Rehabilitating Duverger's Theory

Testing the Mechanical and Strategic Modifying Effects of Electoral Laws

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Although Duverger is traditionally seen as synonymous with the institutionalist approach to party systems, this article shows that he believed social pressures were the driving force behind the multiplication of parties. Electoral institutions are important, but only because they determine the extent to which social forces are translated into political parties. Although the literature has finally come to realize that social and institutional forces interact to shape party systems, scholars still do not seem to fully understood the implications of Duverger's theory. This article shows that existing research employs flawed statistical specifications, makes inferential errors, and does not calculate desired quantities of interest. Using a new data set that includes elections since 1946, the authors reexamine Duverger's theory and find that modern tests largely bear out his expectations when properly specified and interpreted. This analysis also extends current research by specifically estimating the mechanical and strategic modifying effects of electoral institutions.

Keywords: *Duverger; social heterogeneity; party systems; electoral institutions*

The literature addressing the number of political parties in a polity is one of the richest in comparative politics (Cox, 1997; Duverger, 1954/1963; Lijphart, 1994; Lipset & Rokkan, 1967; Riker, 1982). Both institutional and sociological branches of this literature have a pedigreed history. Recently, scholars have attempted to combine these approaches into a coherent explanation of party system development by arguing that sociological and institutional factors have some sort of interactive effect on the number of parties

(Amorim Neto & Cox, 1997; Filippov, Ordeshook, & Shvetsova, 1999; Jones, 1994; Mozaffar, Scarritt, & Galaich, 2003; Ordeshook & Shvetsova, 1994). However, other than arguing that there is an interaction effect, these scholars fail to provide a clear exposition of the underlying causal process by which sociological and institutional factors interact to shape party systems. Moreover, they employ flawed statistical specifications, make inferential errors, and do not calculate desired quantities of interest. In this article, we argue that Maurice Duverger (1952, 1954/1963), the father of the so-called institutionalist approach, clearly articulated the way in which social and institutional variables interact a half century ago. We also show that modern tests largely bear out his expectations when properly specified and interpreted.

Rehabilitating Duverger's Theory

The notion that Duverger proposed a pure institutionalist explanation for the number of parties has hindered progress toward a clear understanding of the determinants of party system size.[1] To some extent, the appeal of a pure institutional approach reflects the desire on the part of political scientists to unearth unconditional empirical regularities. Why do some polities have two parties and some have many? Duverger's law and Duverger's hypothesis were thought to provide an answer to this question (Riker, 1982). It is perhaps the fascination with the promise of well-corroborated empirical regularities that has led generations of scholars, with the notable exception of Powell (1982, p. 83), to overlook what we refer to as Duverger's theory of the number of parties. Duverger (1954/1963) lays out the basic tenets of his theory when he claims that

1. In this article, we focus on the effective, rather than the actual, number of parties in the legislature and electorate. We do this for three reasons. First, Duverger (1954/1963, pp. 207-208) clearly had the concept of effective parties in mind when discussing party systems. Second, the substantive interest of most political scientists will naturally be with those "effective" parties that can influence policy and voting. Finally, from a practical standpoint, it is not possible to find the actual number of parties competing in many countries even if we wanted to.

the influence of ballot systems could be compared to that of a brake or an accelerator. The multiplication of parties, which arises as a result of other factors, is facilitated by one type of electoral system and hindered by another. Ballot procedure, however, has no real driving power. The most decisive influences in this respect are aspects of the life of the nation such as ideologies and particularly the socio-economic structure. (p. 205)

Thus far from taking social structure as "more or less a residual error, something that might perturb a party system away from its central tendency defined by the electoral law," as Amorim Neto and Cox (1997, p. 151) claim in their much-cited analysis of party systems, Duverger clearly believes that social forces were the driving force behind the multiplication of parties. Duverger sees political parties as a reflection of social forces or what he calls "spiritual families." In his view, these families are made up of individuals with a set of socially determined common interests. As social developments (primarily industrialization and the expansion of the franchise) increase the number of politically mobilized spiritual families, Duverger claims that the number of parties increase as well. We do not mean to suggest that electoral laws do not play an important role for Duverger; they obviously do, but only because they determine "the presence or absence of 'brakes' upon the tendency [for parties] to multiply" (Duverger, 1952, p. 1071). In other words, electoral institutions modify the effect of social forces on the creation of political parties. Social forces create more or less pressure for the multiplication of political parties and electoral laws either permit these pressures to be realized or they constrain them by discouraging the formation of new parties.

Duverger argues that single-member district plurality rule elections discourage the formation of more than two parties, no matter whether social forces encourage a large number of parties or not. In contrast, he observes that such a brake on the formation of parties is absent (or weaker) in more permissive electoral systems. As a result, multiparty systems are free to form in permissive systems so long as social factors warrant them. It follows that Duverger's (1954/1963) famous observation that "the simple majority [by which he means plurality] single ballot encourages the two-party system; on the contrary both the simple-majority system with second ballot and proportional representation favour multipartism" (p. 239) is *not* his explanation for the number of parties but instead, a set of empirical implications that are deducible from his theory. It is precisely the failure to recognize this point that led Duverger to be labeled as a pure institutionalist and that encouraged almost 40 years of institutional analyses of party systems that largely ignore sociological factors.

Although Duverger's theory generates a clear expectation that the number of parties will be small when the electoral system is not permissive, the

number of parties in more proportional electoral systems will depend on the presence or absence of social pressures. This means that absent any knowledge concerning the social pressure for the multiplication of parties, it is not possible to predict whether multiple parties will actually form in permissive electoral systems. Consequently, unconditional comparative static predictions about the effect of electoral laws on the number of parties are necessarily indeterminate if Duverger's theory is correct. This difference in the degree of determinism used by Duverger in describing his expectations about the number of parties under alternative electoral rules is noticed by Riker (1982) in his magisterial history of "Duverger's Law." However, the fact that Riker laments the less precise prediction of what he terms "Duverger's Hypothesis" suggests that he himself failed to recognize that the difference in the degree of determinism in proportional electoral systems necessarily follows from the conditional nature of Duverger's theory.[2] It is for this reason that we believe attempts to pit "institutional" and "sociological" approaches against each other are theoretically regressive. Indeed, we believe that attempts to gauge the unconditional effect of electoral laws on the number of parties are also theoretically regressive because the so-called institutionalist approach does not produce clear expectations about such a quantity; everything depends on the presence or absence of social forces.

Duverger's theory is straightforward and implies that the number of parties should be an increasing function of the number of politically salient spiritual families in a polity and that this relationship between social structure and the party system should be closer when electoral laws are permissive compared to when they are not. Thus the main quantity of interest required to evaluate Duverger's theory is the marginal effect of social pressures on the number of parties at different levels of electoral system permissiveness.

The Modifying Effect of Electoral Institutions

According to Duverger's theory, social cleavages represent "natural constituencies" that generate particular policy demands. Political parties are seen as organizations that form to represent these demands and electoral institutions are treated as intervening factors determining the extent to which existing social cleavages are translated into political parties. In other words, electoral laws act as a filter linking social cleavages to the number of parties.[3]

2. Cox (1997, p. 123) makes the same mistake when he too laments that Duverger made no specific claim regarding the equilibrium number of parties in permissive electoral systems.
3. This framework is often criticized for ignoring the fact that social heterogeneity may actually influence the choice of electoral rules. However, the common objection that highly heterogeneous societies tend to choose proportional electoral systems does not constitute an endogeneity

Electoral institutions determine how accurately party systems reflect existing social cleavages through the strategic incentives that they create for both elites and voters. For example, it is well known that small district magnitudes grant considerable electoral advantages to large parties. This is illustrated quite clearly in Britain where the Labor and Conservative parties are typically awarded a much larger share of seats than the share of votes they receive. It is the existence of this "mechanical effect" that creates incentives for strategic voting on the part of voters and for strategic entry or withdrawal on the part of political entrepreneurs (Cox, 1997; Duverger, 1954/1963). Members of socioeconomic groups represented by small parties are more likely to vote strategically if they find themselves in single-member district electoral systems than if they vote in multimember districts. In contrast, the benefits of strategic voting are unlikely to loom as large in highly proportional systems, such as those in Israel or the Netherlands. In a similar manner, political entrepreneurs will be more willing to form new parties to take advantage of unrepresented constituencies in permissive electoral systems. In less permissive systems, these entrepreneurs are more likely to prefer seeking elected position by running within an existing party.

