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Mixed electoral systems and electoral system effects: controlled comparison and cross-national analysis

Robert G. Moser [a,*], Ethan Scheiner [b,c]

[a] *University of Texas at Austin, Austin, TX 78712, USA*
[b] *Stanford University, Stanford, CA, USA*
[c] *University of California at Davis, Davis, CA 95616, USA*

Abstract

Utilizing data from 15 countries that employ mixed electoral systems, we provide a cross-national analysis of the defining elements and potentially constraining effects of such systems. Using district level election results, we examine the effects of the proportional representation (PR) and single-member district (SMD) tiers of mixed systems separately and in combination. We also test the effects on electoral outcomes of different components of mixed systems such as linked tiers, ratio of SMD to PR seats, and majority versus plurality rules in the SMD tier. Our findings suggest that, despite claims of a ''contamination effect'' between the two tiers, in countries with developed party systems, PR and SMD electoral arrangements tend to approximate their expected effects even when used in combination in mixed systems. We also find that particular institutional characteristics within mixed systems have a substantial constraining effect on the number of significant political parties. However, the nature of the party system itself, in particular the extent to which its parties are institutionalized, also plays a very important role in shaping the degree to which constraining effects are truly felt.

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* Corresponding author. Tel.: +1-512-232-7278; fax: +1-512-471-1068.
  E-mail address: rmoser@mail.la.utexas.edu (R.G. Moser).

1. Introduction

Mixed electoral systems, defined here as electoral systems that provide voters two votes for the legislature—one for a party list in a proportional representation (PR) tier and one for a candidate in a single-member district (SMD) tier—have emerged as a major alternative to strictly PR or SMD systems. This paper provides an analytical dissection of mixed electoral systems. Using district level data from 15 countries, we offer a comparative analysis of the effects of PR and SMD electoral arrangements when used simultaneously in mixed systems.

Our approach offers several contributions to the growing literature on mixed electoral systems: first, we examine the effects of mixed systems in the widest variety of cases to date. Our dataset includes established democracies and new democracies from Europe, post-communist states, and Latin American countries, with systems that range from the long-standing institutionalized parties of Germany to the nearly inchoate party systems of Soviet successor states. Our study also provides the most complete analysis we have found of the effects of different institutional variations of mixed electoral systems, such as the impact of linked versus unlinked tiers. Finally, unlike many such cross-national studies of mixed systems, we use *district level* data to test relationships between electoral arrangements and party configurations, since theories of electoral system effects apply most directly to this level of analysis.

With our data, we are able to analyze the independent influence of PR and SMD rules when combined in mixed electoral systems. The separate votes cast in the PR and SMD portions of the balloting offer scholars an opportunity for "controlled comparison": mixed electoral systems represent a social laboratory in which effects of different types of electoral systems can be studied in isolation from influences of the social context such as social cleavages, socioeconomic development, or culture. Such an approach not only produces fresh insights on the effects of PR and SMD elections; but also explores the extent to which "contamination"—the presence of PR balloting altering SMD politics and SMD balloting affecting PR—shapes the effects of electoral rules in mixed systems (see Herron and Nishikawa, 2001; Cox and Schoppa, 2002). We find that PR and SMD electoral arrangements tend to approximate their expected effects even when used in combination if party systems are well developed.

Our central findings focus on the factors that constrain the number of significant candidates and political parties. We find that particular institutional features within mixed systems—such as mechanisms linking the two tiers—constrain such numbers, but electoral institutional features are not alone in their constraining effects. We argue that the nature of the party system itself, in particular the extent to which a country's party system is institutionalized, also plays a critical role in shaping the degree to which electoral system constraining effects are truly felt. Constraining effects commonly attributed to electoral systems are much more likely at a certain level of party institutionalization.

2. Duverger's law and its limits

The electoral system literature is based on three central Duvergerian premises: PR systems tend to produce multi-party systems; two-ballot majoritarian systems promote multiple parties aligned into two camps; and plurality systems promote bipartism (Duverger, 1986, p. 70). Subsequent scholarship has better specified the nature of all these relationships.

District magnitude (the number of representatives elected from each district) seems to be the decisive influence on multipartism and disproportionality in the translation of votes to seats. Low magnitudes, especially SMDs, have a powerful constraining effect on the number of parties and produce high disproportionality. High magnitudes allow (but do not cause) greater proliferation of parties and produce less disproportionality (Taagepera and Shugart, 1989; Lijphart, 1994). The constraining effect of electoral systems seems to reside most directly at the district level rather than at the national level (Sartori, 1986, pp. 54–55; Cox, 1997).

Cox (1997) explicates the limits of Duvergerian equilibria. District level strategic voting (and, by implication, strategic entry and departure by elites) requires certain conditions regarding actors' motivations, preferences, time horizons, and availability of accurate information. Plurality SMD elections may not reduce the vote for minor parties if any of the following holds: voters who are not short-term instrumentally rational; a lack of public information about voter preferences and vote intentions (and, hence, insufficient sense about which candidates are "out of the running"); widespread certainty regarding likely winners; and the presence of many voters who strongly prefer their first choice and, thus, are nearly indifferent to other choices (Cox, 1997, p. 79).

Even if conditions are favorable for establishing two-candidate races at the district level, bipartism projection to the national level is not assured. Projection depends on parties' ability to unite prominent elites in single nationwide party organizations. If this is not accomplished, the two candidates produced in district level plurality elections may belong to many different parties across the country. Cox cites institutional factors, most notably the direct election of a powerful national executive, as the primary forces behind such nationalization (Cox, 1997, pp. 182–193).

The pre-conditions for strategic behavior at the district level and projection of bipartism to the national level are particularly problematic during the initial elections in new democracies, especially cases with little democratic tradition. The absence of previous electoral experience and accurate polling information may deny voters and elites the information necessary to behave strategically. The lack of well-established parties undermines the ability of voters and elites to behave strategically, as well as project to the national level constraining effects that occur at the district level. Where parties are new and weak, party ID among voters may be absent, so the main voting cues voters are left with involve the personal characteristics of candidates and patronage. In many new democracies, party organizations tend to be transitory, with parties continually entering and leaving the political arena (usually in step with the clout of their party leaders), thereby pro-

viding little continuity between electoral periods. In such democracies, voters find it hard to cultivate lasting party preferences, leaving most uncommitted to any party.

As we discuss below, party institutionalization has major consequences for electoral systems' interaction with party systems. It would be a mistake to assume that institutional effects found in established democracies will be replicated in the very different context of new democracies in East Europe, Eurasia, and Latin America. Through our controlled comparison of PR and SMD tiers of mixed systems in both consolidated and unconsolidated democracies, we can investigate the extent to which the level of party institutionalization conditions electoral system effects.

Regarding specific effects of mixed electoral systems, Cox and Schoppa (2002) and Herron and Nishikawa (2001) each argue cogently that there will be an interaction or contamination effect in mixed systems, whereby the existence of PR affects results in SMDs and vice versa. In this way, we argue, mixed systems become a "harder" test of the impact of electoral institutions. What would ordinarily seem like an obvious proposition (e.g., SMD tiers will be less proportional than PR tiers) becomes worthy of testing. If we find that electoral outcomes in both the SMD and PR portions of mixed systems follow the same tendencies as would be predicted for pure SMD and PR systems, despite this contamination effect, it serves to support even more strongly the existence of general electoral system "laws." Moreover, while not denying the existence of contamination effects, findings showing that SMD and PR rules have predicted effects even when combined in mixed systems would suggest that contamination effects do not necessarily create entirely new outcomes in mixed systems.

