial contagion effects will be strongest in low-clarity settings.

(3) *Clarity of Responsibility "Classic" Hypothesis (H3)*: Economic voting will be strongest when responsibility for policymaking is most clear.

(4) *Prime Ministerial Hypothesis (H4)*: Economic voting will be strongest for the party of the incumbent prime minister.

While Hypotheses 3 and 4 can be easily tested using standard models for panel data, Hypotheses 1 and 2 cannot. In the next section, we discuss our modeling approach, in which we estimate spatial autoregressive models in order to test our hypotheses about party competition.

Spatial Autoregressive Models of Party Competition

As we outlined above, the chasm between the role of relative ideological proximity in spatial models and economic voting models is partly a result of the two literatures failing to theoretically engage with each other. However, the lack of an empirical method that would allow us to combine these two approaches has also contributed to this divide. Until now, the available methods have meant that scholars have employed empirical models that examined the impact of ideological positions in isolation (e.g., Somer-Topcu 2009; Tavits 2007) or that made somewhat arbitrary decisions regarding small groups of parties (Meguid 2005) or averages of systemic changes (Adams and Somer-Topcu 2009).

Researchers of party competition rarely have acknowledged spatial interdependence, and when they have,

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[6]Voters in these multiparty contexts have also been conditioned to support more extremist parties in an effort to produce a policy that is closer to their ideal point, once they take into account the coalition politics (Kedar 2005). Voters' most preferred parties might not face a high possibility of being in the coalition formed after the election, which causes voters to support the "lesser of evils" that has a reasonable chance of being in the next cabinet formed (Bargsted and Kedar 2009). In fact, states that have the lowest levels of pure proximity voting—evidence consistent with coalition-directed voting—are those that traditionally have single-party majority governments (Bargsted and Kedar 2009).

they treat it as a "nuisance" to be corrected through robust standard errors or panel-corrected standard errors (see Williams 2011 for an example). Given what we know about party competition, this is not a satisfying theoretical approach, but it is often justified on methodological grounds. Yet, even this approach is prone to inefficiency, omitted variable bias, and the drastic underestimation of standard errors (Franzese and Hays 2007, 17). This is troubling because not only does ignoring the spatial component (ρ) overestimate the effects of the other variables (βs), but also this bias grows as the observations become more interdependent (Franzese and Hays 2007, 6–7). Furthermore, our own Monte Carlo experiments point to spatial autoregressive (SAR) models weakly dominating nonspatial ordinary least squares (OLS) models in terms of root mean square error across all types of common party systems. It is our contention that anytime scholars have a theoretical basis for believing that the observations are spatially interdependent—which is particularly likely to be the case in models of party competition or electoral support—then at worst, the model will perform similarly to the OLS regression. At best, it will represent a substantial improvement in terms of overall model fit and the accuracy of the coefficients and standard errors. Perhaps most importantly, nonspatial OLS models do not allow some of the most substantively interesting inferences that scholars usually seek: those that are related to the influence of the relative spatial positioning of parties on party strategy and ultimately electoral success or failure.

Studies of party competition have largely ignored spatial considerations because it is difficult to incorporate them into the types of multivariate models typically estimated. The recent proliferation of SAR models in the social sciences offers a solution to this problem (e.g., Kayser 2009; Mukherjee and Singer 2010). The main contribution of SAR and other spatial models is that they relax the assumption of typically employed models that observations are spatially independent. In this context, researchers are able to test theories at two different levels: theories about the effects of conventional independent variables on their dependent variable and theories about the ways in which the spatial relationships across cases shape these effects.[7] When used to test theories of party competition, these models allow for the possibility that

the impact of conventional independent variables like economic performance on party support is shaped by each party's distance from other relevant parties. The result is more theoretically accurate tests of aggregate voting patterns because they incorporate economic performance and party attributes along with the relative ideological location of competing parties.

Our model setup is analogous to models that have been used in international relations (e.g., Gleditsch and Ward 2001; Murdoch and Sandler 2004) and comparative political economy (e.g., Franzese and Hays 2006) to measure the geographic spread of phenomena such as civil and international conflict and economic policies. The basic theory in those models is that outcomes in geographically proximate entities will be positively correlated. Researchers commonly test these theories with SAR models in which they measure geography as the distance between each pair of nations or states. As outlined above, our main theoretical expectation is one of "spatial contagion," where the vote shares of proximate parties should be positively correlated. Our "geographic" variable, then, is the ideological distance between each pair of parties contesting an election.

The basic setup of SAR models is as follows:

$$\mathbf{y} = \rho \mathbf{W} \mathbf{y} + \mathbf{X} \beta + \boldsymbol{\epsilon},$$

and the reduced form of this equation is.

$$\mathbf{y} = (\mathbf{I_N} - \rho \mathbf{W_N})^{-1} (\mathbf{X} \beta + \boldsymbol{\epsilon}),$$

where $\mathbf{y}$ is a vector of dependent variable values (in our models: change in the vote percentage for each party from the previous election); ρ is the spatial autoregressive coefficient; $\mathbf{W}$ is a weights matrix that contains the spatial relationship between each pair of cases;[8] $\mathbf{X}$ is a matrix of independent variables that we theorize impact $\mathbf{y}$ (in our models: measures of the economy, timing of the election, party characteristics, and coalition characteristics); $\hat{\boldsymbol{\beta}}$ are the prespatial estimated effects of each X; and $\mathbf{I_N}$ is an $N \times N$ identity matrix. The main moving parts in these models are as follows: independent variables, $\mathbf{X}$, and parameter estimates, $\hat{\boldsymbol{\beta}}$, that determine the "prespatial" predicted value, $\mathbf{x}_i \hat{\beta}$, for each observation i; $\mathbf{W}$, which measures the spatial connections between each pair of relevant observations; $\mathbf{W} \mathbf{y}$, the spatial lag, which is the sum of the dependent variable values for the other relevant

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[7]In their introduction to spatial models generally, Neumayer and Plumper (2010a, 585) provide a useful analogy for understanding the contribution of this class of models: "Do you avoid taking the car during rush hours? If so, you understand the concept of spatial dependence, which in this case means that your choice of a means of transport or the choice of your time of travel is partly a function of other individuals' choices."

