

# Extra- and within-system electoral volatility

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## Abstract

We analyze the remarkable differences in the electoral success of new parties and compare the determinants of electoral volatility attributable to new versus established parties. We base our findings on an original data set of total volatility, extra-system volatility, and within-system volatility for 67 democratic countries across all regions of the world since 1945.

The article makes three contributions. First, we show that it is important to distinguish between electoral volatility that represents vote shifts among established parties (within-system volatility) and shifts to new parties (extra-system volatility). Second, we provide descriptive information about total, within-system, and extra-system volatility for 67 countries. Third, we analyze the determinants of volatility. Our results show that the causes of within- and extra-system volatility differ markedly. In contrast to Powell and Tucker, for our broader range of countries and longer time period, there are several statistically robust positive findings.

## Keywords

electoral volatility, new democracies, new parties

In this article, we analyze the remarkable differences in the electoral success of new parties in 67 democratic countries in the post–World War II period and compare the determinants of electoral volatility attributable to new versus established parties. These questions are relatively new. Prior to the third wave of democratization, they were not on the research agenda because the vote share of new parties was limited in almost all democracies. Most Western European and Anglo-American democratic party systems were stable from the 1920s until 1967, when Lipset and Rokkan (1967) published their seminal contribution on the “freezing” of party systems. Major new parties were uncommon. In many third- and fourth-wave competitive regimes, however, new parties burst on the scene and become important contenders while some established parties fade away. In these countries, party systems are clearly not frozen. Social scientists should systematically capture and account for these differences in the electoral success of new parties.

We make three contributions. The first is conceptual/theoretical. Following Birch (2003: 119–135), Golosov (2004: 47–49), Powell and Tucker (2014), Sikk (2005), and Tavits (2008), we argue that it is important to disaggregate total electoral volatility into the vote share of new parties (which we also call extra-system volatility) and vote transfers that go to established parties (within-system volatility). This point holds for a much broader range of countries and much longer time period than the postcommunist countries that were the focus of these earlier works.

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Electoral volatility is a good indicator of aggregate electoral stability and change,<sup>1</sup> but it does not distinguish between vote transfers among established parties and transfers to new contenders. The dynamics and characteristics of a party system are different if new competitors frequently enter the system and capture a significant share of the vote. In this situation, the very parties that compete to win elections change. Whereas within-system volatility reflects change among established parties, extra-system volatility indicates changing membership of the system and reflects dissatisfaction with all of the old parties. Extra-system volatility is a useful indicator of how open or impermeable party systems are.

Our second contribution is descriptive. We provide information about total volatility, within-system volatility, and extra-system volatility. We introduce a new data set that covers 67 countries for an extended period of time, beginning in 1945 or the inauguration of a country's most recent competitive regime, whichever came later, and ending in 2006. To the best of our knowledge, the analysis is based on the most comprehensive data set of electoral volatility that has been compiled.

Our third contribution is explanatory. We analyze the determinants of extra-system volatility and compare these results to those for within-system volatility. Consistent with Powell and Tucker (2014), for 21 postcommunist countries ( $N = 89$  electoral periods), the determinants of extra-system volatility differ sharply from those of within-system volatility. However, in contrast to Powell and Tucker, who found few statistically significant results for extra-system volatility and none for within-system volatility, for our much broader range of countries and electoral periods ( $N = 618$ ), we obtain several significant results.

The Birth year of democracy has a robust impact on both kinds of volatility. Democracies established in earlier historical periods have much lower extra- and within-system volatility than third- and fourth-wave democracies. The Birth year of democracy is the only variable that consistently affects both kinds of volatility.

Following a well-established finding in the literature on total volatility, sluggish economic growth facilitates the electoral success of new contenders. Surprisingly, economic performance has no impact on vote transfers among established parties. Nor did inflation have any impact on any of the dependent variables.

Finally, it is easier for new parties to succeed when the system has a higher effective number of parties (ENP). However, a higher ENP has no impact on within-system volatility. Two other variables for institutional openness (district magnitude and presidentialism) consistently had no association with any of the dependent variables.

## Theoretical expectations

The extensive literature on electoral volatility dates back to the 1970s, with many contributions since then. In the

2000s, some articles focused on the vote share of new parties and distinguished between electoral volatility attributable to transfers to established parties and to new parties. This literature has focused on the post-Soviet region, so it has been limited to the period since around 1989 (Birch, 2003: 119–135; Golosov, 2004: 47–49; Powell and Tucker, 2014; Sikk, 2005; Tavits, 2008). Powell and Tucker (2014) made an important contribution by systematically comparing the correlates of within- and extra-system volatility across 89 electoral periods in the post-Soviet region. We greatly expand the geographic and historic scope of this work on the vote share of new parties.<sup>2</sup> Like Powell and Tucker, we distinguish between within- and extra-system volatility. We describe their distributions across countries and over time and study their differential determinants.<sup>3</sup>

In the literature on electoral volatility and the vote share of new parties, some empirical results diverge across different samples of countries and electoral periods. Nevertheless, these literatures suggest three core hypotheses that we test.

First, poor economic performance should lead to higher volatility, primarily by weakening support for the governing party or coalition. Poor economic performance could make it easier for new parties to enter the system by discrediting the existing labels and generating willingness on the part of voters to support a new option.

Second, permeable institutional arrangements such as fragmented party systems and permissive electoral systems should be associated with higher volatility. In fragmented party systems, total electoral volatility has been higher in several studies, perhaps because politicians and voters can defect to more options (Bartolini and Mair, 1990: 131–145; Madrid, 2005: 10; Roberts and Wibbels, 1999; Tavits, 2005). The openness of fragmented party systems might also make it easier for new parties to succeed. In less fragmented systems, divisions among parties might be harder, making it less likely that voters would defect from an established party.

