
Measuring Party System:

Revisiting Competitiveness and Volatility in Parliamentary Party Systems*

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(ABSTRACT)

This study aims to generate indicators of party system applicable to studies of measuring the party system, and to conceptualize party system properties with eight measures of party system, i.e., strength of the largest party, actual number of parties in parliament, fractionalization index by Rae, effective number of parties by Laakso and Taagepera, aggregation index by Mayer, volatility seat renovated from Pederson's, strength of the second largest party and the strength of the third largest parties. For this study, we collected our own dataset which includes the percentage of parliamentary seats occupied by parties in 212 nations and used 187 nations for the analysis. We focused on changes of party system, and collected data on the distribution of party seats at two points in time: after a *stimulus* election prior to 2007 and after a *referent* election adjacent to the stimulus election. The very low correlations between percentages of seats held by parties #1 and #2, and #2 and #3, suggest that the success of the second largest party is largely independent of the third party's success. The percentage of seats held by the second largest party in parliament offers itself as a good simple indicator of parliamentary party competition. Regarding volatility, there was virtually no correlation between the logged volatility seat score and the percentage of seats held by party #2 in the stimulus year. Volatility correlated slightly negatively with party #1 seats and slightly positively with party #3 seats. Our findings reconfirms that volatility is distinctly different dimension of party system properties. Our measure of party competition, the second largest and the volatility score tended to be unrelated to *any* of the other six indicators. Moreover, the factor analysis showed that six indicators, i.e., the strength of the largest party, actual number of parties in parliament,

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fractionalization, effective number of parties, aggregation index, and the strength of the third largest party, load on Factor 1, which could be named as party system fragmentation. The strength of the second largest party load on Factor 2, which could be named as "Party system competitiveness." However, the volatility measure again did not correlate systematically and sufficiently with any of the other indicators. This confirms that we could use volatility for another independent indicator for measuring party system.

Key words: Party system, competitiveness, volatility, fractionalization

I. Introduction

Contemporary party theorists agree that a modern state cannot practice democracy without competitive political parties.²⁾ A United Nations publication says, "In many countries today, political parties are an essential part of the apparatus of governance³⁾

However, people across the world have a love-hate relationship with political parties. Parties are highly valued by most scholars for enabling popular control of government but are distrusted by many leaders and citizens.⁴⁾ As two experts write, "The widespread perception that parties are procedurally necessary for the effective functioning of democracy does not translate into their being widely supported or respected.⁵⁾ Ambivalent judgments about the role of parties in government appear in these conflicting statements by other party scholars. One praises their

2) See, for example, Peter Mair, "Comparing Party Systems," in *Comparing Democracies 2: New Challenges in the Study of Elections and Voting*, ed. Lawrence LeDuc, Richard G. Niemi, and Pippa Norris (London: Sage, 2002), pp. 88 - 107.

3) Democratic Governance Group, *A Handbook on Working With Political Parties*. (New York: United Nations Bureau for Development Policy, United Nations Development Programme, 2006), p. 9. See also Michelle Kuenzi and Gina Lambright, "Party Systems and Democratic Consolidation in Africa's Electoral Regimes," *Party Politics*, Vol. 11 (July 2005), pp. 423-446.

4) After analyzing trends in survey data in advanced industrial democracies, Dalton and Weldon find that "weakening party ties are nearly universal." Russell J. Dalton, and Steven Weldon, "Is the Party Over? Spreading Antipathy Toward Political Parties," *Public Opinion Pros*, (May, 2005). http://www.cses.org/resources/results/POP_May2005.htm

5) Ingrid van Biezen and Michael Saward, "Democratic Theorists and Party Scholars: Why They Don't Talk to Each Other, and Why They Should," *Perspectives on Politics*, Vol. 6 (March, 2008), p. 21.

contributions to democratic theory,⁶⁾ but another thinks that parties have not delivered on their promised contributions.⁷⁾

While we usually agree with the importance of political parties in democratization and democratic consolidation, it is not easy to find the research that attempts to show those contributions of political parties.⁸⁾ Part of the causes could come out of the absence of available data which contain the major variables for understanding party systems worldwide. The other part of the causes could be found in difficulties of developing indicators for measuring party system.

This study aims to generate the operationalized indicators of party system⁹⁾ with self-collected parliamentary party system data. In fact, the previous studies of party systems have used indicators mainly based on electoral results such as the percentage of votes each party earned in elections. However, when we seek to analyze the party system, we'd better look at the parliamentary party system, the seats of each party in the parliament, which is more related to the political system governability.

The purpose of this study is to generate indicators of party system relevant to measure the party system, and to identifying the concepts of party properties by empirical testing of those indicators of party system with other alternative measures. For this study, we collected dataset which includes % of parliamentary seats occupied by parties in 189 nations¹⁰⁾ and used 187 nations for the analysis.

6) Richard Herrera, "The Origins of Opinion of American Party Activists," *Party Politics*, Vol. 5 (April 1999), p. 237.

7) S. C. Stokes, "Political Parties and Democracy," in *Annual Review of Political Science*, Vol. 2 (1999), p. 263.

8) Vicky Randall and Lars Svåsand, "The Contribution of Parties to Democracy and Democratic Consolidation," *Democratization*, Vol. 9 (2002), p. 3.

9) Newcomers to comparative party politics are sometimes surprised to learn that political parties and party systems are different units of analysis, and they often have difficulty distinguishing the study of parties from party systems. The distinction was formalized in Maurice Duverger's pioneering 1951 study, *Les Partis Politiques*, which was divided into Book I, "Party Structure," and Book II, "Party Systems." Other texts since have followed that format. Ware's, *Political Parties and Party Systems* (1996) adopts a similar format. See also Giovanni Sartori, *Parties and Party Systems: A Framework for Analysis* (London: Cambridge University Press, 1976); and Jan-Erik Lane and Svante O. Ersson, *Politics and Society in Western Europe, 3rd Edition*. (London: SAGE Publications, 1994), p. 180.

10) Our dataset include 212 nations. However, for measuring party system competitiveness and volatility, we include 187 nations which have the data of % of seats by #1, #2, and #3 parties of two different elections.

II. The Dimensions of Party System

The cross-national literature offers numerous alternative measures of party-system properties. Lane and Ersson identified fifteen,¹¹⁾ just as summarized in Table 1.