[8]The elements along the block-diagonal represent the absolute ideological distance between theoretically relevant parties; we code the elements along the diagonal as 0 because they represent party j's connection to itself. Likewise, we code the elements along the off-block-diagonal as 0, since they represent party j's connection to parties at other elections. We code parties sharing the same left-right position as a distance of 0.1 to distinguish these pairs from theoretically non-relevant pairs.

cases **y** weighted by **W**; and the spatial parameter estimate, $\hat{\rho}$, which connects different $x_i\hat{\beta}$ values across observations based on **Wy**.

There are three additional points worth noting about these models before we discuss the specification of the weights matrix. First, if $\rho = 0$, this model collapses to $y = X\beta + \epsilon$, which is a standard OLS specification. We can think of a SAR model of this type as a more general specification that subsumes the typical OLS specifications. If the assumptions of independence made implicitly in OLS models are correct, then ρ will equal zero. Second, by examining the reduced form, we can see that the effects of any of the vectors in **X** on **y** depend on the spatial multiplier, $(I_N - \rho W_N)^{-1}$. For example, in the context of our model specification, the effects of *real GDP per capita growth* on *vote change* depend on the degree of spatial interdependence of parties (ρ), the pattern of interdependence (W_N), and the prespatial effects of the rest of the independent variables in that election ($X\beta$). Finally, because the relative distances between pairs of observations are measured in terms of distances rather than "closeness," the expectation that the dependent variable's values of pairs of proximate observations will be positively correlated produces an expectation that ρ will be negative.

Because SAR models relax the assumption of independent observations, in this case, we can explicitly model the ways in which parties' vote shares are related based on their relative ideological placements. The workhorse for accomplishing this task in SAR models is the spatial weights matrix **W**. We can translate different theoretical propositions about the ways in which relative party placements affect vote shares into spatial weights matrices. The literature on party competition offers competing expectations of spatial interconnectedness that are derived from spatial models such as proximity voting and directional voting (e.g., Adams, Merrill, and Grofman 2005; Downs 1957; Grofman 1985; Rabinowitz and Macdonald 1989). We draw on this vast literature to modify the weights matrix in spatial regressions in order to test for different theoretically plausible spatial patterns, or what is known in the literature on spatial models as the nature of the connectivities (Beck, Gleditsch, and Beardsley 2006, 28).

To test our expectations that the vote shares of parties are interconnected based on each party's relative ideological proximity, we use the "rile" variable from the Comparative Manifestos Project (CMP) to fill in the unstandardized weights matrix with each relevant party's distance from each other.[9] Spatial theories of how ideol-

ogy works differ in terms of how they measure ideological distances (absolute linear distance to reflect a constant impact versus squared distance to reflect quadratic loss) and the relevant parties for comparison in terms of ideological distance (only those parties that are ideologically adjacent neighbors versus including all pairwise comparisons). Because we did not have strong theoretical priors in favor of one specification over another, we estimated our models with weights matrices that reflected all four pairwise combinations of these measurement options for ideological distances. Model selection criteria identified the weights matrix with absolute linear distances and neighbors-only as the best-fitting model.[10] Allowing only contiguous parties to influence each other is consistent with a wide range of spatial models because the relative distance of neighboring parties determines the cutpoints that partition the voter distribution into support for the various parties (e.g., Adams 2001; Downs 1957). This implies that strategies of more extreme parties will not influence those of more moderate parties, unless they leapfrog other parties (which is quite rare; see Budge 1994) so that they are contiguous.

Empirical Testing

In order to test our theory of spatial contagion effects, we assembled data from elections in 23 parliamentary democracies between 1951 and 2005.[11] As outlined above, we are testing whether each party's electoral fortunes depend on how well the other relevant parties fare in combination with the relative ideological positioning of the other relevant parties.[12] We measured our dependent

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is the same for all parties and that each party has the same relative weight; this has the effect of making the spatial lag a weighted average of the effects of parties' vote shares rather than the weighted sum of the effects (Plumper and Neumayer 2010, 428–29). We are not comfortable making this assumption, as we have no theoretical expectation that the influence of parties diminishes if there are more spatially contiguous parties.

[10]The online supporting information contains results from models with all four weights specifications, as well as a more detailed discussion of the construction of different weights matrices.

[11]The first democratic election (Greece, Portugal, and Spain) or the availability of economic data determines the start dates for the sample countries. The availability of CMP data determines the end dates.

[12]We present details of the cases included in our analysis, as well as descriptive statistics, in the supporting information.