Likewise, higher district magnitudes (the number of seats per district) should make it easier for new parties to establish an electoral foothold (Tavits, 2006, 2008). Conversely, low district magnitudes might reduce volatility and set high barriers for new entrants. The effects of district magnitude operate partly through their impact on the number of parties, but district magnitude might have an independent effect on volatility.

Third, parties in long established democracies developed strong organizations with deep connections to voters and organized interests, whereas most third- and fourth-wave democracies lack strong parties (Gunther, 2005; Mainwaring and Zoco, 2007; Schmitter, 2001). Along related lines, Roberts and Wibbels (1999) showed that volatility was lower in Latin American democracies with parties that were established earlier. If this argument holds across our larger data set, earlier democracies will have lower electoral volatility and a lower vote share of new parties.

Prior research showed that these hypotheses were well-grounded for total volatility. We did not have strong ex ante reasons to theorize whether they would affect within- and extra-system volatility in different ways. Therefore, we apply these theoretical expectations to both within- and extra-system volatility.

## Data set and case selection

Our data set includes 618 electoral periods in 67 countries in all regions of the world: Western Europe, North America, and Oceania (20 countries); Latin America (16); Eastern Europe and post-Soviet Union (14); Asia (8); Africa (4); and 5 others. The historic and geographic scope of the data set is useful for an empirical mapping, for testing hypotheses about the electoral success of new parties, and for verifying whether the same factors drive within- and extra-system volatility. From the point of view of observationally based causal inference, the strength of our sample lies both in its size and in the much larger variability it offers in the independent variables (e.g. gross domestic product (GDP) per capita varies much more between Benin and Norway in our sample than between Albania and Slovenia in the postcommunist samples). This greater variability and sample size allow for a more precise estimation of regression coefficients.

The analysis includes all countries with at least 1 million inhabitants that as of 2006 had experienced at least four consecutive lower chamber elections during which the country's Polity score was consistently 3 or higher (including the years of the elections and all years in between). A Polity score of 3 or higher is designed to eliminate authoritarian regimes. An authoritarian regime's control of elections favors the governing party and usually limits electoral volatility. Therefore, including elections under authoritarian regimes is likely to produce biased estimates of the effects of the independent variables. We also excluded countries that had experienced an annulled election during the time period in question.

We measure our dependent variables—extra-system and within-system volatility—by decomposing total volatility into two components: (a) the net change in parties' vote shares from one election to the next that is driven by transfers to existing parties (within-system volatility) and (b) the net change in parties' vote shares that is driven by transfers to new parties. This disaggregation of total electoral volatility requires the operationalization of "new party" and the measurement of the vote shares of new parties at each election. We coded this variable beginning with the second election of a new competitive regime. In the founding election, the vote share of new parties might be high simply because an antecedent dictatorship had suppressed parties, and the parties from the previous democratic period (if there was one) might not have reappeared. Online Appendix 1A provides information on what we counted as new

parties and how we treated party schisms, mergers, coalitions, and changes of name. Specific coding decisions about all 618 electoral periods and 67 countries are available from the authors and will be made available online along with the data set.

## Variance in extra-system and within-system volatility

Table 1 reports total electoral volatility, within-system volatility, and extra-system volatility for the lower chamber of the 67 countries that meet the selection criteria described above.<sup>4</sup> New parties win a meaningful share of the vote. The mean vote share for new parties is 6.5% taking the electoral period as the unit of analysis and 10.5% at the country level. (There are many more electoral periods for the average old democracy in the data set, so the country mean is higher.) For the average country, 42% of total electoral volatility represents transfers to new parties and 58% is within-system volatility. Mean total volatility is 17.8% for the 618 electoral periods and 25.2% for the 67 countries.

The cross-country differences are huge. Mean total volatility is 20 times greater in Benin (68.3%) than in the United States (3.4%). Mean extra-system volatility ranges from 0.1% (the United States) to 41.8% (Benin). Some party systems (e.g., the United States) pose daunting barriers to the success of new entrants, while new competitors have a much easier time achieving success in many countries. Mean within-system volatility ranges from 3.3% (the United States) to 30.0% (Poland). Regional differences in all three kinds of volatility are high.

High extra-system volatility characterizes most third- and fourth-wave competitive regimes. New parties have had little success in long-established democracies, consistent with Lipset and Rokkan's (1967) notion of "frozen" party systems. The mean vote share of new parties in competitive regimes established by 1945 was 2.4% in all elections from 1945 to 2006 compared to 14.6% for new parties in competitive regimes established in the third and fourth waves. Mean total volatility was 13.2% for 475 electoral periods for democracies established before 1978 compared to 32.9% for 143 electoral periods for democracies established in 1978 or later.

Newer democracies also have a higher *share* of extra-system volatility, consistent with Powell and Tucker's (2014) observation about the post-Soviet cases. In democracies inaugurated before 1978, 30% of total volatility goes to new parties and 70% is within-system volatility. In the democracies established in 1978 or thereafter, 44% of total volatility is extra-system and 56% is within-system.

Figure 1(a) and (b) present median band plots of extra-system and within-system volatility by Birth year of democracy. In these graphs, the x-axis is divided in a number of bands or segments of equal width. In both graphs, the

**Table 1.** Mean total volatility, mean extra-system volatility, and mean within-system volatility, 67 Countries, 1945–2006.

