An Empirical Model of Sequential Strategic Voting

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Abstract

Based on the results of a game-theoretic model by Meirowitz and Tucker (2003), this paper develops an empirical model of sequential strategic voting in the context of consecutive elections of unequal institutional importance (first- vs. second-order elections). The main hypothesis emerging from the theoretical model's predictions consists of a curvilinear effect of the time elapsed between any two consecutive asymmetric elections on the degree of vote share congruence both at the party and the country level. Drawing on cross-European electoral data inclusive of elections for the European Parliament, we do find a significant non-linear effect as evidence of strategic voting using both parametric and non-parametric regression methods. As it turns out, the effect is more prevalent among incumbent parties.

I. Introduction

Positive political theory hinges on the premise that institutions affect political behavior and, as a result, institutional design ought to account for various distortionary effects. In this paper, we attempt to tease out the effects of a particular set of institutions, namely sequential elections on distinct legislative chambers, on electoral outcomes and democratic accountability, by testing for the theoretical prediction of **strategic** (or else **insincere**) voting.

Meirowitz and Tucker (2003) present a theoretical model of strategic voting within an institutional setting of sequential elections. They derive the conditions under which a voter would vote against his/her preferred candidate in an election of lesser significance (second-order) in order to induce the latter to put in a stronger performance in the upcoming first-order elections (e.g. presidential or national parliamentary elections). This is a case of sequential information transmission within a dynamic environment with uncertainty about voter preferences. A voter faces a trade-off between an unrepresentative and unappealing second-order legislative chamber (e.g. national parliament or the European Parliament) and a preferred candidate with a good performance and public image in the run-up to the main elections of the electoral cycle. Assuming that the relative institutional weight of the second chamber is not high enough (hence the cost of misrepresentation of preferences is low), then voters may face the distorted incentives

of strategic voting (as in a vote of protest against an incumbent) in order to signal their discontent and to elicit a better response on the part of their preferred candidate or party.

Unlike the traditional Downsian framework, electoral competition in this model takes place on an orthogonal **valence** dimension - taking ideological positions as fixed - through the accumulation of such traits that will boost a politician's or party's public image of competence and reliability. This type of formulation makes the model's predictions applicable across both presidential and multi-party parliamentary systems. The prevalence of sequential strategic voting ultimately depends on the relative institutional importance of successive elections, their sequencing, and the marginal cost of political capital accumulation.

A direct empirical implication of the game theoretic model is a nonlinear effect of the timing and sequencing of elections on the degree of **congruence** in party vote shares in two consecutive elections. In this case, the time elapsed between two consecutive asymmetric elections may be construed as a proxy for the marginal cost of valence accumulation relative to the value of higher office (variable β in the model). We expect that the more time transpires between an election of secondary importance and the next first-order election, i.e. the easier it is for the party (or presidential candidate) to improve its performance (valence), the higher the degree of sequential strategic voting on the part of the electorate, i.e. congruence should increase. However, the time effect may occur up to a certain threshold whereupon negative returns set in, since voters will discount any potential competence-enhancing actions more heavily because of a longer time horizon until the next first-order elections[3], hence congruence should decrease. Moreover, as a result of sequential strategic voting, whereby voters do not cast their vote for their preferred candidate in the relatively unimportant elections in order to send them a warning message for the upcoming first-order elections, the model predicts a higher level of **'discord'** between the two respective elected branches (e.g. presidents and parliaments) of government, i.e. hostile institutional interactions. This is an indirect implication of the model that we do not test for in the empirical analysis to follow. Instead, we focus on the direct voting effect drawing on a cross-European dataset of electoral outcomes over two decades.

In the analysis to follow, we first present a sketch of the game-theoretic model accompanied by its main results. We then go on to describe our dataset and explain the rationale for using cross-European electoral data on both European Parliament elections (second-order) and national

[3] In fact, we rather expect incumbent parties to be the recipients of such voting signals, insofar as they have more leverage to visibly alter (improve) their outward image of competence. This will tested in the analysis to follow.

elections (first-order). We subsequently present the empirical model and discuss identification issues. Finally, we present the results using both parametric and non-parametric estimation methods and we evaluate their robustness to different specifications.

II. The Model

In this stylized model of sequential strategic voting based on valence rather than spatial (ideological) competition, Meirowitz and Tucker (2003) assume that there are three voters N = {1, 2, 3} with private information about their preferences between three parties P = {1, 2, 3}. A voter *i*'s private type denoted by $\theta_i \in P$ consists of his preferred party. There exists overall uncertainty about which of the two major parties is majority-preferred, while it is common knowledge that the third (small) party does not garner significant electoral support, i.e. only the two bigger parties are viable contenders for office in the presidential elections. Note that the existence of a small, insignificant party is not necessary for the results. Voting takes places over two consecutive asymmetric elections (with the less significant second-order election taking place first) and candidates (or parties) may choose to accumulate valence or some commonly attractive political traits in response to the outcome of the second-order election.

In the first period of the model, voters cast their ballot for either of the three parties in the parliamentary elections (second-order) and seat shares $s = (s_1, s_2, s_3)$ are then are allocated on a proportional basis. Once the first two parties observe the seat allocation portfolio (s), they choose one of three discrete costly levels of political capital accumulation $a_p = 0$, 1 or 2 in light of the upcoming presidential (first-order) elections, where β would denote the marginal cost of capital accumulation relative to the value of the presidency. This capital or valence accumulation may be construed as an effort to build a better reputation, public image, or even perception of competence. Increased levels of valence accumulation render parties more attractive for voters. Finally, voters cast their ballot for their most preferred party in the presidential elections. Obviously each party prefers winning the presidency to losing.

In any Perfect Bayesian Nash Equilibria (PBE) of the game, weakly undominated voting strategies involve sincere voting in parliamentary and presidential elections only for β high enough. However, for β below a certain threshold value and for a low enough value of having one's preferred party winning the parliamentary second-order elections relative to winning the

presidency, sincere voting in the parliamentary elections may not be part of an equilibrium profile of strategies. Thus, if the relative institutional importance of second-order elections relative to first-order elections is low enough, sincere voting may never be a best response. Strategic (insincere) parliamentary voting is more likely as: (i) the relative importance of the parliament (parameter λ) decreases, (ii) the cost of capital accumulation relative to the value of winning the presidency (β) increases (up to a certain threshold value). Essentially the model predicts that signaling by means of sequential strategic voting should be more prevalent in cases where second-order elections are sufficiently unimportant and valence is more costly but not too high. We now turn to the description of our dataset and our empirical model, which essentially seeks to test the model's findings on the effects of electoral sequencing and valence accumulation costs on strategic voting.

III. Dataset

Our raw data[4] consist of electoral outcomes from 1979 (year of first European Parliament elections) to 2003 across both European and national elections in a cross-European sample of all fifteen member-states of the EU-15[5], i.e. before its most recent waves of enlargement in 2004 and 2007. 2003 includes the last national parliamentary elections to have taken place (in Belgium) after the last European Parliament elections (1999) in our sample. We opt to cluster observations both at the national party level and the country level. The **party-level disaggregated dataset** amounts to 1,050 observations, where observation consist of party-level dyads of two consecutive asymmetric elections (1st order – 2nd order/ 2nd order – 1st order) for each of the initial 15 EU member-states. The **country-level aggregated dataset** amounts to 137 observations of asymmetric election dyads aggregated across all parties in each country, where aggregated measures of voting pattern congruence (or dispersion) constitute the dependent variables of interest. By first-order elections we refer mostly to parliamentary elections and/or, where applicable (i.e. in presidential or semi-presidential systems) to presidential elections. Second-order elections universally refer to European Parliament elections (see Reif and Schmitt, 1980), whereby candidates stand for office in a weaker, more remote institution, which arguably appears as less important in the eyes of the respective electorates.

[4] The data was compiled from a number of sources listed in the references.
[5] EU-15 consisted of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The desirable feature of this dataset is that European Parliament (EP) elections take place simultaneously across all member-states every five years. Moreover, EP electoral systems are on the most part similar versions of list PR with some few first-past-the-post exceptions (e.g. UK), which were eventually phased out in the latter years of the dataset's time span. This natural feature of the dataset is a very attractive property because it controls for issues of strategic timing of second-order elections. Moreover, exogenous variation in election timing across countries is useful as an independent variable, since the timing of EU elections is fixed and constant, while the timing of parliamentary/ presidential elections is country-specific (whether it is constitutionally mandated or not)[6]. Hence, we can isolate the effect of time elapsed within an election dyad. Finally, it allows us to control for the relative importance of the second-order elections vis-à-vis first-order elections (parameter λ in the model) across countries with distinct political systems, since we do not expect any significant variation in how national electorates perceive the EP's role, impact on policy, and relative institutional capacity with respect to their national governments.

Both party- and country-aggregated datasets consist of unbalanced pooled cross-sectional data. Only ten of the EU's initial fifteen countries took part in all five EP elections (1979, 1984, 1989, 1994, 1999). Spain and Portugal (who both joined the European Community in 1986) took part in the last four, while Sweden, Austria, and Finland (who were the last to join in 1995 amongst all fifteen countries) took part in only the last two of them. Moreover, not all parties take part in two consecutive elections, i.e. within one election dyad.