[9]Standardizing the weights matrix sums each row to unity. Implicitly, this assumes that the net effect of relative ideological proximity

variable as the change in the percentage of vote for each party from election $t-1$ to election t.[13]

Our expectation is that the SAR parameter, ρ, will be negative, indicating that the further a pair of parties is from each other, the less correlated the vote change will be. But we expect to find stronger (i.e., more negative) evidence of spatial contagion effects when clarity of responsibility is low. In addition, our core model specification predicts gains or losses by parties based on unique party features such as economic performance, election timing, government attributes, and ideological position. We also include a number of interactions to examine the different effects of government versus opposition parties, as well as niche versus mainstream parties.[14]

Our models have a number of complicated moving parts. For ease of estimation and presentation of our findings, we estimated separate spatial autoregressive models for elections with high and low clarity of responsibility,[15] presenting the results in Table 1. In order to appropriately interpret the results presented in this table, we will discuss them in three stages: a discussion of the statistical results for the spatial component for each model, with an emphasis on testing Hypotheses 1 and 2; a discussion of the estimated prespatial effects, with an emphasis on testing Hypotheses 3 and 4; and then a series of simulations based on a combination of the spatial and prespatial relationships to explore the substantive implications of our findings.

[13] As explained in greater detail in the supporting information (in a section titled "Choice of Dependent Variable"), we initially planned to estimate our models with the percentage of vote for each party as the dependent variable and a lagged value of this variable on the right-hand side, but our diagnostics indicated that this dependent variable was not stationary, which, in turn, raised the specter of spurious regressions (Granger and Newbold 1974).

[14] Details about this model specification and the coding of variables are in the supporting information under the heading "Core Model Specification."

[15] Ideally, we would have estimated a single model with interactions between clarity and our spatial weights matrix, as well as interactions between clarity and the variables in our $\mathbf{X}\boldsymbol{\beta}$ specification. This would allow for the most direct tests of our hypotheses about the impact of clarity of responsibility. While a model containing interactions with the spatial weights matrix is theoretically feasible, we have not yet found a stable method for estimating such a model. Following the example of Palmer and Whitten (1999), we coded high-clarity elections as those in which the incumbent government controlled a majority of the legislative seats (i.e., was not a minority government), did not face opposition control of a politically significant upper house, did not come from a legislature that allows opposition parties to hold committee chairs that matter, and did not come from a nation in which there is weak internal party cohesion.

TABLE 1　Spatial Autoregressive (SAR) Results of Spatial Contagion Effects across Elections with High and Low Clarity of Responsibility

Variable	High-Clarity		Low-Clarity	
	β	S.E.	β	S.E.
Real GDP per Capita Growth	−.26**	(.10)	−.01	(.06)
Coalition Party × Growth	.46***	(.17)	−.08	(.10)
PM's Party × Growth	.53***	(.19)	.26**	(.11)
Party Shift$_t$	.004	(.01)	.014*	(.008)
Party Shift$_{t-1}$	.01	(.01)	.03***	(.009)
Time Left in CIEP	−.03**	(.01)	−.01*	(.006)
Coalition Party × Time Left	.06***	(.03)	.03***	(.01)
PM's Party × Time Left	.09***	(.03)	.05***	(.01)
Coalition Party	−4.09***	(.98)	−1.42**	(.51)
Prime Minister's Party	6.94**	(3.19)	1.20	(1.78)
Niche Party	−.12	(1.19)	.44	(.54)
Majority Government			.12	(.32)
Number of Gov't. Parties	.15	(.21)	.15	(.15)
PM's Party × No. of Gov't. Parties	−.96**	(.42)	−.11	(.35)
Vote$_{t-1}$	.001	(.02)	−.03**	(.01)
PM's Party × Vote$_{t-1}$	−.31***	(.07)	−.08**	(.04)
Niche Party × Vote$_{t-1}$	−.13	(.09)	−.07*	(.04)
PM's Party × Majority			−.13	(.72)
Effective Number of Parties	−.24	(.29)	−.18	(.12)
Constant	2.64**	(1.01)	1.17**	(.54)
ρ	−.004***	(.001)	−.012***	(.001)
Adjusted R^2		.24		.16
N		398		1030
Tests of Spatial Interdependence				
Moran's I		−.29***		−.37***
Geary's C		1.41***		1.43***
LM		10.95***		109.0***
Wald Test		16.65***		48.15***

Notes: ***p < .01, **p < .05, *p < .10 (p-values are reported for two-tailed z-tests despite most of our hypotheses being directional).

Spatial Results

In Table 1, we can see that in both of the models, the estimated ρ parameter is negative and statistically significant. Recall that our weights matrix specifies the distance between ideologically contiguous parties, so a negative ρ provides evidence in support of our spatial contagion hypothesis, Hypothesis 1, indicating that the vote shares of ideologically contiguous parties are correlated and that this correlation approaches zero as the distance between parties increases. Although both models in Table 1 show support for Hypothesis 1, they differ substantially in terms of this support. This difference, indicating that spatial effects are stronger in low-clarity elections, provides strong support for our spatial contagion clarity hypothesis, Hypothesis 2.[16]

Prespatial Effects

Hypotheses 3 and 4 reflect our expectations that economic voting will be stronger in high-clarity elections than in low-clarity elections and stronger for the prime minister's (PM's) party than other parties. Testing these conditional hypotheses requires interactive specifications, which in turn means that the interpretation of these relationships is better illustrated with marginal effects (Brambor, Clark, and Golder 2006). Table 2 shows the estimated *prespatial* marginal effects for the interactive relationships between economic growth and government status (with 90% confidence intervals in brackets) for the high-clarity and the low-clarity models.