3. Effects of specific rules distinguishing mixed electoral systems

We examine mixed electoral systems in 13 countries and 2 national sub-units. Six—Germany, Italy, Japan, New Zealand, Scotland and Wales—are consolidated democracies with long experience in competitive elections. One—Venezuela—had a history of stable democratic rule, but in recent years has seen a major implosion of its party system. The remaining countries—Armenia, Bolivia, Croatia, Hungary, Lithuania, Macedonia, Russia, and Ukraine—are democratizing states recently emerging from a long period of communist or authoritarian rule. These cases provide significant variation in the rules governing their specific mixed systems and their levels of party institutionalization. The extent of the constraining effects may vary according to specific features of the mixed systems and the political contexts (such as level of party institutionalization) in which the systems are operating.

All mixed electoral systems—as we define them here—share the distinction of allowing the electorate votes in both PR and SMD elections, but four characteristics distinguish mixed systems from one another: linkage/compensatory seats, the ratio of seats in each tier, the SMD electoral formula, and the district magnitude and legal threshold of the PR tier. Based on these characteristics, Table 1 presents

Table 1
Description of 15 mixed electoral systems

Country	Number of elections under mixed system	Linked tiers	SMD electoral formula	SMD:PR ratio	Average PR district magnitude[a]	PR legal threshold (%)	Level of party instit.
Germany	13	Yes[b]	Plurality	248:248	248[c]	5	Instit.
Italy	2	Yes[d]	Plurality	475:155	155	4	Instit.
Japan	2	No	Plurality	300:200 (1996), 300:180 (2000)	18.18 (1996), 16.36 (2000)	None	Instit.
New Zealand	2	Yes[b]	Plurality	65:55	55	5	Instit.
Scotland		Yes	Plurality	73:56	7	None	Instit.
Wales	1	Yes	Plurality	40:20	5	None	Instit.
Hungary	3	Yes[e]	Majoritarian	176:210	7.60 (territorial), 58 (national)	4 (1990), 5 (1994)	Instit.
Bolivia	1	Yes	Plurality	68:62	6.9	3	Instit.
Croatia	1[f]	No[g]	Plurality	28:80	80	5	Instit.
Lithuania	2[h]	No	Majoritarian	71:70	70	5	Instit.
Macedonia	1	No	Majoritarian	85:35	35	5	Instit.
Venezuela	2	Yes	Plurality[i]	88:119	8.3	None	Instit.
Armenia	2	No	Majoritarian	75:56	56	5	Non-Inst.
Russia	3	No	Plurality	225:225	225	5	Non-Inst.
Ukraine	1	No	Plurality	225:225	225	4	Non-Inst.

[a] With fully linked tiers (e.g., Germany), one could come up with two different measures of the average PR district magnitude. On one hand, it might be simply the total number of PR seats in the region. On the other hand, given the linkage, it could be the sum of the SMD and PR seats in the region, so that, for example, in Germany the magnitude in 1998 was in fact 496.

[b] In Germany and New Zealand, seats won in the SMD tier are subtracted from the total of any PR seats attained.

[c] PR mandates are distributed in 10 territorial districts (Land) but parties have the option to pool their votes for state lists at the national level making the average district magnitude in reality a single 248-member national district rather than a number of state districts average of 24.8 members per district (Cox, 1997, pp. 287–288).

[d] In Italy, a compensation system known as the scorporo links the PR and SMD tiers. If a party wins an SMD seat its PR vote total is diminished by the number of votes (plus one) received by the second-place candidate in the district.

[e] In Hungary, there are three levels. The SMD and territorial PR tier are not linked. But surplus votes (all votes not used to win a seat in either lower tiers) are aggregated in a third national tier, which allocates a minimum of 58 seats (plus any seats not distributed in the territorial PR tier) based on these surplus votes (Benoit, 1999, pp. 2–5).

[f] Croatia has had subsequent elections after 1995 under a strictly PR system.

[g] Croatia also has special seats for representation of ethnic minorities, which are not included here.

[h] Lithuania has had three elections using the mixed system, but our data are from the second election. In 2000, Lithuania changed its formula in the SMD tier from majoritarian to plurality.

[i] Venezuela has several multimember plurality districts. The average district magnitude is 1.2.

a description of the 15 mixed systems included in the study. Each of these institutional variations potentially has its own effects on the number of parties in the system and the level of disproportionality and thus will be treated as independent variables affecting the number of parties and disproportionality in certain analyses below.

3.1. Linked tiers

The most important of these characteristics is the extent to which the two tiers are linked together through the use of compensation seats. Mixed systems like Germany's that use the PR tier to compensate for disproportional effects of the SMD tier undermine the constraining effect of the SMD half of the system, both in terms of strategic voting and mechanical effects in the translation of votes into seats. Although strategic voting has been shown to occur in Germany, voters in linked mixed systems have less incentive to defect from small parties to large parties at the district level since the SMD vote is largely meaningless for a party's share of legislative seats.

In our cases, Germany and New Zealand maintain the most comprehensive systems of compensation: the PR and SMD tiers hold roughly equal numbers of seats and seats won in SMDs are subtracted from the total number of seats that parties are awarded by the vote in the PR tier. The result is a distribution of seats almost fully controlled by the PR vote. Italy's linkage mechanism is less comprehensive, as its PR tier does not have enough seats to overcome fully the disproportional effects of the much larger SMD tier. Moreover, it is less direct: if a party wins an SMD seat, the number of votes (plus one) won by the second-place candidate in the district is subtracted from the winning party's vote in the PR tier. Hungary's linkage is the most complicated. A tertiary tier of compensation seats stands above both the SMD tier and the territorial PR tier and distributes a minimum of 58 seats to parties based on surplus votes not used to win seats in either the SMD or PR tiers. This system does not provide enough seats to make it fully proportional, but it does significantly undermine strategic voting in the SMD tier.

Obviously, the disproportionality of "unlinked" mixed systems ought to be greater than linked systems because the PR tier does not directly counteract the mechanical effects of the SMD tier. Also, there ought to be a greater "psychological effect" in the SMD tier in mixed electoral systems that do not link their tiers in a system of compensatory seats. Voters and elites have a greater incentive to behave strategically because of the greater value of every SMD seat won.

3.2. SMD/PR ratio

The larger the proportion of the total number of seats devoted to the SMD tier, the greater will be the impact of SMDs on overall outcomes in the system.

Under such conditions, we ought to expect parties and voters to place greater emphasis on winning SMDs. In turn, therefore, we should expect SMDs in such systems to have a greater constraining effect than in systems with a lower proportion of seats devoted to SMDs. This is particularly true in unlinked systems but even if the two tiers are linked the number of parties will be influenced by the SMD tier if it is significantly larger than the PR tier, as is the case in Italy.