These strategic considerations indicate that electoral institutions modify the relationship between socioeconomic cleavages and the number of parties. In particular, this framework indicates that there are two reasons why a country might have a small number of parties. First, it could be the case that the demand for parties is low because there are few social cleavages. In this situation, there would be few parties whether the electoral institutions were permissive or not. Second, it could be the case that the electoral system is not permissive. In this situation, there would be a small number of parties even if the demand for political parties were high. Only a polity characterized by both a high degree of social heterogeneity and a highly permissive electoral system is expected to produce a large number of parties. This line of reasoning generates the following hypothesis:

> *Hypothesis 1:* Social heterogeneity increases the number of parties, but only when electoral institutions are sufficiently permissive.[4]

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problem because social heterogeneity and electoral institutions are both predictor variables in this theoretical framework. We recognize that an endogeneity issue may still exist if one believes that the number of parties determines the choice of electoral laws or the degree of social heterogeneity. Our response to this is that electoral institutions and social heterogeneity are both typically quite sticky (at least in the short run) and that they can therefore be treated as exogenously determined.

4. One might restate this hypothesis to claim that electoral institutions influence the number of parties only when there is a high level of social heterogeneity. However, this restatement is

This hypothesis can be tested using the following interaction model:

$$Parties = \beta_0 + \beta_1 Social + \beta_2 Institution + \beta_3 Social \times Institution + \in, \qquad (1)$$

where *Parties* is a measure of the number of parties, *Social* is a measure of social heterogeneity, and *Institution* is some measure of electoral system permissiveness.

The marginal effect of social heterogeneity on the number of parties is

$$\frac{\partial \, Parties}{\partial \, Social} = \beta_1 + \beta_3 \, Institution.$$

The claim that greater social heterogeneity should increase the number of parties when electoral institutions are permissive indicates that this effect should be positive and significant when *Institution* is sufficiently high or permissive. β_3 should be positive because the marginal effect of social heterogeneity is expected to be increasing as electoral institutions become more permissive. Finally, β_1 should be 0 because social heterogeneity is expected to have no effect on the number of parties when electoral institutions are not permissive (*Institution* = 0). This simple interaction model and set of predictions underlies all of the models that appear in subsequent sections.

Previous Statistical Analyses

Recently, several scholars have attempted to examine how electoral institutions and social heterogeneity interact to determine the number of parties using interaction models similar to that shown above (Amorim Neto & Cox, 1997; Filippov et al., 1999; Jones, 1994; Mozaffar et al., 2003; Ordeshook & Shvetsova, 1994). These analyses are to be welcomed on the grounds that they are long overdue. Unfortunately, we show that none of these studies actually calculate the quantity of interest necessary to evaluate Duverger's theory (i.e., the marginal effect of social heterogeneity *when electoral institutions are permissive*). Moreover, they often employ statistical models that are both incorrectly specified and interpreted (Brambor, Clark, & Golder, in press).

The primary goal of existing studies has been to show that interactive models similar to that outlined in Equation 1 are superior to either a pure institutional or pure sociological model. To this end, they have focused heavily on whether the coefficient on the interaction term is significant and

misleading because Duverger clearly indicates that social heterogeneity is the primary determinant of party system size and that electoral rules play the modifying role.

whether the interactive model has a higher (adjusted) R^2 than either of the pure models. However, Duverger's theory is not just that there is some interaction between institutional and sociological factors. It is much more concrete than that—social heterogeneity should increase the number of parties only when the electoral system is sufficiently permissive.

Although it will come as a surprise to many, none of the existing studies we cite above show whether social heterogeneity significantly increases the number of parties when the electoral system is permissive. Although it is possible for the reader to calculate the marginal effect of social heterogeneity in permissive systems ($\beta_1 + \beta_3 Institution$) with a little algebraic manipulation using the table of results in these articles, it is not possible to determine whether these effects are significant without access to the variance-covariance matrix. This is because the standard error for the marginal effect of social heterogeneity is

$$\hat{\sigma}_{\frac{\partial\, Partial}{\partial\, Social}} = \sqrt{\mathrm{var}(\hat{\beta}_1) + \mathrm{var}(\hat{\beta}_3)Institution^2 + 2 \times Institution \times \mathrm{cov}(\hat{\beta}_1, \hat{\beta}_3)}\,. \quad (2)$$

The reader cannot calculate this standard error when *Institution* is greater than 0 without the covariance term. None of the existing studies provide the reader with this term. As a result, it is impossible to evaluate Duverger's claim that social heterogeneity leads to significantly more parties when electoral institutions are permissive based on the evidence presented in the literature. The recent studies also fail to provide other quantities of substantive interest, such as the magnitude of the effect of social heterogeneity under different electoral rules or estimates of the mechanical and strategic effects of electoral institutions. These are all quantities that we report in this article.

Another problem with existing studies is that they employ interaction models that are misspecified. For example, all constitutive terms should be included in multiplicative interaction models except in extremely rare circumstances (Brambor et al., in press).[5] This is because all of the parameters of interest will be estimated with bias if the coefficient on any omitted term is not precisely 0.[6] Despite these potentially dire consequences, all of the articles we cite above present results from models where at least one constitutive term is omitted; many show results where multiple terms are omitted. For example, the preferred interaction models of Ordeshook and Shvetsova (1994, p. 114) and Amorim Neto and Cox (1997, p. 165) both omit the con-

5. Constitutive terms are those elements that constitute the interaction term. Thus the constitutive terms in Equation 1 are *Social* and *Institution*.

6. Technically, bias will result unless the coefficient on the omitted term is 0 or if the coefficients from a regression of the omitted variable on the other variables are all 0.

stitutive terms *Social* and *Institution*. We are certainly not suggesting that all of the results presented in these analyses are necessarily wrong. However, we do believe that there is a potential for bias and that as a result, incorrect inferences may have been drawn.

Finally, several scholars incorrectly interpret the results from their interaction models. In particular, it is common for authors to interpret the coefficients on constitutive terms as unconditional marginal effects just as they would if the coefficients came from a linear-additive model. This is clearly wrong. For example, Mozaffar et al. (2003, p. 387) claim that electoral institutions such as district magnitude reduce the number of parties because their coefficient on *Institution* (β_2) is negative and significant. Like many others, they forget that this coefficient indicates the marginal effect of electoral system permissiveness only when social heterogeneity is 0. This is easy to see once one remembers that the marginal effect of electoral system permissiveness is

$$\frac{\partial\, Parties}{\partial\, Institution} = \beta_2 + \beta_3\, Social.$$

Note that not only is their interpretation incorrect but also this particular coefficient (β_2) is substantively meaningless because social heterogeneity is never 0 in the real world.

It should be pointed out that our criticisms of the existing literature are not minor econometric quibbles with little substantive import. For example, a reanalysis of the examination of African party systems by Mozaffar et al. (2003) illustrates that almost none of their substantive conclusions regarding the effect of electoral institutions, presidential elections, and ethnic heterogeneity are supported by the data once their model is fully specified and correctly interpreted (Brambor et al., in press). Given the econometric problems with the existing literature and the absence of the required quantities of interest necessary to evaluate Duverger's theory, it is worthwhile reexamining the sociological and institutional determinants of party system size. We build on the existing literature by using a reanalysis of Amorim Neto and Cox (1997) as a benchmark against which to compare the additional information supplied by our investigation.