In the high-clarity elections, the prespatial estimated marginal effect of *real GDP per capita growth* for opposition parties is negative, whereas the estimated marginal effect for the PM's party is positive. Both of these results are in the expected direction and statistically significant at conventionally accepted levels. Although coalition partners benefit from growth, this effect is not statistically distinguishable in high-clarity elections from the effect

for the PM's party.[17] In contrast, opposition parties in the low-clarity elections are not hurt by *real GDP per capita growth* (since the marginal effect is not significant), and non-PM government parties do not benefit. In low-clarity elections, the only statistically significant effect of growth is on the party of the prime minister, and, as expected, this effect is positive. These results together provide strong support for Hypothesis 3 and somewhat mixed support for Hypothesis 4. We also estimated a set of interactive terms to test for the benefits of opportunistic election timing. As expected, increasing the *time left in CIEP*—representing an early election—reduces opposition parties' expected vote shares and increases the PM's party's expected vote. Moreover, this effect is magnified in systems with high clarity of responsibility. Because of space constraints, we have confined further discussion of these results to the supporting information.

It is worth reemphasizing that in spatial regressions, the β coefficients—and the resulting marginal effects that we have just explored—reflect the "prespatial effects" on the outcome.[18] In situations where the spatial effects are simultaneous (as is the case for parties' ideological positions), these "prespatial effects" are actually unobservable (Franzese and Hays 2007, 19). One way to observe the effects of counterfactual shocks across units is through the spatial multiplier, $(\mathbf{I} - p\mathbf{W})^{-1}$, which captures the feedback of changes in the electoral fortunes of Party A on other parties, feedback from the other parties' electoral fortunes to Party A, and so on (Franzese and Hays 2006, 180). While researchers typically use a spatial regression to explore how changes in the variables of interest ($\mathbf{X}$) are translated into outcomes through the *geographic* interdependence of observations (e.g., Beck, Gleditsch, and Beardsley 2006; Franzese and Hays 2007; Neumayer and Plumper 2010b), it is also helpful in illustrating how the spatial interconnectedness of parties influences election results. In the next section, we turn to simulations to show the combined effect of our estimated spatial and prespatial effects.

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[16]We have thus far not found statistical software that allows us to estimate interactive relationships with our spatial weights matrix. If we compare the 95% confidence intervals for the two ρ estimates in Table 1, [−.006,−.002] for the high-clarity elections as compared to [−.014, −.010] for the low-clarity elections, we have evidence supportive of Hypothesis 2. The two confidence intervals do not overlap, and the effect is stronger for the low-clarity elections. In addition, as we discuss in more detail in the supporting information under the heading "Spatial Diagnostics from Main Models," while the diagnostics point toward strong evidence of spatial effects for the low-clarity models, the results for the high-clarity models are very mixed.

[17]We cannot reject the null hypothesis that the marginal effects for government parties and the PM's party are equal (F = 0.09, p-value = .76).

[18]This relative role of the β coefficients vis-à-vis ρ in spatial regressions is similar to the role of the β coefficients vis-à-vis ϕ, the coefficient on a lagged dependent variable, in a time-series context. See De Boef and Keele (2008) for an excellent discussion of the roles of ϕ and β parameters in time-series models.

TABLE 2 **PreSpatial Marginal Effects for Interactive Relationships**

X Variable	Z Variable(s)	High-Clarity	Low-Clarity
Real GDP per Capita Growth	Opposition	−0.257***	−0.014
		[−0.419, −0.095]	[−0.110, 0.082]
	Coalition Partner	0.203	−0.089
		[−0.025, 0.431]	[−0.233, 0.055]
	Prime Minister	0.269*	0.243***
		[0.002, 0.536]	[0.095, 0.392]

Notes: Brackets contain 90% confidence intervals. Marginal effects reported are $\beta_X + (\beta_{XZ} \times Z)$.
***p < .01, **p < .05, *p < .10 (one-tailed).

Spatial Effects

Since Table 2 shows only the prespatial estimated marginal effects, it presents an incomplete picture of the overall effects of these variables. As an illustration, consider how the estimated marginal effect of *real GDP per capita growth* on *vote change* varies based on the spatial multiplier. Figure 2 shows that the extent to which a one standard deviation increase in *real GDP per capita growth* (2.87%) improves the PM's party's vote share (in a low-clarity setting) depends on its own ideological position, the position of another party in the system, and the prespatial effects of the other party in the system. The prespatial marginal effects predict that the opposition party (anchored at the center of the left-right scale) would lose about 0.04%, while the PM's party would gain about 0.70%. Once we consider the spatial multiplier, we can see that the marginal effect of economic conditions depends on the location of the PM's party relative to other parties and the expected effect of economic conditions for the opposition party. In this figure, then, as the PM's party distances itself from the electorally vulnerable opposition party (which stands to lose votes), it benefits more from economic growth. If it chooses to occupy an ideological position close to the opposition party, it will only gain 0.70%.

Hypothesis 2 posits that spatial contagion effects will be strongest in low-clarity settings, so this hypothesis is supported, since the degree of spatial autocorrelation (ρ) is much larger in the low-clarity model compared to the high-clarity model. To better understand the substantive implications of these results, we explore how spatial positioning influences election results in high-clarity systems (left panel) and low-clarity systems (right panel). Figure 3 demonstrates the spatial contagion effects of one party's ideological positioning. We depict the expected change in vote share for Party A and B. In this simulation, Party A's ideology can vary from –50 to 50 and Party B's ideology is fixed at 0. We have set the prespatial effects ($\mathbf{X\beta}$)

such that Party A's vote share is expected to remain unchanged ($x_A\beta = \mathbf{0}$), whereas Party B is expected to lose 5% ($x_B\beta = \mathbf{-5}$) when the two parties are at the same spatial location.