3.3. Electoral formula

Countries can either employ a plurality ("first past the post") system, in which the candidate with the most votes wins the seat, or a majoritarian system, which requires a candidate to win a majority of votes in a district to win election or a second run-off election is held. If majority elections are used in a mixed electoral system, there ought to be more parties produced than in plurality systems. Parties tend to proliferate in the first round in which minor candidates face a lower threshold to the run-off than they would victory in a plurality race. However, disproportionality between parties' votes and seats should be higher in mixed systems with majoritarian SMD tiers (as opposed to plurality tiers) because smaller parties are more viable in the first round (and thus more likely to run) but rarely win election to the legislature (see Duverger, 1986, p. 70). This is particularly true for a mixed system using majoritarian rules because the incentive for party proliferation is further reinforced by the PR tier.

3.4. PR district magnitude and legal threshold

Finally, just as in strictly PR systems, the district magnitude and legal thresholds of the PR tier influence how proportional the mixed system will be. Six of our 15 country cases elect their PR deputies in meaningful territorial districts, while the others distribute their PR seats in one nationwide district. Most PR systems (including most we examine here) impose some type of minimum legal threshold to attain representation. As Lijphart (1994, pp. 25–30) has shown, legal thresholds and district magnitude work in the same way to constrain party proliferation by setting a vote threshold necessary to gain election. In our quantitative tests, we use legal thresholds as the measure for this factor for all cases. Thus, higher thresholds should produce a greater disproportionality.

4. Mitigating effects of party system institutionalization

While institutions ought to influence the effective number of parties, we argue that one also needs to consider the impact of political context, especially party system institutionalization.

Party system institutionalization is a complex process involving different components including organizational continuity of parties, the relative stability of party

support, ideological consistency over time, party legitimacy, and party control over nominations (Mainwaring, 1999, pp. 27–39).[1] The party systems under investigation here vary in their level of institutionalization. While many of the countries have political systems highly structured by parties, a number of the new democracies, in particular the post-communist states of the former Soviet Union, suffer from problems of great volatility and young political parties with very little historical foundation.

While developing a systematic measure of institutionalization is difficult, we offer a dichotomous variable, categorizing each country as either non-institutionalized or institutionalized (coded 0 and 1, respectively). This variable is founded on the extent to which parties do in fact structure the vote, and we classify cases with very large numbers of independent candidates and seat holders as non-institutionalized cases. In our data set, three countries—Russia, Ukraine, and Armenia—fall into the non-institutionalized category. There are certainly independent candidacies in established systems, such as New Zealand and, especially, Japan, but there is a huge gulf between party systems like those we see in countries such as Armenia, Russia, and Ukraine and those in the more established systems.

While independents win less than 10% of the vote in Japan, in Russia officially nonpartisan candidates took 58% of the vote in 1993, 38% in 1995, and 43% in 1999. Independents in Russia not only made up a large proportion of candidates competing for office, they also accounted for the largest proportion of the winners. Fifty-two percent of winners were independents in the 1993 Russian elections, 34% in 1995, and 46% in 1999. Ukraine and Armenia had similarly high levels of nonpartisanship in their SMD tiers with 48% of the SMD vote going to independents in Ukraine and 44% in Armenia.

Moreover, even beyond the issue of whether candidates can credibly run and win as independents, the party systems of these three countries are clearly not well developed. Party identification is very weak compared to Western democracies and information in the form of polls tracking the relative strength of individual candidates' support in the SMD tier is only beginning to emerge on a systematic basis (as opposed to party support in the PR round, which is more developed). In addition, our identification of Russian, Ukrainian, and Armenian party systems as non-institutionalized coincides with the work of other scholars who have also depicted states of the former Soviet Union as having weaker party systems than

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[1] While party system institutionalization and the nationalization of the party system may be related processes they should not be seen as equivalent or interchangeable. The former concerns the degree to which parties are important and stable institutions that dominate the nomination and election of representatives. The latter relates to whether national parties that are competitive in most districts exist as opposed to electoral competition dominated by regional or local parties. A party system can be institutionalized but not fully nationalized (e.g., Canada or India). Conversely, a party system can be dominated by national parties but not well institutionalized because those parties are fluid and unstable with weak ties to social constituencies (e.g., post-communist states). We argue that party nationalization is a product of party institutionalization.

their Eastern European counterparts (Evans and Whitefield, 1993; Kitschelt, 1995).

We classify the remaining countries in our data set as institutionalized party systems. Of course, there is a substantial variation in the level of party system stability within this eclectic collection of consolidated and new democracies. Yet, unlike our three cases of non-institutionalized party systems, all of these countries experienced elections in which parties (rather than independents) dominated the electoral process. Other indicators of party institutionalization such as electoral volatility and ideological and organizational stability were too difficult to apply systematically and hence we focus on the dichotomous distinction based on party control over the electoral arena.[2]

We expect the level of party institutionalization to mitigate the constraining effects of electoral systems. In countries lacking party institutionalization, the SMD tier should not have its intended effect of constraining the number of competitors in a district. Instead, a proliferation of independent candidates or microparties formed around single personalities may produce very fragmented district level contests between many candidates.[3] Without widespread party identification among voters, ranking preferences among candidates becomes more difficult, undermining strategic voting. Consequently, many elites see viable opportunities for victory in the fluid and fragmented plurality races, further swelling the ranks of an already crowded field of candidates in SMDs. The effect of this failure to constrain the number of candidates in SMDs reverberates through the system culminating in a mixed system that may actually multiply the number of parties in the legislature. When independents and representatives of microparties who won election in the

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[2] We have also developed an alternative measure, whereby we divide our institutionalized systems into well-established democracies and new democracies that have a short history of parties structuring the vote. This leads to a trichotomous variable, coded 0 for the non-institutionalized systems noted above, 1 for well-established democracies with institutionalized party systems—Germany, Italy, Japan, New Zealand, Scotland and Wales—and 0.5 for new democracies whose electoral volatility, weak party organizations and dominance of individual personalities suggest that their party systems are not yet fully institutionalized—Hungary, Bolivia, Croatia, Lithuania, Macedonia, and Venezuela. While the significance levels changed, the coefficient's signs remained the same. We therefore feel comfortable with our results and do not believe they are founded on our scoring of the institutionalization measure. In addition, our dichotomous measure could conceivably be criticized for giving too much weight to outlier effects in the Russian, Ukrainian and Armenian cases. However, as we note below, using measures such as Cook's D, we find no overwhelming outlier effects and using our trichotomous measure, we find results similar to those with the dichotomous measure, offering greater support for the findings we report below.

[3] It should be noted that this argument is very different from the one concerning projection from the district to the national level. We are arguing that a lack of party institutionalization actually undermines the district level, two-candidate competition that lies at the heart of the Duvergerian equilibrium. The argument concerning national level bipartism assumes that two party competition persists at the district level but this bipartism is not realized at the national level because different parties are viable in different districts.

SMD tier enter parliament, they tend to form their own parliamentary factions separate from the parties that won representation in the PR tier, increasing the total number of parliamentary parties (Moser, 1995).