	Elections included	Birth year of democracy	Mean total volatility	Mean within-system volatility	Mean extra-system volatility
Western Europe, North America, and Oceania					
United States	1946–2004	1800	3.4	3.3	0.1
Germany	1949–2005	1949	8.0	7.8	0.2
Sweden	1948–2002	1911	7.9	7.2	0.7
Finland	1945–2003	1917	8.0	6.9	1.1
Norway	1945–2005	1945	11.3	10.1	1.2
Austria	1945–2002	1945	6.6	5.3	1.3
United Kingdom	1945–2005	1837	7.6	6.2	1.4
Ireland	1948–2002	1921	9.5	8.1	1.4
Australia	1946–2004	1901	6.9	5.3	1.6
Denmark	1945–2005	1945	11.0	9.1	1.9
Canada	1945–2006	1867	11.6	9.6	2.0
Greece	1974–2004	1974	10.8	8.7	2.2
Netherlands	1946–2003	1946	12.5	10.1	2.4
Switzerland	1947–2003	1848	7.4	4.8	2.6
France	1946–2002	1946	18.1	14.9	3.1
Portugal	1975–2005	1975	16.1	13.0	3.2
Belgium	1946–2003	1944	11.7	8.2	3.4
New Zealand	1946–2005	1857	11.1	7.5	3.6
Spain	1977–2004	1976	17.6	13.0	4.6
Italy	1948–2001	1945	15.4	8.7	6.7
Unweighted average			10.7	8.4	2.2
Latin America					
Honduras	1981–2005	1981	6.8	6.4	0.4
Brazil	1986–2006	1985	18.8	16.1	2.8
Chile	1989–2005	1990	13.9	11.0	2.9
Uruguay	1984–2004	1985	15.6	12.6	3.0
Dominican Republic	1978–2006	1978	33.2	29.5	3.7
Argentina	1983–2003	1983	22.5	15.1	7.4
Mexico	1994–2006	1994	20.6	13.0	7.6
Panama	1994–2004	1989	28.9	21.0	7.9
Colombia	1958–2006	1958	15.9	7.9	8.0
El Salvador	1985–2006	1982	17.8	8.3	9.6
Costa Rica	1946–2006	1853	29.9	18.7	11.1
Venezuela	1958–2005	1958	32.9	18.1	14.8
Ecuador	1979–2002	1979	31.9	15.6	16.3
Guatemala	1985–2003	1986	42.4	22.9	19.6
Bolivia	1985–2005	1982	39.5	18.5	21.0
Nicaragua	1990–2006	1990	51.4	28.2	23.2
Regional (unweighted) average			26.4	16.4	10.0
Asia					
Sri Lanka	1952–2004	1948	16.7	11.7	5.0
Japan	1952–2005	1952	14.1	8.6	5.5
Malaysia	1974–2004	1971	13.3	6.8	6.5
Mongolia	1990–2004	1990	32.2	24.0	8.2
India	1951–2004	1950	26.7	13.1	13.6
Taiwan	1992–2001	1992	20.3	3.8	16.4
Philippines	1987–1998	1987	44.8	27.1	17.8
South Korea	1988–2004	1988	36.6	9.9	26.7
Regional (unweighted) average			25.6	13.1	12.5
Africa					
Mauritius	1976–1995	1968	22.5	19.1	3.4
Botswana	1965–2004	1966	10.6	6.2	4.5
Namibia	1989–2004	1990	13.1	6.8	6.3
Benin	1991–1999	1991	68.3	26.5	41.8
Regional (unweighted) average			28.6	14.7	14.0

(continued)

Table 1. (continued)

	Elections included	Birth year of democracy	Mean total volatility	Mean within-system volatility	Mean extra-system volatility
Eastern Europe and post-Soviet Union					
Hungary	1990–2002	1990	30.1	26.0	4.1
Slovenia	1992–2004	1991	28.9	19.5	9.4
Macedonia	1990–2006	1991	38.3	24.0	14.3
Poland	1991–2005	1989	45.5	30.0	15.5
Czech Republic	1990–2002	1990	28.5	11.6	16.9
Lithuania	1992–2004	1991	51.2	29.6	21.6
Romania	1990–2004	1990	46.5	23.8	22.7
Bulgaria	1990–2005	1990	39.3	15.5	23.8
Estonia	1992–2003	1991	44.7	20.9	23.8
Slovakia	1994–2006	1993	43.6	19.5	24.2
Russia	1993–2003	1992	44.8	20.3	24.5
Latvia	1993–2002	1991	52.0	26.8	25.2
Moldova	1994–2005	1991	56.5	28.9	27.6
Ukraine	1994–2006	1991	60.3	28.8	31.4
Regional (unweighted) average			43.6	23.2	20.4
Other countries					
Jamaica	1959–2002	1959	14.7	13.7	1.0
Israel	1949–2003	1948	20.1	12.5	7.6
Papua New Guinea	1977–1997	1975	27.8	16.3	11.4
Trinidad and Tobago	1966–2002	1962	27.3	8.7	18.7
Turkey	1983–2002	1983	32.2	13.6	18.6
Regional (unweighted) average			24.4	13.0	11.5
Overall (unweighted) average			25.2	14.7	10.5

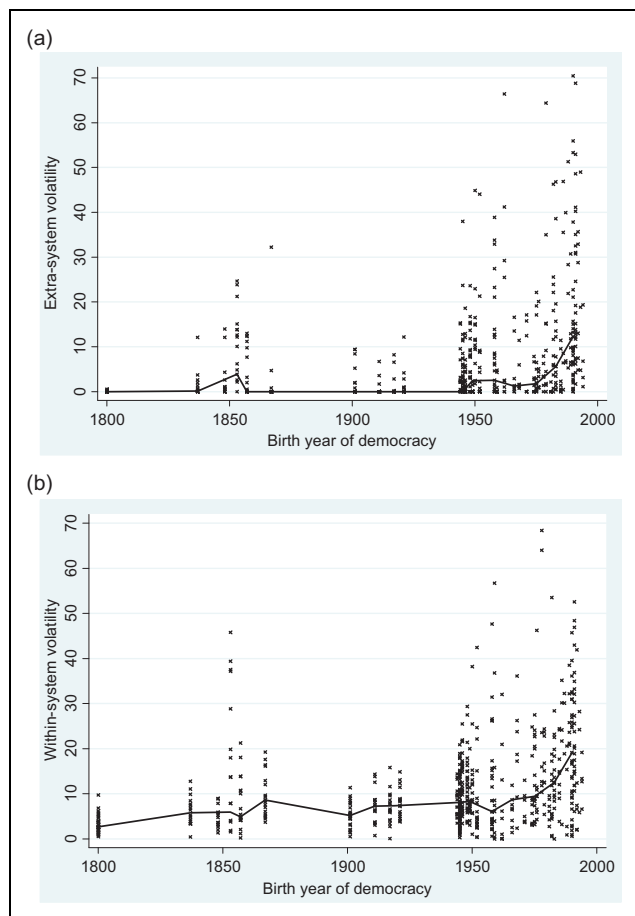
194 years represented in the  $x$ -axis are broken up into 28 segments of approximately 7 years each.<sup>5</sup> The medians for the  $x$ -variable Birth year of democracy and the  $y$ -variable extra-system volatility (Figure 1(a)) and within-system volatility (Figure 1(b)) were calculated for all the observations contained within each 7-year segment on the  $x$ -axis. For example, Figure 1(a) shows that the median extra-system volatility for all competitive regimes inaugurated between 1981 and 1987 (the next to last segment on the  $x$ -axis) was 5.6%. Each of these 28 pairs of medians was then connected by a straight line in order to show more clearly how median volatility varies from older to younger democracies.