Table 1. Lane and Ersson's 15 properties of party system¹²⁾

#	Properties of party system	Party system concepts*	Times accessed*
1	Electoral participation: votes cast as a percentage of eligible voters	Electoral participation	One point of time
2	Strength of largest party: percent of seats held by largest party in parliament	Degree of party fragmentation	
3	Actual Number of parties in parliament: parties holding at least one seat		
4	Number of parties reported in Rose and Mackie: ¹³⁾		
5	Fragmentation Index: created by Rae [measures party number and size] ¹⁴⁾		
6	Effective number of parties: created by Laakso and Taagepera ¹⁵⁾		
7	Aggregation Index: share of the largest party / the number of parties, by Mayer. ¹⁶⁾	Party ideology	
8	Left-right score: parties' scores from 0 to 10 weighted by electoral strength		
9	Polarization Index: weighted differences in scores on a left-right scale		
10	Strength of socialist parties:		
11	Strength of parties to the left of socialist parties:	Social bases of support	
12	Strength of agrarian, ethnic, and religious parties:		
13	Strength of class-based parties: #10 plus #11		
14	Strength of non-structural parties: 100 (#12 plus #13)	Party strength	
15	Volatility: created by Pedersen [changes in party strength over time] ¹⁷⁾		

11) Jan-Erik Lane and Svante O. Ersson (1994), p. 180

12) The 3rd and 4th columns are conceptualized by authors.

13) Thomas T. Mackie and Richard Rose (eds.) *The International Almanac of Electoral History*, 3rd Edition.

The Lane and Ersson's study is just one in a huge literature on conceptualizing and measuring party systems.¹⁸⁾ These writings reflect vastly different perspectives. Some are devoted to classifying party systems according to parties' relative strength and size.¹⁹⁾ At least one entire book focuses on conceptualizing competition in just two-party systems.²⁰⁾ More recently, scholars have pushed for more extensive "assessment of the different arenas—distinguished vertically, horizontally, and functionally—in which parties interact with one another."²¹⁾ The point is that conceptualizing and measuring party systems is an extensive and complex enterprise. Moreover, most writings that propose different concepts and measures of party systems simply describe and analyze how their measures differ technically from others. Lane and Ersson say:

There are a number of relevant party-system properties and little justification for the use of one or two of these to the exclusion of the others. The study of party systems faces a conceptual problem about what the semantically relevant properties of a party system are.²²⁾

(Washington, D.C. : Congressional Quarterly, 1991).

14) Douglas Rae, "A Note on the Fractionalization of Some European Party Systems", *Comparative Political Studies*, Vol. 1 (October 1968), pp.413-418.

15) Markku Laakso and Rein Taagepera, "Effective Number of Parties: A Measure with Applications to West Europe," *Comparative Political Studies*, Vol. 12. (1979), pp.3-27.

16) Lawrence C. Mayer, 1980. "A Note on the Aggregation of Party Systems," in Peter Merkl, ed., *Western European Party Systems*. (New York: Free Press, 1980), pp. 515-520. Mayer's original formula used the "largest party in the government coalition," and he multiplied the index by 100.

17) Mogens N. Pedersen, "The Dynamics of European Party Systems: Changing Patterns of Electoral Volatility," *European Journal of Political Research*, Vol. 7. (1979), pp. 1-26.

18) Wolinetz summaries that literature in "Party Systems and Party System Types." Whole books have been devoted to measuring party system change, see Mair, *Party System Change: Approaches and Interpretation* and Paul Pennings and Jan-Erik Lane (eds.), *Comparing Party System Change* (London: Routledge, 1998).

19) Alan Siaroff, *Comparative European Party Systems: An Analysis of Parliamentary Elections since 1945* (New York : Garland, 2000).

20) Alan Ware, *The Dynamics of Two-Party Politics: Party Structures and the Management of Competition*. (London: Oxford University Press, 2009).

21) Luciano Bardi and Peter Mair, "The Parameters of Party Systems," *Party Politics*, Vol. 14. (March, 2008), p. 161.

22) Lane and Ersson (1994), p. 175.

Although we do not try to achieve definitive results in our empirical analysis of party system effects on governing, we hope to contribute to understanding by analyzing the alternative measures laid out by Lane and Ersson. We skip their measure of electoral participation (#1), which pertains to voters not to parties. The next six measures (#2 through #7) deal in some way with the number and strength of parties—fitting under the broader concept of degree of party fragmentation. Four items (#8 through #11) involve estimating party ideology, and three (#12 through #14) rely on estimating social bases of support. All of the first fourteen measures assess party systems at just one point in time. Only #15, volatility, measures changes in party strength over two or more elections, making it truly different from the others.

After computing intercorrelations among all fifteen indicators for 201 elections from 1945 to 1989 in 16 countries, Lane and Ersson found that the six strength and competition measures co-varied together as did most of the several policy and social support measures.²³⁾ They said, however, “Volatility does not co-vary with any of the other party system dimension, which reflects the circumstance that volatility stands for party system instability in general.”²⁴⁾ We build on these findings in identifying attributes of party systems in 189 countries.

III. Parliamentary Party Data

1. Focusing on Parliamentary Party Systems

Most scholars contend that a party “system” requires more than one party. Sartori’s definition is typical: a party system is “the system of interactions resulting from inter-party competition.”²⁵⁾ Earlier and later writers agree that a party system requires competition between at least two parties.²⁶⁾ However, often the same writers blithely talk about a one-party system.²⁷⁾ In the

23) Lane and Ersson (1994), p.180. However, the left-right scores and polarization index correlated only -.42.

24) *Ibid.*, p. 181.

25) Giovanni Sartori (1976), p. 44. Emphasis removed.

26) Alan Ware (1996), p. 7; and Steven B. Wolinetz, (2006), p. 52

27) G. Sartori (1976), however, avoids speaking of a one-party system, which he refers to instead as a “party-state system,” p. 45

concluding essay to his edited book on comparative political parties, an eminent scholar once wrote, “Only the co-existence of at least one other competitive group makes a political party real.”²⁸⁾ Nevertheless, his book included a chapter on the “Communist Party of the Soviet Union”—a one-party state.

In truth, comparative party scholars repeatedly refer to one-party, two-party, and multiparty systems, so we need a definition that accommodates one-party systems—such as China. Accordingly, we define a party system as *the pattern of interactions of one or more political parties with government, citizens, and other parties*. In short, we broaden the concept of a party system to include as actors the government and the public—not just competing parties. We narrow the concept’s application in this study to parties in parliaments, excluding elections.

In countries with competitive elections, political parties operate most publicly during election campaigns.²⁹⁾ Parties are more widely visible in parliamentary than presidential elections. Virtually all countries have parliaments or legislatures, while relatively few countries elect presidents.³⁰⁾ Moreover, parties are banned from presidential elections in some countries.³¹⁾ Parliaments, in contrast, offer a nearly universal basis for cross-national analysis of political parties. Unfortunately, data for parliamentary elections often go unreported in smaller countries.

