The Electoral Sweet Spot: Low-Magnitude Proportional Electoral Systems

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Abstract

Can electoral rules be designed to achieve political ideals such as accurate representation of voter preferences, accountable governments, and strong economic performance? The academic literature commonly divides electoral systems into two types, majoritarian and proportional, and asserts that the choice between these implies a straightforward trade-off by which having more of an ideal that a majoritarian system provides implies less of something that PR delivers in equal measure. We posit that these trade-offs are better characterized as non-linear and that one can gain most of the advantages attributed to PR, while sacrificing less of those attributed to majoritarian elections, by maintaining district magnitudes in the low to moderate range. We test this intuition against data from 610 election outcomes in 81 countries between 1945 and 2006. Electoral systems that use low-magnitude multi-member districts produce disproportionality indices almost on par with those of pure PR systems while limiting party system fragmentation, producing simpler government coalitions, and surpassing both majoritarian and pure PR systems on some indicators of government performance.

Introduction: An Ideal Electoral System?[1]

It is widely argued by social scientists of electoral systems that there is no such thing as the ideal electoral system. Although many scholars harbor strong preferences for one type of system over another, in published work and in the teaching of electoral systems it is standard practice to advocate the notion of a straightforward trade-off. If a country wants a highly representative parliament, where the assembly is a microcosm of the pluralism of opinions in society, a proportional representation (PR) system is best. Alternatively, if a country wants the party that wins the most votes in an election to form a stable single-party government, a majoritarian system is best. You have to choose which you care about most: representation or accountable government. You just cannot have both, so the mantra goes.

A cursory look around the electoral systems of new democracies or reforms to electoral systems in established democracies suggests that practitioners of electoral reform do not think like political scientists. Rather than assuming that the trade-off between representation and accountable government is linear, many new electoral systems attempt to maximize both objectives. For example, some electoral systems have small multi-member districts, others have high legal thresholds below which parties cannot win seats, while others have 'parallel' mixed-member systems, where the PR seats do not compensate for disproportional outcomes in the single-member seats. These types of systems sacrifice pure proportionality for the specific purpose of increasing the accountability.

So, who are right, the political scientists or the practitioners? Is there a linear trade-off between representation and accountability? Or, is it possible to engineer electoral systems to approximate ideal levels of both? To answer these questions we do the following.

In the next section we discuss three common approaches electoral system designers employ to shape the representation versus accountability trade-off, focusing our attention primarily on the number of seats available in each electoral district (or district magnitude). We then introduce our dataset of 610 election outcomes in 81 countries and present some descriptive statistics to illustrate the trade-off at stake. Next, we present the variables we use and the statistical models we estimate, followed by our empirical results, and conclude with a discussion of the implications for electoral system design.

We find that, relative to single-member district systems, low-magnitude PR is almost as effective as high-magnitude PR at reducing disproportionality in legislative representation, whereas increases in party system fragmentation at low-magnitude PR are less pronounced, which in turn simplifies the coalitional structure of governments. Low-magnitude PR systems also tend to have low levels of government spending and to be overachievers on the United Nations Human Development Index, which we regard as a reasonable overall indicator of government performance in the delivery of public goods and human welfare. Low-magnitude PR systems allow a broad range of opinions to be represented in a parliament while at the same time provide incentives for voters and elites to coordinate around viable parties. Put another way, some countries – such as Chile, Costa Rica, Hungary, Ireland, Portugal, and Spain – appear to have discovered a way to have the best of both worlds in the design of their electoral systems.

The Case for Low-Magnitude Proportional Representation

The central trade-off in the design of electoral systems is frequently characterized as being between the representation of voters' preferences and the accountability of governments (cf. Lijphart 1984; Powell 2000). By this account, the first virtue of representation to allow for inclusion of parties reflecting diverse interests and identities in the legislature. PR systems

accurately translate parties' vote-shares into parliamentary seat-shares and allow for inclusion of the broadest possible array of partisan views in the legislature. Arend Lijphart, perhaps the most eloquent advocate of inclusiveness, regards proportionality as "virtually synonymous with electoral justice" (1984: 140), elsewhere elaborating "the beauty of PR is that, in addition to producing proportionality and minority representation, it treats all groups – ethnic, racial, religious, or even noncommunal groups – in a completely equal and evenhanded fashion. Why deviate from full PR at all?" (2004: 100). A further representative virtue of PR, is that inclusive parliaments tend to produce a close mapping between the median member of the parliament, on a left-right ideological scale, and the median member of the electorate (Huber and Powell 1994).

In contrast, majoritarian electoral systems with single-member districts – such as a simple-plurality, alternative-vote, or majority-run-off system – tend to produce less inclusive parliaments. Vote shares in majoritarian elections may translate quite well into parliamentary seat shares, but only if distortions at the district level (where, by definition, the winning party gets 100 percent of the representation) cancel out across districts, as they tend to do in the United States. In most majoritarian elections, however, particularly in multi-party systems, first-place parties reap huge bonuses while others find themselves under-represented or even shut out of parliaments entirely. As a result, majoritarian systems tend to produce parliamentary majorities behind governments with considerably less than fifty percent of the votes. Disproportional representation in parliaments consequently translates into disproportional representation in governments, with median parliamentary parties in majoritarian systems often off-set considerably to the left or to the right of the median voter (Powell and Vanberg 2000).

On representation grounds, then, the case for proportionality is strong. Yet proportionality attracts some skepticism on the government accountability side of the ledger.

PR systems can produce broad and fractious coalitions, whereas majoritarian systems tend to yield single-party governments. If coalition governments are formed via bargains between parties after elections, as is often the norm in PR systems, voters do not know *a priori* how their votes will determine which party or parties govern, and which policies will then result. In contrast, in majoritarian systems, voters can more easily anticipate how a vote for a particular party will translate into the formation of a government, which allows for a high prospective identifiability of potential governments (Strom 1990).