The Mechanical Modifying Effect of Electoral Laws

The effect of electoral institutions on the number of parties can most clearly be seen in the way in which they influence the translation of votes into seats. Because electoral rules reduce the number of parties irrespective of the way in which votes are determined, their effect is often referred to as mechanical. This section focuses on this mechanical effect and examines those features of electoral systems that might influence how accurately the number of electoral parties is translated into legislative parties.[7] The mechanical effect of electoral institutions is important because it is precisely this effect that induces strategic behavior on the part of voters and elites in Duverger's theory. We turn to the strategic effect of electoral rules in the next section.

It is clear that the number of legislative parties would be identical to the number of electoral parties if the electoral system were characterized by pure proportionality. However, the most cursory examination of electoral systems throughout the world indicates that such a system does not exist. Even in the world's most proportional systems, it is possible for a party to obtain a significant number of votes without winning a seat. Thus the number of legislative parties will always be smaller than the number of parties among the electorate. The extent to which the number of electoral parties is perfectly translated into the number of legislative parties should depend on several features of the electoral system, such as the average district magnitude and the use of upper tier seats.[8]

In single-member districts, only one of the parties actually winning electoral support can obtain a seat. Consequently, it is possible that a party could

7. Analyses of party systems that examine the effect of social heterogeneity and electoral institutions on the number of legislative parties directly do not allow us to distinguish between the mechanical and strategic effects of electoral rules (Jones, 1994; Mozaffar, Scarritt, & Galaich, 2003). Moreover, they ignore the fact that social heterogeneity can theoretically have an effect on the number of electoral parties only—social forces cannot influence the way votes are translated into seats. Analyses that examine only the effect of electoral rules and social heterogeneity on the number of electoral parties allow us to measure the strategic effect of electoral rules but not the mechanical effect (Filippov, Ordeshook, & Shvetsova, 1999; Mozaffar et al., 2003; Ordeshook & Shvetsova, 1994). The only way to gauge the mechanical effect is to specifically examine how electoral institutions modify the way electoral parties are translated into legislative parties.

8. It should also depend on the threshold of votes that must be overcome before a party can obtain a seat. However, including electoral thresholds in any statistical analysis is problematic because they are hard to compare cross-nationally. For example, some thresholds are implemented in the electoral constituency, whereas others are enforced at the regional or national level; some thresholds even depend on the actual election outcome.

receive a sizeable share of votes in every district in the country but not win a plurality of votes in any one constituency. In this extreme case, the number of parties receiving votes would clearly be larger than the number of parties awarded seats. However, an identical distribution of votes across multi-member districts employing a proportional representation formula can be expected to yield a considerable number of seats for parties that would not win a plurality in any single-member district. This means that more electoral parties can actually win seats and obtain representation in the legislature as the district magnitude increases, holding the distribution of votes constant. Using Duverger's metaphor of electoral institutions as a brake, this means that the number of electoral parties should be translated into legislative parties with less friction as district magnitude becomes larger. The number of electoral parties should also be translated into legislative parties with less friction when there are upper tier seats (Amorim Neto & Cox, 1997). This is because these seats are typically compensatory in nature. For example, 39 seats are distributed in a second tier among the parties in Sweden whose share of the seats is less than their share of the votes.

Thus one would expect the number of legislative parties to increase as the number of electoral parties grows. Moreover, the extent to which this occurs should depend on the proportionality of the electoral system's mechanical effects. More specific, the following can be hypothesized:

Hypothesis 2: The number of electoral parties should have a greater positive effect on the number of legislative parties when district magnitude is large.

Hypothesis 3: The number of electoral parties should have a greater positive effect on the number of legislative parties when the percentage of seats allocated in upper tiers is large.

A Test for the Mechanical Modifying Effect of Electoral Laws

These hypotheses can be tested using the following interaction model:

$$
\begin{aligned}
LegislativeParties = \beta_0 + {} & \beta_1 \, ElectoralParties + \beta_2 \ln(Magnitude) + \beta_3 \, UppertierSeats \\
& + \beta_4 \, ElectoralParties \times \ln(Magnitude) \\
& + \beta_5 \, ElectoralParties \times UppertierSeats + \in .
\end{aligned} \tag{3}
$$

LegislativeParties measures the effective number of legislative parties, whereas *ElectoralParties* measures the effective number of electoral parties.[9]

9. Typically, the effective number of parties is calculated as $1/\Sigma x_i^2$, where x_i is the percentage of seats or votes won by the ith party. However, measurement problems arise when official electoral

Magnitude measures the average district magnitude and is logged to capture the intuition that the marginal effect of district magnitude is smaller as district magnitude increases. *UppertierSeats* is the percentage of seats allocated in upper tiers. The interaction terms are required to test the conditional nature of Hypotheses 2 and 3.

β_1 captures the marginal effect of electoral parties in disproportional electoral systems with single-member districts and no upper tier seats— remember that $\ln(Magnitude) = 0$ when district magnitude is 1. Because an increase in the number of electoral parties is expected to have a less than proportional effect on the number of legislative parties in all countries, we expect $0 < \beta_1 < 1$. The marginal effect of electoral parties is expected to grow as district magnitude and the percentage of upper tier seats increase. As a result, the coefficients on each of the interaction terms should be positive. These coefficients are, in some sense, an estimate of the mechanical effect of electoral institutions.

The data set used to test this model and those that appear in subsequent sections is new and covers all democratic legislative and presidential elections between 1946 and 2000 (Golder, 2005). This amounts to 294 presidential elections and 867 legislative elections. A significant advantage of this data set is that it includes information on a wide range of Asian, African, and East European countries that have been absent in many of the previous studies. The inclusion of elections in the 1990s also marks a difference with earlier research and allows us to examine whether the impact of electoral institutions and social heterogeneity has changed since the large-scale democratization of regimes in Eastern Europe and Africa in the 1990s. This is substantively important because the number of countries holding democratic elections has increased markedly from 67 in 1989 to 109 in 2000. It is also theoretically significant because one might expect that the impact of electoral institutions and social heterogeneity would be weaker in this decade because of the large number of new democracies.

Several legislative elections are omitted because they were unsuitable for testing Hypotheses 2 and 3. For example, elections in Kiribati, Kyrgyzstan, Lebanon, the Marshall Islands, Micronesia, Nauru, and Palau were excluded

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statistics fail to provide information on all competing parties. For example, very small parties are often lumped together into a residual category known as "other." Although existing studies do not address this issue, the way in which the residual category is treated can significantly influence the effective number of parties that is calculated. As a result, we omit 32 elections in which the residual category was so large (greater than 15%) that there was little hope of measuring the number of parties accurately. These elections account for less than 4% of the sample. For the remaining elections, we use the method of bounds to calculate a more accurate effective number of parties (Taagepera, 1997).

because it was not possible to identify formal parties in these countries. We also dropped Colombian elections between 1958 and 1970 because there was a constitutional agreement during this period that the Conservative Party and the Liberal Party would alternate in power and share the legislative seats irrespective of the electoral results. Elections in Papua New Guinea and Mauritius, as well as Malta since 1987 and South Korea between 1988 and 1995, were also omitted because the upper tier seats in these countries cannot be considered compensatory. Although these elections are omitted for theoretical reasons, several others are dropped because of missing data on one or more of the explanatory variables. Together, these omissions leave a total of 680 legislative elections.