28) Sigmund Neumann (ed.), *Modern Political Parties: Approaches to Comparative Politics*. (Chicago: University of Chicago Press, 1965), p. 395.

29) Here, a political party is defined an organization that seeks to place its avowed representatives in government positions. “To place” means through competitive elections or political appointments, which occurs in authoritarian governments. “Avowed representatives” means that candidates must compete under the party’s name or publicly identify with the party when in office. “Government positions,” for our purposes, means seats in a parliament or legislature. See Kenneth Janda, *Political Parties: A Cross-National Survey*. (1980), p. 5.

30) For discussion of presidential and parliamentarism see José Antonio Cheibub, Zachary Elkins, and Tom Ginsburg, “Beyond Presidentialism and Parliamentarism: On the Hybridization of Constitutional Form,” Prepared for the Comparative Constitutional Law Roundtable, George Washington University Law School, Washington, DC. (March 6, 2009). For discussions of their effects on party government see George Tsebelis, Tsebelis, George, “Veto Players and Institutional Analysis,” *Governance*, Vol. 13. (October, 2000). pp. 441-474.; and Paul Webb, “Presidential” Rule and the Erosion of Party Government in Parliamentary Systems: The Case of the United Kingdom,” [Original Title La “presidenzializzazione” e l’erosione del governo di partito nei sistemi parlamentari: il caso del Regno Unito “] *Rivista Italiana di Scienza Politica*, Vol. 34. (December, 2004), pp. 347-377.

31) National constitutions in some twenty countries prohibit presidents from affiliating with political parties. See Kenneth Janda, *Adopting Party Law*. (Washington DC.: National Democratic Institute, 2005), p. 21.

Fortunately, one can almost always learn the percentage distribution of parliamentary party seats after elections. Needing to score as many polities as possible on features of their party systems, we collected data on the percentage of party seats held in lower chambers, not on the percentage of votes cast for parties in parliamentary elections.

The percentage of party seats held in parliament is also theoretically more relevant to our research than the percentage of party votes. Because most electoral systems distort translating votes won to seats won, party success in elections does not necessarily produce party control of parliament. In presidential systems—which comprise about 25 percent of the 212 countries in our population—party success in legislative elections does not even correspond to heading the government. Granted that parties play different roles in presidential than parliamentary governments, parties in parliament play a more direct role in government than parties in elections.³²⁾ So both practical and theoretical considerations led to collecting data on parliamentary parties.

To assess the effect of parliamentary party systems on governing, we need to focus on changes of party system rather than a property of party system at one point of time. Thus we collected data on the distribution of party seats at two points in time: after a *stimulus* election prior to 2007 and after a *referent* election adjacent to the stimulus election.

We collected our own data for this research from various Internet resources. By far the most important sources for the stimulus election were Adam Carr Election Archives³³⁾ and Wikipedia Election Results by Country.³⁴⁾ Finding data for the referent election proved to be more difficult, forcing us to scour the Internet for information. The Inter-Parliamentary Union³⁵⁾ helped considerably, as did the African Elections Database.³⁶⁾

Data in Table 2 on the status of parliamentary parties in 212 countries were derived mostly

32) Hans Keman summarizes the assumptions of the theory of parliamentary party government in "Party Government Formation and Policy Preferences: An Encompassing Approach," in Judith Bara and Albert Weale (eds.), *Democratic Politics and Party Competition: Essays in Honor of Ian Budge*, (London: Routledge, 2006), p. 36.

33) <http://psephos.adam-carr.net/>.

34) http://en.wikipedia.org/wiki/List_of_election_results_by_country.

35) <http://www.ipu.org/english/home.htm>.

36) <http://africanelections.tripod.com/>. The obscure site, Travel Documents System, was the only source found for parliamentary seat data for the tiny polity, Reunion, an island east of Madagascar. <http://traveldocs.com/>.

from the 2006 CIA World Factbook and apply to unicameral parliaments or in the lower chambers of bicameral parliaments.³⁷⁾ The table cross-classifies countries by two criteria: do the deputies represent parties and were deputies popularly elected? The first column shows that 185 of the parliaments in 2006 seated deputies by publicly identified political parties. Only 152 countries popularly elected *all* parliamentary seats. In another 28, most seats were elected but some were indirectly elected or appointed, and in one country fewer than half were directly elected. Therefore, only 181 chose at least some of their deputies through popular elections—using the phrase generously for direct selection by voters, regardless of the quality of the process. Four countries did not select deputies through popular elections yet seated them by parties.

Table 2: Status of Parliamentary Parties in Lower Chambers in 2006^a

Were Deputies Popularly Elected to Parliament?	Did deputies represent political parties				Total
	Public parties	Shadowy parties	No parties	No parliament	
All deputies were popularly elected	152	0	8 ^b	0	160
Most were popularly elected	28	8	1	0	37
Some were popularly elected	1 ^c	1	1	0	3
None were popularly elected	4 ^d	0	6	0	10
No parliament existed	0	0	0	2	2
Total	185	9	16	2	212

^a Based on data in the 2006 CIA *World Factbook*

^b American Samoa had 1 appointed and 20 elected deputies. The other countries with all non-partisan parliaments were Marshall Islands, Micronesia, Nauru, Niue, Oman, Palau, and Tuvalu.

^c Macao

^d China, Congo (Kinshasa), Sudan, and Eritrea. Eritrea's parliament was chosen in one election, in 1994.

Column 2 classifies 9 countries with "shadowy" parties (unofficial or underground) by how deputies were selected. Seat data was obtained for only four (identified in boldface). Column 3 shows 16 parliaments without party deputies, and half (mostly small island nations) elected them through nonpartisan elections. Two nations in 2006 (Nepal and Myanmar) had no parliament or legislative council.

37) The CIA provides access to the most recent *World Factbook* on its own web site at <https://www.cia.gov/library/publications/the-world-factbook/index.html>. Earlier editions, including the 2006 edition, are available through the private site, <http://www.theodora.com/wfb/>.