Once governments are in place, simpler coalitions may also be more effective, and more easily accountable, for policy-making. With multiple veto-players, coalition governments tend to be less able to change existing policies than single-party governments (Tsebelis 2002). Policy stability may be a good thing if policies are already close to the preferences of the median-voter. But policy gridlock is a bad thing if a government is incapable of reacting to changes in citizens' preferences or an exogenous economic or political shock. Moreover, a common way of resolving conflicts inside coalition governments is to agree to the public spending priorities of all the involved parties, which consequently leads to higher public spending and higher public deficits than would otherwise be preferred by the voters (Persson and Tabellini 2003). Further, when governing coalitions are composed of fewer partners, it is easier for voters to attribute responsibility to parties for policy outcomes, so retrospective voting is more effective. In short, skepticism about full proportionality on accountability grounds holds that mitigating party system fragmentation clarifies the links between citizens' votes, legislative representation, participation in government, and, ultimately, policy-making.

The choice between representativeness and accountable government is generally presented as a linear trade-off. On one side, inclusiveness and the proportional translation of electoral support across parties into assembly seats often entail party system fragmentation,

which in turn means unwieldy coalition governments. On the other side, raising the electoral threshold for entry into the parliament limits party system fragmentation, facilitating accountability but also likely reducing proportionality and inclusiveness.

We recognize the tension between representativeness and accountability, but we suspect the trade-off is amenable to maximization. One reason is that the normative ideal of electoral proportionality is subject to diminishing returns in the properties of electoral systems that foster it. Consider the effect of district magnitude. Moving from a district magnitude of 1 to relatively small multi-member districts – of magnitude 6, say – will likely allow for representation of parties that can win support at around 10 percent or greater. In most countries, the vast majority of votes are cast for such parties. Moreover, moderate multipartism implies some diversity among viable parties, which in turn softens the Hobson's Choice confronting a voter whose first preference might be for a very small party, but who does not want to 'throw her vote away' on a party that cannot win representation? Thus, low-magnitude PR systems can allow for substantial minority representation while also encouraging voter coordination and discouraging wasted votes. As a result, moving from single-member districts to low-magnitude PR districts is likely to lead to major gains in terms of inclusiveness and proportionality. Low-magnitude PR districts may, of course, allow for multiparty representation more than winner-take-all systems, but to the extent they foster voter coordination around viable, moderately-sized parties, fragmentation should not increase as dramatically as disproportionality decreases. Cox (1997: 103-21) provides empirical evidence, for example, that while strategic voting exists in low magnitude districts, it diminishes in larger multi-member districts.

By contrast, moving from small multi-member districts to larger multi-member districts should lead to only modest additional gains in proportionality. The trade-off is consequently curvilinear rather than linear, since beyond a certain point, increasing the

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magnitude of electoral districts yields diminishing returns on the representative ideals to which proportionality aspires.

District magnitude is the central element of electoral system design bearing on proportionality and party system fragmentation (Taagepera and Shugart 1989; Lijphart 1994; Cox 1997). However, it is not the only one manipulated by electoral system designers to affect the representativeness-accountability trade-off. For example, starting from a PR system with high-magnitude districts, introducing a legal threshold for allocating seats to parties – of 5 percent of national votes, for example – should reduce party system fragmentation considerably by denying any representation to parties with vote shares below the threshold. The legal threshold, moreover, might encourage voter coordination, provided that voters can accurately assess which parties are likely to fall above and below the fixed threshold, and those who prefer below-threshold contestants are willing to cast their ballots for less-preferred-but-viable parties.

Another modification is the use of mixed-member SMD-PR systems, whereby seats in a given legislative chamber are allocated simultaneously in both single-member districts and multi-member districts, superimposed upon each other. If the PR seats in a mixed-member system are allocated directly to offset disproportional outcomes in the single-member districts (as in Germany, for example), then the mixed-member system is, effectively, proportional in terms of inclusiveness and the proportionality of translating votes into seats. But even if seats in the proportional tier are allocated independently from the single-member districts, the overall electoral outcome may be more proportional than if the election were held in just the single-member districts. Hence, mixed-member systems are often introduced as attempts to enhance representativeness without sacrificing accountability

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and thus to approximate 'the best of both worlds' in a single electoral system (Shugart and Wattenberg 2001).[2]

In short, it may be productive to think of the tension between representation and accountability as a convex maximization problem rather than as a linear zero-sum trade-off. These alternative ways of envisioning the problem are illustrated in Figure 1, in which the y axis represents levels of government accountability and the x axis the inclusiveness of representation in the parliament party system. The figure portrays two possible accountability-representativeness frontiers – one indicating a linear trade-off between these normative ideals, the other convex, suggesting that moves away from extreme values on a given ideal can initially improve values on the other in a disproportionate manner.[3]

[Figure 1]

Electoral reformers regularly tout their plans on the grounds that they will strike an improved balance between representativeness and accountability (Rachadell 1991; Culver and Ferrufino 2000). Three strategies that might shape the trade-off displayed in Figure 1 are to: (1) use low-magnitude districts with PR; (2) impose a legal vote-share threshold below which parties win no representation; and (3) employ a parallel mixed-member system, which combines single-member and multi-member districts, but where the multi-member seats are not allocated to compensate for disproportional outcomes in the single-member districts.