We test Hypotheses 2 and 3 using both cross-sectional and pooled analyses. In the pooled analyses, the estimation issues that typically arise with longitudinal data were complicated by the structure of our particular data. The crucial thing to remember is that although OLS is consistent with longitudinal data, the standard errors may be incorrect. Feasible generalized least squares offers one solution to this problem. However, feasible generalized least squares is inappropriate here because it would significantly underestimate the standard errors given that the number of time periods (or elections) is not very large compared to the number of countries in our data set (Beck & Katz, 1995). Panel-corrected standard errors (PCSEs) might be another solution. However, because the accuracy of PCSEs increases with the number of elections per country and many countries in our data set have had few elections, it is reasonable to question the usefulness of PCSEs in this particular application. As a result, we use a third option and employ OLS with robust standard errors clustered by country.

Although it is common to include a lagged dependent variable with longitudinal data to take account of serial correlation, the structure of our data suggests that this would be inadvisable here. One problem is that our observations do not come in regular intervals either within countries or across countries. In these circumstances, it is hard to know how one would interpret the estimated coefficient on any lagged dependent variable were one to be included. The second problem is that the panel nature of our data set (small T, large N) means that the inclusion of a lagged dependent variable would significantly reduce the sample size and drop all countries that only ever experienced one election in any given democratic period. Thus for both theoretical and practical reasons, we present results from models where there is no lagged dependent variable. Any anxious readers at this point should be comforted by the fact that employing PCSEs with or without a lagged dependent variable does not qualitatively change our inferences.

Evidence for the Mechanical
Modifying Effect of Electoral Laws

The results from six slightly different models are shown in Table 1. For convenience, the first column reports the results presented by Amorim Neto and Cox (1997). Their results are based on a cross-sectional analysis of legislative elections in 54 different countries during the 1980s.[10] Note that the fact that they omit two constitutive terms—*UppertierSeats* and ln(*Magnitude*)— means that their estimates will be biased unless the coefficients on these terms are precisely 0. Column 2 allows us to see whether this is the case because it presents the results from our recommended specification using their data. The remaining columns retain our specification but employ our more extensive data set. The 1990s cross-section allows us to see if the mechanical effect of electoral laws remains the same following the substantial increase in the number of democracies after 1989. We examine the legislative election in each country that occurred closest to 1995. The fourth column presents results from the same 1990s cross-section that includes only established democracies (we exclude countries that transitioned to democracy after 1989). These cross-sectional results can be compared to two pooled models that differ in terms of whether they examine the whole sample or only established democracies.

As predicted, all six models provide evidence that the number of electoral parties has an increasing, but less than proportional, effect on the number of legislative parties in countries where there are no upper tier seats and the district magnitude is 1 (i.e., $0 < \beta_1 < 1$). Moreover, every model indicates that an increase in district magnitude allows for a more proportional translation of votes into seats; in other words, the coefficient on *ElectoralParties* × ln(*Magnitude*) is positive and significant. Together, these findings provide considerable support for Hypothesis 2 because they are robust across all six models. Substantively, the results from the pooled model with established democracies indicate that an additional electoral party in countries with single-member districts and no upper tier seats would lead to an additional 0.63 (0.52, 0.74) legislative parties; 95% confidence intervals are given in parentheses. An additional electoral party in a country such as Israel where the district magnitude is 120 and there are no upper tier seats would lead to an additional 0.90 (0.81, 0.99) legislative parties.

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10. Amorim Neto and Cox (1997) examine the legislative election that occurred closest to 1985 in each country. We were able to replicate their results exactly. The only difference is that we divide the coefficient on the interaction term *ElectoralParties* × *UppertierSeats* by 100 to make it directly comparable with the equivalent interaction terms in the other columns.

Table 1
The Mechanical Modifying Effect of Electoral Laws

| | Dependent Variable: Effective Number of Legislative Parties | | | | | |
| | Cross-Sectional Analysis | | | | Pooled Analysis | |
Regressor	1980s Amorim Neto & Cox Data[a]	1980s Amorim Neto & Cox Data[a]	1990s Whole Sample	1990s Established Democracies[b]	1946 to 2000 Whole Sample	1946 to 2000 Established Democracies[b]
ElectoralParties	0.51*** (0.05)	0.38*** (0.06)	0.39*** (0.07)	0.46*** (0.07)	0.61*** (0.06)	0.63*** (0.06)
ln(Magnitude)		−0.31*** (0.10)	−0.14 (0.15)	−0.26 (0.19)	−0.02 (0.06)	−0.04 (0.06)
UppertierSeats		0.01 (0.01)	0.019 (0.014)	−0.01 (0.02)	0.02** (0.01)	0.01 (0.01)
ElectoralParties × ln(Magnitude)	0.08*** (0.01)	0.16*** (0.03)	0.09*** (0.04)	0.13*** (0.04)	0.05** (0.02)	0.06** (0.02)
ElectoralParties × UppertierSeats	0.004*** (0.001)	0.002 (0.002)	−0.003 (0.002)	0.007 (0.005)	−0.004 (0.003)	0.001 (0.003)
Constant	0.58*** (0.13)	0.99*** (0.20)	1.20*** (0.29)	0.90*** (0.29)	0.52** (0.17)	0.46** (0.16)
Observations	54	54	81	54	680	604
R^2	.93	.94	.76	.85	.85	.88

Note: Standard errors are given in parentheses for cross-sectional models; robust standard errors clustered by country are used for the pooled models.
a. See Amorim Neto and Cox (1997).
b. Established Democracies omits elections from countries that transitioned to democracy after 1989.
$**p < .05$. $***p < .01$.

In contrast, Hypothesis 3 receives no support from our tests. The coefficient on *ElectoralParties* × *UppertierSeats* is never positive and significant in any of the fully specified models. As a result, there is no evidence to support Amorim Neto and Cox's (1997) claim that votes are translated more perfectly into seats when there are upper tier seats. It is true that the coefficient on *ElectoralParties* × *UppertierSeats* is positive and significant in their model (see Table 1, column 1). However, it is important to remember that they fail to include the constitutive term *UppertierSeats*. As a result, all of their coefficients are potentially biased. It turns out that once this constitutive term is included (see Table 1, column 2), the coefficient on the interaction term is reduced by 50% and is no longer significant.[11] Whether we use their data or our own, there is simply no evidence that upper tier seats ever modify the way electoral parties are translated into legislative parties in the predicted manner. In fact, two of the models suggest that they can actually make the electoral system more disproportional.

It is interesting that the coefficient on the upper tier interaction term is negative in those models that include elections from countries that became democratic in the 1990s. We suspect that these negative coefficients may be caused by elections from the new democracies of Eastern Europe. The number of electoral parties in the lower tiers of Eastern Europe is typically much larger than the number of parties in the upper tier. This is because local notables have been able to win in single-member districts without national party affiliations. Party labels have often proven to be crucial only in the larger and more proportional upper tier districts (Moser, 1999). This means that upper tiers will have a negative impact on the translation of electoral parties into legislative parties. This should obviously change as the East European party systems become more nationalized. Some evidence for this line of reasoning comes from the 1990s cross-section and pooled model that include only established democracies. In both cases, the coefficient on the upper tier interaction term becomes positive (although still insignificant).

Overall, there is considerable evidence that small district magnitudes have a strong mechanical reductive effect on the number of legislative parties. It is precisely this effect that Duverger (1954/1963) believed encourages voters to engage in strategic voting and party elites to participate in strategic entry or withdrawal.

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11. Amorim Neto and Cox (1997) also failed to include the constitutive term ln(*Magnitude*) in their model. Column 2 of Table 1 indicates that the coefficient on *ElectoralParties* × ln(*Magnitude*) increases by 100% once this term is included. In other words, they severely underestimate the mechanical modifying effect of district magnitude by omitting this constitutive term.