2. Parliamentary Party Data After Stimulus Elections

Although party seat data are more readily available than party vote data, obtaining even party seat data for 212 polities after the stimulus election was challenging and tedious. Despite the abundance of Internet resources on the world's countries, party politics are not well covered in many smaller countries. We narrowed the task by collecting data on only the three largest parliamentary parties elected in a national election held prior to 2007—the starting year of our study. With one exception, we fixed 2005 as the last date for a *stimulus election*. The distribution of years in which stimulus elections were held is reported in Table 3. It shows that about 20 percent of the stimulus elections were held in 2005 and almost 85 percent occurred from 2002 to 2005. The earliest elections (1992, 1994, and 1996) were in Angola, Eritrea, and the Palestinian Territories (respectively). Ten nations (Bhutan, Brunei, Libya, Myanmar, Nepal, Oman, Qatar, Saudi Arabia, Somalia, and United Arab Emirates) did not hold elections to elect a parliament or legislative council, although all but Nepal and Myanmar had such a body.

Table 3: Dates for the Stimulus Elections

year	1992	1994	1996	2000	2001	2002	2003	2004	2005 ^a	Total Elections	No elections	Total Countries
Frequency	1	1	1	3	19	44	36	51	45	202	10	212
Percent	.5	.5	.5	1.4	9.0	20.8	17.0	24.1	21.2	94.8	5.2	100.0

^a Includes the January 25, 2006 election in the Palestinian Territories

As implied by Table 2, some of the 202 elections in Table 3 were non-partisan, and elected no party deputies. In all, we scored 189 countries for seats held by the three largest parties after the stimulus election. Table 4 reports that the three largest parties in those countries held an average 82.5 percent of all the parliamentary seats. The median was 89 percent, meaning that in half the countries the three largest parties accounted for nearly 90 percent of all the seats in parliament. While we exclude some parliamentary representation by focusing on the top three parties, we don't miss much.

However, we do miss a lot of small parliamentary parties. A separate count of the total number of parties seated in parliament revealed that the average parliament seated 6.7 parties, with a high

of 39 in Colombia. In few countries, however, do any parties ranking fourth or lower hold an appreciable percentage of seats. As disclosed in Table 4, the largest party in 189 parliaments after the stimulus election averaged almost 51.7 percent of the seats, compared with about 23.2 percent for the next largest and 7.6 percent for the third. In one country (Malta), the second largest party held 49.3 percent of the seats to 50.7 for the largest party. The close division of parliamentary seats in Malta between its two largest parties implies a high degree of interparty competition. Later we rely on the percentage of seats held by the second largest party as a prime indicator of party system competitiveness.

Table 4: Seats Held by Three Largest Parties after Stimulus Elections in 189 Countries

	Minimum	Mean	Maximum
Largest party % of seats	7.0 ^a	51.7	100.0
Second party % of seats	.0 ^b	23.2	49.3
Third party % of seats	.0 ^c	7.6	24.0
Sum of all three parties	11.0 ^d	82.5	100.0

^aSome countries (e.g., Belarus, Macao and Kyrgyzstan) elected few deputies by parties, resulting in the largest party having a tiny percentage of all parliamentary seats.

^bThe "second largest" party got 0 percent of seats in 11 one-party parliaments.

^cThe "third largest" party held 0 percent of seats in 27 two-party parliaments.

^dParty deputies accounted for just 11 percent of all parliamentary seats in Belarus.

3. Parliamentary Party Data After Referent Elections

To evaluate party system stability, we compare how the three largest parties in the stimulus election performed in a *referent election*—a *temporally adjacent election*. Initially, we thought that the referent election should be prior to the stimulus election. One can argue to the contrary that stability should be assessed over the lifespan of the parliament responsible for governance in target year, not for a prior period. For some nations, moreover, an election after 2005 may more accurately represent the party systems' maturity.

Practical considerations resolved the argument in many cases. Elections prior to 2005 often occurred many years earlier and involved defunct parties. Elections after 2005 sometimes reflected more comparable party systems. The wide range of dates in Table 5 hints at our difficulty in choosing referent elections. Although we favored choosing earlier elections, we

chose post-2005 elections for about 35 percent of the polities. In two cases (Cuba and Pakistan) we choose 2008. Also in two cases, we were forced to choose years before 1990 (Angola, 1986 and Rwanda, 1988). Eritrea's parliament, elected in 1994, has had no election since. The 11 polities that had no reference elections match the 10 polities in Table 5 that had no stimulus elections plus Afghanistan, which had an election in 2005 but none (to date) afterward.

Table 5: Dates for the Referent Elections

Year	1986	1988	1993	1995	1996	1997	1998	1999	2000
Frequency	1	1	2	1	4	7	14	32	28
Percent	.5	.5	.9	.5	1.9	3.3	6.6	15.1	13.2

Year	2001	2002	2003	2005	2006	2007	2008	Total Elections ^a	No Elections
Frequency	18	12	4	1	44	30	2	201	11
Percent	8.5	5.7	1.9	.5	20.8	14.2	.9	94.8	5.2
Total countries = 212									

^aEritrea had only one election, in 1994.

Although the Internet provided useful sources of information on parliamentary party compositions, the data had to be sifted and analyzed before determining how many seats each party held, and even which party was which. Different sources sometimes reported different figures. Often the sources differed on party names. Too often the parties experienced splits or mergers between elections, making it difficult to trace parties across elections and posing difficulties in deciding how to allocate percentages after party splits. We checked the party labels with references of party system from various sources and asked country experts' help for tracing party changes.

Our scoring results for parliamentary seats following the referent election are presented in Table 6. The scoring procedures used in Tables 4 and 6 need explanation. Whereas Table 4 reports on the three largest parties according to their size after the stimulus election, Table 6 reports on the *same* three parties regardless of rank after the referent election. For example, the

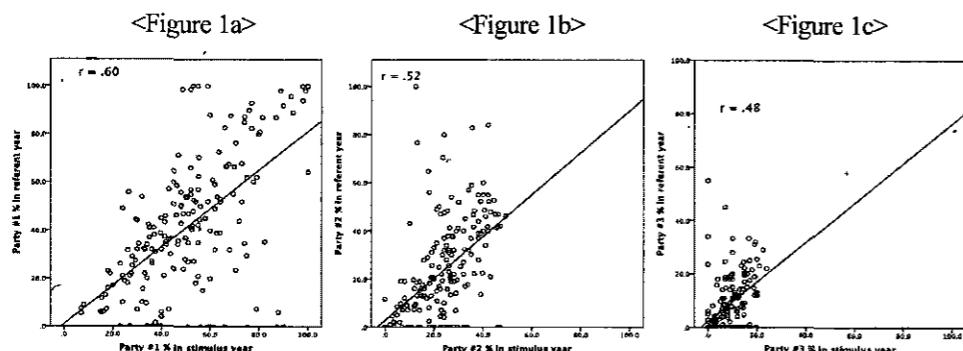
Mexican PRI was the largest party after the 2003 stimulus election, holding 45 percent of the seats. After the 2006 referent election, the PRI won only 24 percent, making it the second largest. Nevertheless, we compared the PRI's seat percentages in 2003 with 2006. The process was reversed for the Mexican PAN, the second largest party in 2003 with 30 percent of the seats but the largest party in 2006, with 41 percent. The PRI's percentage in Table 6 is included among the largest parties after the stimulus election and the PAN's percentage is counted among the second largest parties.