Figures 1(a) and (b) also show all the volatility scores for all elections in the data set (shown as small letters “x”<sup>6</sup>) for countries whose competitive regimes were inaugurated in a given year. All the scores for a given country appear vertically above the year in which its current democratic regime was established. For example, all volatility scores for a democracy born in 1978 appear in the graph vertically above the value 1978 on the  $x$ -axis. With the exception of a peak for democracies born around 1850 (mostly due to several high extra-system volatility elections in Costa Rica and New Zealand), the median vote share of new parties for democracies born before 1945 is 0. In

contrast, for democracies born after 1945 and especially since the 1980s, the trend is steadily upward. In more recently established competitive regimes, new parties enjoyed more support. In the last band of Figure 1(a) (corresponding to the period 1988–1994), median extra-system volatility rises to a maximum of 12.3%, and it also shows some of the highest scores in the whole sample, as indicated by several observations above 50% on the  $y$ -axis.

Within-system volatility follows a different pattern. Although democracies born in the 1980s and 1990s have had higher within-system volatility than old democracies, democracies born in the 19th century were not markedly less prone to within-system volatility than those established in the first seven decades of the 20th century. These historical trends underscore the differences between both types of volatility. The success of new contenders is mostly a phenomenon of post-1945 and especially post-1978 democracies, while vote flows between established parties affect both old and new democracies.

For the 618 electoral periods, the correlation between within-system volatility and extra-system volatility is essentially 0 ( $r = 0.03$ ;  $p$  value = 0.42), providing additional evidence that it is useful to separate the two; they do not vary in lock step. Extra-system volatility often suggests a very different picture than within-system volatility.



**Figure 1.** (a) Extra-system volatility by Birth year of democracy. (b) Within-system volatility by Birth year of democracy.

## Independent variables

What accounts for the cross-country and cross-temporal differences in within-system and extra-system volatility documented above? And to what degree do the determinants of within-system volatility differ from those of extra-system volatility? We hypothesized that poor economic performance, more permissive electoral rules, and more fragmented party systems and democracies born more recently would have higher volatility of both types.

### Economic performance

We measure economic performance with short-term per capita GDP growth and inflation, tracking average annual change from the year of the first election in an electoral period to the year before the second election. For inflation, we used the natural log because we expect a nonlinear effect, given some extreme values (up to an average 2593% per year for an electoral period).<sup>7</sup>

### Institutional openness

*A higher ENP increases volatility.* We measure the ENP in votes (Laakso and Taagepera, 1979). The ENP in the first election of an electoral period is the value for that observation; the measurement for ENP antecedes the measures for volatility. Volatility and the number of parties are conceptually unrelated: volatility can be high if a major party loses all its votes to another party, yet the ENP will remain unchanged. Likewise, a system with many parties will have low volatility if their vote shares are stable.

*A higher district magnitude fosters higher volatility.* Our measure is the natural log of the mean effective magnitude (Taagepera and Shugart, 1989: 126–141).<sup>8</sup> The correlation between district magnitude logged and ENP is only 0.30, and the variance inflation factor (VIF) statistics for these two variables in our models below are modest (1.24 and 1.20, respectively), so there is no problem of multicollinearity by including both variables in the regressions.

*Presidentialism fosters higher electoral volatility.* In presidential and semi-presidential systems, individuals can more easily become head of government without having the backing of a major party (Samuels and Shugart, 2010). The potential to capture executive power without establishing an extensive national organization might lower barriers for new parties in presidential elections, with possible spillovers to legislative elections.

### Waves of democracy

*Democracies that were inaugurated more recently have higher volatility.* To test this hypothesis, we used the natural log of the number of years from the birth of democracy until 2006 because we expect a diminishing effect over time. We call this measure “Birth year of democracy.”

### Control variables

An alternative hypothesis to the one about the Birth year of democracy is that regardless of when they were born, party systems might become more stable over time as voters have more time to identify with parties (Brader and Tucker, 2001; Converse, 1969). We test this hypothesis by including a variable for the logged number of years since the inauguration of democracy until a given election (“Age of democracy”). Whereas Age of democracy changes from one electoral period to the next, Birth year of democracy is constant for all electoral periods for a given country. The two variables are highly correlated empirically ( $r = 0.82$ ) but are different theoretically. Birth year of democracy captures “cohort effects,” that is, the causal impact of factors associated with characteristics of the historical period in which a democracy was born. Age of democracy is about “age effects,” that is, about whether volatility changes as