The Strategic Modifying Effect
of Electoral Laws

In the previous section, we examined how electoral institutions have a mechanical reductive effect on the number of legislative parties even when voter behavior is exogenously determined. In this section, we address the ways in which electoral laws may have a second reductive effect by influencing the behavior of voters and candidates. Duverger (1954/1963) refers to the behavioral effect of nonpermissive electoral laws on voters and candidates as the "psychological effect." In a similar manner, Riker (1982) alerts us to the way in which electoral laws encourage strategic voting and the strategic entry of candidates. In this section, we also reexamine the question as to whether presidential elections influence the number of parties.

According to Duverger, the mechanical effect of electoral institutions favoring large parties creates incentives for strategic entry and strategic voting. Parties that have no chance of winning are encouraged to withdraw. If these parties fail to withdraw, then voters will have an incentive to vote strategically in favor of better placed parties. Thus disproportional systems with low district magnitudes are likely to reduce the demand for political parties created by social heterogeneity. In contrast, one might expect social heterogeneity to have a greater impact in those countries that have upper tier seats (Amorim Neto & Cox, 1997). The reason for this is that the compensatory nature of these seats encourages political parties to remain in electoral contests because of their increased likelihood of actually winning a seat. Voters may also be more willing to support minor parties in these countries because their votes are less likely to be wasted. However, note that the evidence we present in the last section suggests that upper tier seats may not have this predicted effect. Because upper tier seats are not found to have a mechanical effect on the translation of votes into seats, it is unlikely that they would generate a strategic effect on the part of voters and party elites. This is an empirical issue, of course, and can easily be tested. The argument we present above, therefore, suggests the following hypotheses:

> *Hypothesis 4:* Social heterogeneity increases the number of electoral parties only when the district magnitude is sufficiently large.
> *Hypothesis 5:* Social heterogeneity will increase the number of electoral parties to a greater extent when more seats are allocated in upper tiers.

Recent research suggests that presidential elections also have an important impact on legislative elections (Jones, 1994). Thus far, the results are somewhat contradictory. Some research finds that presidential elections increase

party system fragmentation (Filippov et al., 1999), some that they reduce it (Cox, 1997; Mozaffar et al., 2003; Shugart & Carey, 1992), and some that they have no significant effect (Coppedge, 2002; Samuels, 2000). Given the contradictory conclusions in the literature, it is worthwhile reexamining the influence of presidential elections on the number of parties.

Because the presidency is typically considered the most important electoral prize in a polity, political parties often organize around it. The fact that presidential campaigns often generate an influx of resources that parties can direct toward legislative contests creates a coattails effect where the fortunes of legislative parties are tied to presidential candidates. The actual impact of this coattails effect depends on the temporal proximity of presidential and legislative elections, as well as the number of presidential candidates. Temporal proximity is important because presidential elections are most likely to have their strongest effect when presidential and legislative elections are held concurrently. The further apart in time these elections are held, the harder it is to imagine that presidential elections will significantly influence the behavior of voters and party elites in legislative elections. The actual direction of the coattails effect will depend on the number of presidential candidates. Typically there are only a small number of candidates who compete for the presidency because there are only one or two candidates that can realistically win. In this case, presidential elections will have a reductive effect on the number of electoral parties because those parties that are not viable at the presidential level will be disadvantaged. However, this reductive effect is likely to be weaker whenever there are a large number of presidential candidates. This line of reasoning suggests the following hypothesis:

> *Hypothesis 6:* Temporally proximate presidential elections reduce the number of electoral parties if and only if the number of presidential candidates is small.

A Test for the Strategic Modifying Effect of Electoral Laws

Hypotheses 4, 5, and 6 can be tested using the following multiplicative interaction model:

$$
\begin{aligned}
ElectoralParties = \beta_0\ &+ \beta_1\, Ethnic + \beta_2 \ln(Magnitude) + \beta_3 UppertierSeats \\
&+ \beta_4\, PresidentCandidates + \beta_5 Proximity \\
&+ \beta_6\, Ethnic \times \ln(Magnitude) + \beta_7 Ethnic \times UppertierSeats \\
&+ \beta_8\, PresidentCandidates \times Proximity + \in.
\end{aligned} \tag{4}
$$

ElectoralParties and *PresidentCandidates* measure the effective number of electoral parties and presidential candidates, respectively. *Ethnic* measures the effective number of ethnic groups and is our proxy for social heterogeneity.[12] Although the number of ethnic groups represents just one element of social heterogeneity, it is a proxy that all previous analyses use and, therefore, provides the best means for comparing our results with existing findings. Once again, *Magnitude* is the average district magnitude and *UppertierSeats* is the percentage of assembly seats allocated in upper tiers. Finally, *Proximity* measures the temporal proximity of presidential and legislative elections. This is a continuous measure of proximity calculated as

$$2 \times \left| \frac{L_t - P_{t-1}}{P_{t+1} - P_{t-1}} - 1/2 \right|,$$

where L_t is the year of the legislative election, P_{t-1} is the year of the previous presidential election, and P_{t+1} is the year of the next presidential election (Amorim Neto & Cox, 1997). This equals 1 whenever presidential and legislative elections are held concurrently and 0 whenever there are midterm legislative elections or no direct presidential elections. The various interaction terms are required to test the conditional nature of Hypotheses 4, 5, and 6.

The marginal effect of ethnic heterogeneity on the number of electoral parties is

$$\frac{\partial ElectoralParties}{\partial Ethnic} = \beta_1 + \beta_6 \ln(Magnitude) + \beta_7 UppertierSeats.$$

Following Duverger's theory, ethnic heterogeneity should not influence the number of electoral parties in nonpermissive electoral systems. Thus β_1 should be 0. However, the marginal effect of ethnic heterogeneity should become positive and significant once the electoral system is sufficiently permissive. Because district magnitude and upper tier seats are both expected to increase the permissiveness of electoral institutions, β_6 and β_7 should be positive. The marginal effect of temporally proximate presidential elections is

$$\frac{\partial ElectoralParties}{\partial Proximity} = \beta_5 + \beta_8 PresidentialCandidates.$$

12. Unlike the existing literature, which typically measures the number of ethnic groups using the index of ethnolinguistic fractionalization, we employ a newer, and arguably better, measure of ethnic fragmentation drawn from Fearon (2003).

Because presidential elections are expected to reduce the number of parties when there are few presidential candidates, β_5 should be negative. As the number of presidential candidates increases, this reductive effect is expected to decline. Thus β_8 should be positive.

We use the same legislative elections as before to test the model. The only difference is that we also exclude elections from fused vote systems in which individuals cast a single ballot for the presidency and the legislature. We do this because these systems prohibit split ticket voting and would bias our results in favor of finding an effect of presidential elections on the number of electoral parties. As a result, we drop all of the elections in Bolivia and Uruguay, as well as Honduran elections up to 1993 and Guatemalan elections up to 1990. We also exclude elections in the Dominican Republic for 1966, 1970, 1974, and 1986 for the same reason. This leaves a total of 555 legislative elections.

We test Hypotheses 4, 5, and 6 using both cross-sectional and pooled models. As before, the cross-sectional specifications use a single election from each country in the 1980s or 1990s. Once again, we employ OLS with robust standard errors clustered by country in our pooled models; our inferences are qualitatively unaffected if we instead use PCSEs with or without a lagged dependent variable.

Evidence for the Strategic Modifying Effect of Electoral Laws

The results from six slightly different models are shown in Table 2. We begin by reporting Amorim Neto and Cox's (1997, p. 165) results from their preferred cross-sectional analysis of elections in the 1980s. Note that their coefficients may be biased because they omit multiple constitutive terms—*ln(Magnitude)*, *Ethnic*, and *PresidentCandidates*. Moreover, they include upper tier seats additively rather than interactively as the theoretical argument would imply. Column 2 allows us to see whether these specification issues matter by presenting results from our recommended specification but using their data. As before, the 1990s cross-sectional models apply our specification to the election that occurred closest to 1995 in each country using our own data. These results can be compared to two pooled models that differ in terms of whether they include the whole sample or just established democracies.