In the left panel of Figure 3, depicting a high-clarity scenario, the ρ value is quite close to 0 ($\rho = -.004$), suggesting a small degree of spatial contagion effects. Changing the position of Party A has almost no impact on the vote shares of either Party A or Party B. In the right panel of Figure 3, we present the much larger spatial contagion effects present in low-clarity elections. Since the electoral fortunes of these two parties are interconnected by a negative ρ estimate, how much Party A gains (solid line) and Party B loses (dashed line) depends on their relative positioning. With an expectation that Party B will lose votes, our model predicts that Party A will gain votes as it distances itself from Party B. Correspondingly, the further Party A moves away from Party B, the greater Party B's losses. What is interesting about this particular scenario is that changing the parties' relative positioning in a manner that has no direct effect on either party's $\mathbf{X\beta}$ has an *indirect effect* on the predicted vote share of both parties through the spatial multiplier. These are effects that have thus far been neglected in studies of electoral results because they cannot be modeled in a nonspatial OLS framework.

This figure provides support for the Downsian implication that parties move spatially to maximize their vote totals. If Party A senses that Party B is losing (gaining) votes, then it pays for A to move further from (closer to) Party B's position. This may seem like a somewhat obvious proposition, considering our knowledge of politics and understanding of spatial models. But to our knowledge, this has never before been demonstrated with macrolevel electoral evidence that takes into account the relative spatial positioning of each competing party. The SAR model relaxes the constraining OLS assumption of the conditional independence of observations and thus allows for more realistic empirical predictions.

FIGURE 2 **Marginal Effect of Real GDP per Capita Growth on Prime Minister's Party Vote Share across Relative Ideological Positioning: Low-Clarity Model in Table 1**
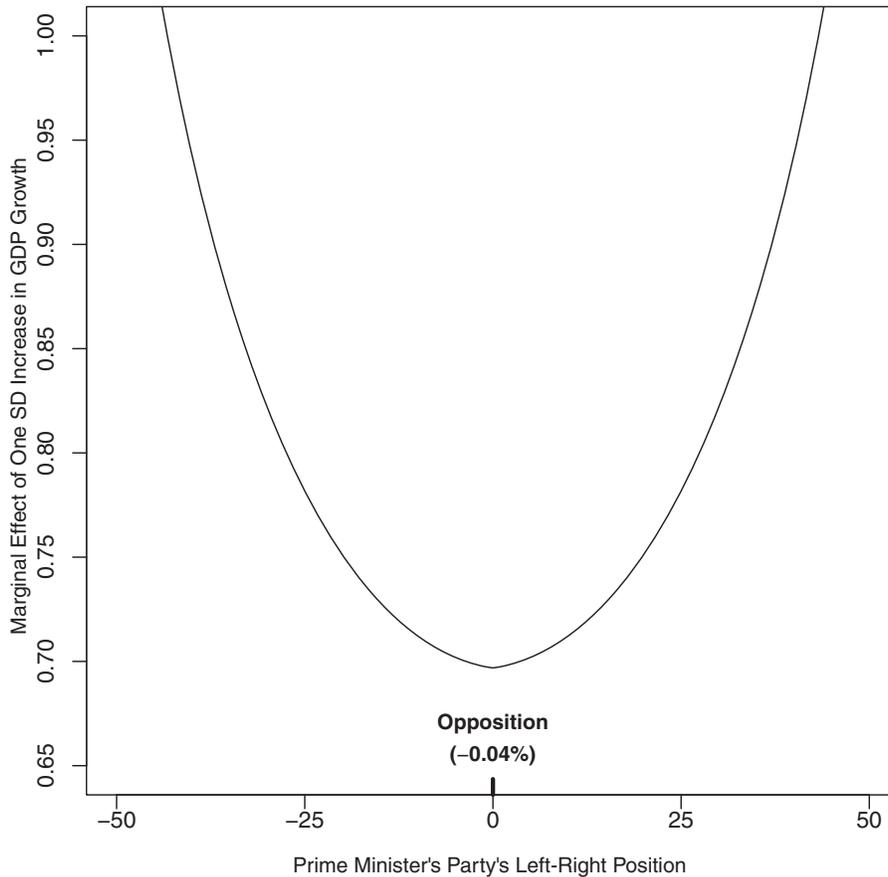
Note: Figure depicts the marginal effect of a one standard deviation increase in *real GDP per capita growth* (2.87%) on the prime minister's party's vote share as its position varies relative to a stationary opposition party (at point 0). Since the opposition party's prespatial marginal effect is a reduction in votes (–0.04%), the PM's party stands to gain from distancing itself from the opposition.