We present the set of variables in the Appendix. We use several different measures of **congruence** as the dependent variable of the empirical analysis, so we can test for the robustness of the results with respect to the type of measurement. In the country-aggregated dataset, we make use of aggregate measures of congruence in voting patterns, namely mean absolute deviations and standard deviations of vote share differentials within each election dyad. By way of isolating the noise of small party vote shares (which often do not participate in two consecutive elections), we also use normalized versions of the above aggregate variables accounting only for 'effective' parties, defined as those whose vote shares exceed some *ad hoc* country-specific threshold. The party-disaggregated dataset contains similar disaggregated measures of congruence at the party level.

[6] See Sapir and Sekkat (1999) for a model of optimal electoral areas with synchronized election timing.

Our two main independent variables consist of i) the number of days or weeks elapsed between elections (testing for the timing effect) and ii) an election sequence dummy (=1 if the second-order election comes first) (testing for the sequencing effect). As predicted by the model, we expect the strategic signaling mechanism among voters to be more prevalent when the second-order election precedes the first-order one. Finally, our set of control variables includes standard measures of i) the number of effective parties (e.g. the Laakso-Taagepera index), ii) the number of incumbent parties in government, iii) the electoral system, and iv) voter turnout, all of which may help control for omitted variable bias. Unfortunately, we do not have a specific theory with regards to the expected sign of those biases.

IV. Empirical Model

We essentially seek to test the following curvilinear model of the effect of timing on the magnitude of congruence in voting patterns (at the party or country level):

$$\text{Congruence dependent variable (party or country level)} = \alpha_{ic} + \beta \times \text{days}_{ic} + \gamma \times \text{days}_{ic}^2 + \boldsymbol{\delta} \times \text{control variables}_{ic} + \varepsilon_{ic}, \text{ where i: dyad and c: country}$$

Our main hypothesis consists of an inverted U-shaped curvilinear effect of time elapsed with $\beta>0$ and $\gamma<0$. It would conform nicely to the predictions of the model since: a) when the first-order election is too close to the second-order election, then there is not enough time for the signal to be answered by means of valence or political capital accumulation. The marginal cost of such efforts would be prohibitive within a very short period of time. Hence, assuming that would be common knowledge, we should not expect voters to behave in a sequential strategic manner. b) On the other hand, when the two consecutive asymmetric elections are too far apart, then the signal would not matter because it would be heavily discounted by the party and consequently by the voters. c) In-between the two extremes, there must be an optimal time for the signal to be cast. That is when we would expect the maximum amount of sequential strategic voting to occur.

We make the reasonable assumption that voter preferences are held constant within each dyadic observation. Hence, vote share dispersion within a dyad may not be attributed to partisan realignments. After all, the signaling voting model we are testing is a valence model, not a spatial one. Inevitably, partisanship realignments occurring within an election dyad (because of say an

economic shock) will be captured by the error term and may in fact account for cross-country error correlation in the event of a common pan-European shock.

We still allow for contemporaneous Coxian-style strategic voting (see Cox, 1997) accounted for by the proportionality of the electoral system and other institutional parameters (that will often be controlled for). However, the Null hypothesis of this empirical model implies that time elapsed between elections has no effect on the intertemporal inter-election level of congruence or dispersion in voting patterns. Interestingly enough, the datasets contain dyads, where both elections take place at the same time, still yielding significant vote share discrepancies. The attractiveness of these datasets essentially comes down to the fact that institutional configurations are essentially held constant across countries and over time (with the exceptions of a few electoral system shifts).

The model is oversimplified by the assumption that second-order elections (EP elections) and their debated issues are relatively unimportant in the eyes of the electorates, who just view them as a chance to send a costless signal to their preferred party to shape itself up for the first-order elections, that is when it matters most and the political stakes are highest. We thus assume that voters essentially rank parties the same across the two elections (constant preferences), regardless of the differences in the political agenda. The European policy dimension does not dictate voter preferences! However, it is increasingly the case that EP elections acquire a character of their own, i.e. with a more EU-oriented agenda and parties formed in opposition or in support of a specific EU policy issue. Moreover, voters tend to cast sympathy votes for smaller, non-electable parties, since they are not electing a government; this implies that Coxian strategic voting will tend to subside in EU elections. The latter identification issues should be kept in mind in our search for evidence of sequential strategic voting patterns.

We further allow for strong partisan biases and feel more inclined to attribute sequential strategic voting patterns to less ideological, pivotal voters. We assume that core ideological support is differenced out within each dyadic observation. On a last note, we discount the role of smaller parties (not represented in either parliament) in this whole sequential voting process. To that effect, we also perform the analysis on a 'cleaned' dataset consisting of effective/ viable party observations (with and without normalized vote share differentials).

V. Results

We first turn to the party-level disaggregated dataset in order to detect our predicted patterns. We initially focus on the party-level absolute (normalized) vote share differential as the dependent variable. We choose to drop observations including presidential first-order elections, since an unequal variance equality of means test turns out significant. Dyads including presidential elections are bound to confound our results for the following reasons:

1. Several small parties often do not endorse a presidential candidate of their own, hence yielding wide vote share disparities both with and without normalization.

2. Incumbent presidents often disassociate themselves from their respective parties seeking to appear as cross-partisan political figures.

3. Finnish and Irish presidential elections are significantly lagging in importance compared to parliamentary elections or even French presidential elections.

4. Two-ballot electoral systems introduce unexpected and unaccounted for strategic voting incentives (even though vote share differentials were calculated using the results of the first ballot only).

With respect to the **incumbency effect**, non-incumbent parties appear to have significantly higher mean absolute (normalized) vote share differentials for two incumbents or more, while the opposite is the case when one-party governments are in place. That confirms our intuition that sequential strategic voting would be more prevalent for single-party incumbents, while the signaling effects would be dissipated and hence discounted by voters in the case of multi-party governments. Hence, depending on the number of incumbents, **party incumbency matters**. The **sequence of elections**, however, does not produce a significant distinction of mean absolute (normalized) vote share differentials across countries (more on this later).

Tables 1 and 2 present the results of heteroskedasticity-robust OLS regressions on both gross and normalized (accounting for 'effective' parties only) measures of the absolute party vote share differential.

Effect of Time Elapsed on Absolute Party Vote Share Differentials

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Time elapsed (weeks)	.0000356 (1.93)*	.0000623 (1.06)	.0000607 (1.03)	.0000695 (1.19)	.0000837 (1.42)	.0000739 (1.26)	-5.31e-06 (-0.08)
Weeks squared		-1.18e-07 (-0.46)	-1.13e-07 (-0.44)	-1.57e-07 (-0.62)	-2.06e-07 (-0.81)	-1.61e-07 (-0.64)	1.31e-07 (0.44)
Incumbency Dummy			-0.003 (-1.07)	0.0002 (0.08)	0.019 (2.90)***	0.0002 (0.08)	-0.0004 (-0.13)
Constant	0.043 (18.91)***	0.042 (14.17)***	0.043 (14.12)***	0.051 (14.65)***	0.046 (12.39)***	0.052 (14.32)***	0.046 (13.71)***
Number of Incumbents				-0.004 (-4.50)***	-0.002 (-1.80)*	-0.004 (-4.51)***	
Election Sequence Dummy (1 if Second-Order Election First)						-0.003 (-1.14)	
inc_number					-0.007 (-3.53)***		
							Country absorbed (15 categories)
Observations	1048	1048	1048	1048	1048	1048	1048
R-squared	0.004	0.004	0.002	0.03	0.04	0.03	0.13

Table 1

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Effect of Time Elapsed on Absolute Normalized Party Vote Share Differentials

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Time elapsed (weeks)	.0000599	.0002301	.0002228	.0002312	.0002402	.0002389	.000103
	(2.90)***	(3.44)***	(3.38)***	(3.51)***	(3.63)***	(3.57)***	(1.29)
Weeks squared		-7.56e-07	-7.29e-07	-7.72e-07	-8.03e-07	-7.80e-07	-2.35e-07
		(-2.72)***	(-2.68)***	(-2.85)***	(-2.94)***	(-2.89)***	(-0.70)
Incumbency Dummy			-0.015	-0.012	0.0003	-0.012	-0.012
			(-4.57)***	(-3.46)***	(0.04)	(-3.46)***	(-3.09)***
Constant	0.055 (22.86)***	0.049 (15.19)***	0.053 (16.61)***	0.061 (17.05)***	0.058 (15.12)***	0.063 (16.65)***	0.058 (16.52)***
Number of Incumbents				-0.003	-0.002	-0.004	
				(-3.98)***	(-2.25)**	(-4.01)***	
Election Sequence Dummy (1 if Second-Order Election First)						-0.005	
						(-1.66)*	
inc_number					-0.004 (-2.08)**		
							Country absorbed (15 categories)
Observations	1050	1050	1050	1050	1050	1050	1050
R-squared	0.01	0.01	0.03	0.05	0.05	0.05	0.11

Table 2

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Under several specifications, we do find a significant curvilinear effect of time elapsed on absolute (normalized) vote share differentials with the predicted curvature. Our intuition that incumbency matters is validated, less so however as the number of incumbents increases. Moreover, we also argue that country fixed effects should not matter once we control for institutional disparities.