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[2] Shugart and Wattenberg identified a broad trend toward mixed-member systems that crested during the 1990s, chronicling the motivations for the mixed-member reforms. But given their recent adoption in many countries, the volume is necessarily cautious in judging performance. Elsewhere, assessments of mixed-member systems have been skeptical (Moser 1999; McKean and Scheiner 2000).
[3] The convex frontier captures the idea that initial returns to efforts on behalf of a given ideal are substantial, even if subsequent returns are diminishing. Of course, one could also portray an inwardly-bowed frontier in which returns would be increasing, suggesting economies of scale in realizing these values. Unlike diminishing returns, we are unaware of any theoretical reason to expect electoral economies of scale in achieving representativeness or accountability.

Data

As our observations we take all elections since 1945 in all democratic countries with a population of more than one million. We follow standard practice of counting a country as democratic if it rates a Polity IV political freedom score of greater than or equal to +6 in the year of the election (cf. Przeworski et al. 2000; Boix 2003). This leads to 610 elections in 81 countries.

We distinguish among electoral systems according to the magnitude of the median district, the use of legal thresholds for representation, and the use a mixed-member format. Table 1 shows the countries included, grouped according to the first of our criteria, median magnitude. Note that we use *median* district magnitude as a defining feature of electoral systems rather than *mean* district magnitude. This is because many countries have a large number of small districts and only a few very large districts (as in Spain or Brazil, for example). The mean district magnitude in such systems can consequently be quite large relative to the median. In these systems, very small parties might gain a few seats in a couple of very large districts, but the structure of party competition in most districts will be quite different (Monroe and Rose 1999). We regard median district magnitude as a better measure of the overall constraints on party system fragmentation at the national level.

Twenty-eight countries have, or had, a median district magnitude of one. Most of these are pure single-member district plurality systems, like Canada, India, and the United States, although this category includes two-round run-off elections, as in France, and mixed-member systems in which at least half the districts (and thus, the median) are single-member, as in Russia and South Korea.[4] Table 1 groups multi-member districts in intervals with

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[4] We measure the median district magnitude as follows: in non mixed-member systems the median district magnitude is the magnitude of the district with an equal number of larger and smaller districts; in compensatory mixed-member system the median district magnitude is the median size of the PR districts; and in mixed-member parallel systems the median district magnitude is the median size of all districts. Our measure of median magnitude is different from the median magnitude (MedMag) variable from Golder's (2005) widely cited dataset. Golder's

roughly equal numbers of electoral systems. Fourteen countries have, or had, elections with median magnitude of 2 or 3; twenty-five electoral systems fall in the 4-6 range; twenty in the 7-10 range; thirteen between 11-20; and thirteen high-magnitude systems fall above that cut-off. Eleven countries have had mixed-member parallel systems, and thirty-three have employed legal thresholds.

[Table 1]

Note that some countries take a 'belt and braces' approach to electoral system design, combining a legal threshold with moderately low-magnitude districts, as in Hungary or Turkey, or with a parallel mixed-member system (as in Panama or South Korea). The diversity in approaches to modifying the principle of pure proportionality affords us some leverage in estimating the relative impact of district magnitude, legal thresholds, and mixed-member designs on various phenomena of interest independently. Note also that many countries appear in more than one column as, for example, Benin, which moved from higher median magnitude (11-20) in its first democratic election to a lower range (4-6) subsequently. Some appear more than once in the same column as, for example, the Philippines, which maintained a median magnitude of one, but switched from simple plurality to a mixed system as of 1998. The multiple listings in Table 1 convey some sense of the frequency of within-country change on our defining characteristics. This variance provides some additional leverage in estimating the effects of electoral system design on political outcomes.

Figure 2 presents an initial illustration of the trade-off between inclusive representation and accountable government. Each observation in the figure is the outcome of

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codebook describes MedMag as 'the district magnitude associated with the median legislator in the lowest tier.' As we understand it, this means identifying the legislator for whom there are an equal number of other legislators from districts of greater and or lesser M, then assigning the value of MedMag as the M of that legislator's district. For more discussion, and examples, of how this difference matters, see the codebook for the dataset for this project, available on the authors' respective websites.

an election in a country in Table 1. The *x* axis is a standard disproportionality index, where lower scores mean that partisan representation in parliament more closely reflects the partisan distribution of votes (Gallagher 1991). In our data, disproportionality ranges from 0.28 to 34.52, with a mean of 7.09 and standard deviation 6.24. The *y* axis is a standard measure of the effective number of parties represented in the parliament, where a lower number on the scale means a more concentrated party system and a higher number reflects greater fragmentation (Laakso and Taagepera 1979; Taagepera and Shugart 1989). In our data, the effective number of parliamentary parties ranges from 1 to 10.87, with a mean of 3.36 and standard deviation 1.50.

[Figure 2]

One can think of the axes on Figure 2 as inverted versions of those in Figure 1, where disproportionality (*x* axis) is the inverse of inclusiveness and party system fragmentation (*y* axis) is the inverse of accountability. If our idea of a non-linear trade-off is on target, the empirical pattern should show elections arrayed in a pattern that bows toward the origin of the axes, with an ideal electoral system minimizing disproportionality while constraining fragmentation so as to foster clear partisan responsibility in government. The pattern in Figure 2 confirms this intuition. The observed data – elections – are concentrated along the axes, indicating that there is more disproportionality in elections with low fragmentation, and vice-versa; but there is also a cluster of observations near the origin, with relatively low scores on both variables.

Figure 2 divides our elections into three groups by district magnitude: pure single-member district systems are coded blue; systems with moderate median magnitudes, ranging from 2-10, are coded green; and high-magnitude systems, above 10, are red. Single-member district systems tend toward low fragmentation but exhibit wide variance on disproportionality, with highly disproportional outcomes when voters fail to coordinate

expectations on which parties are viable or when winners' bonuses at the district level do not cancel each other out in the aggregate (Powell and Vanberg 2000). High-magnitude systems are inclusive by design, and tend toward highly fragmented party systems with correspondingly low disproportionality. Meanwhile, low- and moderate-magnitude systems are clustered in the bottom left-hand corner, with relatively proportional results and a relatively compact party system.