Political learning is also undermined by poor institutionalization. Countries that institute new SMD electoral systems face a learning curve, and may not immediately conform fully to its constraining effects. We expect that, up to some sort of relative equilibrium point, the effective number of candidates per district will decrease over time, but learning will be harder in poorly established party systems. Indeed, the proliferation of SMD candidates (and a large number of parties under PR) could be a stable equilibrium in weak party systems that should not be expected to change over time unless a strengthened party system warrants such change.

Like the institutional variations among mixed systems noted above, party system institutionalization will be treated as an independent variable affecting the number of parties and disproportionality (as well as an interaction variable combined with institutional variables).

5. Operationalization of dependent variables

We view mixed systems as the simultaneous use of PR and SMD electoral rules. While this combination undoubtedly results in some contamination between the two systems, we emphasize the autonomous effects of each tier of the mixed system. In order to do this, we need to divide these systems into their constituent parts and study each part separately. When possible, we calculate the effective number of parties and least-squares index of disproportionality for each tier of the mixed system, as well as the system as a whole.[4] We treat each election as a separate case. With more than one election for many of our countries, this gives us 24 cases.[5] Where possible, we create four sets of analyses each (SMD tier, PR tier, the system as a whole, and the SMD district mean for SMD candidates and PR parties). (See Appendix A.)

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[4] In linked systems, the PR tier's effective number of parliamentary parties (N_s) and the level of disproportionality are fairly nonsensical. Because of the use of compensation seats, parties that won a large proportion of the PR vote will win very few seats in the PR tier if they won a large number of SMDs. For this reason, we do not report the effective number of parliamentary parties and the level of disproportionality in the PR tier of linked systems.

[5] We examine elections for every case in which data were readily available. Obtaining data for most German elections was difficult, so we focused first on getting data for the earliest postwar elections, as early German elections made for an appropriate comparison with the other cases in our study, which were all *new* mixed electoral systems. In addition, we sought to obtain the most recent election results at the time of writing, so as to increase the variance over the "number of elections" variable that we utilize below.

The Laakso and Taagepera (1979) effective number of parties (N) provides a measure of party system fractionalization by counting parties weighted by their national shares of votes or seats.[6] The disproportionality produced by an electoral system is the average deviation between the proportion of votes received and the proportion of legislative seats obtained. Disproportionality is a key to the mechanical effect of electoral systems. Disproportionality tends to be highest in plurality/majoritarian SMD systems, which penalize small parties and reward large ones, and lowest in large magnitude, PR systems.[7]

In addition, we calculate the effective number of SMD candidates per district (N_{cands}, the mean effective number of *candidates* for all districts in a given case) to examine the district level effect of the SMD tier on the number of competitors. We also calculate the mean district level effective number of parties ($N_{parties}$) by examining the proportion of votes each party gets in the PR balloting in each SMD. The calculation of the effective number of candidates per district for the SMD tier provides a good measure of the district level effect of the electoral system.[8]

By comparing the number of parties produced by the SMD tier (compiled at the national level) and the number of candidates produced in each district (the mean of N_{cands} for a given case), we can test the level of projection of "bipartism" from the district level to the national level. If both the effective number of parties (SMD tier at the national level) and the effective number of candidates (at the district level) are low, a country has a party system that has conformed to the constraints of the electoral system at both the district and national levels—a sign of a nationalized party system. If the effective number of parties in the SMD tier is high but the effective number of candidates is low, then the electoral system has produced only

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[6] The effective number of parties index is calculated by squaring the proportion of the vote or seat shares of each party, adding these together, then dividing 1 by this total:

$$N_v = 1/\Sigma(v_i^2) \text{ or } N_s = 1/\Sigma(s_i^2)$$

Laakso and Taagepera (1979), Lijphart (1994, pp. 57–72), and Taagepera and Shugart (1989, pp. 77–81, 104–105). Note that, aside from Appendix A itself, in parts of our analysis of N_v (SMD) below, we drop Armenia, Russia and Ukraine. These three countries have a huge number of independent candidates and, therefore, we treat all independents as a single residual category, which artificially reduces the effective number of parties measure since independents did not behave as a single group. Alternative measures using parliamentary factions formed after the election or treating each independent as a different "party" produces unrealistically high measures. However, this is not a problem in our most important empirical tests, which examine *district level* outcomes and are thus unaffected by our measurement of independents at the *national level*.

[7] The least-squared index of disproportionality is calculated by squaring the vote–seat share differences and adding them together; this total is divided by 2; and then the square root of this value is taken:

$$LSq = \sqrt{\frac{1}{2} \sum (v_i - s_i)^2}$$

See Lijphart (1994, pp. 57–72) and Taagepera and Shugart (1989, pp. 77–81 and pp. 104–105).

[8] N_{cands} and $N_{parties}$ are computed exactly as N_v is, except computations are made for, respectively, all candidates and parties competing within a given district and then taking the average for all districts across the country.

a district level effect that was not projected to the national level. If both the effective number of parties and candidates are high, then the pre-conditions for strategic behavior appear not to have been met even at the district level.

6. Results

We examine the impact of mixed electoral systems on party systems pursuing the following four broad themes: disproportionality, psychological effect of the SMD tier, district level effect on the number of parties, and the projection of district level party configurations to the national level. Where appropriate we include particular institutional factors (e.g., linked versus unlinked tiers) and party institutionalization as independent variables in our analyses.

6.1. Disproportionality

6.1.1. Autonomous effects of each tier

As noted above, the potential of mixed systems' contamination effect creates a harder test of the impact of electoral institutions. As a result, seemingly obvious electoral relationships become more worthy of investigation. Among the most "obvious,"

Hypothesis 1. *SMD tiers will generate greater disproportionality than PR.*

SMD tiers' disproportionality appears to be the most important aspect of proportionality in mixed systems. Mixed systems' PR tiers are designed to provide some proportionality to systems that would otherwise discriminate against smaller parties. In general, PR tiers in mixed systems have their expected effects, producing higher numbers of effective electoral and parliamentary parties and lower levels of disproportionality than their corresponding SMD tier (supporting Hypothesis 1).

The mean LSq for countries where separate disproportionality scores could be calculated for each tier is 16.32 (16.71 if we include all countries) for the SMD tier and 8.72 for the PR tier. There are, however, three country exceptions, where the SMD LSq is lower than the PR LSq: Venezuela, Russia, and Ukraine. In Venezuela, LSq in *both* the SMD and PR tiers is very low. The Russian and Ukrainian exceptions are probably partly due to our lumping together of independents into one category. The large residual category of independents artificially lowers the effective number of parties and disproportionality in the SMD tier by creating the misleading impression of a large and rather successful "party" of independents.

However, it is also due to the uncertain world of Russian and Ukrainian party politics, where opinion polls regularly record upwards of 40% of respondents as undecided. Smaller parties with little chance of gaining representation may take a risk that they will be the next surprise party to capture these undecided votes and be catapulted above the PR thresholds of representation (5% in Russia and 4% in Ukraine), even though few actually do find such success. This dramatically increases the disproportionality of the PR tier. For example, in 1995, only four out of 43 Russian parties crossed the legal threshold. At the same time, weak party develop-

ment lowers the level of disproportionality in the SMD tier at the national level by providing locally popular politicians from minor parties opportunities to win seats in individual districts even though their parties garner an extremely low percentage of the national vote. Indeed, there were a number of minor parties in Russia whose sole reason for existence seemed to be to serve as a vehicle for the election of their party leader to an SMD seat.[9] In short, while a certain level of contamination may be in effect here, low party institutionalization probably has a greater impact on such outcomes.