By way of heteroskedasticity tests, we ran quantile regressions (90^{th}, 75^{th}, 50^{th}, 25^{th}, 10^{th} quantile), which yield no evidence of time effects at the higher quantiles of the distribution, while curvilinearity seems to be significant and of the predicted curvature for median and lower

quantiles, which may be construed as evidence of heteroskedastic errors. Table 3 presents the results.

Quantile Regressions of Absolute Normalized Party Vote Share Differentials on Time Elapsed

	(1) Median	(2) Median (2)	(3) 90th Quantile	(4) 75th Quantile	(5) 25th Quantile	(6) 10th Quantile
Time elapsed (weeks)	4.63e-06	.0001434	4.45e-20	8.65e-20	.0002032	.0000543
	(2.29)**	(15.05)***	(0.00)	(0.00)	(3.20)***	(1.40)
Weeks squared		-4.29e-07	-1.96e-22	-3.54e-22	-6.60e-07	-1.82e-07
		(10.70)***	(0.00)	(0.00)	(2.47)**	(1.13)
Incumbency Dummy	-0.053	-0.047	0.009	-0.010	-0.009	-0.001
	(169.72)***	(99.42)***	(3.93)***	(717580056)***	(3.06)***	(0.65)
Number of Incumbents	-0.0004	-0.002	1.05e-17	-5.32e-18	-0.004	-0.001
	(5.16)***	(15.55)***	(0.00)	(0.00)	(4.55)***	(3.46)***
Constant	0.090	0.080	0.090	0.090	0.026	0.009
	(278.97)***	(137.80)***	(44.44)***	(6766164514)***	(6.52)***	(3.81)***
Observations	1050	1050	1050	1050	1050	1050

Table 3

Absolute value of t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Moreover, the Cook-Weisberg heteroskedasticity test significantly rejects the Null and points to cross-country disparities in electoral institutions as the source.

Figures 1 and 2 below give us a non-parametric picture of the timing effects using the party-disaggregated dataset. We present the results for both locally-weighted (lowess) and kernel-density estimates.

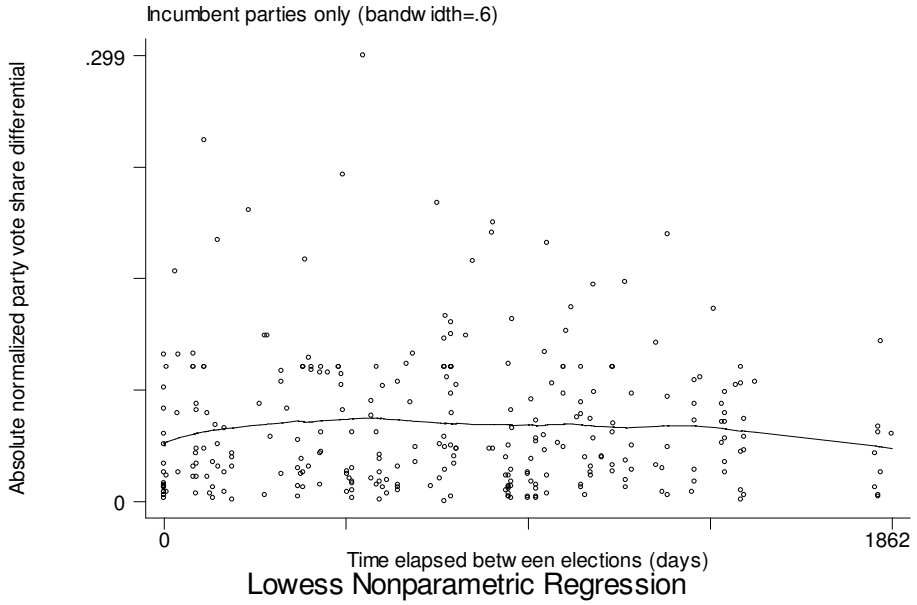

Figure 1

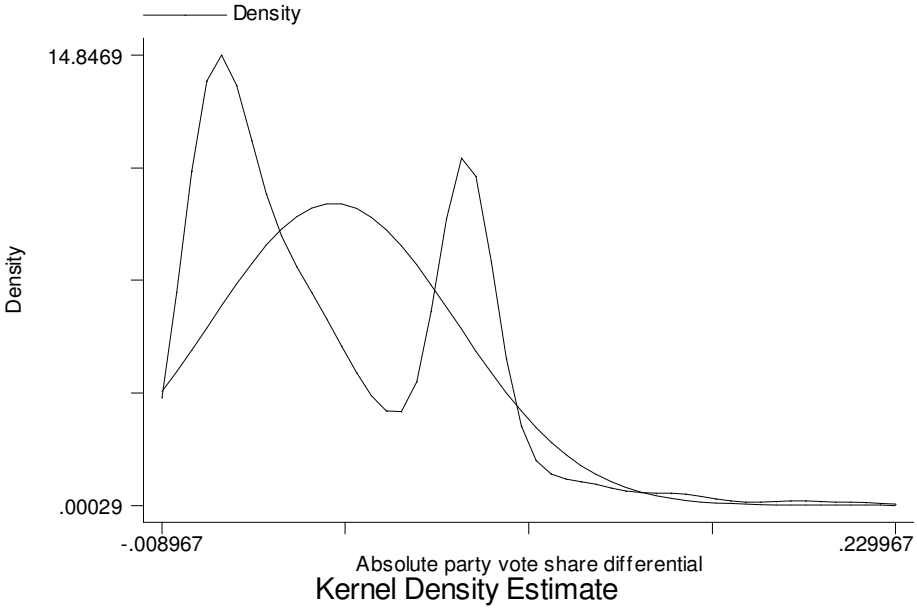

Figure 2

Our non-parametric analysis hints to the fact that the disaggregated party-level dataset may be problematic and inadequate. The following reasons concur: kernel density estimation reveals a **bimodal distribution** and hence implies cross-country institutional disparities (e.g. one-party vs. multi-party governments) that need to be aggregated. Moreover, data are bound to suffer from

serial correlation, since partisanship and ideological preferences are bound to be sticky over two consecutive election dyads; hence, party-level unexplained absolute vote share differential will be serially correlated over time. We expect for example incumbent parties to suffer a setback in EP elections (also affected by political business cycle effects) and to recover most of their votes (or even increase their share) in the next first-order elections. Finally, party-level observations per election dyad are not independent, since actual vote share differentials add up to one, while in absolute value they are still dependent on each other (e.g. consider the two-party example). The independence assumption will be more closely approximated, the larger the number of parties per dyad.

Our solution to the above problems is to use summary measures of congruence (or dispersion) abstracting away from party-level potential biases. We choose to shift our emphasis to country-level dyadic observations, where systematic cross-country variation may be accounted for by institutional electoral factors. Furthermore, given that the theoretical model is ideology-free, we do not wish to test for the direction of the strategic signal, i.e. which party would be the recipient of the electoral benefits of the valence-enhancing signal targeted to another party[7]. We hence impute independence and time invariance on the aggregated data (no heterogeneity).

The remainder of our empirical analysis is restricted to our cross-country aggregated dataset (inclusive of presidential elections). With respect to our choice of dependent variable, we have created summary measures of mean absolute (normalized or not) vote share differentials (congruence measures) as well as standard deviations of actual vote share differentials around the mean zero (dispersion measures). We have run analyses using both types of dependent variables, but the former seem to produce much more intuitive and significant results.

To give a rough picture of the variation in the dependent variable across countries, the following descriptive statistics consist of measures of the top-ranked parties' absolute summed vote share differentials across two consecutive asymmetric elections by election sequence (figures 3 and 4) and by country (figure 5).

[7] Even though it would be reasonable to presume that the vote recipient party would be a strong opposition party that would accentuate the impact of the warning signal upon the target party's actions.