To the extent that minimizing some combination of disproportionality and fragmentation represents a desirable trade-off between representativeness and accountability, Figure 2 suggests that PR with modest district magnitude is a good design. Note that these are just descriptive results, pooled across a wide range of countries and elections, and with no control for other factors that might influence the number of parties in a party system or the proportionality of elections. To investigate our conjecture in more detail, we now move to a statistical analysis of election outcomes in the world's democracies.

Variables and Models

We look at three sets of dependent variables, to capture representativeness, accountability, and government performance, respectively. The first set includes *Disproportionality*, which we have already discussed, as well as a measure of *Voter-government distance*. Our measure of distance is adapted from HeeMin Kim and Richard Fording's data (Kim, Powell, and Fording 2009), using their indicator of ideological distance between the median voter and median government party when majority governments formed, but substituting their indicator of distance between the median voter and median parliamentary party under minority government, when the center of policy-making gravity shifts toward parliament (Strom 1990).

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The second set of dependent variables, on accountability, includes: *Effective number of parties by seats*, which is the Laakso and Taagepera (1979) fragmentation index, also introduced above; *Parties in government*, which is a simple count of the number of parties in the first cabinet formed after a given election; and a dummy variable indicating whether a *Single-party government* formed after an election or not.[5]

The third set of dependent variables includes two measures of fiscal performance – *Central Government Spending* and *Budget Surplus(Deficit)*, each measured as a percentage of GDP – and the UN *Human Development Index*, which encompasses provision of an array of public goods for which governments generally take responsibility, including education, health care, physical security, environmental protection, and economic opportunity.

We use the economic indicators to test Persson and Tabellini's (2003) claims that electoral rules affect government spending and growth. One of Persson and Tabellini's arguments is that the costs of reaching agreements on policy rise with the presence of more parties, such that government spending, and deficits, will be higher when fragmentation and the number of parties in government are higher. To the extent electoral rules contribute to party fragmentation and complex government coalitions, then, spending and deficit patterns should be traceable back to electoral system design. This logic suggests that spending and deficits should be higher under more inclusive electoral rules, and tempered by rules that decrease fragmentation and coalition complexity.

If minimal government is inherently more efficient, then electoral rules that minimize fragmentation might also boost the Human Development Index. But the human development

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[5] When analyzing the effect of electoral systems on party system fragmentation and parties in government, we ran all models with and without controls for the fragmentation of the party system amongst the electorate, as measured by the *Effective number of parties by votes*. Adding this variable allows us to distinguish the 'mechanical' from the 'psychological' effect of electoral systems, since the vote fragmentation variable captures how far voters and parties coordinate in anticipation of which parties are more likely to win seats. Consequently, the estimated effect of electoral system factors that remains in models controlling for vote fragmentation is purely mechanical. Whether or not the control for vote fragmentation is included never changes the estimated direction or significance of the impact of district magnitude.

index reflects the universality of provision of basic public goods, even when such breadth might come at some fiscal cost or might temper overall economic growth. In its balance of efficiency and distributional concerns, the index reflects a non-linear trade-off similar to the one we postulate in the choice of electoral rules. If low-magnitude PR maximizes the combination of accountability and inclusive representation, it might also produce governments that maximize the Human Development Index.

The electoral system factors on which we focus as independent variables are: *Median district magnitude*, as described above; *1/(median district magnitude)*; *Legal threshold*, coded as the percentage of votes a party must win at the national level to be eligible to win seats, and 0 when no legal threshold applies; *Mixed-member parallel*, coded as 1 when members of the lower house are elected from parallel tiers of single-member districts and proportional districts and in which allocations of seats in each tier are mutually independent; and *Mixed-member compensatory*, coded as 1 when members of the lower house are elected from parallel tiers of single-member districts and proportional districts and in which the formula for allocating seats in the proportional districts offsets disproportionalities at the single-member district level. Appendix A provides descriptive statistics for the dependent variables and the key independent variables.

All models also include a wide range of control variables that may have an effect on the number of parties in a system, the polarization of party systems, the stability of governments, or economic performance. Specifically, we control for whether a country has a presidential, a parliamentary, or a hybrid regime, the year of the election, the levels of political freedom and economic freedom, population size, GDP per head, economic growth rates, economic inequality (as measured by the GINI index), the age of the democracy, whether the country has a federal system, the level of ethnic fractionalization, the latitude of the capital city of the country, whether the country was a former colony of the UK, Spain or

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Portugal, or another country, and whether the country is in the Americas, Western Europe, the Pacific, South Asia, or Africa and Middle-East, or is a former Communist country. Appendix B provides a detailed description of all the variables and the data sources.

We use a large number of control variables for several reasons. First, several of the control variables are political factors which could affect the fractionalization of a party system independently of any direct electoral system effect, such as whether a country has a presidential or parliamentary regime, whether a country has a federal system, the levels of income inequality and ethnic fractionalization, and the size of a country (cf. Taagepera 2007). Second, several other controls relate to the general political and economic development of a regime, which may indirectly impact the extent of consolidation and stability of a party system, such as political and economic freedoms, economic growth rates, GDP per head, the age of democracy, and the geographic location of a country (cf. Persson and Tabellini 2003).