6.1.2. Mixed system effect on overall system disproportionality

Ultimately, while the individual tiers have an impact on overall system disproportionality, the mechanism linking (or not linking) the two tiers is probably the most important factor. Such linkage mechanisms, which ensure that electoral outcomes are based to a larger degree on the results of the PR balloting, are certain to have a substantial impact on overall system disproportionality. That is,

Hypothesis 2a. *Disproportionality will be greater in unlinked systems.*

Hypothesis 2b. *Disproportionality will be greater in systems that utilize majority (as opposed to plurality) SMD arrangements and high thresholds in the PR tier.*

Indeed, linked systems' level of disproportionality is markedly lower than that of unlinked systems. Linked systems have a mean LSq of 6.69, but unlinked systems' mean LSq is 10.11. We examine the impact of linkage, plurality rules and PR threshold on system disproportionality by running an OLS regression model with LSq (whole system) as the dependent variable. The independent variables are (1) *unlinked*, coded 0 for systems with any sort of compensation votes or seats and 1 for fully unlinked systems, (2) *plurality*, coded 0 for majority run-off systems and 1 for plurality systems, and (3) *threshold*, the legal threshold of representation in the PR tier. Based on our above hypotheses, unlinked should have a positive coefficient, plurality should have a negative coefficient and threshold should have a positive coefficient.

The coefficients are all in the expected direction, but only unlinked and plurality are statistically significant. (See Table 2.) It appears that only linkage mechanisms and SMD tier electoral formula have a substantial impact on system disproportionality. This offers clear support for Hypothesis 2a, but only supports the first half of Hypothesis 2b. It appears that PR threshold of representation does not play a major role in shaping overall system disproportionality. We hypothesized

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[9] Moreover, in Russia, campaign finance incentives encourage elites to form their own personal PR electoral blocs even though these blocs have no chance of winning representation in the PR tier. This is because the state provided free television and radio air time to PR blocs that these elites use to further their personal campaign in an SMD. Several ''personal'' PR parties that effectively served as electoral vehicles for their leaders' successful SMD campaign existed in Russia's 1995 election (Moser, 1997, p. 293; McFaul, 1996, p. 17). Election rules were later changed to curtail this behavior by forcing PR parties and individual candidates that fail to win a certain percent of the vote to pay for the airtime they received during the campaign.

Table 2
Variables affecting proportionality

	LSq whole system	LSq SMD	LSq PR
Unlinked	3.536**		
	(1.561)		
Plurality	−5.418***	−10.684**	
	(1.901)	(4.352)	
Threshold	0.101		1.547
	(0.670)		(0.951)
Constant	10.453***	27.528***	2.202
	(3.554)	(3.867)	(4.216)
N	23	19	14
F	4.63	6.03	2.65
Prob > F	0.014	0.025	0.13
R^2	0.422	0.262	0.181
Adj. R^2	0.331	0.218	0.112

Entries are OLS coefficients with standard errors in parentheses.

The SMD models do not include Armenia, Russia, and Ukraine. However, the results are nearly identical even when they are included.

Note that this table is not intended to present a set of fully specified models. They are principally intended to show the rough relationship between key independent variables and the dependent variable under consideration.

* $p < 0.05$ (one-tail test).

** $p < 0.05$ (two-tail test).

*** $p < 0.01$ (two-tail test).

that this threshold might simply play a role in shaping PR tier disproportionality, but the third column of Table 2 indicates only weak support for this proposition.[10]

6.2. Psychological effect

We also test for the presence of a psychological effect, by which voters are more likely to cluster their votes around a smaller number of stronger parties and potentially weak parties are more inclined to exit from the race in SMDs, and both actions are less likely in the PR tier.[11] At the most "obvious" level, despite "con-

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[10] As Table 2 suggests, threshold's impact on PR disproportionality is only significant at 0.065 level in a one-tail test. We similarly hypothesized that plurality would strongly shape disproportionality in the SMD tier and this is borne out by the results in the second column of results in Table 2.

[11] Research on Germany's mixed electoral system has demonstrated this psychological effect, even though Germany's SMD has little control over the final overall distribution of seats (Barnes et al., 1962; Bawn, 1999; Cox, 1997; Fisher, 1974; Jesse, 1988). Nevertheless Jesse (1988) argues that such a psychology in Germany makes very little rational sense since the final distribution of seats is determined exclusively by the PR tier. If voters and elites realize this distinction, one would expect a stronger psychological effect in SMD tiers of unlinked mixed systems that actually give their SMD tiers an equal influence over the final distribution of seats. In these systems, the stakes are much higher in the SMD vote and the psychological effect should therefore be greater.

tamination'' effects, we expect behavior in each tier to behave according to the separate rules governing it:

Hypothesis 3. *There will be a lower effective number of parties in the SMD tier than in the PR tier.*

Indeed, we find that at both the national and district levels, there is a substantial difference in the effective number of parties in the SMD and PR tiers. At the district level, on average the PR tier allowed one more effective party ($N_{parties}$) than the SMD tier. The mean effective number of parties receiving votes in PR balloting at the district level ($N_{parties}$) is 5.19. In the countries where we could compute a value for $N_{parties}$, the mean effective number of candidates receiving votes in SMD balloting (N_{cands}) at the district level is 4.03 (4.11 if we include all cases).[12]

Moreover, as suggested above, particular institutional variations among mixed systems should impact the psychological effect.

Hypothesis 4. *The difference between the effective number of electoral parties (at both the district and national levels) in the SMD and PR tiers will be greater in systems with unlinked tiers, a high ratio of SMD to PR seats, and plurality (rather than majority) SMD electoral formula.*

We conduct OLS analysis to determine the impact of specific institutional variations (unlinked versus linked tiers, SMD/PR ratio, and plurality versus majoritarian rules in the SMD tier) on strategic behavior. Since the psychological effect's impact is especially great at the district level, we focus our measure of the psychological effect on the effective number of electoral parties ($N_{parties}$) in the PR tier minus the effective number of candidates (N_{cands}) in the SMD tier, both calculated at the district level.[13] We expect the psychological effect to be felt especially strongly in the SMD tier, thereby leading to a smaller number of SMD candidates

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[12] At the national level, there were roughly one and a half more effective electoral parties (N_v) in the PR tier (5.65) than in the SMD tier (4.27). While not as large, a substantial difference remains if we exclude Armenia, Russia, and Ukraine's figures, whose large number of independents, as noted above, create problems for the computation of N_v in the SMD tier: N_v in the PR tier then becomes 5.10–4.27 for N_v in the SMD tier. Germany (1953), Hungary, and Bolivia went against the expected pattern and had more significant electoral parties compete at the national level in their SMD tier than their PR tier. Hungary's deviation may be attributed to institutional causes that we discuss below with our examination of the constraining effects on the number of candidates. The Bolivian case is harder to explain but may be due to specific institutional arrangements, most notably its parliamentarized presidency that closely ties parliamentary parties to presidential candidates (Mayorga, 1997). Germany's first election under its current mixed system saw constituency agreements among allied parties not to run candidates against one another. The 1953 election was the only federal election in which the CDU/CSU won fewer SMD votes than PR. Jesse (1988, pp. 111–112) attributes this lack of strategic defection to the CDU/CSU to the fact that the party had constituency agreements with its smaller allies not to run candidates in 21 constituencies in which these parties fielded candidates. Constituency agreements lasted one more election (1957) but by 1961, there were no more such agreements and the three main parties (CDU/CSU, SPD, and FDP) ran candidates in every district. Not surprising, since 1961, only very rarely (and only recently) has any party other than the CDU/CSU and SPD won SMDs.