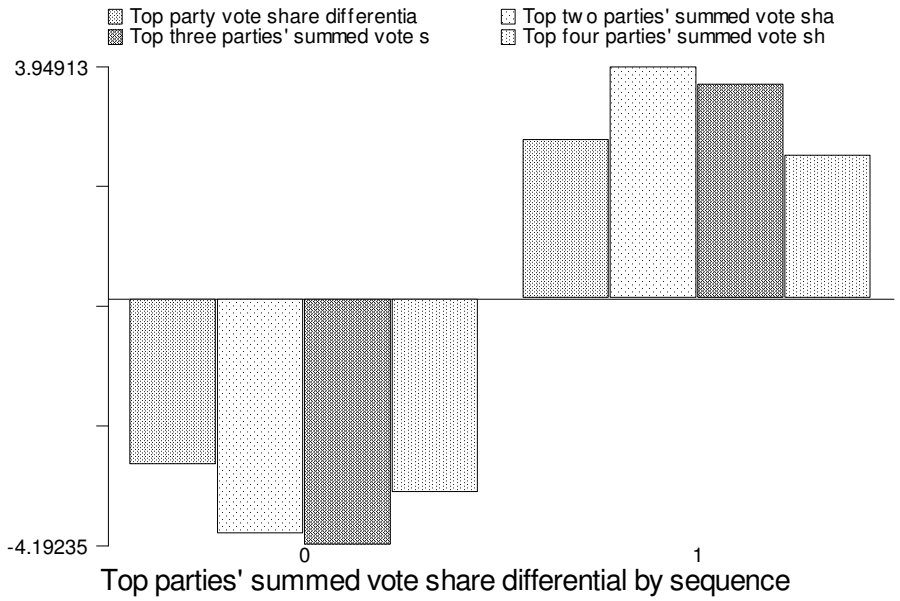

Figure 3

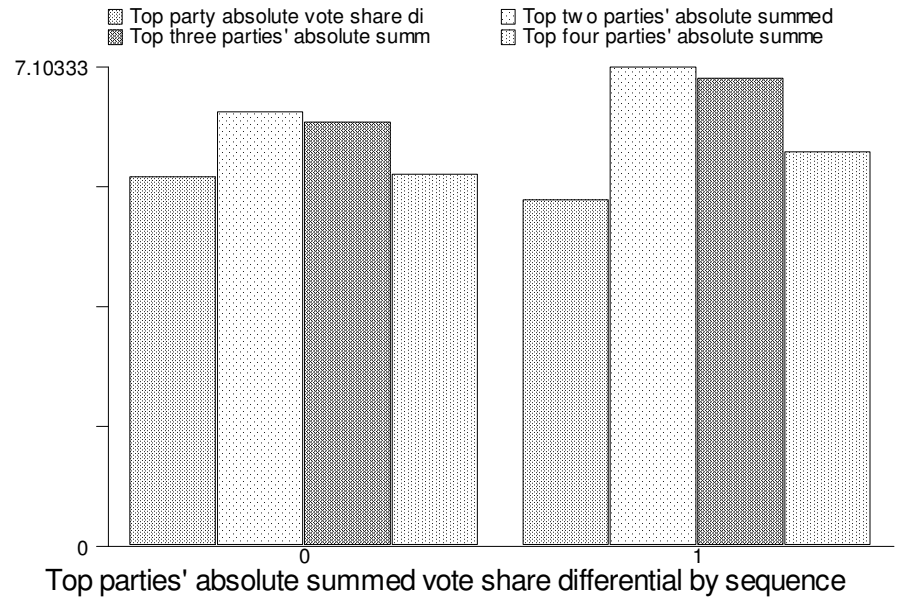

Figure 4

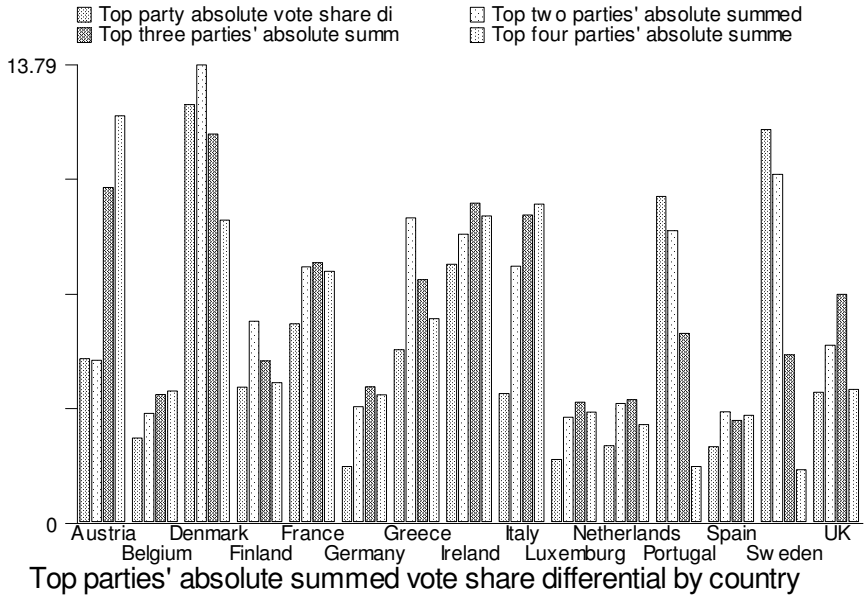

Figure 5

Unequal variance mean comparison tests indicate that sequence does not significantly distinguish between either of the dependent variables**.** As for the incumbency effect, a paired t-test on the equality of means shows that mean absolute values among incumbents are significantly higher than those among non-incumbents[8].

Switching to a non-parametric analysis of the data, the following figures consist of Gaussian kernel density estimations of the mean absolute dependent variables for both incumbent and non-incumbent parties as well as for the normalized index of congruence. They all give rise to unimodal, inverted U-shaped density curves, which should arguably confirm our intuition about the relationship between time elapsed and vote share congruence. It should be noted that there seems to be a strong incumbency effect on the location of the curve's peak, which in the context of the model would imply a disparity in the marginal cost of political capital accumulation among incumbent and non-incumbent parties.

[8] The same test on standard deviation dependent variables does not confirm our result.