A third set of controls is included to capture the fact that electoral systems themselves are 'institutional choices' resulting from the strategic decisions of political elites when a system is designed or reformed (e.g. Benoit 2007). Major determining factors in the choice of electoral systems are the regional location of a country and a country's colonial origins: hence, almost all Latin American countries have PR electoral systems while most former British colonies have majoritarian electoral systems. The colonial origin of a country also has a significant impact on a range of political and economic factors that no doubt affect how electoral systems impact the party systems and the stability and performance of government (e.g. Acemoglu et al. 2001). Also, one factor widely regarded as causally related to the design of the electoral system when a country extends the franchise is the number of parties in a party system (esp. Rokkan 1970; Colomer 2005; cf. Boix 1999). We consequently

include the effective number of parties (by votes) as an independent variable in some models to control for this effect.

Although the choice between a majoritarian and a PR system may be endogenous to the number of parties or the colonial origins of a system, however, specific matters of design such as the magnitude of electoral districts or the height of an electoral threshold are unlikely to be determined by clearly identifiable factors. These more technical aspects of electoral system design are highly context specific and are often dependent on the type of electoral system expertise received by policy-makers when establishing or reforming an electoral system (Benoit 2007). It is reasonable to assume that expertise and advice about electoral system design has grown and spread over time. We consequently include the year of the election as a control variable to remove a potential timing effect.

We estimate models for each of our dependent variables in four different ways. We specify first a linear, then an asymptotic, shape for the effect of district magnitude, and we run both the linear and the asymptotic models first pooling data across countries, then using country-specific fixed effects. The linear specification tests for the effect of a straightforward effect of median district magnitude on the electoral ideals captured by our dependent variables. The asymptotic specification includes a variable, 1/(median district magnitude), that detects whether this effect is subject to diminishing returns. We interpret the shapes of the relationships between magnitude and our electoral ideals – and more specifically, the relative extent to which they are subject to diminishing returns – as indicative of whether electoral designers might capture some of the benefits of proportionality while bearing relatively fewer of the costs.

We estimate our pooled models clustering observations by country and using panel-corrected standard errors, given that the observations on multiple elections from the same country are not independent (Beck and Katz 1995). We also estimate models that include

country fixed-effects (a dummy variable for each country in the data). These fixed-effects models capture within-country variations in the data, such as the effect of adopting a legal threshold, moving from a pure single-member district system to a mixed-member system, or changing the electoral district structure in a way that affects median magnitude. There is far less variance in electoral systems within countries than cross-nationally, but the fixed-effects models isolate the within-country effects of what electoral systems reforms are included in the data.[6] Later, to illustrate the effects of district magnitude more intuitively, we also estimate the pooled models with a series of dummy variables that group elections by median magnitude.

Results

Table 2 shows the results from models on our dependent variables capturing representation. Model 1 tests a simple linear specification of the effect of district magnitude, the negative coefficient on which confirms that larger districts are associated with less disproportionality. Legal threshold has no measurable effect in this model, and mixed-member parallel systems appear to contribute to disproportionality. Model 2, by comparison, estimates a diminishing returns (asymptotic) effect by including the inverse magnitude variable. Note that the adjusted R-squared improves by about a third, from .43 to .56, and that the scope of the coefficient on raw magnitude drops when the inverse magnitude term is included. The estimated effect of legal threshold is also to increase disproportionality, as expected, and the precision of the estimate on that variable improves. The sign on the mixed-member parallel

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[6] Our electoral systems variables are, at best, rarely changing within countries. To estimate effects of such 'sluggish' variables in cross-sectional time-series data structures such as ours, when the ratio between-cluster to within-cluster variance is high, Plümper and Troeger (2007) recommend a fixed effects vector decomposition (FEVD) approach that separates within-cluster from between-cluster variance in estimation without ignoring the latter entirely. Results of all our models using the Plümper and Troeger method are available from the authors, and are generally consistent with those from our pooled, PCSE models, although the latter produce somewhat more conservative estimates.

dummy flips, suggesting these systems mitigate disproportionality relative to single-tier systems.

[Table 2]

Figure 3 illustrates the effect of district magnitude on the disproportionality of an election, with predicted values derived from the asymptotic Model 2. There is a rapid decline in the level of disproportionality of an election as the district size increases beyond 1, and then a flattening out of the relationship as the district size increases beyond 5 or 6. For example, the average level of disproportionality in single-member district elections is 11.9, while the average in small multi-member districts (with a median magnitude of between four and six) is 5.3. Then, increasing the size of the district beyond this does not improve the representativeness of a parliament much further: the average score for a median district size of between seven and ten is 4.6, for a district size of between eleven and twenty is 3.5, and for a district size of more than twenty is 3.0.

[Figure 3]

Models 3 and 4, in Table 2, replicate the pooled results using fixed effects models, providing a more conservative test of electoral system. The key results from Models 3 and 4 are that the estimated effect of magnitude on disproportionality is similar in the fixed effects models, and that the improvement of the diminishing returns model over the simple linear model remains – indeed when the asymptotic term is included in the fixed effects model, the coefficient on the linear term is indistinguishable from zero.

The effect of district magnitude on our second quality-of-representation variable, *Voter-government distance*, is strikingly similar to that on disproportionality. Note, however, that distance and disproportionality are correlated at only .16, so these are not merely picking up the same effect. Model 5, the linear specification using pooled data, shows no measurable impact of magnitude, legal threshold, nor mixed parallel systems on

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Voter-government distance. The asymptotic Model 6, however, confirms that there is a

strong diminishing returns effect of magnitude on disproportionality, and again explains a

third more variance in voter-government distance than the linear model. With the improved

specification, mixed-member parallel systems are also associated with a stronger mapping

between the median voter on a left-right spectrum and the pivotal party in government.

Again, Models 7 and 8 replicate the effect (asymptotic, not linear) of magnitude on voter-

government distance in the fixed-effects specifications.