[13] We also run a similar model for the national level (N_v PR–N_v SMD).

than PR parties. We expect all of the above explanatory variables to have positive coefficients.[14] Results are shown in Table 3.

All of the coefficients in the district level model are in the expected direction and significant (supporting Hypothesis 4).[15] In short, the psychological effect in SMD races appears more powerful in systems that do not offer a compensation linkage between the SMD and PR tiers, systems with a high ratio of SMD to PR seats, and systems that use a plurality electoral formula.

6.3. District level constraining effects on the number of candidates

Next, we consider the impact of various mixed system institutional features on local bipartism at the district level in the SMD tier. To what extent do mixed system features alter the constraining effects of SMDs? How does party system institutionalization mitigate these effects? In this instance we expect:

Hypothesis 5. *There will be a smaller effective number of candidates at the district level in systems with unlinked tiers, a high ratio of SMD to PR seats, plurality (as opposed to majority) SMD electoral formula, and an institutionalized party system.*

The only cases of very substantial candidate proliferation ($N_{cands} > 5$) in the SMD tier are Hungary and Lithuania and the non-institutionalized Russian and Ukrainian cases. Hungary and Lithuania have institutional reasons for candidate proliferation in the SMD tier in their use of two-round majoritarian systems rather than plurality systems. There is much less incentive for parties to withdraw their candidates in the first round or voters to defect from their first preference in these systems, especially in Hungary where wasted votes are pooled at the national level for compensatory seats. However, the number of candidates has decreased over time in Hungary, as voters and elites have grown more accustomed to the system.

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[14] We do not examine party institutionalization as an independent variable in this analysis although it most probably has an impact. Analyzing party vote proportions in each tier (at the SMD level) in mixed systems, Moser and Scheiner (2000) find evidence that party institutionalization played a substantial role in shaping strategic voting. However, unlike our N_{cands} model above, it makes little sense to include Institutionalization in our analysis here, because the level of party institutionalization affects the effective number of parties not only in SMDs, but in PR as well. The correlation between the effective number of electoral parties and institutionalization is stronger than −0.60 for N_v (PR and SMD national level), N_{cands} (SMD level), and $N_{parties}$ (SMD level). Therefore, while party institutionalization is clearly having an effect, it is one that will scarcely be picked up in an analysis of a dependent variable that is calculated by subtracting N (SMD) from N (PR). This is borne out in alternative OLS models, we ran with level of institutionalization as an independent variable. Not only was the institutionalization independent variable non-significant, but the sign on the coefficient was negative (the opposite of what would be expected). Moreover, in the district level model, the R-squared was unchanged from that seen in the model that did *not* include the institutionalization independent variable.

[15] In the national level model, all coefficients' signs are in the expected direction and only plurality is non-significant. We should add that we also re-ran both models with attention to the outlier and fixed effects issues we considered in the N_{cands} model, but eliminating outliers and examining only the last election for each country had only a negligible effect on the results.

Table 3
Psychological effect (PR–SMD effective number of candidates/parties)

	District level (Mean)	National level
	$N_{parties}$ (PR voting)$-N_{cands}$ (SMD voting)	N_v (PR)$-N_v$ (SMD)
Constant	−3.522**	−1.518
	(1.294)	(1.026)
Unlinked	0.886*	1.214*
	(0.447)	(0.685)
SMD/PR	1.365***	1.009*
	(0.322)	(0.504)
Plurality	2.316**	1.348
	(0.920)	(0.828)
N	15	24
F	6.19	3.18
Prob > F	0.010	0.046
R^2	0.628	0.323
Adj. R^2	0.527	0.222

OLS coefficients with standard errors in parentheses.
  * $p < 0.05$ (one-tail).
  ** $p < 0.05$ (two-tail).
  *** $p < 0.01$ (two-tail).

As non-institutionalized party systems, the high N_{cands} figures cannot be too surprising in the Russian and Ukrainian cases.

Table 4 provides the mean effective number of candidates at the district level (N_{cands}), broken down by each of the categories. N_{cands} is lower in systems with a high SMD/PR ratio, plurality systems, and cases where the party system is more institutionalized and more elections have been held under the system. Unlinked systems have more candidates than linked systems do, but this result, is due to the negative correlation (−0.61) between unlinked and (party) institutionalization. As

Table 4
Relationship between system characteristics and N_{cands} (effective number of candidates at the SMD level)

	N_{cands} mean	N
SMD/PR > 1	3.45	12
SMD/PR ≤ 1	4.90	10
Plurality	3.93	17
Majority	4.72	5
Unlinked	4.50	10
Linked	3.79	12
Institutionalized	3.68	17
Non-Institutionalized	5.57	5
Correlation between number of elections and N_{cands}	−0.16	

Table 5

N_{cands}, by linkage and level of institutionalization (number of cases in parentheses)

	Unlinked	Linked
Non-institutionalized	5.57 (5)	0 (0)
Institutionalized	3.42 (5)	3.79 (12)

Table 5 indicates, many unlinked cases have non-institutionalized party systems while all linked cases have institutionalized party systems. However, when comparing unlinked to linked cases within classes of party institutionalization, the mean for N_{cands} is lower in our unlinked cases. This interactive effect of unlinked systems and party institutionalization provides a clear example of how both institutional rules and political context need to be considered when examining the impact of electoral systems on party systems.

Running OLS on N_{cands}, we provide a more systematic analysis using the following five explanatory variables: (1) *institutionalized*, which indicates the level of institutionalization of the party system (coded 0 for non-institutionalized systems and 1 for institutionalized systems);[16] (2) *unlinked*, coded 0 for systems with any sort of compensation votes or seats and 1 for fully unlinked systems;[17] (3) *SMD/PR*, the ratio of SMD to PR seats; and (4) *plurality*, coded 1 for plurality systems and 0 for majority systems. We also added a fifth variable to control for electoral experience: *number of elections*, the number of elections held under the mixed system under analysis (e.g., for Germany, number of elections is equal to 1 in 1953 and 13 in 1998).

The coefficients should be negative, as each variable is expected to constrain the effective number of candidates. We expect a positive and fairly large constant, as it approximates the outcome for non-institutionalized, majority, linked systems, with few elections and a low SMD/PR ratio. The relatively small number of cases and the fairly high correlation between the explanatory variables make it unlikely that the variables will turn up significant, but by examining the direction of the coefficients, we can evaluate the tendencies associated with each variable.