**Table 2.** Descriptive statistics.

	No. of observations	Mean	Standard deviation	Minimum value	Maximum value
<b>Dependent variables</b>					
Total volatility	618	17.8	15.4	0.4	83.7
Extra-system volatility	618	6.5	11.2	0.0	70.4
Within-system volatility	618	11.3	10.1	0.0	68.4
<b>Independent variables</b>					
GDP growth	615	2.2	2.8	-11.7	18.7
Inflation	613	22.9	125.8	-7.2	2593
ENP	618	4.0	1.9	1.2	15.5
District magnitude	612	18.1	41.4	1	299
Presidential system	618	0.37	0.48	0	1
Birth year of democracy (cohort effects)	618	70.5	51.9	12	206
Age of democracy (age effects)	618	47.7	48.3	1	204
Per capita GDP	618	13380	8926	563	45837

GDP: gross domestic product; ENP: effective number of parties.

a democracy grows older, regardless of when it was established. These two variables would be indistinguishable in a cross-sectional data set but can be disentangled with our time-series cross-sectional (TSCS) data. In the tables below, we refer to them as “Birth year of democracy (cohort effects)” and “Age of democracy (age effects).”

We use the natural log of per capita GDP based on the estimates of the Penn World Tables as a control variable to assess whether unmeasured factors in wealthier countries account for lower volatility. Without this control, a positive finding for Birth year of democracy or Age of democracy might stem from some unspecified characteristics of wealthier democracies.

Table 2 shows the descriptive statistics for the dependent and (unlogged) independent variables. Each electoral period in a country is one observation.

## Methods, results, and interpretation

We estimate our models through generalized estimating equations (GEE), which is appropriate for panel data when the goal is to obtain population-averaged estimates (Zorn, 2001). GEE models are appropriate for data sets with temporally correlated errors and with more units than time periods (ours contain 67 countries and a mean of 9.2 electoral periods per country) (Beck, 2001: 273–274). We chose an autoregressive correlation structure, AR(1), because we expect the dependent variables to be positively correlated over time, and we expect this correlation to be larger for consecutive elections than for those farther apart in time. The AR(1) specification has the additional advantage of not demanding too much from the data (only one  $\rho$  parameter has to be estimated). We ran the models with semi-robust standard errors, which are valid even if the assumed structure is incorrect, and with the Stata option “force,” which includes observations that are not equally spaced in time.

Models 1 to 3 in Table 3 show results for the eight independent variables for which we have almost complete data ( $n = 604$ ). Models 4 to 6 drop Age of democracy to alleviate problems of multicollinearity (the mean and maximum VIF in models 1 to 3 are 1.91 and 3.80, respectively; they fall to 1.31 and 1.61 in models 4 to 6). Results between the two sets of models are highly consistent.

Birth year of democracy is the only variable that has a powerful impact on all three dependent variables.<sup>9</sup> Democracies that were born earlier have lower volatility of all three kinds, thus supporting arguments about the critical importance of the historical period in which competitive regimes were established. Its impact is powerful statistically and substantively.

Because the regressions include per capita GDP, the impact of Birth year of democracy does not stem primarily from greater wealth in the countries where democracy was inaugurated earlier. Many democracies that were born generations ago did not have high per capita GDPs at that time, and on average, they had low electoral volatility. Conversely, some countries that have transitioned to democracy in the third and fourth waves are fairly wealthy but have had high volatility (e.g. South Korea). The correlation between the natural log form of per capita GDP and Birth year of democracy ( $\ln$ ) is only 0.43.

The results support the theoretical expectations about the impact of economic performance and institutional arrangements but only for specific independent variables. Both hypotheses hold up for within- or extra-system volatility but not both.

Sluggish or negative economic growth consistently increased extra-system and total volatility, but it had no influence on within-system volatility. Thus, when voting patterns shift because of poor economic growth, they appear to turn against all existing parties rather than switching to an alternative within the system. In models 1 and 2, each increase of 1% in per capita GDP growth is associated

**Table 3.** GEE (AR[1]) models for total volatility, extra-system volatility, and within-system volatility.

	Model 1 Total volatility	Model 2 Extra-system volatility	Model 3 Within-system volatility	Model 4 Total volatility	Model 5 Extra-system volatility	Model 6 Within-system volatility
GDP growth	−0.889 (0.234)***	−0.818 (0.235)***	−0.115 (0.150)	−0.834 (0.238)***	−0.805 (0.237)***	−0.081 (0.161)
Inflation (ln)	−0.394 (0.443)	−0.082 (0.451)	−0.091 (0.341)	−0.597 (0.474)	−0.139 (0.455)	−0.220 (0.361)
ENP	1.61 (0.45)***	1.80 (0.42)***	−0.09 (0.33)	1.58 (0.46)***	1.82 (0.42)***	−0.09 (0.34)
District magnitude (ln)	0.021 (0.750)	−0.066 (0.495)	−0.051 (0.408)	−0.105 (0.769)	−0.114 (0.509)	−0.172 (0.389)
Presidential system	1.59 (1.94)	0.20 (1.49)	1.01 (1.22)	2.65 (2.10)	0.52 (1.52)	1.78 (1.27)
Birth year of democracy (cohort effects) (ln)	−11.89 (1.96)***	−4.55 (1.35)***	−7.61 (1.37)***	−8.57 (1.90)***	−3.36 (1.19)***	−4.78 (1.04)***
Age of democracy (age effects) (ln)	3.30 (1.01)***	1.12 (0.79)	2.70 (0.83)***			
Per capita GDP (ln)	−4.96 (1.43)***	−2.67 (0.89)***	−2.20 (0.84)***	−3.83 (1.25)***	−2.34 (0.81)***	−1.38 (0.73)*
Constant	96.04 (12.25)***	40.25 (7.81)***	53.59 (7.91)***	83.60 (10.43)***	36.13 (7.15)***	43.82 (6.13)***
Observations	604	604	604	604	604	604
Number of countries	67	67	67	67	67	67

Note: GEE: generalized estimating equations; GDP: gross domestic product; ENP: effective number of parties. Robust standard errors are given in parentheses.  $R^2$  is not reported because this statistic is not defined for GEE models.