Table 3 turns to accountability, as reflected first in the fragmentation of the

parliamentary party system. Model 9's simple linear specification confirms that as

magnitude increases, so does fragmentation, although the coefficient is quite small. This

suggests that, other things equal, a jump from a median magnitude of one to ten is expected

to boost the fragmentation index by one-tenth of a unit. Adding the asymptotic term, in

Model 10, confirms that there are diminishing returns in fragmentation to increasing

magnitude, although the linear magnitude term remains significant in this specification.

Legal threshold also attains significance in the asymptotic model, mitigating party system

fragmentation, as expected, while mixed-member parallel systems have no measurable

impact, and compensatory systems inflate fragmentation by a quarter of an effective party,

perhaps by encouraging localist parties in single-member district competition.[7] Note,

however, that the improvement in fit from the diminishing returns model of fragmentation is

not as pronounced as with disproportionality or voter-government distance: Model 10

explains just under 10 percent more of the variance in fragmentation than does Model 9 (the

R-squared changes from .31 to .34). With party system fragmentation, again, the fixed

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[7] Bear in mind that compensatory are, for our purposes, proportional, and we code their median magnitudes
according to the proportional districts. We include a dummy for compensatory systems in our model as a
check on whether adding the element of single-member district competition affects our dependent variables,
even if not through the formula for translating vote shares to overall seat shares.

effects results closely mirror those from the pooled models, with evidence that higher

magnitudes increase fragmentation, although with diminishing effects, legal thresholds

reduce fragmentation, and mixed-member systems increase it.

[Table 3]

Models 13 through 16 focus attention on another facet of accountability, the number

of parties holding cabinet portfolios. In the familiar sequence, Model 13 tests a simple linear

specification using pooled data, confirming that coalition complexity rises with median

district magnitude. Adding the asymptotic term, in Model 14, confirms some measure of

diminishing returns but, as with fragmentation, the coefficient on the linear term remains

positive and significant, and the improvement in overall explanation of variance is minimal

(adjusted R^2 nudges from .34 to .35). None of the other electoral system factors has a

measurable impact. The fixed-effects models, 15 and 16, show no measurable effect of

district magnitude on government coalition complexity, although the adoption of mixed

electoral systems appears to cut in opposite directions, depending whether the reform is to

parallel (simpler coalitions) or compensatory (larger coalitions) seat allocation.

Figure 4 illustrates the relationship between district magnitude and the number of

parties in government. The curve is clearly flatter (more linear) in this figure than the

analogous graph for *Disproportionality*. An analogous graph for *Voter-government distance*

(not shown), like *Disproportionality*, is strikingly curvilinear, whereas that for Effective

number of parties falls in between, somewhat more curvilinear than *Parties in government*,

but less so than *Disproportionality* or *Voter-government distance*. The key point is that the

relationships between district magnitude and our two dependent variables reflecting

representation are distinctly curvilinear, showing sharply diminishing returns to increases in

magnitude above quite moderate levels, whereas the relationships between district magnitude

and our dependent variables reflecting accountability exhibit more linearity.

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[Figure 4]

The last panel of Table 3 shows results for the incidence of single-party government, which some regard as the *sine qua non* of accountability. Models 17 and 18 estimate logit regressions on pooled data, showing that increasing magnitude diminishes the likelihood of single-party government and, perhaps surprisingly, that the asymptotic specification provides only modest additional leverage beyond the pure linear one. The marginal effects on the estimated probability of single-party government of a one-unit change in each variable, with all other variables held at their median values, are shown in italics. The probability of single-party government falls by a percent with each unit increase in median magnitude under both specifications.

Table 4 examines government performance. Beginning with total government spending as a percentage of gross domestic product, Model 19 offers support for Persson and Tabellini's (2003) argument that highly proportional electoral systems increase the fiscal costs of reaching agreements on policy, insofar as higher magnitudes and mixed-member parallel systems increase spending whereas thresholds reduce it somewhat. Model 20 shows that the asymptotic specification provides no additional leverage on government spending, nor do the fixed-effects specifications in Models 21 and 22, perhaps because the amount of within-country variance in our electoral system variables is slight relative to the between-country variation.

[Table 4]

Models 23 through 26 display a similar pattern in that the linear, but not the asymptotic, specification of district magnitude provides leverage in the pooled models, but the substantive effect is surprising. The high-magnitude systems in which government spending as a share of GDP tends to be high, other things equal, also tend toward more positive fiscal balances – surpluses rather than deficits. Legislatures elected from higher-

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magnitude districts, that is, appear to be equally as capable in raising revenues as appropriating them. Among mixed-member parallel systems, by contrast, higher central government spending is associated, more predictably, with fiscal deficits. As with overall spending, the fixed-effects models gain no traction on fiscal balances.

Finally, Model 27 suggests that the higher public spending, coupled with greater fiscal discipline, associated with higher magnitude elections yields some measurable benefit to citizens in the form of overall public goods provision. The substantive effect, measured by the UN Human Development Index, is modest but positive, with a move from the lowest district magnitude (single-member district elections) to the highest (e.g. Slovakia's nationwide district) yielding an expected boost of .08, or a little over half a standard deviation in the HDI. The significant coefficient on the asymptotic term in Model 28 demonstrates, moreover, that the relationship between district magnitude and the HDI is curvilinear, such that the expected dividends from increasing magnitude are concentrated among the low values, with the effect subject to diminishing returns at higher magnitudes. Note that these effects on the HDI are not artifacts of particular electoral rules prevailing among wealthier or more egalitarian societies, as they obtain whether or not *GDP per capita* and/or the *Gini index* of income inequality are included as controls on the right-hand side of the regression. As above, the fixed-effects models provide little leverage on the HDI, although it appears that countries that adopted legal electoral thresholds experienced a slight improvement in citizen well-being, whereas the adoption of mixed-member parallel elections was less auspicious.