Table 6 lists the results. In a first cut (first column of results), all coefficients are in the expected direction and the constant, institutionalized and SMD/PR are statistically significant. We also suspected that the institutional variables may have different effects depending on the country's level of party institutionalization, and re-ran

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[16] Again, as noted above, our results remain very similar even when using a measure of institutionalization that distinguishes between levels of institutionalization within our "institutionalized" category.

[17] A case could certainly be made for creating greater nuance within this variable. For example, it might be argued that the vote-adjustments (*scorporo*) in the Italian system represent only a partial linkage when compared to the seat-based one of Germany. However, depending on the total number of votes cast, it is possible to conceive of situations in Italy where a second-place candidate receives a large number of votes and the first place party therefore loses the equivalent of *more* than one seat worth of votes. Such a situation would suggest much more than partial linkage. Given the potential variability in impact, it would be difficult to formulate a consistent measure that takes into account such nuance. For this reason, we maintain the dichotomous coding: linked or unlinked.

Table 6
Correlates of N_{cands} (the effective number of candidates at the district level)

	Simple model	Interaction model
Constant	7.595*** (0.891)	5.265*** (0.535)
Institutionalized	−1.954*** (0.632)	−1.960*** (0.546)
Number of elections	−0.104 (0.089)	−0.087 (0.0077)
Unlinked	−0.477 (0.536)	−0.424 (0.463)
SMD/PR	−0.746 (0.316)**	−0.634 (0.276)**
Plurality	−0.702 (.506)	−0.721 (0.437)
Plurality*Instit		−2.763** (1.085)
N	22	22
F	4.73	6.37
Prob > F	0.008	0.002
R^2	0.597	0.718
Adj. R^2	0.470	0.606

Entries are OLS coefficients with standard errors in parentheses.

* $p < 0.01$ (one-tail).
** $p < 0.05$ (two-tail).
*** $p < 0.01$ (two-tail).

the models using interaction terms between level of party institutionalization and the variable in question.[18] This interaction term had no effect for unlinked and SMD/PR, but drew out the impact of plurality more fully, as the plurality/institutionalization interaction term is statistically significant, indicating that the constraining effect of plurality systems is more likely realized in institutionalized party systems.[19]

In short, systems with a large number of SMD seats, plurality formulae, and institutionalized party systems appear to offer particularly strong constraints on effective number of candidates at the district level and these constraints seem greater as well in systems with unlinked tiers and greater number of years of experience under the mixed system (supporting Hypothesis 5).

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[18] We employ the mean-difference or "centering" method of adjusting the interaction variables to give the variables greater substantive meaning and reduce statistical multicollinearity (Hamilton, 1998).

[19] Using Cook's D, we re-ran the models with outliers eliminated. Also, while the different number of cases per country do not allow us to run standard fixed effects models to isolate the time-series impact, we re-ran the models only looking at the last election for which we have data for each case. Even taking into account in these ways the potential impact of outliers and potential fixed effects, the results essentially stay the same. Because of the reduction in the sample sizes, the levels of significance drop, but the signs on the coefficients do not change.

6.4. District projection to the national level

Finally, we investigate the degree to which district level effects are projected to the national level. The coexistence of a PR tier promises to complicate this process and thus we hypothesize that:

Hypothesis 6. *There will be a higher effective number of SMD parties at the national level than at the district level.*

Local ''bipartism'' typically has not been projected fully to the national level in our mixed system cases: in most cases, the effective number of SMD parties at the national level was substantially greater than at the district level. This may be due to the diluting effect of the PR tier, which undermines the nationalization of bipartism by lowering the threshold of representation, thus sustaining the viability of minor parties, which might not exist in a purely SMD system. This influence of the PR tier is felt at the national level (as well as the district level) because the minor parties promoted by PR are likely often to have regionally concentrated followings. This means that not only are there more parties contesting SMD elections than there would be in a pure SMD system; but also that these parties differ from district to district, further promoting party fragmentation at the national level. Therefore, one would expect a greater effective number of electoral parties at the national level in the SMD tier (N_v SMD) than effective candidates (N_{cands}) in each district.

We do find exceptions. Armenia, Russia and Ukraine fall outside of expectations, most likely because of the artificially low estimates of the measure that we derive because of our decision to aggregate the votes of all independents. In Italy (1994), N_v (SMD) is also smaller than N_{cands}. The reason for this is no doubt simply that the alliance system that Italian electoral rules promote led to an instant projection of near bipartism from the district to the national level.[20] Finally, in Hungary, there is very little difference between N_{cands} and N_v (SMD), due to the low number of independent candidates and dominance of several large parties, which has kept very high the number of candidates at the district level. Two of the three Hungarian elections studied followed the expected pattern of N_{cands} being slightly smaller than N_v (SMD), but in the 1994 election N_{cands} was slightly larger than N_v (SMD). On the whole, though, N_v (SMD) was greater than N_{cands}, with an average difference of 0.73 for the non-Armenia–Russia–Ukraine cases (and the mean N_v (SMD) is greater than the mean N_{cands} even when we include those three countries). Thus, we find considerable support for Hypothesis 6.

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[20] The Northern League's departure from the conservative alliance in 1996 no doubt helped increase N_v relative to N_{cands} in that election, but the effect of alliances was still large, as N_v minus N_{cands} remained quite small.

7. Conclusions

We close by briefly summing up our main findings. First, our study highlights the degree to which PR and SMD electoral systems work as expected even when they are combined in a mixed system. Mixed systems are usually adopted with the hope that the advantages of both PR and SMD electoral arrangements can be enjoyed in a ''best of both worlds'' scenario (Shugart and Wattenberg, 2001). Scholars emphasizing the contamination effects of a mixed system suggest that this expectation is misplaced because the interaction of PR and SMD rules mutates the effects of each part of the system. Our study lends credence to the position that to a great extent mixed systems maintain the independent effects of PR and SMD tiers in countries with established party systems.

Second, while many have assumed that mixed system-specific rules (such as linkage mechanisms and the SMD/PR ratio) play an important role in shaping behavior in mixed systems, our study empirically demonstrates the impact of such rules. We find that the ratio of SMD to PR seats and linkage arrangements (as well as plurality electoral arrangements in SMDs) play a particularly critical role in strengthening the constraining effects of the SMD tier at the district level, which also leads to differences in party success between the SMD and PR tiers.

Third, we find that projection of district bipartism to the national SMD level is not perfect in mixed systems. While our findings in other areas downplay the importance of contamination effects, we argue that contamination from the PR tier can help explain why the effective number of SMD parties at the national level tends to be greater than the effective number of candidates at the district level. By promoting the viability of smaller parties with geographically concentrated followings, the PR tier tends to undermine the projection of district level effects of the SMD tier to the national level. This finding complements and extends the scholarship emphasizing contamination effects within mixed systems. Perhaps, some of the contamination effects found in other studies of mixed systems are due to the impact of PR on projection rather than its influence on district level dynamics in SMD races.[21] This less emphasized aspect of the interaction between SMD and PR tiers in mixed systems deserves greater investigation.

Finally, and most important, our findings highlight the importance of political context, in particular the role of party institutionalization, in mitigating the impact of political institutions. The most striking differences found among mixed systems were the result of the degree of party institutionalization rather than institutional variations. Post-communist states lacking well developed parties con-

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[21] Herron and Nishikawa (2001), however, demonstrate district level contamination using district level data for Russia and Japan. Clearly, both some measure of district level contamination and projection are at work.