To illustrate how these models work with an actual election, consider Figure 4, a simulation based on data from the Dutch parliamentary elections of 1994. This is the election that led to the first post–World War II Dutch governing coalition that did not contain a Christian Democratic party. Each of the four panels in Figure 4 represents the predicted vote for one of the four main parties if it had changed its spatial location, whereas the other three parties stayed the same in terms of their spatial locations and their **Xβ** values. The dashed vertical line in each panel depicts the actual spatial location of the party, and the solid line depicts predicted vote change across the range of spatial positions. In the upper-left panel, we simulate the predicted vote of the Labour Party (PvdA) according to its relative ideological proximity to the other parties. The PvdA came into this election as

a junior partner in an unpopular coalition government with a Christian Democratic Appeal (CDA) prime minister (Ruud Lubbers). Our model predicted a loss for both CDA and PvdA and gains for the left-Liberal D66 and right-Liberal party (VVD). We see from Figure 4 that while the PvdA was predicted to lose votes regardless of its ideological position, its best move would be to shift rightward toward the VVD.[19]

The left-liberal D'66 Party (upper-right panel) could have increased its vote by moving almost anywhere other than where it was in 1994, with only a slight move to the

[19]The big shifts that we see when the PvdA "leapfrogs" a party are there because of the spatial weights matrix specification used to estimate these models. This is an "ideological neighbors" specification in which the only spatially relevant parties are those that are ideologically contiguous.

**FIGURE 3 Spatial Contagion Effects in a Two-Party System Where
Party A's Ideology Varies and Party B's Ideology = 0: High-
and Low-Clarity Models in Table 1**
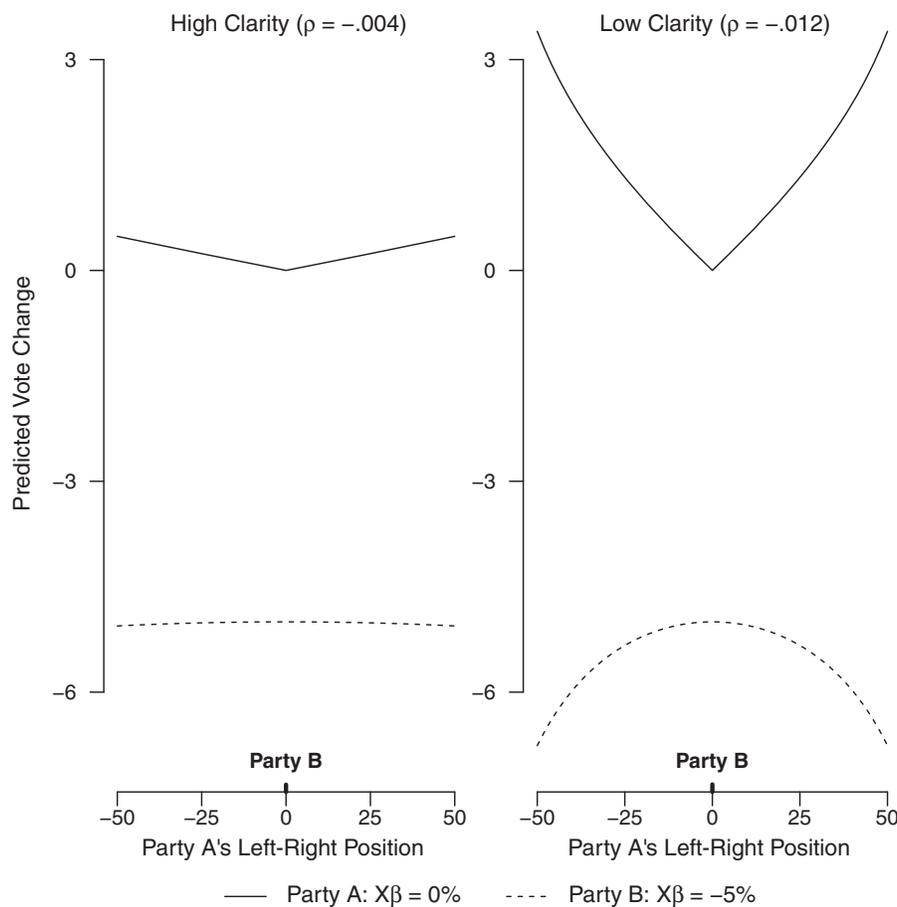
Note: Figure shows the predicted vote change for Party A (solid line) and Party B (dashed line)
given Party A's position (varies) relative to Party B's position (stationary at point 0) for elections
with high-clarity (left panel) and low-clarity (right panel). The prespatial effects are such that
Party A is expected to maintain its vote share, whereas Party B loses 5%. Party B's predicted
vote change (dashed line) varies solely based on feedback through the relative distance in the
weights matrix caused by Party A's position.

right worsening the vote for that party. The lower-right panel in this figure shows a similar story for the liberal VVD. For the main loser in 1994, the CDA, the story is more complex. It could have increased its vote by moving anywhere away from its actual position, but the predicted marginal returns from movement to either the left or the right quickly tail off for the CDA. Of course, when we think about the formal models of spatial competition on which these empirical propositions are based, it is somewhat unrealistic to examine the moves of each party in isolation. Indeed, shifting one party's position "holding all else constant" naturally violates the notion of equilibrium in formal models. Nevertheless, these types of figures represent an important first step toward model-

ing directly these agent-based processes in an effort to produce more realistic empirical inferences.