On the whole, the results presented in Tables 2, 3, and 4 suggest that the most consistent and powerful electoral system factor driving the representativeness-accountability trade-off is district magnitude. Various dimensions of this trade-off, and their shapes, are shown in Figure 5, which illustrates the relationships between district magnitude, on the one

hand, with the predicted probabilities good outcomes on our two representation dependent variables and on the first two of our accountability variables, *Effective number of parties* and *Parties in government*. (Marginal effects of magnitude on the last accountability variable, *Single-party government*, are already provided in Table 3). The predicted values are derived from regressions on the pooled data with both the linear and asymptotic district magnitude variables. We define a 'good' outcome as any value below the median in our data insofar as we hold *Disproportionality* and *Voter-government distance* to be representational 'bads,' and we regard party system fragmentation and complex government coalitions to pose obstacles to electoral accountability. A key message from Figure 5 is that increases in district magnitude yield diminishing returns in improving representation as well as in compromising accountability, but the diminishing returns effect is stronger in the former than in the latter.

[Figure 5]

The key implication of the relationships sketched in Figure 5 is that it is possible to capture many of the representation gains of increased magnitude while sacrificing relatively less of the accountability ideals. This point is distilled most clearly in Figure 6, which shows the combined probability, conditional on district magnitude, of achieving good outcomes on all four of the dependent variables from Figure 5 simultaneously. The curve rises sharply moving from pure single-member districts through the low-magnitudes, peaks in the six to eight range, and then declines.

[Figure 6]

Not surprisingly, the predicted likelihood of having better-than-median outcomes on all four criteria is relatively low, peaking just above 10 percent. If we relax our demands, looking for good outcomes on one representation and accountability ideal each (say, *Disproportionality* and *Effective number or parties*, or *Voter-government distance* and *Parties in government*), then the predicted likelihood of having one's cake and also eating it

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rise to around 40%. Importantly, however, the shape of the relationship between district magnitude and realization of combined representation and accountability ideals is consistent, always rising sharply through the low magnitudes, peaking below a median magnitude of ten, then declining as magnitude rises further.

This consistent relationship suggests a magnitude 'sweet spot,' in the four to eight range, where the most improvements in representativeness have already been realized but where the predicted party system fragmentation and government coalition complexity remain limited enough to allow voters to sort our responsibility for government performance and attribute credit and blame accordingly. The story that emerges from Figures 5 and 6 in combination is that the vast bulk of improvements in representativeness can be realized by moving from single-member districts to multi-member districts of quite modest magnitudes, and that in doing so, electoral system engineers might avoid substantial 'accountability costs', in terms of party system fragmentation and coalition complexity, which continue to increase at higher magnitudes.

To check the pro-low magnitude case against our data, with the full set of controls in place, and to provide more easily interpretable estimates of the effect of magnitude, Figure 7 revisits our regressions, this time substituting a series of dummy variables to capture the effects of various magnitude intervals on the dependent variables of interest. The models all use single-member district systems (among which there are 191 elections in our data) as a baseline category. We group multi-member district systems by the magnitudes originally shown in Table 1: 2 to 3 (N=50), 4 to 6 (N=160), 7 to 10 (N=75), 11 to 20 (N=69), and greater than 20 (N=65). We chose these intervals according to a couple of guiding principles. The intervals are smaller at the low end of the magnitude scale because we expect the marginal effects to shift most quickly here, and because we are particularly interested in the marginal effects in this neighborhood. We place systems with median

magnitudes of two and three into their own category because the electoral systems literature includes skepticism regarding the dynamics of partisan competition at these particular low magnitudes (see Auth 2006; Nohlen 2006 on magnitude 2, and Taagepera and Shugart 1989 on magnitude 3). Beyond this, we aimed for groups with roughly similar numbers of elections to ensure comparable quality estimates across intervals.

[Figure 7]

The top panel confirms that moving from single-member districts to a system with districts with a median magnitude in the four to six range can be expected to reduce disproportionality by almost eight points, or about three-quarters of the total expected reduction possible by raising district magnitude. Also, the same magnitude four to six category also achieves over eighty percent of the maximum reduction (relative to single-member districts) in voter-government distance.

Further, the second panel shows that the four to six range yields only about half the expected increase in party system fragmentation as the highest-magnitude systems, and less than a third the maximum increase in expected number of parties in government (although this result is not significant in a model with country fixed effects).

In the third, were government performance is concerned, the magnitude 2 to 3 interval appears to be an overachiever, with markedly lower spending than the single-member district reference category and higher marks on the human development index. Specifically, moving from a single-member district system to magnitude 2 to 3 yields an expected increase of about half a standard deviation, which is equivalent to raising a country's GDP per capita by approximately $9,000. These results also reflect favorably once again on the magnitude 4 to 6 interval, which exhibits somewhat lower spending relative to single-member district systems but with stronger public goods provision as reflected in the HDI. The middle magnitude groups, by contrast, are generally indistinguishable from single-

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member districts on these counts, whereas the highest-magnitude interval shows high spending as well as strong public goods provision. These government performance results should be interpreted with caution, as they are not significant with country fixed-effects are included. This is not surprising, however, as most of the variance in public spending and public goods provision is across country rather than within country over time.

Conclusion: Small Multi-Member Districts Are Best

With the spread of democracy across the world in the last few decades and with more and more established democracies tinkering with their electoral systems, we can identify the nature of the trade-off between fair representation of citizens' preferences and accountable government more accurately than we have been able to before. With this aim in mind, our results suggest that practitioners who have sought to design an electoral system that maximizes these competing objectives deserve more credit than standard political science has given them. Consistent with the traditional view of electoral systems in political science, we find that single-member district systems tend to produce a small number of parties and single-party government, but also have relatively unrepresentative parliaments. On the other side, electoral systems with large multi-member districts have highly representative parliaments, but also have highly fragmented party systems and unwieldy multi-party coalition governments.