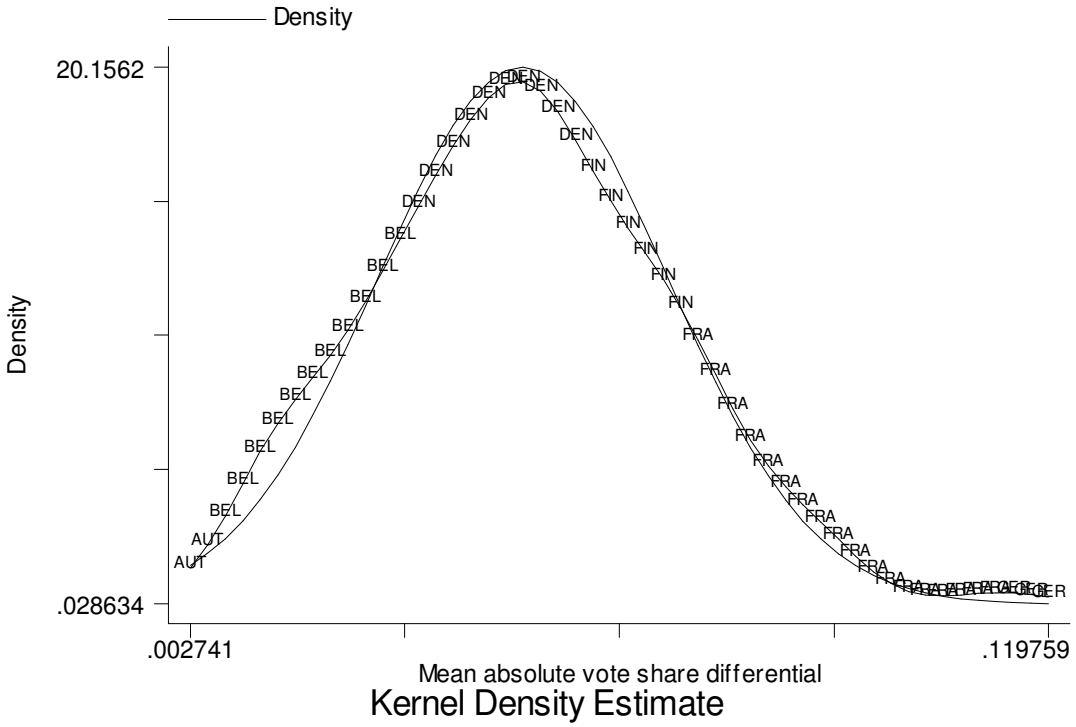

Figure 6

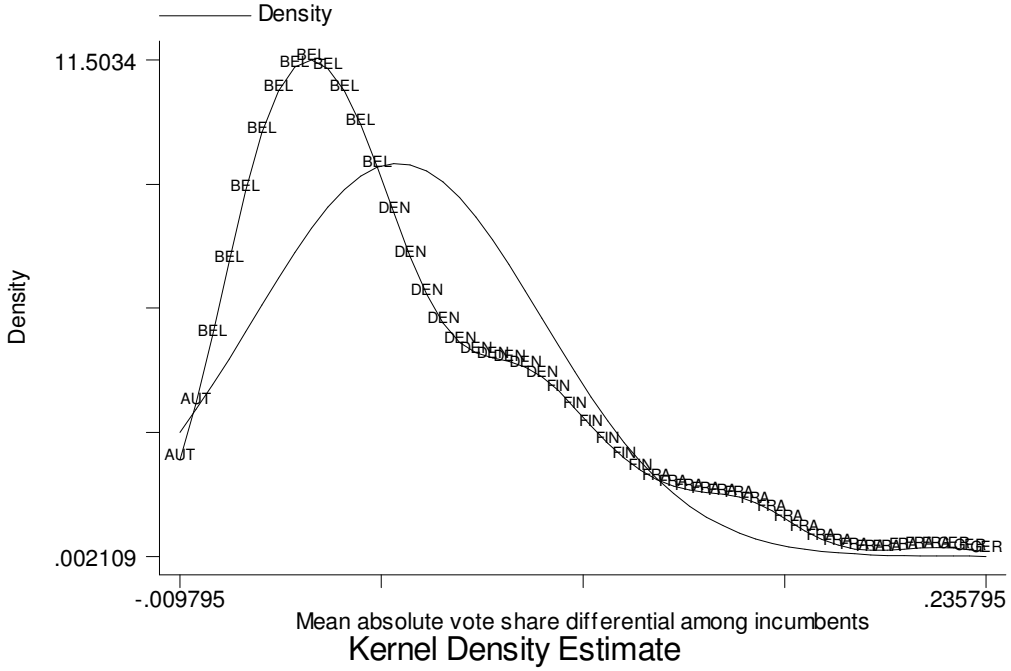

Figure 7

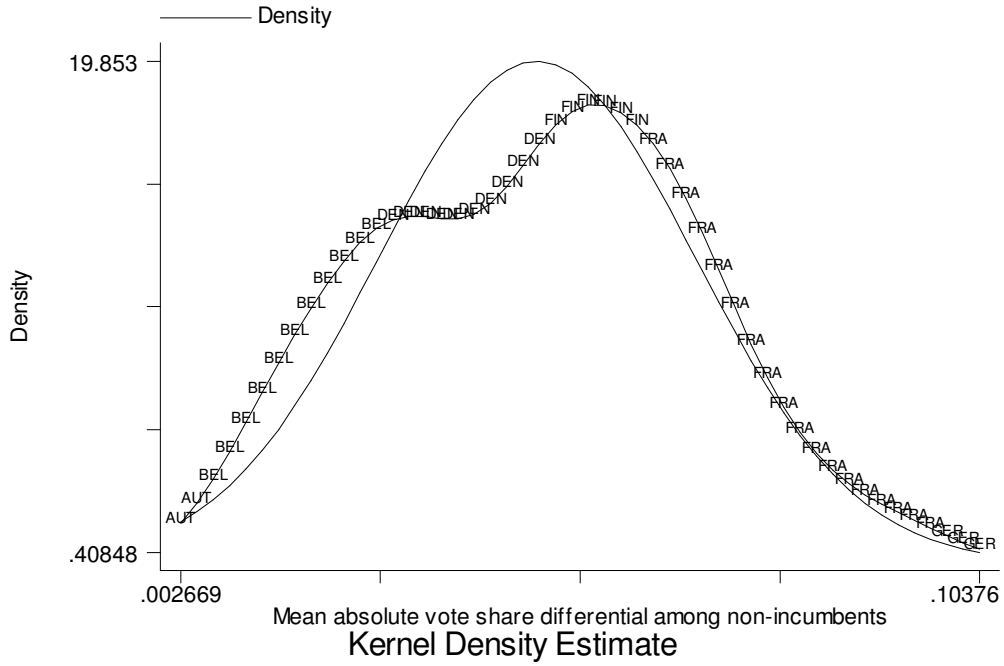

Figure 8

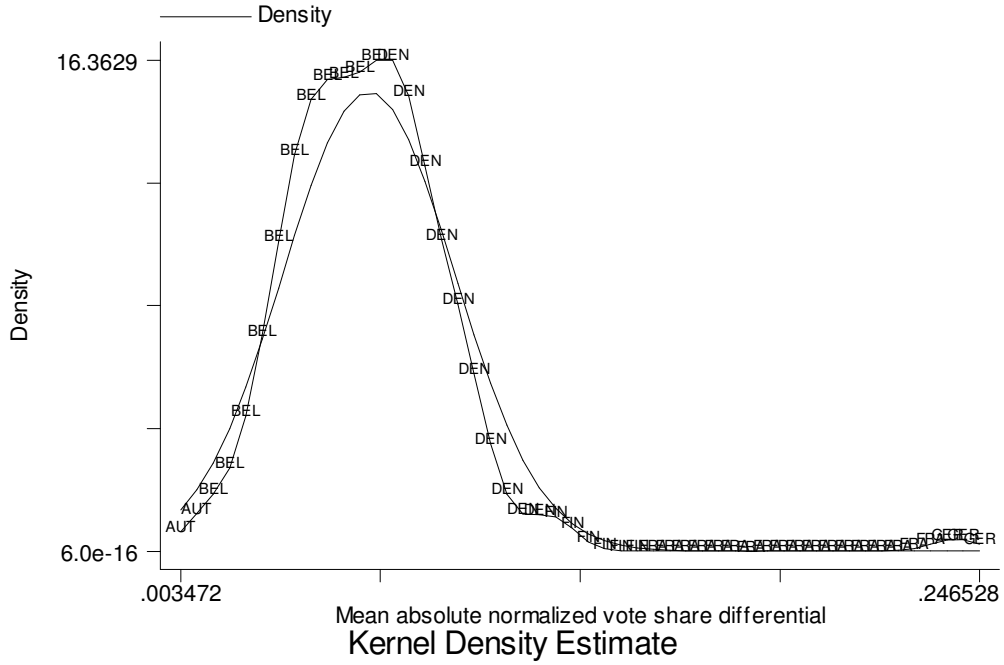

Figure 9

Using optimal bandwidth locally-weighted nonparametric regressions (lowess) of mean absolute (normalized) dependent variables (for all and for incumbents only) on time elapsed, we arrive at the same hump-shaped curves that corroborate our hypothesis on the curvilinear effect of time.