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

with a predicted decrease of 0.89% in total volatility and 0.82% in extra-system volatility. Inflation was not significant in any of the six models.

We also ran models with medium term growth and inflation and with change in inflation from the previous to the current electoral period (logged). Against expectations, these three variables were consistently insignificant for all three dependent variables across many model specifications. We do not present the results.

The covariates for institutional openness also have mixed results. A higher ENP makes it easier for new parties to win votes, but it has no impact on within-system volatility. The frequent finding that a higher ENP is associated with higher total volatility (Bartolini and Mair, 1990: 131–145; Roberts and Wibbels, 1999; Tavits, 2005) therefore stems primarily from the effect on extra-system volatility. The substantive effect on the vote share of new parties is meaningful. In model 2, an increase of 1 in ENP is associated with a predicted increase of 1.8% in extra-system volatility.

This difference in the impact of ENP on within- and extra-system volatility makes intuitive sense. With more constricted party systems, it is usually riskier for politicians to jump ship and form a new party. Only a few parties are serious contenders, so strategic voters might be more

reluctant to abandon the existing options. Conversely, in more open party systems, politicians face lower hurdles in winning votes if they form new parties. Strategic voters are less likely to waste their votes if they cast their ballot for a new entrant.

Against expectations, district magnitude and presidentialism were not statistically significant for within-system, extra-system, or total volatility.

Total volatility, extra-system volatility, and possibly within-system volatility tend to be lower in wealthier democracies; the coefficients for per capita GDP (ln) on all three dependent variables are negative and statistically significant in models 1 to 3. They remain negative and significant in the models without Age of democracy, although only at the 10% significance level for within-system volatility (model 6).

With both it and Birth year of democracy in the same regression (Table 3), Age of democracy appears to have a surprising impact: as democracies get older, within-system and total volatility increases. This is due to the high correlation between Birth year of democracy and Age of democracy. A more detailed analysis of Age of democracy reveals a generally weak and inconsistent effect of Age of democracy on within- and extra-system volatility. Locally weighted scatterplot smoothing (LOWESS nonparametric



regression) plots (online Appendix 1B) split our data set into four waves according to when different regimes democratized: 1885–1921,<sup>10</sup> the first wave of democratization; 1944–1953; 1954–1971; and 1974–94. For the first two waves for which we have data points (1885–1921 and 1944–1953), extra-system volatility is essentially flat over time. It shows a gradually increasing trend for the few cases of democratization that began between 1954 and 1971 and a declining trend for the third- and fourth-wave cases (consistent with Powell and Tucker, 2014). Given these results and the high multicollinearity that affects Age of democracy in our parametric regression models (which implies that its coefficient is estimated with less precision than others), we cannot safely draw clear conclusions about age effects on volatility. The coefficients for Age of democracy are consistently much smaller in magnitude and less significant than for Birth year of democracy.

Models 4 to 6 drop Age of democracy to estimate the remaining coefficients more efficiently (especially that of Birth year of democracy, which is highly collinear with the excluded variable). The only coefficients that change noticeably are those of Birth year of democracy, which become smaller in absolute magnitude than in models 1 to 3. However, their sign and high significance remain unchanged.

We ran some models adding union density to models 1 to 3 in Table 3, but it was not significant for any of the three dependent variables ( $n = 498$ ). We tested this variable because in some analyses, strong linkages between voters and parties via organizational attachments lowered volatility (Bartolini and Mair, 1990: 231–238; Madrid, 2005; Roberts and Wibbels, 1999: 582). With union density in the regression equation, per capita GDP was not significant for extra- or within-system volatility (but it was for total volatility). Otherwise, the results were consistent with models 1 to 3.

Our results diverge markedly from Powell and Tucker's (2014) for the post-Soviet cases. In their sample, no independent variable affected within-system volatility, and only one, economic growth since 1989, affected extra-system volatility. In contrast, we have many significant coefficients.

Different factors drive within- and extra-system volatility. To summarize these differences, Table 4 synthesizes the results of Table 3, showing only the covariates that were sometimes statistically significant. The determinants of within- and extra-system volatility differ markedly, lending support to the argument that it is important to distinguish between them.

The most robust and powerful findings concern the Birth year of democracy. To show the substantive effects of this explanatory variable in a multivariate analysis, Table 5 simulates the decreases in volatility for a democracy born 1 year earlier, comparing 1995 to a baseline of 1996, 1985 compared to 1986, 1955 versus 1956, 1905 versus 1906, and 1805 versus 1806. We start at 1806 and finish at 1996 as the baseline years to approximate our real data.

**Table 4.** Determinants of within- and extra-system volatility.

Variable	Extra-system volatility	Within-system volatility
GDP growth	Significant	Not significant
ENP	Significant	Not significant
Birth year of democracy (cohort effects) (ln)	Significant	Significant
Age of democracy (age effects) (ln)	Not significant	Significant
Per capita GDP (ln)	Significant	Significant

GDP: gross domestic product; ENP: effective number of parties.

We simulate results using the coefficients from models 1 to 3 of Table 3. Extra-system volatility decreases by 0.44% for a democracy established in 1995 rather than 1996, by 0.22% comparing a democracy created in 1985 to 1986, and so forth. The substantive impact of an earlier Birth year of democracy is considerable.

## Robustness checks

Given the sensitivity of TSCS analysis to different specifications, we checked how robust these findings are to alternative TSCS estimators. In Appendix 1, we rerun the model with extra-system volatility (panel A) and within-system volatility (panel B) as the dependent variables. We include all five independent variables with nearly complete information that were significant for any of the three dependent variables in models 1 to 3 of Table 3, dropping the three independent variables that consistently had no impact. We use three different estimators and compare the results to the GEE estimates, which are in column 1. The alternatives used are Beck and Katz's (1995, 1996) panel-corrected standard errors with an autoregressive 1 (AR1) process (PCSE + AR[1]) and with a lagged dependent variable (PCSE + LDV) and the random effects estimator. (We do not use fixed-effects estimators because they are unable to produce results for the time-invariant variable Birth year of democracy.) Most of the results are robust, and they reinforce the general story that the determinants of within-system and extra-system volatility differ.