Table 6: Seats Held by Three Largest Parties after Referent Elections in 189 Countries

Size Status in Stimulus Year	Minimum	Mean	Maximum
Largest party % of seats	.0	42.4	100.0
Second party % of seats	.0	23.0	100.0
Third party % of seats	.0	7.8	55.0
Sum of all three parties	.0	73.2	100.0

Often the largest party after the stimulus election was no longer the largest after the referent election, causing the mean percentage of seats held by the largest party's to drop substantially (51.7 versus 42.4) between Table 4 and 6. In some dramatic cases, parties holding a parliamentary majority after the stimulus election held no seats at all after the referent election. Nevertheless, the correlation is substantial ($r = .60$) between the percent of seats held by the largest party in the stimulus election and that party's performance in the referent election ($p < .05$). Figure 1a graphs that correlation, for all 189 party systems. Figures 1b and 1c graph the correlations of .52 and .48 between the seats won by the second and third parties in the stimulus elections and the referent elections ($p < .05$). Note that the maximum percentage of seats held after the stimulus election is logically limited to 49.9 percent for the second largest party and to 33.3 percent for the third largest party. Note also that their seat percentages are not bounded for the referent election, that is, they can win greater seat percentages in referent elections.

Figure 1: Correlation Plots for the 1st, 2nd, and 3rd Largest Parties in Parliament after the Stimulus Election, and How They Fared in the Referent Election



We use these six variables (three measures of party strength in two different elections) in deriving alternative measures of parliamentary party systems.

IV. Testing Party System Indicators

1. Party System Competition

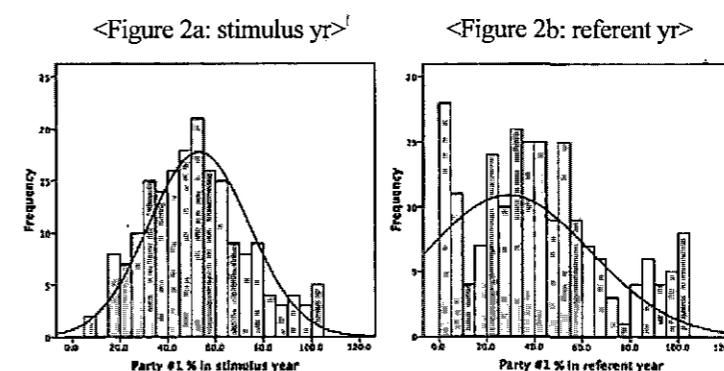
We collected data on parliamentary party distribution in order to generate measures of party system competition. Table 7 reports statistics for percentage of seats held by the top three parties in the 187 polities that had deputies seated by parties even in parliaments for which some seats were appointed. The minimum value of 7 percent for the largest party in parliament comes from the stimulus election of 2004 in Belarus, where most seats in the stimulus election were won by nonparty groups, except for the 7 percent won by the Communist Party. The maximum value of 100 percent for the second largest party in a reference election is attributed to Monaco, where a party that won all the seats in 1998 was not the largest party in 2003.

Table 7: Means and Standard Deviations for Percent Seats Held by the Original Top Three Parties in Both Elections

	N	Minimum	Maximum	Mean	Std. Dev.
Party #1 % in stimulus year	187	7.0	100.0	51.7	20.9
Party #1 % in referent year	187	.0	100.0	42.2	28.2
Party #2 % in stimulus year	187	.0	49.3	23.3	12.5
Party #2 % in referent year	187	.0	100.0	22.9	21.0
Party #3 % in stimulus year	187	.0	24.0	7.6	6.3
Party #3 % in referent year	187	.0	55.0	7.8	9.9

Figures 2a and 2b are histograms that graph the distribution of the percentages of seats held by the largest parties in the stimulus year and by the *same* parties in the referent years, superimposed with the line for a normal curve. The figures reflect the data in the first two rows of Table 7. Two features stand out in these distributions. (1) The percentage distribution in the stimulus year is unimodal, fairly symmetrical, and approximately normal around a mean of 51.7. (2) The comparable distribution for the same parties in the referent year has a much lower mean (42.2) and higher standard deviation (28.2 v. 20.9). Note also that more than 15 of the largest parties in the stimulus year held virtually no seats in the referent year.

Figures 2a and 2b: Histograms for Seat % Held by Party #1, Both Years

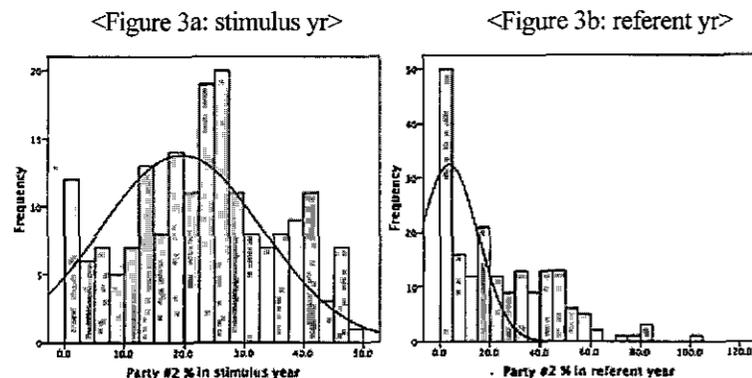


Figures 2a and 2b differ because they do not simply display the percentage of seats held by the

“largest party” in each year. Instead, they track how well party #1 (the largest party in the stimulus year) fared in the referent year. The designation as “party #1” derives from its status in the stimulus year, and it is not a ranking that carries over to the referent year. In fact, party #1 might fall to second place, third place, or further in percentage of seats held in the referent year. Indeed, the data implies that this often occurs, and the correlation is only .56 between the seats that party #1 won in both years ($p < .05$).