Finally, the results in Table 1 shed light on the question of how and whether voters respond to parties' shifts in ideological orientation. *Party Shift$_t$* and *Party Shift$_{t-1}$* are both in the expected positive direction (indicating that voters reward centrist shifts), but these variables are only statistically significant in the low-clarity context. Voters reward moderating shifts in low-clarity systems (which is consistent with Adams and Somer-Topcu 2009), but there is no statistically discernible effect for similar shifts in high-clarity systems. One possible explanation that we intend to explore further is that the clear line of accountability in those elections strengthens the performance

FIGURE 4 Predicted Vote Change for Each of the Four Dutch Parties in the 1994 General Elections, Varying Ideological Position: Low-Clarity Model in Table 1
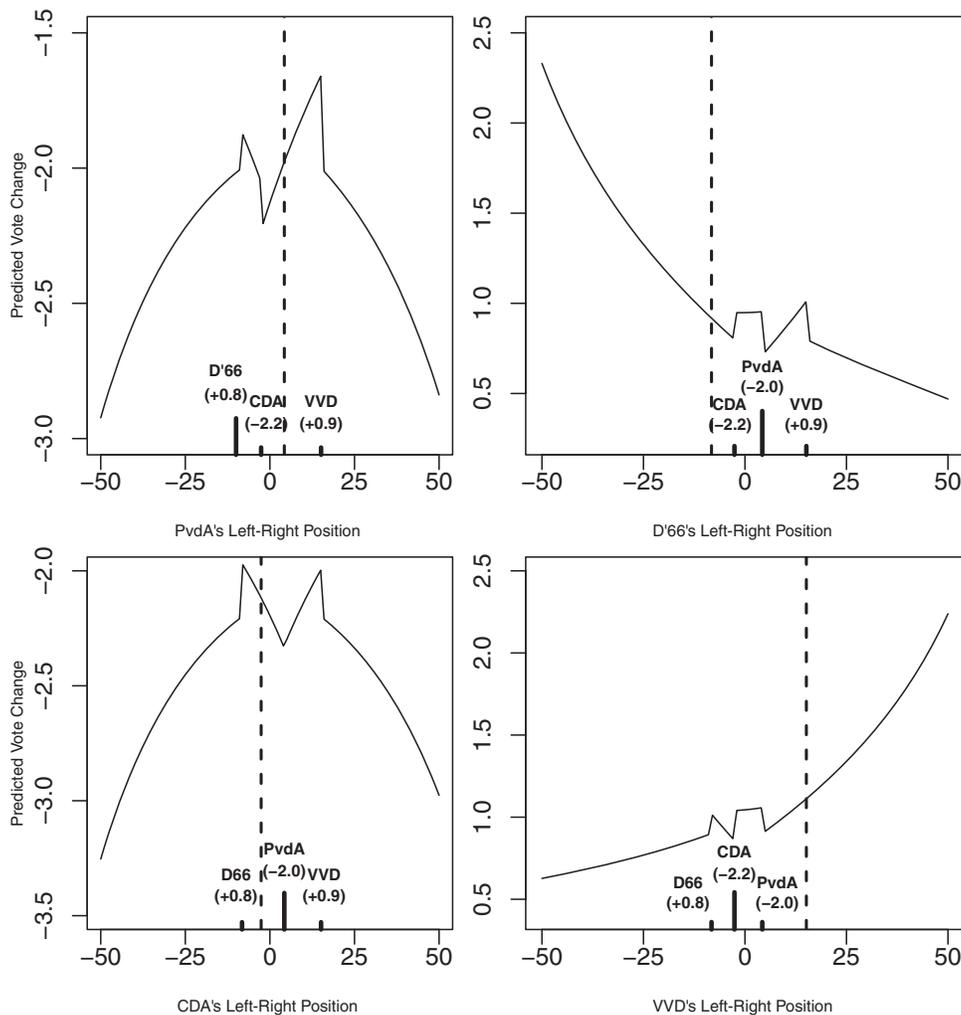

Note: Panels depict how the predicted vote change for each of the four Dutch parties in the 1994 generalelection varies according to its left-right position. The left-right positions and prespatial effects (in parentheses) are shown for the nonfocal parties in each scenario, whereas the dashed vertical line depicts the focal party's actual position in the 1994 general election. Predicted values are based on an absolute linear distance, neighbors-only weights matrix.

vote to the extent that ideological shifts—even if they are toward the center—are not rewarded. It is only in those cases where voters lack performance assessments on the parties that they rely to a greater extent on proximity voting (e.g., Alvarez, Nagler, and Bowler 2000; Cho and Endersby 2003).

If we return to the two early 1980s scenarios presented in Figure 1, we see that our theoretical framework does a fine job of explaining the results from these two elections. Figure 5 shows the results from Ireland in 1981, a case with high-clarity of responsibility. As expected from the economic voting literature, Fianna Fail saw its sup-

port decline substantially, whereas the major opposition party, Fine Gael, was the beneficiary of this decline. In the Netherlands in 1982, the Christian Democrats (the party of the prime minister) lost votes, but considering the size of the recession in which they were running, their losses were fairly modest. One explanation for their small losses is that the election occurred only about a year into a 48-month election cycle, and as our results demonstrate, governing parties tend to benefit substantially in early elections. But as our model of such low-clarity settings predicts, there appear to have been substantial contagion effects at work in this election. The Christian