To check for the possibility that some results are driven by outlying observations or countries, we ran models 1 to 3 in Table 3, dropping all observations that are more than 3 standard deviations from the mean on at least one of the independent variables. The resulting models ( $N = 567$ ) do not differ in any significant way from the full sample models with one exception: the coefficient for GDP growth in the regression for extra-system volatility remains negative but drops in magnitude to less than half of its previous size and becomes not significant at conventional levels ( $p$  value = 0.14).

It is also possible that some results are driven by an atypical country. We implemented a robustness analysis akin

**Table 5.** Simulated effects of Birth year of democracy (cohort effects) on extra-system, within-system, and total volatility.

	Coefficient of logged Birth year of democracy	Effect of a 1-year earlier birth				
		1995 vs. 1996	1985 vs. 1986	1955 vs. 1956	1905 vs. 1906	1805 vs. 1806
Extra-system volatility	−4.6	−0.44	−0.22	−0.09	−0.05	−0.02
Within-system volatility	−7.6	−0.72	−0.37	−0.15	−0.08	−0.04
Total volatility	−11.9	−1.13	−0.58	−0.24	−0.12	−0.06

to Cook's distance diagnosis in cross-sectional ordinary least square regressions by running our GEE models 67 times, dropping all electoral periods corresponding to a particular country. We then analyzed the distribution of the 67 resulting slopes and *t*-statistics for each of the independent variables. All the coefficients kept their signs and significance levels (and their magnitudes did not vary much) with one minor exception. Age of democracy in the extra-system volatility model, which is not significant in the full sample, is significant at the 0.05 level (in a positive direction) in the model that drops the four electoral periods for Romania. Overall, these two tests show that our findings do not depend on atypical observations or countries.

We also ran the models in Table 3 for total volatility and extra-system volatility by region (the regions are indicated in Table 1, but we merged Africa, Asia, and "other" due to the small number of countries and observations in each of them separately) and by the historical period in which democracy was established in each country (pre-1944, 1944–1973, and post-1974 or "third wave"). Results and a summary discussion are posted in online Appendix 1C. Most coefficients keep their signs and levels of significance in all subsamples or become indistinguishable from 0 (a result expected on statistical grounds, given that each subsample includes fewer observations clustered within fewer countries that typically display lower variance on the independent variables, all factors that make standard errors larger and achieving conventional levels of significance harder).

## Conclusions

This article builds on Powell and Tucker (2014) and other recent work by distinguishing between extra- and within-system electoral volatility. This distinction is important because a vote transfer among established parties might reflect transitory shifts within the existing system without any movement toward a change of the system, whereas high extra-system volatility indicates a change of the system.

We made a descriptive contribution about electoral volatility and its two subcomponents, within- and extra-system volatility, showing the patterns of geographical and temporal variation. The sample is much larger than that of previous studies, greatly increasing the number and diversity of the included countries and considerably lengthening the temporal coverage relative to most previous work. Extra-system volatility is an important phenomenon in

third- and fourth-wave democracies, thus buttressing the notion that it is useful to distinguish between within-system and extra-system volatility. Two countries with similar total volatility can have very different extra-system volatility, demonstrating divergences in voters' willingness to flee from existing parties and different levels of dissatisfaction with all existing parties. The very membership of the party system changes when new parties capture a meaningful share of the vote.

The third contribution of this article is explanatory. The analysis of extra-system volatility and how it compares with within-system volatility is in its infancy, notwithstanding recent contributions (Birch, 2003; Powell and Tucker, 2014; Sikk, 2005; Tavits 2006, 2008). Our article shows that the determinants of these two types of volatility diverge markedly. Whereas Powell and Tucker (2014) find almost no significant predictors of within- or extra-system volatility, our sample supports several hypotheses for both kinds of volatility.

The Birth year of democracy has a strong influence on extra-system, within-system, and total volatility. We cannot resolve what the specific mechanisms behind this finding are, but previous work has suggestively emphasized that parties in older democracies were much more encompassing and penetrating. An early history of strong organizations and powerful identities created deep attachments to parties in old democracies. Parties forged strong and enduring linkages to voters. They served as agents of political mobilization, successfully pushed for the incorporation of new citizens into politics, and offered health and recreational benefits. Voters developed political identities closely connected to their parties. Even today, parties remain crucial in structuring the vote in these countries (Bartels, 2000; Green et al., 2002).

Media effects might also help explain the large difference in volatility between democracies established generations ago and more recently established competitive regimes. Before television was an important means for transmitting campaign information, politicians developed organizational ties to voters. If mass television anteceded strong party organizations, as is the case in most third-wave competitive regimes, politicians can more easily appeal for votes through television, and they have less need to build parties. Where candidates can carry out effective electoral campaigns largely through the mass media, established party labels are less essential for reaching voters. Television and internet

forms of communication have profoundly changed electoral competition in long-established democracies, but party labels and organizations are still highly valued.

In most third- and fourth-wave competitive regimes, political elites have weaker incentives to invest in party building. Strong party organizations are typically less crucial to electoral success, so party labels are less valuable and party substitutes are more common (Hale, 2006). Many candidates have won the presidency running on new party labels. Many of them eschewed building a powerful party organization even after their election. The fact that well-structured organizations are not essential to electoral victory makes it less costly to start a new party. In most later competitive regimes, parties have played a less central role in citizens' lives. Citizens are more willing to shift their votes to new contenders.