Much the same story is repeated in Figures 3a and 3b, histograms that graph the distribution of the percentages of seats held by the second largest parties in the stimulus year and by the same parties in the referent years. The figures reflect the data in rows three and four of Table 7. The average second-place party in the stimulus year held 23 percent of the seats. Again, the distribution is unimodal, roughly symmetrical, and also roughly normal. One party (the MLP in Malta) held 49.3 percent of the seats, just short of making it party #1 instead of party #2. More than 10 parties lie in the other tail of the distribution, holding virtually no seats and reflecting that a single party monopolizes some parliaments. More than 40 #2 parties held virtually no seats after the referent election. The correlation is .52 between the seats that party #2 won in both years ($p < .05$).

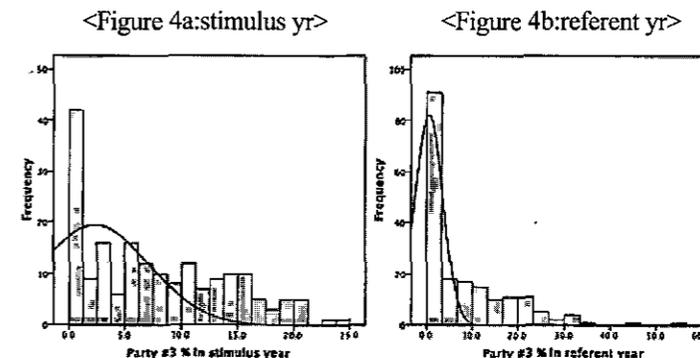
Figures 3a and 3b: Histograms for Seat % Held by Party #2, Both Years



Figures 4a and 4b, histograms graphing the distribution of seat percentages for the third largest parties in the stimulus year and by the same parties in the referent years, reflect data from rows five and six in Table 7. These graphs are somewhat different from those for party #1 and party

#2. The data distributions are highly skewed. The average #3 party held only 7.8 percent of the seats in the stimulus year, and about 40 countries lacked a third party with parliamentary representation. Nevertheless, the correlation is .48 between seats won by #3 parties in both years ($p < .05$).

Figures 4a and 4b: Histograms for Seat % Held by Party #3, Both Years



Although we recorded data on only the top three parties in the stimulus election (and on their seats after the reference election), we captured most of the parliamentary party representation in most of the polities. Table 8 shows that the top three parties held on average over 80 percent of the parliamentary seats in the stimulus election. In referent elections, they held just over 70 percent. The drop occurs because we omitted parties that won seats in the referent election but were not among the top three parties in the stimulus election.

Table 8: Seats Held by Parties #1, #2, and #3 in Both Elections

	N	Minimum	Maximum	Mean	Std. Dev.
Sum of seat percentages for parties #1, #2, and #3 in stimulus election	187	11	100	82.5	18.6
Sum of seat percentages for parties #1, #2, and #3 in referent election	187	0	100	72.9	27.9

What did we learn about parliamentary party competition in the stimulus years, from our scores for the top three parties? Of course, the three variables are not mathematically independent. The greater the seat share for party #1, the less the seat shares available to be split

between parties #2 and #3. But the correlations were somewhat surprising. The correlation was $-.58$ between party #1 and party #3, but the correlation between party #1 and party #2 was only $-.30$ ($p < .05$). So it seems that the largest parties tend to suck parliamentary representation from parties other than its largest challenger. The very low correlation ($+ .11$) between percentages of seats held by parties #2 and #3 ($p < .05$) suggests that the success of the second largest party is largely independent of the third party's success.

All these statistical results showed that the percentage of seats held by the second largest party in parliament offers itself as a good simple indicator of parliamentary party competition. We define party system *competition* as the prospect that the largest party (which usually forms the government) can be replaced by a rival party. The percentage of seats held by the second largest party in the parliament could be the indicator of party competition.

2. Party System Volatility

In ordinary discourse, the term "volatile" means inconstant, fleeting, capable of quick change. It has the same meaning in describing party systems but has been applied separately to party, votes and seats. *Electoral* volatility, as popularized by Pedersen, assesses changes in percentages of votes cast for all parties in adjacent elections.³⁸ *Seat* volatility refers to changes in percentages of parliamentary seats for all parties in adjacent elections. Of course, measures of electoral and seat volatility tend to be highly correlated; Ersson and Lane find they correlate $.77$ for measures for 18 European countries.³⁹

We collected data on how well those parties were represented after the referent election to assess parliamentary party system volatility. Table 8 summarizes the continuity of parties #1, #2,

38) Pedersen (1979). Lane and Ersson also refer to electoral volatility as "net" volatility, see Jan-Erik Lane with Svante Ersson, "Party System Instability in Europe: Persistent Differences in Volatility between West and East?" *Democratization*, Vol. 14, (February, 2007), pp. 92-110. Powell and Tucker dissect Pedersen's formula to measure two types of volatility: type A captures volatility from party entry and exit, and type B captures volatility among stable parties. See Eleanor Neff Powell and Joshua A. Tucker, "New Approaches to Electoral Volatility: Evidence from Postcommunist Countries," Paper prepared for delivery at the 2009 Meeting of the American Political Science Association, Toronto, Canada. We do not distinguish between their types for we count both types of volatility.

39) See Svante Ersson and Jan-Erik Lane, "Electoral Instability and Party System Change in Western Europe," in Paul Pennings and Jan-Erik Lane (eds.), *Comparing Party System Change* (London: Routledge, 1998), p.29.

and #3 over both the stimulus and referent elections. Overall, a great deal of shuffling occurred among the parliamentary parties in the 212 polities. In less than 45 percent of the polities were the parties that ranked 1-2-3 after the stimulus election also among the top three parties after the referent election. The bigger parties, however, did tend to appear in both elections. Another 21 percent of the time parties #1 and #2 (including those in two party systems) were represented after both elections. In almost 12 percent of the polities, the largest party in the stimulus year stood out as the largest party in the referent year while no other parties from the stimulus year appeared with it.

Table 8: Continuity of Parties #1, #2, and #3 over the Stimulus and Referent Elections

	Frequency	Percent
No parties in chamber either year	24	11.3
None of top 3 parties seated in referent year	7	3.3
Only party #3 held seats both years	2	.9
Only party #2 held seats both years	3	1.4
Parties #2 & #3 held seats both years	4	1.9
Only party #1 held seats both years	25	11.8
Parties #1 & #3 held seats both years	8	3.8
Parties #1 & #2 held seats both years	26	12.3
Two party system, both parties retained seats	18	8.5
Parties #1, #2, and #3 held seats both years	95	44.8
Total	212	100.0

The data in Table 8 hints at the volatility of the polities' parliamentary party systems, but it does not directly measure volatility. In a seminal article, Pedersen defined the concept of "electoral volatility, by which will be meant the net change within the electoral party system resulting from individual vote transfers."⁴⁰ He operationalized his concept by summing the absolute differences in the percentage of votes cast for all parties in two adjacent elections and dividing by 2 (to avoid double-counting losses and gains). Others have applied Pedersen's formula to the distribution of parliamentary party seats held by all parties in two adjacent elections.