Before interpreting the results in Table 2, we briefly summarize the findings reported by Amorim Neto and Cox (1997). These conclusions can then act as a benchmark against which to compare the additional information provided by our analysis. Amorim Neto and Cox's main conclusion is that the

Table 2
The Strategic Modifying Effect of Electoral Laws

	Dependent Variable: Effective Number of Electoral Parties					
	Cross-Sectional Analysis				Pooled Analysis	
	1980s	1980s	1990s	1990s	1946 to 2000	1946 to 2000
	Amorim Neto & Cox Data[a]	Amorim Neto & Cox Data[a]	Whole Sample	Established Democracies[b]	Whole Sample	Established Democracies[b]
Regressor						
Ethnic		−0.05 (0.28)	0.06 (0.37)	−0.70 (0.68)	0.19 (0.13)	0.11 (0.14)
ln(Magnitude)		−0.08 (0.30)	0.51 (0.44)	−0.61 (0.59)	0.33* (0.20)	0.08 (0.23)
UppertierSeats	0.04** (0.01)	−0.07 (0.04)	0.01 (0.02)	−0.02 (0.06)	0.05*** (0.02)	−0.06* (0.03)
PresidentCandidates		0.22 (0.27)	0.36 (0.26)	0.07 (0.22)	0.35** (0.16)	0.26* (0.15)
Proximity	−6.05*** (0.88)	−5.88*** (0.84)	−4.19*** (1.26)	−4.95*** (1.24)	−3.42*** (0.55)	−3.10*** (0.46)
Ethnic × ln(Magnitude)	0.39*** (0.07)	0.37* (0.20)	−0.09 (0.17)	0.63* (0.34)	0.08 (0.12)	0.26 (0.17)
Ethnic × UppertierSeats		0.07*** (0.02)	−0.005 (0.01)	0.01 (0.04)	−0.02** (0.01)	0.06*** (0.02)
PresidentCandidates × Proximity	2.09*** (0.26)	1.84*** (0.43)	0.99** (0.46)	1.42*** (0.44)	0.80*** (0.23)	0.68*** (0.23)
Constant	2.40*** (0.21)	2.60*** (0.51)	4.08*** (0.95)	5.15*** (1.32)	2.81*** (0.34)	2.92*** (0.35)
Observations	51	51	62	39	555	487
R^2	.71	.77	.29	.48	.30	.40

Note: Standard errors are given in parentheses for cross-sectional models; robust standard errors clustered by country are used for the pooled models.
a. See Amorim Neto and Cox (1997).
b. Established Democracies omits elections from countries that transitioned to democracy after 1989.
*$p < .10$. **$p < .05$. ***$p < .01$.

"effective number of parties appears to depend on the product of social heterogeneity and electoral permissiveness, rather than being an additive function of these two factors" (pp. 166-167). This is based on the fact that the coefficient on $Ethnic \times \ln(Magnitude)$ is positive and significant and that the interactive model produces a higher R^2 than either their pure institutional or pure sociological model. Although this is an important conclusion, it is somewhat limited. Amorim Neto and Cox do not actually interpret any of their coefficients. Nor do they calculate the marginal effect of ethnic heterogeneity when the electoral system is permissive. This is not actually possible based on the results from their preferred model because $Ethnic$ is not included as a constitutive term. As a result, Amorim Neto and Cox do not provide the necessary quantity of interest to test Duverger's theory. Nor do they calculate the marginal effect of presidential elections on the number of parties except for the substantively meaningless case when there are no presidential candidates. In fact, they do not discuss the effect of presidential elections in their results section at all.

Now that we have a benchmark, what inferences can be drawn from our analysis? The evidence that upper tier seats increase the accuracy with which ethnic groups are translated into electoral parties is quite mixed. The coefficient on $Ethnic \times UppertierSeats$ is positive and significant in only two cases. One case is when we use the data from Amorim Neto and Cox (1997) with our recommended specification (see Table 2, column 2). However, in this case an outlier analysis using a Cook's distance test and an examination of the leverage of each observation clearly indicates that this result depends entirely on data from the 1985 Belgian election. If this election is removed, there is no evidence that upper tier seats have any effect on the number of parties.[13] Thus the only robust case in which the coefficient on $Ethnic \times UppertierSeats$ is positive and significant is the pooled model with established democracies. However, it is hard to argue that this represents strong evidence in favor of Hypothesis 5 because all of the other models indicate that upper tier seats never have the predicted modifying effect. In fact, the coefficient on the upper tier interaction term is negative in two of the specifications (one of which is significant). As we suggested earlier, these weak results should not come as too much of a surprise given the evidence we present in the previous section that upper tier seats do not have a mechanical effect on the translation of votes into seats.

13. In fact, the positive and significant coefficient on $UppertierSeats$ in Amorim Neto and Cox's (1997) preferred specification (see Table 2, column 1) also disappears if this Belgian election is removed.

The evidence to support the claim that ethnic heterogeneity increases the number of parties only when district magnitude is sufficiently large also appears to be mixed at first sight. On one hand, ethnic heterogeneity fails to affect the number of parties when district magnitude is 1, as all of the models predict (β_1 is always insignificant). On the other hand, the coefficient on *Ethnic* × ln(*Magnitude*) is positive and significant in only half of the models. However, it is important to remember that we are not primarily interested in whether the coefficient on this interaction term is significant. Instead, what we really want to know is whether the marginal effect of ethnic heterogeneity is positive and significant once the electoral system becomes sufficiently permissive. Figure 1 plots this marginal effect across the observed range of district magnitude for the case when there are no upper tier seats.[14] It does this for all three models that omit democracies that emerged after 1989. At the top, Figure 1a presents the results from the pooled model with established democracies. Below this are the equivalent figures for the 1980s cross-section (Figure 1b) and the 1990s cross-section with established democracies (Figure 1c). The solid sloping lines indicate how the marginal effect of ethnic heterogeneity changes as the average district magnitude increases. One can see the conditions under which ethnic heterogeneity has a significant effect on the number of parties by considering the two-tailed 90% confidence intervals (dashed lines) that are shown. The effect of ethnic heterogeneity is significant whenever the upper and lower bounds of the confidence interval are both either above or below the 0 line.

All three figures clearly illustrate that in established democracies, ethnic heterogeneity significantly increases the number of parties once the electoral system is sufficiently permissive. This is exactly what Duverger's theory predicts. To be more specific, Figure 1a, based on the pooled model with established democracies, indicates that ethnic heterogeneity will increase the number of electoral parties once we move beyond nonpermissive electoral systems with single-member districts—when ln(*Magnitude*) = 0.

Although not shown here, the equivalent figures from the two models that include countries that transitioned to democracy after 1989 provide much weaker evidence in support of Duverger's theory. In fact, the 1990s cross-section is particularly anomalous given that the coefficient on *Ethnic* × ln(*Magnitude*) is negative (although insignificant). These weaker results are perhaps not too surprising given that the hypothesis linking electoral system permissiveness and ethnic heterogeneity to the number of parties largely

14. We could examine the modifying effect of upper tier seats by drawing additional sloping lines corresponding to various upper tier seat allocations. However, we do not do this because there is no robust evidence that upper tier seats ever have the predicted modifying effect.