Except for Birth year of democracy and per capita GDP, the statistically significant findings differ for within- and

extra-system volatility. A higher ENP is associated with more electoral support for new parties but not with greater within-system volatility. A high ENP signals an open electoral market. In these contexts, new parties face lower barriers, and citizens' votes for new parties are more likely to be meaningful. Poor short-term economic growth performance is favorable to the electoral success of new contenders but surprisingly does not affect within-system volatility.

These results raise intriguing new questions for a future research agenda. Do these differences in the determinants of within- and extra-system volatility hold up for even larger samples of countries and electoral periods? And why do the determinants of within- and extra-system differ so much? By expanding the range of countries and time period, and by testing for a wide range of independent variables, we have added to the emerging literature on the vote share of new parties and the differences in the correlates of within- and extra-system volatility.

## Appendix: Robustness check

### A. Dependent variable: Extra-system volatility

	GEE AR(1)	PCSE AR(1)	PCSE+LDV	Random Effects
GDP growth	−0.788 (0.222)***	−0.784 (0.175)***	−0.335 (0.214)	−0.703 (0.137)***
ENP	1.81 (0.42)***	1.88 (0.28)***	1.15 (0.35)***	2.29 (0.28)***
Birth year of democracy (cohort effects) (ln)	−4.59 (1.26)***	−4.48 (1.36)***	−5.27 (1.05)***	−4.35 (1.26)***
Age of democracy (age effects) (ln)	1.25 (0.77)	1.16 (0.77)	2.95 (0.67)***	0.30 (0.72)
Per capita GDP (ln)	−2.74 (0.87)***	−2.74 (0.82)***	−2.11 (0.86)**	−1.99 (0.88)**
Lagged dependent variables			0.167 (0.147)	
Constant	40.33 (7.02)***	39.91 (8.03)***	31.30 (8.32)***	33.63 (8.05)***
Observations	615	615	551	615
Number of countries	67	67	67	67

Robust standard errors in parentheses.

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

### B. Dependent variable: Within-system volatility

	GEE AR(1)	PCSE AR(1)	PCSE+LDV	Random Effects
GDP growth	−0.148 (0.132)	−0.153 (0.166)	−0.371 (0.162)**	−0.148 (0.132)
ENP	−0.07 (0.31)	−0.03 (0.39)	0.21 (0.26)	0.01 (0.26)
Birth year of democracy (cohort effects) (ln)	−8.19 (1.37)***	−8.14 (0.70)***	−6.22 (1.17)***	−8.10 (1.06)***
Age of democracy (age effects) (ln)	3.13 (0.86)***	3.11 (0.61)***	2.51 (0.84)***	2.90 (0.67)***
Per capita GDP (ln)	−2.17 (0.77)***	−2.17 (0.64)***	−1.74 (0.73)**	−2.33 (0.73)***
Lagged dependent variables			0.273 (0.156)*	
Constant	54.27 (7.68)***	53.96 (5.19)***	40.72 (8.71)***	55.75 (6.64)***
Observations	615	615	551	615
Number of countries	67	67	67	67

Robust standard errors in parentheses.

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

As shown in panel A, weak per capita GDP growth and a higher number of parties are associated with an increased vote share of new parties in all models (although slightly below conventional levels of significance— $p$ -value = 0.12—in the model with a lagged dependent variable). Birth Year of Democracy and GDP per capita obtain the expected signs and high levels of significance in all models. Age of Democracy is always positive but significant at the 0.05 level in only one model.

The findings obtained using GEE for within-system volatility are robust to other estimation alternatives (panel B). All coefficients keep their expected signs and high levels of significance. Moreover, their magnitudes change only moderately from model to model. Interestingly and in contrast with panel A, GDP growth achieves statistical significance in the model with a lagged dependent variable, providing some evidence that good economic performance may lower within-system volatility.

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### Notes

1. Electoral volatility is computed by adding the absolute value of change in the percentage of votes gained or lost by each party from one election to the next and dividing by two so that gains and losses are not double counted.
2. A related body of literature has analyzed the number of new parties that enter—a different dependent variable than the one studied here. See Hug (2001) and Tavits (2006, 2008).
3. Powell and Tucker call extra-system volatility type A and within-system volatility type B.
4. Electoral data for Benin for 1999 are based on partial results.
5. We used Stata's default number of bands, defined as the maximum of 10 and round  $(10 \times \log_{10}(N))$ , where  $N$  is the number of observations. Applied to our  $N$  of 618 for both dependent variables, the formula yields 28 bands.
6. Some areas of these figures do not contain any "x" markers. They correspond to periods in which no new democracies lasted until the end point of our data set (2006). For example,

no democracies established between 1922 and 1943 survived until 2006.

7. Gross domestic product per capita growth is based on the World Bank's World Development Indicators for 1961–2006 and on Penn World Tables for 1951–1960. For most countries, data for inflation come from Mitchell (1998a, 1998b) for 1945–1960; Bruno and Easterly (1998) for 1960–1994; and IMF (2008) for 1995–2006. It is not possible to calculate a log for a negative value. To minimize the number of missing cases, we assume that inflation below 1% per year including deflation has an impact on electoral volatility that is indistinguishable from that of an inflation rate of 1%. We recorded all such cases as having a logged inflation of 0.
8. For mixed systems (Bolivia, Hungary, Japan, Lithuania, Mexico, Romania, Russia, and Venezuela 1993–1998), we took a weighted mean based on the percentage of seats allocated in the two systems and the average magnitude of seats allocated via proportional representation.
9. We interpret the regression coefficients causally, given that there are good theoretical reasons to do so. As it is the case with all research based on observational data, statistical results cannot "prove" causality, but they do provide empirical evidence that is either consistent (or inconsistent) with a causal impact of the independent on the dependent variables and therefore increase (decrease) confidence in the hypotheses.
10. Some countries democratized before 1885, but our data set begins in 1945, and our analysis of the impact of Age of democracy extends to 60 years. Therefore, we did not include the earliest democratizers in the analysis described in this paragraph.

### Supplementary material

Supplementary material for this article is available online.

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