40) Pedersen (1979). pp. 7, 1-16.

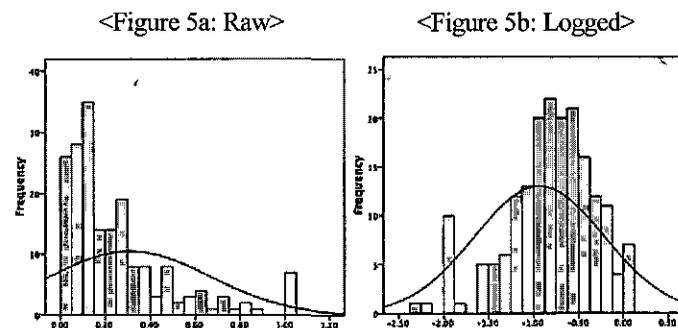
We measure parliamentary party volatility with a comparable formula but one that adjusts for the share of seats won by *k* parties in adjacent elections when not all parties are included in calculating changes in seat shares. It replaces 2 in the divisor in Pedersen's formula with the sum of the seats won in each election by the set of parties (*k*) included in the calculation. The modified formula no longer ranges from 0 to 100 but from 0 to 1 and can be interpreted as the proportion of change in seat percentages held by *k* parties in two adjacent elections.

$$\text{Volatility}_{\text{seats}} = \frac{\sum_{i=1}^k |p_{i(t)} - p_{i(t-1)}|}{\left(\sum_{i=1}^k p_{i(t)} + \sum_{i=1}^k p_{i(t-1)} \right)}$$

Where $p_{i(t)}$ = percentage of seats in stimulus year
 $p_{i(t-1)}$ = percentage of seats in reference year
k = 3, number of parties for which we collected data

This formula produced "raw" volatility scores—ranging from 0 to 1—that were heavily skewed. To normalize the distribution, we computed logarithms for the raw values. Figures 5a and 5b report data on both volatility variables for all 187 polities that seated deputies by parties. Figure 5a shows that raw party seat volatility is heavily right-skewed, as seven polities generated volatility scores of 1. A score of 1 meant that no parties repeated in winning seats in both the stimulus and reference elections. Figure 5b portrays the logarithm of the party seat volatility scores, which resembles a normal distribution. By coincidence, seven polities also had volatility scores of 0—a value that cannot be rendered as a logarithm. Instead of treating these as missing data, the volatility scores were arbitrarily set at .01, which permitted logs to be calculated.

Figures 5a and 5b: Distributions of Volatility Scores: Raw and Logged.



There was virtually no correlation (.06) between the logged volatility score and the percentage of seats held by party #2 in the stimulus year. Volatility correlated slightly negatively with party #1 seats (-.28) and slightly positively (.20) with party #3 seats ($p < .05$). Our findings correspond with those by Lane and Ersson, who analyzed fifteen party system variables for 16 European nations and found the intercorrelations "generally speaking, not very high, which means that the indicators do not go together." In particular, "volatility does not co-vary with any of the other party system dimensions."⁴¹⁾

3. Correlations Among Party Indicators

We did not compute all fifteen Lane-Ersson measures of party systems for our countries. The first on electoral participation (#1) was deemed irrelevant, as was the number of parties competing in elections (#4). Lack of sufficient cross-national data precluded calculating their measures #8 to #14 of Table 1, involving party ideology and social support. We are, however, able to generate measures that match other six measures, and we generated two measures of our own, the strength of second largest party and the strength of third largest party, as explained in IV-1. The eight measures of party systems are reported in Table 9.

Table 9: Eight Measures of Party Systems

Measure	Terms and Formulae
#2 Strength of largest party	p_1 , the proportion of seats held by the largest party
#3 Actual number of parties in parliament	N = number of parties with at least one seat
#5 Fractionalization Index, <i>F</i>	$1 - \sum_i p_i^2$, where p = proportion of seats held by party i
#6 Effective number of parties, <i>ENP</i>	$\frac{1}{\sum_i p_i^2}$, where p = proportion of seats held by party i

41) Jan-Erik Lane and Svante O. Ersson (1994), pp. 180-181.

#7 Aggregation Index	$\frac{P_1}{N}$ where p_1 = percentage of seats held by the largest party; N = all seated parties
Volatility _{seats} * (#15 volatility renovated)	$= \sum_{i=1}^k p_{i(t)} - p_{i(t-1)} / \left(\sum_{i=1}^k p_{i(t)} + \sum_{i=1}^k p_{i(t-1)} \right)$ Where $p_{i(t)}$ = percentage of seats in stimulus year $p_{i(t-1)}$ = percentage of seats in reference year $k = 3$, number of parties for which we collected data
Strength of second largest party*	p_2 , proportion of seats held by the second largest party
Strength of third largest party*	p_3 , proportion of seats held by the third largest party

*The shaded cells are measures generated (or renovated) by authors.

Measures Fractionalization (#5), Number of Parties in parliament (#6), and Aggregation Index(#7) are affected by the Strength of Largest Party (#2), p_1 , and by the number of parties in parliament (#3), N . In all three measures, the proportion of seats held by the largest party affects the formula more than the share of any other party. More subtly, increases in the number of parties in a system also affect the value's magnitude. In essence, all of these measure, positively or negatively, a property that might be called party system "fragmentation." That is, the greater the strength of the largest party and the greater the aggregation index—the *less* fragmented the system. Conversely, the larger the *actual* number of parties, the greater the fractionalization index, and the greater the *effective* number of parties—the *more* fragmented the system.

The formula for volatility, however, is entirely different. As Pedersen wrote after evaluating this family of indicators: "Fragmentation is a locational concept. The indicators of that concept, accordingly, are locational indicators that measure *states* of systems, not *change* in systems."⁴² In addition, volatility measure accords no special weight to the strength of the largest party. That is also true of the last two indicators, but their values are to some extent a function of the seats held by the largest party: the greater its share, the less is available for the second and third place parties.

Not surprisingly, when we analyzed intercorrelations among eight party indicators including our measures of Volatility_{seats}, Strength of second largest party, and Strength of third largest party,

42) Pedersen (1980), p. 398.

all measures based on the strength of the largest party, as shown in Table 10, tend to intercorrelate about .60 or higher. The actual number of parties in parliament and the strength of the third largest party tended to be moderately related to all those measures. The strength of the second largest party and the volatility score tended to be unrelated to *any* of the other six indicators. The right-hand column (**|mean|**) in the table shows the average correlation of the measure in that row with all other indicators. In a rough way, it implies how much that indicator has in common with the other indicators.