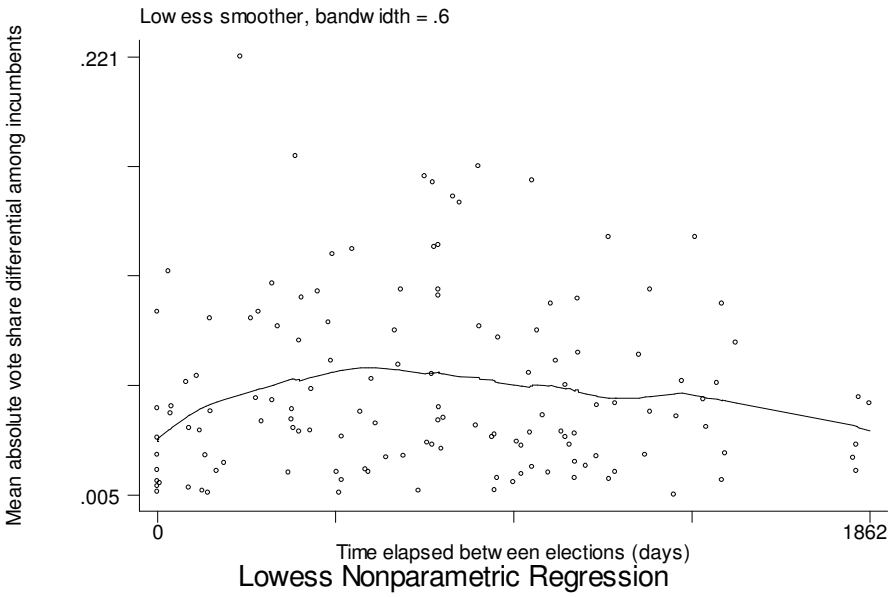

Figure 10

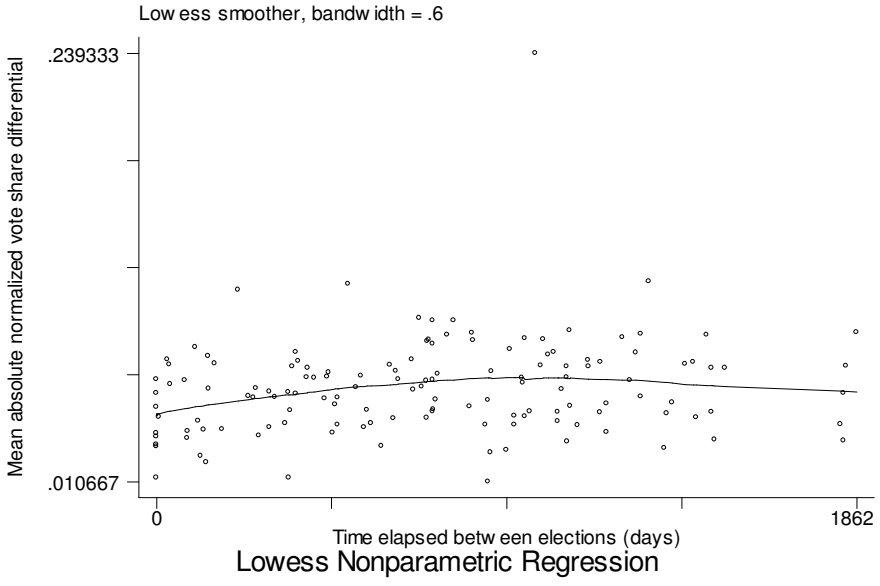

Figure 11

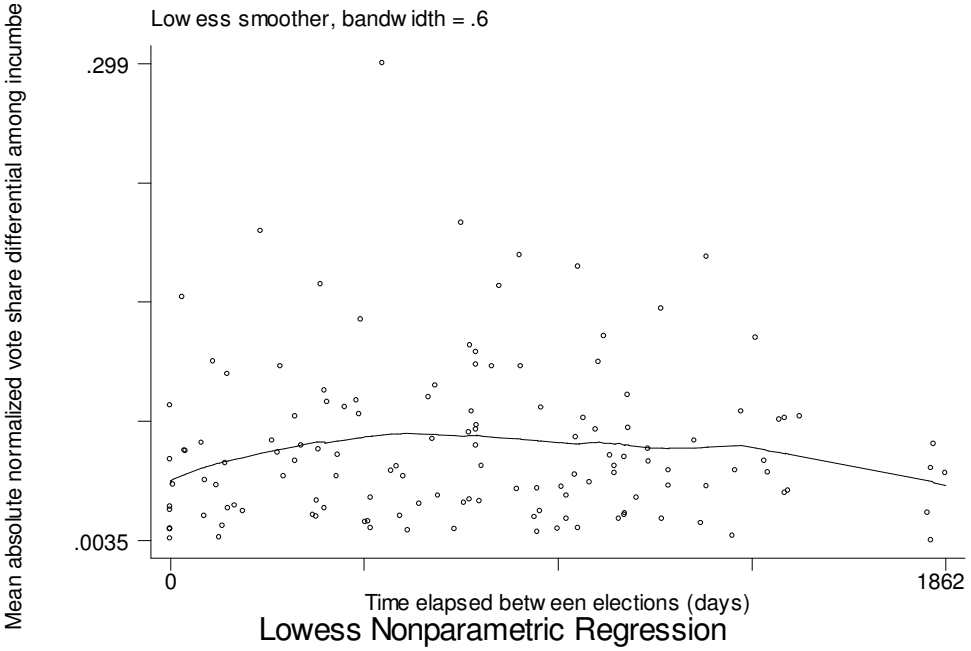

Figure 12

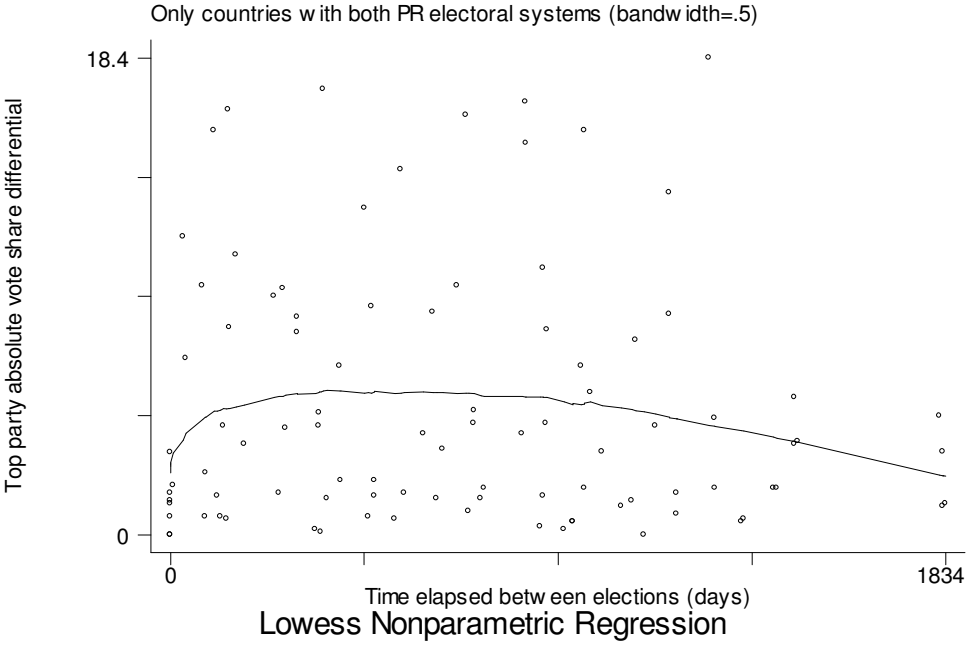

Figure 13

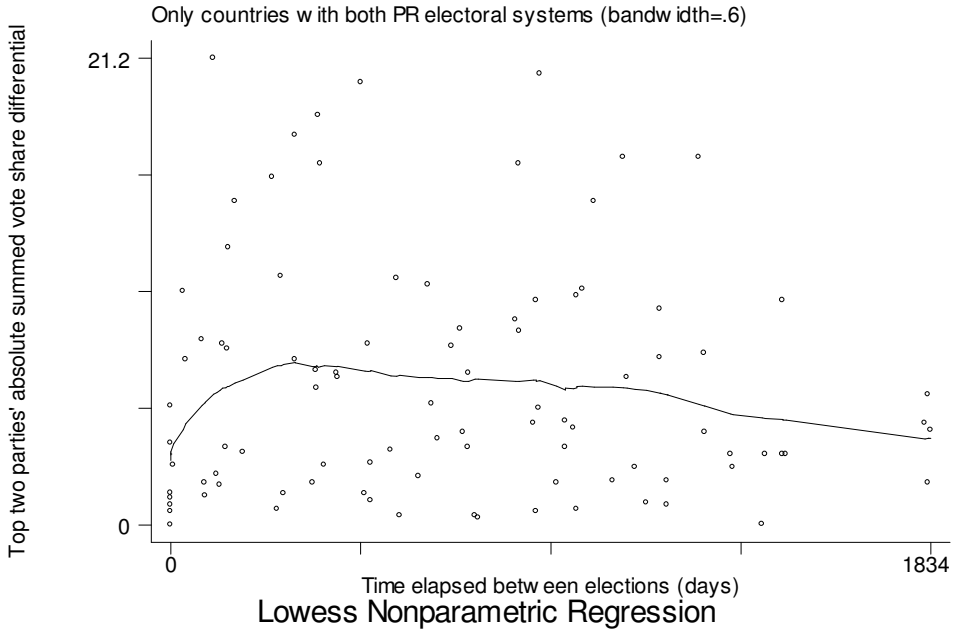

Figure 14

We next turn to OLS heteroskedasticity-robust regression analysis, first using mean absolute vote share differential as the dependent variable. We perform an F-test on the two time variables. Under the above specifications (as shown by table 4) the coefficients of the time-related independent variables are insignificant and often of the wrong sign. Time effects are jointly insignificant in all five model specifications, i.e. for different control variables.

Effect of Time Elapsed on the Mean Absolute Vote Share Differential

	(1)	(2)	(3)	(4)	(5)
Weeks elapsed between elections	.0000921	.0000282	.0000194	.0000514	.000049
	(1.21)	(0.37)	(0.24)	(0.70)	(0.62)
Weeks squared	-2.34e-07	-1.82e-08	2.25e-08	-1.04e-07	-9.38e-08
	(-0.71)	(-0.06)	(0.07)	(-0.35)	(0.29)
Proportional representation (both elections) dummy		-0.013	-0.013	-0.010	-0.010
		(-3.34)***	(-3.43)***	(-2.37)**	(-2.44)**
Absolute voter turnout differential			0.008		0.002
			(0.64)		(0.16)
Number of incumbents				-0.004	-0.004
				(-2.87)***	(-2.83)***
Constant	0.042	0.055	0.053	0.059	0.059
	(10.95)***	(9.43)***	(9.96)***	(9.74)***	(10.60)***

Observations	137	137	137	137	137
R-squared	0.02	0.12	0.12	0.18	0.18

Table 4

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

We then use the mean absolute normalized vote share differential as the dependent variable to see whether the sequential signaling effect is more prevalent and significant among incumbent parties. We look for sequencing effects and perform robustness checks. As the table below reveals, election sequence does not seem to have a significant effect, which may be accounted for by electoral business cycle effects.

Effect of Election Sequencing on the Mean Absolute Normalized Vote Share Differential

	(1)	(2)	(3)	(4)
Election Sequence Dummy (1 if Second-Order Election First)	0.006 (0.37)	-0.002 (-0.22)	0.009 (0.44)	0.016 (0.82)
Time elapsed (weeks)	.0000526 (0.71)	.0003622 (2.22)**	.0004834 (2.34)**	.0004303 (2.27)**
seq_weeks	- .0000812 (0.72)		-.0002402 (0.70)	-.0003973 (-1.19)
Weeks squared		-1.56e-06 (-2.49)**	-2.06e-06 (-2.25)**	-1.91e-06 (2.31)**
seq_weeks2			9.32e-07 (0.70)	1.53e-06 (1.21)
Proportional representation (both elections) dummy				-0.028 (-2.73)***
Constant	0.057 (7.59)***	0.048 (5.99)***	0.044 (5.69)***	0.066 (6.15)***
Observations	134	134	134	134
R-squared	0.00	0.03	0.03	0.10

Table 5

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

We then test for nonlinear effects of time elapsed on congruence (using the normalized incumbent measure) and perform robustness checks.

Effect of Time Elapsed on the Mean Absolute Normalized Vote Share Differential Aamong Incumbents

	(1)	(2)	(3)	(4)
Time elapsed (weeks)	.0003609 (2.24)**	.0002356 (1.45)	.0004967 (1.29)	.0002538 (1.55)
Weeks squared	-1.56e-06 (-2.49)**	-1.12e-06 (-1.83)*	-3.85e-06 (1.04)	-1.17e-06 (-1.91)*
Proportional representation (both elections) dummy		-0.027 (-2.65)***	-0.026 (-2.65)***	-0.026 (-2.54)**
Weeks3			7.26e-09 (0.77)	
Laakso-Taagepera index of effective parties based on average vote share within dyad				-0.003 (-1.47)
Constant	0.048 (5.54)***	0.072 (5.44)***	0.068 (5.19)***	0.084 (6.04)***
Observations	134	134	134	134
R-squared	0.03	0.09	0.09	0.10

Table 6

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The results presented in table 6 point to a quadratic relationship between our variables of interest under specification 1. The enhanced models tested in columns (2) to (4) seem to indicate that institutional factors play a confounding role because Duvergerian effects of proportionality bias the results and contribute towards heteroskedastic errors.