Figure 1
The Marginal Effect of Ethnic Heterogeneity on the
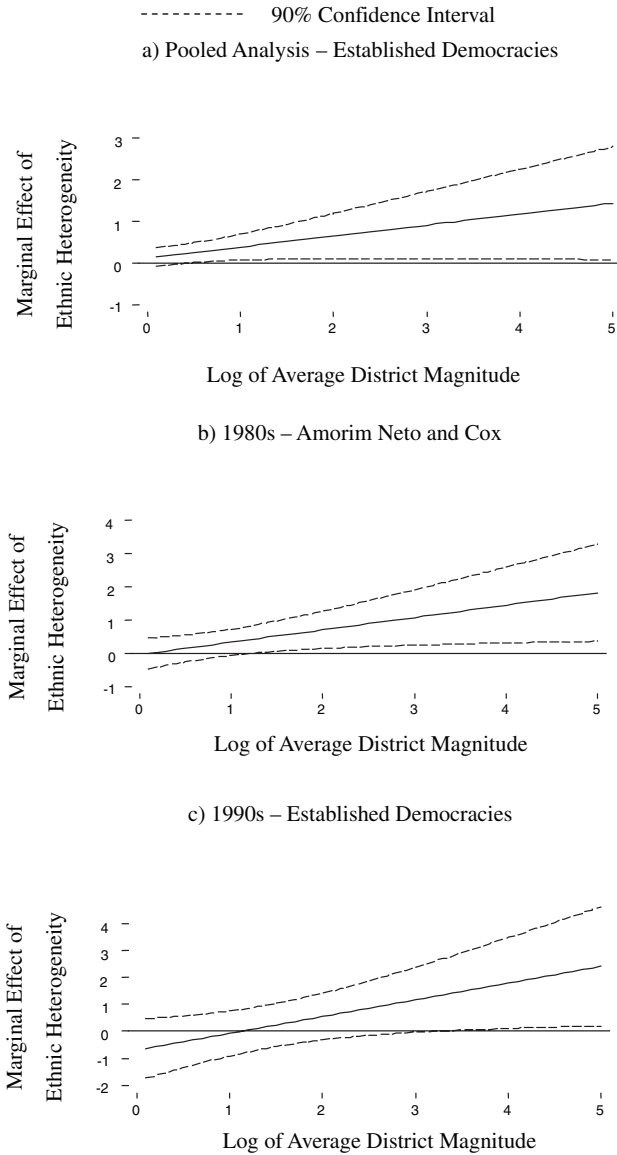**Effective Number of Electoral Parties**

---------   90% Confidence Interval

a) Pooled Analysis – Established Democracies

Log of Average District Magnitude

b) 1980s – Amorim Neto and Cox

Log of Average District Magnitude

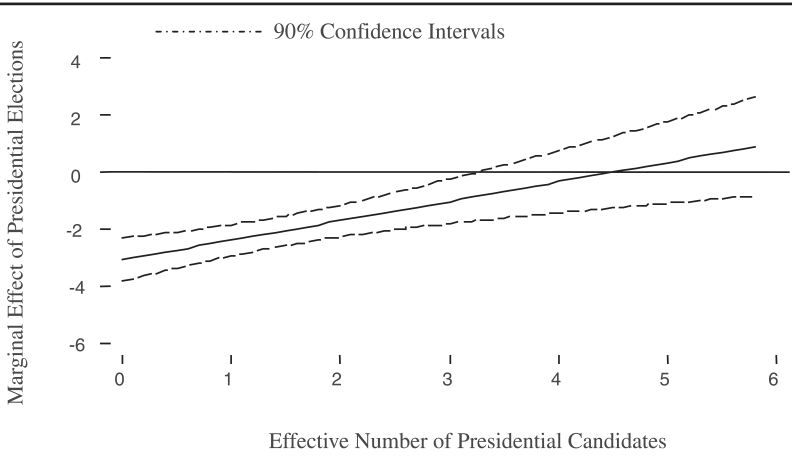c) 1990s – Established Democracies

Log of Average District Magnitude

Figure 2
The Marginal Effect of Temporally Proximate Presidential Elections
on the Effective Number of Electoral Parties

Effective Number of Presidential Candidates

assumes that party systems are in some sort of "equilibrium." Many of the newly democratic countries that were included in these two models may simply not have reached their equilibrium yet, thereby weakening the results. This tentative explanation receives some support from the fact that district magnitude does have the predicted modifying effect in the 1990s cross section once we focus on established democracies only.

What about the effect of presidential elections? The evidence presented in Table 2 provides considerable support for the claim that temporally proximate presidential elections reduce the number of parties when there are few presidential candidates (β_5 is negative and significant in all models) but that this reductive effect becomes weaker as the number of presidential candidates increases (β_8 is positive and significant in all models). Figure 2 plots the marginal effect of temporally proximate presidential elections. The solid sloping line indicates how this marginal effect is modified by the number of presidential candidates. Once again, one can discern whether this effect is significant by examining the two-tailed 90% confidence intervals that are drawn around it. It should be clear that temporally proximate presidential elections have a strong reductive effect on the number of parties when there are few presidential candidates. As predicted, this reductive effect declines as the number of candidates increases. Once the number of presidential candidates becomes sufficiently large, presidential elections stop having a significant effect on the number of parties. Although Figure 2 is based on the pooled

model with established democracies, all of the other specifications produce almost identical figures irrespective of whether they include or exclude those new democracies that emerged after 1989.

Many previous studies find that presidential elections either reduce the number of electoral parties (Cox, 1997; Mozaffar et al., 2003; Shugart & Carey, 1992) or have no effect (Coppedge, 2002; Samuels, 2000). One explanation for these conflicting results might lie with the different geographic samples employed in these analyses. However, it is interesting to note that Figure 2 offers another potential explanation. The figure indicates that presidential elections will reduce the number of parties in some countries but have no effect in others because the effect of temporally proximate presidential elections depends on the number of presidential candidates.

To summarize, our brief investigation of the strategic modifying effect of electoral rules and the impact of presidential elections generates several important results. Most significant, there is strong evidence to support Duverger's theory that social heterogeneity, as measured by ethnic heterogeneity, significantly increases the number of electoral parties once the electoral system becomes sufficiently permissive. Second, we find that the conclusion reached by Amorim Neto and Cox (1997) regarding the impact of upper tier seats on the number of electoral parties is based on a single extreme outlier in their data set (Belgium). Our own results suggest that upper tier seats have little strategic impact on voters and political elites because there is no consistent and compelling evidence that they ever have the predicted modifying effect on ethnic heterogeneity. Finally, our analysis indicates the importance of considering the number of presidential candidates when addressing the impact of presidential elections on party system size. By doing so, we can find a potential explanation for some of the contradictory results in the literature.

Conclusion

What determines the number of parties in a polity? Our analysis provides several contributions to the existing literature that seeks to answer this question. One is to rehabilitate Duverger's theory of party systems. By doing so, we obtain a clearer exposition of the underlying causal process by which sociological and institutional factors interact to shape party systems than is provided by the contemporary party system literature. We show that although Duverger is traditionally seen as synonymous with the institutional camp, he in fact recognized 50 years ago that electoral institutions affect the number of parties only by modifying the effect of more fundamental social

pressures. For Duverger, social heterogeneity is the primary driving force behind the multiplication of parties. Once we recognize this point, it becomes clear that his claims that plurality electoral systems encourage the two-party system and that proportional representation favors multipartism are empirical implications of his theory, not the theory itself. The central hypothesis Duverger's theory generates is that social heterogeneity should increase the number of parties only once the electoral system is sufficiently permissive.

We also illustrate that the existing literature does not provide an adequate test to confirm or refute Duverger's theory. Although scholarship in the past decade has certainly come to recognize that social and institutional factors interact to shape party systems, we believe that scholars still do not fully appreciate all of the implications of Duverger's theory. Although Duverger's central claim is that social heterogeneity will increase the number of parties only when the electoral system is sufficiently permissive, no existing study actually estimates whether social heterogeneity has a statistically significant effect when the electoral system is permissive. As a result, Duverger's theory has never been directly tested. Previous analyses not only fail to calculate the desired quantity of interest but also employ flawed statistical specifications and make inferential errors. For example, our reanalysis of Amorim Neto and Cox (1997) illustrates that their conclusions regarding both the mechanical and strategic modifying effects of upper tier seats are not supported by the data.