Table A1
Raw totals for each case[a]

Country/election	N_v overall	N_s overall	N_v PR	N_s PR	N_v SMD	N_s SMD	N_{cands} SMD (SMD votes)	$N_{parties}$ SMD (PR votes)	LSq whole	LSq PR	LSq SMD
Germany 1953	3.34	2.78	3.31	N/A	3.38	1.83	UN	UN	4.77	N/A	21.66
Germany 1957	2.77	2.39	2.78	N/A	2.75	1.53	UN	UN	4.78	N/A	22.91
Germany 1998	3.06	2.90	3.31	N/A	2.82	1.87	2.71	3.18	2.76	N/A	16.06
Italy 1994[b]	2.97	2.19	7.54	N/A	2.89	1.91	3.04	5.88	11.61	N/A	16.39
Italy 1996[b]	2.66	2.39	7.15	N/A	2.66	2.29	2.43	5.80	5.13	N/A	8.35
Japan 1996	4.10	2.94	4.28	3.84	3.86	2.36	2.95	4.00	10.80	3.19	15.95
Japan 2000	4.58	3.18	5.16	4.72	3.82	2.39	2.94	4.80	11.50	2.36	15.60
New Zealand 1996	4.25	3.76	4.39	N/A	4.10	2.62	3.29	4.03	3.42	N/A	13.19
New Zealand 1999	3.79	3.45	3.93	N/A	3.65	2.07	3.11	3.71	3.20	N/A	15.52
Scotland 1999	3.96	3.34	4.34	N/A	3.60	1.77	3.09	3.10	5.64	N/A	29.65
Wales 1999	3.77	3.08	3.80	N/A	3.73	2.04	3.19	UN	6.60	N/A	22.16
Croatia 1995	3.63	2.52	3.78	2.90	3.39	1.70	2.67	UN	10.43	6.43	23.62
Hungary 1990	7.00	3.79	6.71	4.31[c]	6.00	2.03	5.97	UN	13.74	9.34	31.88
Hungary 1994	5.75	2.90	5.49	3.73[c]	5.60	1.35	5.64	UN	16.21	8.53	40.89
Hungary 1998[d]	4.76	4.17	4.35	3.13[c]	5.00	3.57	4.82	UN	9.12	14.00	20.56
Lithuania 1996	7.87	3.40	7.94	3.16	7.75	3.21	5.59	7.24	15.76	16.34	20.37
Macedonia 1998[e]	4.15	2.76	5.04	4.00	4.42	2.58	2.94	3.62	12.13	5.65	16.78
Venezuela 1998	5.88	5.88	7.69	6.00	5.26	4.55	3.52[f]	UN	2.57	4.81	4.59
Armenia 1998	5.56	3.85	4.61	3.13	4.00[g]	3.03[g]	4.21	UN	10.56	8.45	11.72
Bolivia 1997	6.17	5.36	5.93	N/A	6.38	5.63	4.65	4.42	4.11	N/A	6.64
Russia 1993	7.14	8.16	7.58	6.40	3.23[g]	2.55[g]	5.48	6.60	4.60	4.94	4.27
Russia 1995	10.00	5.71	10.68	3.32	6.10[g]	5.03[g]	6.61	9.46	14.14	20.56	11.09
Russia 1999	7.94	7.63	6.76	5.65	4.26[g]	3.31[g]	5.57	5.60	5.87	6.84	6.85
Ukraine 1998	7.14	5.88	9.01	4.95	3.85[g]	3.33[g]	5.99	6.36	5.30	10.68	4.34
Means	5.09	3.93	5.65	4.23	4.27	2.69	4.11	5.19	8.11	8.72	16.71

N/A, not applicable. As noted in an earlier footnote, in the linked systems, the PR tier's effective number of parliamentary parties (N_s) and the level of disproportionality are fairly nonsensical. Because of the use of compensation seats, parties that won a large proportion of the PR vote will win very few seats in the PR tier if they won a large number of SMDs. For this reason, we do not report the effective number of parliamentary parties and the level of disproportionality for linked systems.

UN, unavailable—the data for the variable were not available to the authors at the time of writing.

[a] Calculations are based on the following sources: Germany—Barnes et al. (1962) and available at http://www.statistik-bund.de/wahlen/ergeb98/d/t/bun999_02.htm. Japan—Seiji Handobokku (1997), Seiji Handobokku (2000) and data shared by Karen Cox and Steven Reed. Italy—Data shared by Alessandro Chiaramonte. New Zealand—elections website: www.election.govt.nz. Russia—Foreign Broadcasting Information Service (1993), Central Electoral

Commission of the Russian Federation, "Rezul'taty golosovaniya na vyborakh v Gosudarstvennuyu Dumu po odnomandatnym izbiratel'nym okrugam," (results of voting on elections to the State Duma in single-member voting districts), Unpublished report, Moscow: Central Election Commission, 1994, Colton (1998), Rossiiskaya Gazeta (1996a), Rossiiskaya Gazeta (1996b); Hungary—Benoit (1999). Dataset available at http://data.fas.harvard.edu/staff/ken_benoit. Lithuania—Lithuanian Seim, "Lietuvos Respublikos Seimo rinkimo '96," available at http://rc.lrs.lt/rinkimai/seim96/, 1996. Croatia—elections website: http://www.sabor.hr/izbori/rezultat/finezl.

[b] In Italy, because there was rarely competition between sub-alliance groups, we treat each *alliance* as a single, autonomous party in our SMD computations.

[c] Based on the territorial PR tier.

[d] In the 1998 Hungarian election, the MDF and Fidesz parties ran joint candidates in the SMD tier as well as their own (non-joint) candidates. Joint candidates belonged to one or the other party and were thus counted among that party's candidates during calculation of vote and seat shares.

[e] In Macedonia, because alliances dominated competition in SMDs, we treat each alliance as a single, autonomous party in our SMD computations. When parties were part of more than one alliance votes were aggregated in the largest (most inclusive) alliance.

[f] Venezuela also includes a number of seats that are won through multi-member districting. We exclude those.

[g] Armenia, Russia, and Ukraine cause problems for N_v SMD and N_s SMD because of the huge number independent candidates they hold. Independents were treated as a single residual category, which artificially reduces the effective number of parties measure since independents did not behave as a single group. Alternative measures using parliamentary factions formed after the election or treating each independent as a different "party" produces much higher measures.

sistently defied expectations and ran counter to the patterns found in countries with more institutionalized parties. Indeed, one could not ascertain the constraining effects of unlinked systems in our study without controlling for the level of party institutionalization. Most important, these countries experienced a proliferation of candidates in their plurality tiers. The fact that SMD contests in countries with more established parties constrained the number of electoral competitors at the district level to a much greater degree suggests that contagion from the combination of PR and SMD rules was not the primary cause for the fragmentation experienced in post-communist states like Russia and Ukraine. This conclusion may be generalized to all electoral systems since we might expect pure SMD systems to produce similarly fragmented electoral competition in a context of inchoate parties.

Appendix A

See Table A1.

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