Finally, we choose to perform a similar regression analysis for the subsample of dyads excluding presidential elections, since the latter seem to be confounding the results for the reasons stated above. We first use mean absolute vote share differential as the dependent variable and test for the joint significance of time effects (F-tests).

Effect of Time Elapsed on the Mean Absolute Vote Share Differential (Excluding Presidential Elections)

	(1)	(2)	(3)	(4)	(5)
Time elapsed (weeks)	.000121 (1.76)*	.0000991 (1.38)	.0000942 (1.22)	.000116 (1.70)*	.000119 (1.62)
Weeks squared	-4.44e-07 (-1.52)	-3.58e-07 (-1.17)	-3.35e-07 (-1.01)	-4.15e-07 (-1.45)	-4.29e-07 (-1.38)
Proportional representation (both elections) dummy		-0.004 (1.07)	-0.004 (1.05)	-0.002 (-0.46)	-0.002 (-0.48)
Absolute voter turnout differential			0.003 (0.30)		-0.002 (-0.18)
Number of Incumbents				-0.003 (-2.38)**	-0.003 (-2.39)**
Constant	0.039 (11.74)***	0.044 (8.29)***	0.043 (7.99)***	0.048 (8.41)***	0.048 (8.48)***
Observations	124	124	124	124	124
R-squared	0.02	0.03	0.04	0.09	0.09

Table 7

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

We still do not obtain the anticipated results because the dependent variable seems to be too aggregated. We next look for the nonlinear effect of time elapsed on the standard incumbent measure of congruence in our subsample and perform robustness checks.

Effect of Time Elapsed on the Mean Absolute Vote Share Differential Among Incumbents

	(1)	(2)	(3)	(4)	(5)
Time elapsed (weeks)	.0004318 (2.96)***	.0002947 (2.04)**	.0002585 (1.48)	.0002406 (1.65)	.0003371 (2.36)**
Weeks squared	-1.94e-06 (-3.30)***	-1.40e-06 (-2.43)**	-1.18e-06 (-1.59)	-1.15e-06 (-1.98)**	-1.53e-06 (-2.75)***
Proportional representation (both elections) dummy		-0.027 (-3.09)***		-0.025 (-2.84)***	-0.023 (-2.70)***
Absolute voter turnout differential				0.036 (1.41)	
Laakso-Taagepera index of effective parties based on average vote share					-0.006

within dyads					(-3.97)***
			Country absorbed (15 categories)		
Constant	0.039 (5.71)***	0.065 (6.28)***	0.045 (5.88)***	0.058 (4.98)***	0.087 (7.77)***
Observations	123	123	123	123	123
R-squared	0.06	0.13	0.41	0.15	0.19

Table 8

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Model (5) yields robust and significant results that pass the robustness checks. We obtain the predicted nonlinear time effects as well as the institutional effects of the electoral and party systems. Model (3) shows that country fixed effects are not significant and hence should not be taken into account.

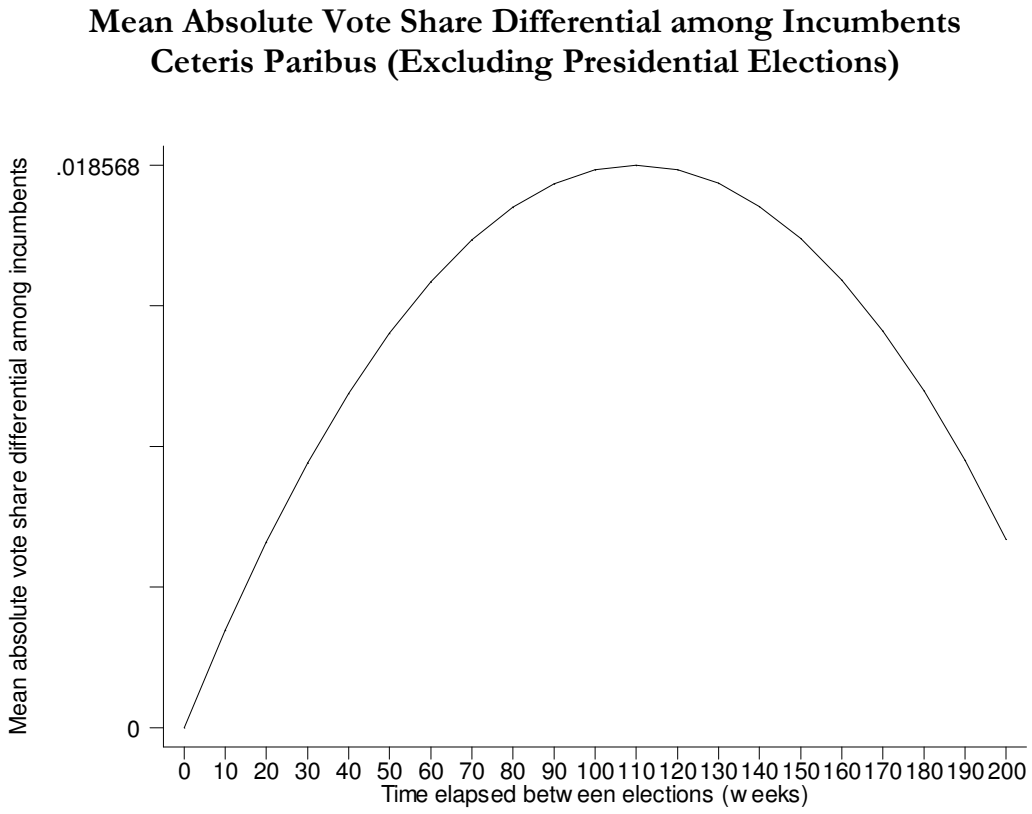

Figure 15

According to the estimates of the above empirical specification, we would expect the **maximum amount of sequential strategic voting** when the second-order elections (EP elections in this case) take place 110 weeks before or after the first-order elections (parliamentary elections in this case) all else held equal (see figure 15)!

Effect of Time Elapsed on the Mean Absolute Vote Share Differential among Incumbents

	(1)	(2)	(3)	(4)	(5)
Time elapsed (weeks)	.0003365 (2.34)**	.0002976 (2.06)**	.0003672 (2.60)**	.0003684 (2.60)**	.0003352 (2.32)**
Weeks squared	-1.52e-06 (-2.71)***	-1.35e-06 (-2.41)**	-1.66e-06 (-3.01)***	-1.66e-06 (-3.01)***	-1.44e-06 (-2.61)**
Proportional representation (both elections) dummy	-0.039 (-1.85)*	-0.022 (-2.53)**	-0.018 (-2.08)**	-0.018 (-2.07)**	-0.023 (-2.73)***
Laakso-Taagepera index of effective parties based on average vote share within dyad	-0.009 (-2.88)***	-0.006 (-3.56)***		-0.001 (0.29)	-0.006 (-3.92)***
Pr*ltaverage	0.004 (1.08)				
Absolute voter turnout differential		0.025 (0.96)			
Election sequence dummy (1 if 2nd order election first)					-0.009 (1.32)
Constant	0.101 (5.20)***	0.082 (6.16)***	0.080 (7.59)***	0.082 (7.12)***	0.091 (7.79)***
Number of Incumbents			-0.011 (-4.10)***	-0.010 (-2.94)***	
Observations	123	123	123	123	123
R-squared	0.20	0.20	0.27	0.27	0.20

Table 9

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Additional robustness checks confirm our previous results (see table 10).

Effect of Time Elapsed on the Mean Absolute Vote Share Differential among Incumbents (subsample of observations with less than 3 incumbents)

	(1)	(2)	(3)	(4)
Time elapsed (weeks)	.0005659 (2.99)***	.0005508 (2.86)***	.0005575 (2.91)***	.000464 (1.75)*
Weeks squared	-2.47e-06 (-3.44)***	-2.41e-06 (-3.29)***	-2.37e-06 (-3.27)***	-2.07e-06 (-1.86)*
Proportional representation (both elections) dummy	-0.014 (-1.35)	-0.014 (-1.30)	-0.014 (-1.37)	
Absolute voter turnout differential		0.007 (0.21)		
Laakso-Taagepera index of effective parties based on average vote share within dyads			0.001 (0.22)	
				Country absorbed (13 categories)
Constant	0.055 (4.26)***	0.054 (3.77)***	0.056 (2.51)**	0.050 (4.37)***
Election Sequence Dummy (1 if Second-Order Election First)			-0.011 (-1.12)	
Observations	82	82	82	82
R-squared	0.15	0.15	0.16	0.39

Table 10

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The signaling effect of time elapsed seems to be even equally pronounced if we only consider the subsample of observations with less than three incumbents. Our intuition about the effects of incumbency and the number of incumbents is confirmed.