When we actually test Duverger's theory with a fully specified model, we find that the results are remarkably consistent with Duverger's expectations. To illustrate this, we summarize the marginal effect of ethnic heterogeneity on the number of parties under different electoral rules in Table 3. Specifically, we show how the marginal effect of an additional ethnic group on the number of electoral and legislative parties changes with district magnitude in countries with no upper tier seats. The results are based on the pooled models with established democracies. It is easy to see that district magnitude influences not only how ethnic groups are transformed into electoral parties but also how votes are translated into legislative parties—the larger the district magnitude, the greater the effect of ethnic heterogeneity on the size of the party system. This is exactly as Duverger predicts. For example, an additional ethnic group in a country such as the United Kingdom with single-member districts is expected to lead to only an extra 0.11 electoral parties and 0.07 legislative parties. On the other hand, an additional ethnic group is associated with 1.37 electoral parties and 1.24 legislative parties in a country such as Israel with a district magnitude of 120. The nice thing about the results in

Table 3
The Marginal Effect of an Additional Ethnic Group on the
Effective Number of Electoral and Legislative Parties

District Magnitude	Country (Example)	Strategic Effect Electoral Party	Mechanical Effect Legislative Party
1	Australia Canada United States United Kingdom	0.11	0.07
2 to 5	Chile Thailand Ireland	0.29 to 0.54	0.20 to 0.39
5 to 10	Greece Argentina Spain Honduras	0.54 to 0.72	0.39 to 0.55
10 to 20	Portugal Finland Brazil Luxembourg	0.72 to 0.90	0.55 to 0.72l
120 to 150	Israel Netherlands	1.37 to 1.43	1.24 to 1.31

Table 3 is that they provide an empirical measure of the mechanical and strategic modifying effects of district magnitude.

Although our results consistently provide strong evidence that district magnitude has a strong modifying effect on the number of electoral and legislative parties, the same is not true for upper tier seats. To some, this might seem surprising. One possible explanation for these anomalous results might be our failure to distinguish between different types of upper tier seats. For example, it may be the case that upper tier seats have a modifying effect only when the electoral formula employed in the lower tier is majoritarian. The analysis presented here (and in all previous studies) does not take this into account and simply mixes those cases in which the lower tier is majoritarian with cases in which it is proportional. This makes it harder to find any effect for upper tier seats because the ability of these seats to increase proportionality is likely to be limited if the lower tier already employs a proportional formula. Moreover, the likelihood that upper tier seats will have a modifying effect should be stronger when the district magnitude in the upper tier is larger and in countries where the electoral tiers are linked (i.e., where the unused votes or seats in the lower tiers are used to allocate seats in the upper

tiers). To this point, none of these more complicated features of upper tier seats have ever been taken into account in the literature. This would be an interesting area for future research.

Another intriguing finding is that Duverger's theory receives much weaker support when we include elections from countries that transitioned to democracy after 1989. This finding is perhaps understandable if we think that party systems in newly democratic countries take a while to reach their equilibrium. It is interesting that Duverger (1954/1963, p. 228) himself took this view in regard to the fledgling democracies of Central Europe, Latin America, and Africa earlier in the 20th century. By warning about the danger of confusing multipartism with the absence of (fully institutionalized) parties, Duverger was indicating that he did not expect his theory to work particularly well in new democracies. We recognize that our results here are suggestive only, and we believe that further research should be conducted to specifically investigate the modifying effect of electoral institutions in new democracies and how this changes with time.

Finally, our analysis adds to the growing literature examining the effect of presidential elections on the fragmentation of party systems. We find that countries typically have fewer electoral parties when there are few presidential candidates. This reductive effect declines and becomes insignificant as the number of candidates increases. Given these results, the question naturally arises as to what factors determine the variation in the number of presidential candidates. We see no reason why the theoretical argument we presented earlier, linking social heterogeneity and electoral system permissiveness to the number of parties, cannot be applied to presidential elections. Thus far, there have been few attempts to systematically examine these factors in presidential elections. Clearly more research is required in this area.

In conclusion, Duverger appears to be correct about the determinants of party systems. Single-member plurality district systems act as a brake on the process by which societal pressures are translated into political parties. As the electoral system becomes more permissive, this constraint is relaxed and party systems increasingly reflect the degree of social heterogeneity in a country. That is, heterogeneous societies will have many parties in countries with permissive electoral systems and relatively homogenous societies will have few. Thus Duverger argues that although electoral institutions are extremely important in shaping party systems, they act as modifying variables and not as driving forces in their own right. Finally, we illustrated in this article that the ability to gauge such modifying forces—and more broadly the effect of institutions in general—depends crucially on the careful

construction and interpretation of multiplicative interaction models (Brambor et al., in press).

References

Amorim Neto, Octavio, & Cox, Gary. (1997). Electoral institutions, cleavage structures and the number of parties. *American Journal of Political Science*, *41*, 149-174.

Beck, Nathaniel, & Katz, Jonathan. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review*, *89*, 634-647.

Brambor, Thomas, Clark, William, & Golder, Matt. (in press). Understanding interaction models: Improving empirical analyses. *Political Analysis*.

Coppedge, Michael. (2002). *Presidential runoffs do not fragment legislative party systems*. Unpublished manuscript, Notre Dame University.

Cox, Gary. (1997). *Making votes count: Strategic coordination in the world's electoral systems*. New York: Cambridge University Press.

Duverger, Maurice. (1952). Public opinion and political parties in France. *American Political Science Review*, *46*, 1069-1078.

Duverger, Maurice. (1963). *Political parties: Their organization and activity in the modern state*. New York: John Wiley. (Original work published 1954)

Fearon, James. (2003). Ethnic structure and cultural diversity by country. *Journal of Economic Growth*, *8*, 195-222.

Filippov, Mikhail, Ordeshook, Peter, & Shvetsova, Olga. (1999). Party fragmentation and presidential elections in post-communist democracies. *Constitutional Political Economy*, *10*, 3-26.

Golder, Matt. (2005). Democratic electoral systems around the world, 1946-2000. *Electoral Studies*, *24*, 103-121.

Jones, Mark. (1994). Presidential election laws and multipartism in Latin America. *Political Science Quarterly*, *47*, 41-57.

Lijphart, Arend. (1994). *Electoral systems and party systems: A study of twenty-seven democracies, 1945-90.* Oxford, UK: Oxford University Press.

Lipset, Seymour, & Rokkan, Stein. (1967). Cleavage structures, party systems and voter alignments: An introduction. In Seymour Lipset & Stein Rokkan (Eds.). *Party systems and voter alignments: Cross-national perspectives* (pp. 1-64). New York: Free Press.

Moser, Robert. (1999). Electoral systems and the number of parties in postcommunist states. *World Politics*, *51*, 359-384.

Mozaffar, Shaheen, Scarritt, James R., & Galaich, Glen. (2003). Electoral institutions, ethnopolitical cleavages and party systems in Africa's emerging democracies. *American Political Science Review*, *97*, 379-390.

Ordeshook, Peter, & Shvetsova, Olga. (1994). Ethnic heterogeneity, district magnitude, and the number of parties. *American Journal of Political Science*, *38*, 100-123.

Powell, G. Bingham. (1982). *Contemporary democracies: Participation, stability and violence*. Cambridge, UK: Harvard University Press.

Riker, William. (1982). The two-party system and Duverger's law: An essay on the history of political science. *American Political Science Review*, *76*, 753-766.

Samuels, David. (2000). The gubernatorial coat-tails effect: Federalism and congressional elections in Brazil. *Journal of Politics*, *62*, 240-253.

Shugart, Matthew, & Carey, John. (1992). *Presidents and assemblies: Constitutional design and electoral dynamics*. New York: Cambridge University Press.

Taagepera, Rein. (1997). Effective number of parties for incomplete data. *Electoral Studies*, *16*, 145-151.

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