FIGURE 5 Which Party Did Voters Support?
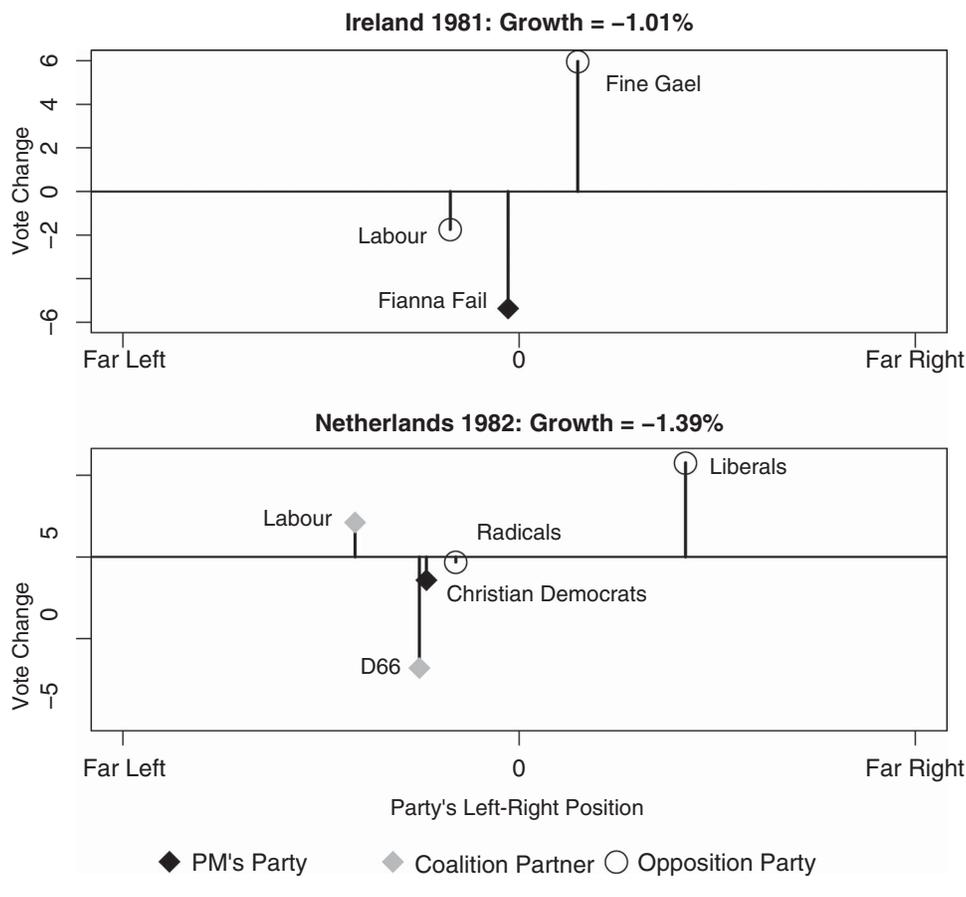
Democrats' two nearest ideological neighbors in 1982, the governing D'66 and the opposition Radicals, both lost votes, whereas the more ideologically distant Labour (in government) and Liberal (in opposition) parties both gained votes.

Conclusion

In this study, we have combined elements from the spatial and economic voting models of party competition to develop a theory of spatial contagion effects. The empirical tests support our theory, showing that there are spatial effects in party competition beyond what previous work has demonstrated. While these effects are relatively modest in high-clarity settings, they are strong in low-clarity settings. This contributes to a growing body of evidence that when faced with crowded and complex ideological menus, voters are able to make nuanced decisions between party choices (Kedar 2005; Stevenson and Vohnamme 2012).

As expected from the economic voting literature, in high-clarity elections, we find strong economic voting effects for both government and opposition parties. But in low-clarity elections, we find these effects only for the party of the prime minister. These differences across clarity situations highlight the contrast in these effects when responsibility is less clear to voters. Together, our findings of economic voting and spatial contagion effects point to the general usefulness of modeling aggregate election results with parties as the unit of analysis and taking into account the relative positions of the competing parties. Although we have tested our theory in a set of wealthy parliamentary systems, these findings should apply in other electoral settings where the relative positions of competing parties and candidates are clear to voters. This is not always the case in presidential systems or less consolidated democracies where party and candidate connections and positions are more fluid, so it would be interesting to explore the limits of spatial contagion effects across institutional settings.

Our findings point to at least three important areas that warrant further attention. First, researchers from the

spatial and economic voting literatures on party competition should pay more attention to each other's work. Scholars should integrate the role of economic performance into spatial models of voting, while also incorporating relative ideological proximity into aggregate models of electoral support. Second, SAR models provide a valuable inferential tool, because we can assess the economic vote within the context of strategic party competition. When we incorporate both elements within a SAR estimation procedure, we produce richer inferences that are closer to the expectations of spatial models. Since voters care about the overall distribution of parties (e.g., Ezrow and Xezonakis 2011), evaluating the movement by parties simultaneously with spatial econometric methods seems a more accurate depiction of the nature of voters' decision making. Moreover, a spatial econometric modeling approach is consistent with the interdependent nature of competition posited by spatial models and represents a closer empirical analogue to agent-based models that explore the simultaneous creation of party strategies (Fowler and Laver 2008; Kollman, Miller, and Page 1992; Laver 2005). Finally, our results highlight the substantial advantage that early elections—even after controlling for the state of the economy—present for the PM's party relative to opposition parties in high-clarity systems, and to a lesser extent in low-clarity systems.[20] While this suggests that the PM's party has a considerable electoral advantage in influencing the timing of elections, a more complete examination is necessary to understand the potential interactive relationship with the state of the economy (e.g., Samuels and Hellwig 2010).

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[20]Holding the election 25% earlier in the election cycle (roughly a one standard deviation increase) produces a 2.26% swing in favor of the PM's party relative to the opposition in the high-clarity system and a 1.16% swing in the low-clarity system.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

- Overview
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