Lowess Non-Parametric Regressions for Subsample Excluding Presidential Elections

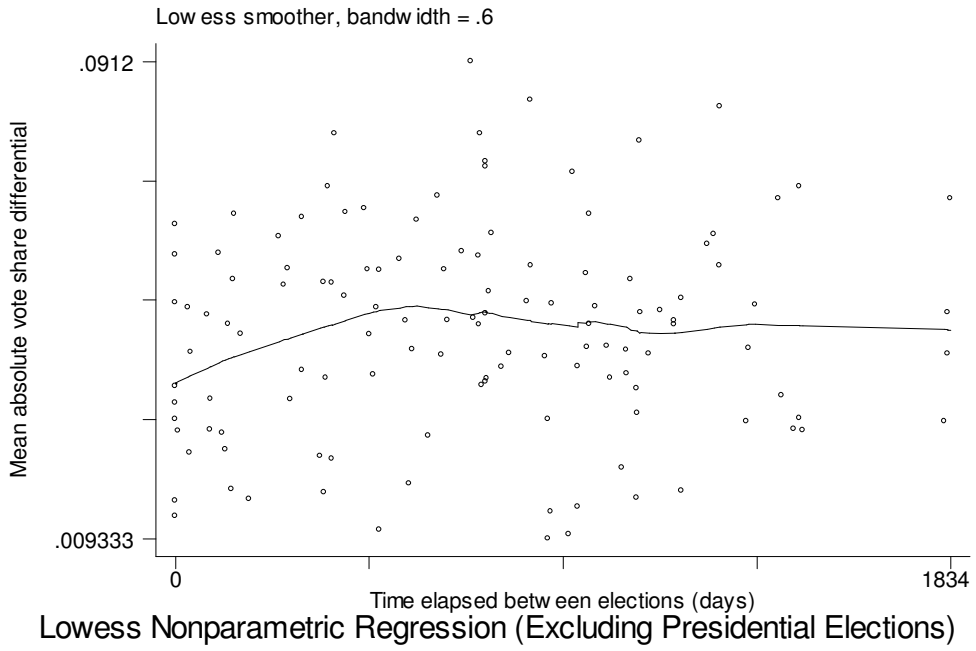

Figure 16

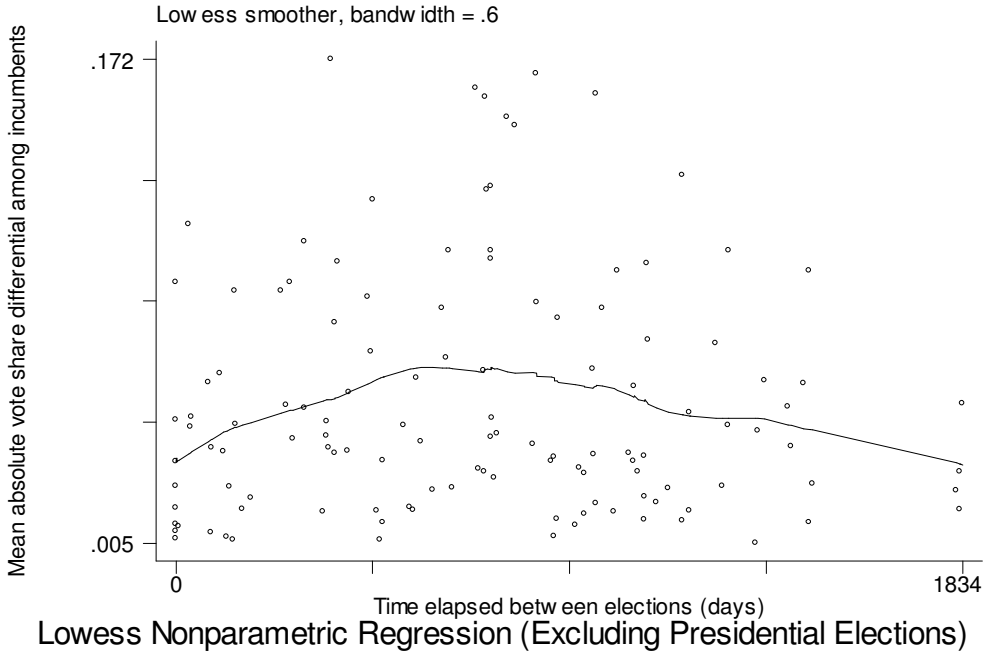

Figure 17

The pattern of curvilinearity that we found using a parametric approach is confirmed by the above locally-weighted (lowess) regressions of time elapsed (days) on the incumbent measure of congruence (see figures 16 and 17).

V. Caveats and Conclusions

We do find a curvilinear effect of time elapsed on voting pattern congruence[9] as predicted by the model (direct test). The signaling effect seems to apply more clearly to incumbent parties, especially when the number of parties in government is low. Restricting our attention to effective parties through normalization of vote share differentials does not alter our results significantly, since small party vote shares do not seem to fluctuate in a confounding manner. Country fixed effects only seem to operate through country-level electoral institutions (i.e. electoral and party systems). Election sequencing does not seem to have an effect. That may well be the case because of the structure of the datasets, since absolute vote share differentials in one dyad (first-order – second-order) may reflect voting signals applying to the first-order election included in the dyad immediately following in time. The absolute voter turnout differential control variable does not appear to play an important role in this empirical model. In fact, abstention is not explicitly modeled in the original theoretical model[10].

In interpreting these results, however, some caveats need to be taken into considerations. For example, there may well be an endogeneity bias, insofar as the timing of parliamentary elections is endogenously determined by the incumbent(s) based on electoral signals (see Kayser, 2003 for a related model). Unfortunately, there is no added value in restricting our attention to first-order elections with constitutionally mandated fixed timing, since there are too few presidential elections in Europe. Moreover, no valid instruments seem to come handy. One should also b aware of possible aggregation biases in the overall measures of congruence (or dispersion) in voting patterns, which may fail to capture some unobserved trends in the data. The possibility of short-term ideological realignments may also constitute a potential source of bias for the results.

[9] In fact, absolute deviation measures of congruence seem to be more robust than standard deviation measures of dispersion, which is quite surprising.
[10] See Shotts (2000) for a model of abstention as a valence-enhancing signal to preferred candidates.

Appendix: List of Variables

- **Classification variables**

- Country
- Type of Election Dyad (i.e. Parliamentary/Presidential-EU or EU-Parliamentary/Presidential)
- Date of first and second election
- Country-level vote share cut-off point (%) (i.e. crude effective party national vote share threshold)
- Party (in party disaggregated dataset only)

- **Dependent variables (aggregate measures of congruence in voting patterns)**

- Total vote share (%) for top 1, 2, …, 10 parties in first and second election
- Top 1, 2, …, 10 parties' summed vote share differential
- Top 1, 2, …, 10 parties' absolute summed vote share differential
- Mean absolute vote share differential
- Mean absolute vote share differential among incumbents
- Mean absolute vote share differential among non-incumbents
- Standard deviation of vote share differentials
- Standard deviation of vote share differentials among incumbents
- Standard deviation of vote share differentials among non-incumbents
- Mean absolute normalized vote share differential (among effective parties)
- Mean absolute normalized vote share differential among incumbents (among effective parties)
- Mean absolute normalized vote share differential among non-incumbents (among effective parties)
- Standard deviation of normalized vote share differentials (among effective parties)
- Standard deviation of normalized vote share differentials among incumbents (among effective parties)
- Standard deviation of normalized vote share differentials among non-incumbents (among effective parties)
- Mean absolute vote share differential (effective parties only)
- Mean absolute vote share differential among incumbents (effective parties only)
- Mean absolute vote share differential among non-incumbents (effective parties only)
- Standard deviation of vote share differentials (effective parties only)
- Standard deviation of vote share differentials among incumbents (effective parties only)
- Standard deviation of vote share differentials among non-incumbents (effective parties only)

In party disaggregated dataset only

- Party absolute vote share differential
- Party absolute normalized vote share differential

- **Independent variables**

- Days and weeks elapsed between elections (*timing effect)*
- Election sequence dummy (1 if 2nd order election first) (*sequencing effect*)

- **Control variables**

- Number of incumbents (at the time of the second election of the dyad)
- Total number of parties in election dyad
- Number of effective parties (Crude Measure)
- Ratio of effective to total number of parties

- Laakso-Taagepera index[11] of effective parties in first and second election
- Laakso-Taagepera index of effective parties based on average vote share within dyad
- Type of electoral system of first election (PR vs. Majority/Plurality vs. STV)
- Type of electoral system of second election
- Proportional representation (both elections) dummy
- Voter turnout as the number of votes divided by voters registered in the first election
- Voter turnout as the number of votes divided by voters registered in the second election
- Absolute voter turnout differential

In party disaggregated dataset only
- Incumbency dummy (=1 if party is incumbent at the time of the second election in the dyad)
- Effective party dummy (=1 if average party vote share within dyad exceeds country-level cutoff percentage)

[11] Equals $\frac{1}{\sum_i v_i^2}$, where v_i is party i's vote share (%).

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