Table 10: Intercorrelations among Eight Party Indicators for 189 Party Systems^a

Indicator	A	B	C	D	E	F	G	H	mean ^b
A: Strength of largest party	1	0.80	-0.78	-0.89	-0.55	-0.57	-0.32	-0.28	.60
B: Aggregation (log) ^c	0.80	1	-0.67	-0.77	-0.92	-0.56	-0.31	-0.01	.58
C: Fractionalization (log)	-0.78	-0.67	1	0.59	0.55	0.44	0.44	0.40	.55
D: Effective # of Parties (log)	-0.89	-0.77	0.59	1	0.48	0.43	0.25	-0.10	.50
E: # all parties (log)	-0.55	-0.92	0.55	0.48	1	0.50	0.30	-0.03	.48
F: Strength of party #3	-0.57	-0.56	0.44	0.43	0.50	1	0.21	0.11	.40
G: Volatility _{seat} (log)	-0.32	-0.31	0.44	0.25	0.30	0.21	1	0.09	.27
H: Strength of party #2 %	-0.28	-0.01	0.40	-0.10	-0.03	0.11	0.09	1	.15

^a $p < .05$.

^b This column reports the mean of the absolute correlation coefficients, ignoring signs.

^c Some of the measures were converted to logarithms to normalize highly skewed distributions.

Factor analysis provides a more precise way of determining what a set of variables has in common. Applied to a correlation matrix, like that in Table 10, the mathematics of factor analysis assesses the amount of variance (called communality) that each variable shares with the others and determines whether subsets of variables differ from one another. The typical factor structure reports how each variable correlates with one or more underlying and uncorrelated "factors," the meaning of which is left to interpretation. Various criteria specify the number of meaningful factors extracted through factor analysis. Our analysis, summarized in Table 11, extracted two factors that explained 70 percent of the total variance among the eight indicators ($p < .05$).⁴³

43) The signs were reversed on the loadings on Factor 1 correspond with the signs of the correlations in the

Although the set of indicators shared a considerable amount of variance, two indicators were distinctly different from the other six.⁴⁴⁾

Table 11: Factor Analysis of Correlation Matrix in Table 10*

		Factor 1: Party Fragmentation	Factor 2: Party Competitiveness
A	Party #1 % stimulus year	.85	<.60
B	Aggregation (log)	.93	<.60
C	Fractionalization (log)	-.69	<.60
D	Effective # of parties (log)	-.86	<.60
E	# of all parties (log)	-.83	<.60
F	Party #3 % stimulus year	-.65	<.60
H	Party #2 % stimulus year	<.60	.94
G	Volatility _{seats} (log)	<.60	<.60

*p<.05

*Extraction Method: Principal Component Analysis.

*Rotation Method: Varimax with Kaiser Normalization.

The decimal values in Table 11 are the correlations of each variable with the unobserved, underlying factors. Standard practice drops loadings below a certain level to prevent distracting statistical “noise” from obscuring the factor structure. We dropped all loadings below .60. The factor analysis reveals that six indicators load on Factor 1, one loads on the *uncorrelated* Factor 2, and one does not load on either factor. The inference is that the various indicators measure three different dimensions of party systems, tapped by two underlying factors and one “missing” factor—volatility.

As mentioned above, analysts must interpret the meaning of an underlying factor. After observing which variables correlate (and how much) with the factor, they try to embrace the matrix.

44) The first edition of Lane and Ersson, *Politics and Society in Western Europe* (1987), reported a factor analysis of 14 party system measures, many—but not all—identical to the 15 in their 3rd edition. They uncovered five factors (p. 161) that correspond closely to the patterns discussed here. Four fragmentation measures loaded on Factor 1; three socioeconomic measures on Factor 2; three ideological measures on Factor 3; two other ideological measures on Factor 4; and two measures of change on Factor 5. The analysis did not include strength of the parties.

pattern under a conceptual umbrella, which amounts to “naming” the factor. We named Factor 1 “party system fragmentation” and Factor 2 “party system competitiveness.” The factor analysis failed to capture a “party system volatility” factor simply because the volatility measure did not correlate systematically and sufficiently with any of the other indicators. Volatility is a distinctly different dimension of party systems—as Lane and Ersson found. This means that we could use volatility_{seat} for another independent indicator for measuring party system.

V. Conclusion

We usually agree with the importance of political parties in democratization and democratic consolidation. However, there is not that much of the body of research specifying how parties affect the popular control of governing. This study indicates that most of the causes of this lack of literature come out of the scarcity of relevant worldwide dataset and the difficulties of developing indicators for measuring party system.

The purpose of this study is to develop indicators of party system, and to show the relevance of those indicators by empirical testing with previously developed indicators of party system. For this study, we collected our own dataset which includes the percentage of parliamentary seats occupied by parties in 212 nations, and used 187 cases for the analysis.

To generate indicators of party systems relevant for assessing the effect of parliamentary party systems on governing, we focused on changes of party system. Thus we collected data on the distribution of party seats at two points in time: after a *stimulus* election prior to 2007 and after a *referent* election adjacent to the stimulus election. The very low correlations between percentages of seats held by parties #1 and #2, and #2 and #3, suggest that the success of the second largest party is largely independent of the third party’s success. The percentage of seats held by the second largest party in parliament offers itself as a good simple indicator of parliamentary party competition.

Regarding volatility, there was virtually no correlation between the logged volatility score and the percentage of seats held by party #2 in the stimulus year. Volatility correlated slightly negatively with party #1 seats and slightly positively with party #3 seats. Our findings

reconfirmed that the volatility is distinctly different dimension of party systems.

With previously developed party system indicators, we tried to measure intercorrelations of eight party measures. Our measure of party competition, the second largest and the volatility score tended to be unrelated to *any* of the other six indicators. Moreover, the factor analysis showed that six indicators, i.e., the strength of the largest party, actual number of parties in parliament, fractionalization, effective number of parties, aggregation index, and the strength of the third largest party, load on Factor 1, which could be named as party system fragmentation. The strength of the second largest party load on Factor 2, which could be named as "Party system competitiveness." However, the volatility measure again did not correlate systematically and sufficiently with any of the other indicators. This reconfirms that we could use volatility for another independent indicator for measuring on dimension of party system.

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