In contrast, electoral systems with small multi-member districts – with median magnitude between four and eight seats, for example – tend to have highly representative parliaments *and* a moderate number of parties in parliament and in government. On the representation side, our results suggest that increasing the district size from one to around five reduces the disproportionality of representation a parliament by three-quarters and reduces the ideological distance between the median citizen and the median government

party even more sharply. This is a result of both the greater opportunities for medium-sized parties to win seats and the new incentives for supporters of small parties, who may simply prefer to 'throw away' their votes under single-member district elections, to coordinate into medium-sized parties. Increasing the district magnitude beyond six does not improve representation much further. On the accountability side, meanwhile, increasing the district size from one to around five increases the number of effective parties in parliament by around one, and increases the number of parties in government by about a half. Countries with small multi-member districts are more likely to have coalition governments than countries with single-member districts but these coalitions are likely to be between two or a maximum of three parties. Put another way, low-magnitude PR simultaneously fosters inclusiveness and limits the political unruliness high magnitudes invite via party system fragmentation and coalition complexity.

Finally, where government performance is concerned, small multi-member district systems outperform both single-member district and large multi-member district systems. Government spending tends to be lower in small multi-member districts than either single-member district or large multi-member district systems. And, societal welfare and economic development – as measured by the UN's human development index – tends to be considerably better in small multi-member systems than in single-member district systems and indistinguishable from the levels of development achieved in systems with very large multi-member districts.

The evidence from a wide range of indicators of electoral and government performance all point toward low-magnitude proportional representation as providing a good balance between the ideals of representation and accountability, with promising indicators of fiscal performance and public goods provision as well. Legislative elections work best when they offer opportunities for multiple winners, and thus afford voters an array of viable

options, but at the same time do not encourage niche parties or overwhelm voters with a bewildering menu of alternatives.

In this sense, elections appear to operate like many other social institutions, in which variety is welcome, but particularly when tempered by moderation. We close with a comparison from another sphere of social life that illustrates our point. For the perfect dinner party, *Etiquette for Dummies* author Sue Fox recommends tables of six to eight, to generate the best conversations, where everyone gets involved but each voice can still be heard. With more than eight guests, her advice is to split into two or multiple tables – or to extend our elections metaphor, to redistrict (RealSimple.com 2007). This wisdom appears to be of established pedigree. Consider the following 18th century anonymous entry, entitled "Recipe for a Pleasant Dinner-Party," from the *Faber Book of Useful Verse*: "A round table, holding eight; A hearty welcome and little state; One dish set on a time, As plain as you please, but always prime; Beer for asking for—and in pewter; Servants who don't require a tutor; Talking guests and dumb-waiters; Warm plates and hot potatoes." Our results suggest a similar 'dinner party rule' for electoral systems.

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Figure 1. The Non-Linear Trade-Off Between Accountability and Representation
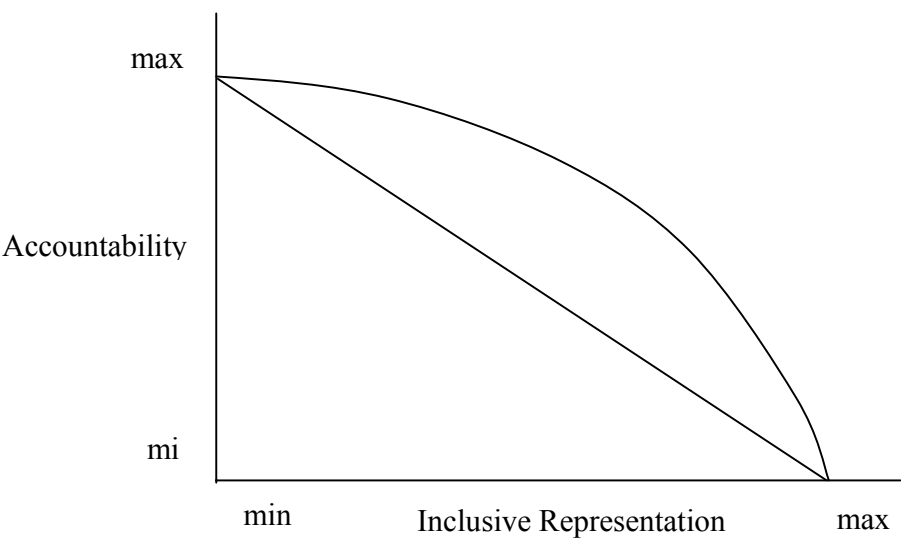
Table 1. Electoral Systems in Modern Democracies, Grouped by Median District Magnitude

Median DM = 1	2 to 3	4 to 6	7 to 10	11 to 20	Greater than 20
Australia	Argentina (~1983) √	Austria (1949, 1962-1970)	Argentina (1983) √	Austria (1971-) √	Czech Rep. (1996-2000) √
Bangladesh	Chile	Belgium (~1965)	Austria (1953-1959) √	Benin (1991)	Germany (-1953) √
Botswana	Dominican Republic (1994-)	Benin (1995-)	Belgium (1965)	Bolivia (-1989)	Israel √
Bulgaria (1990)	Ecuador (-1996)	Bolivia (1993-)	Brazil	Croatia †√	Italy (-1992) √
Canada	El Salvador (1997-)	Colombia (1970-)	Bulgaria (1991-) √	Czech Republic (2002-) √	Lesotho
France (except 1986)	Ireland (1969-1977)	Costa Rica (1978-)	Colombia (1960-1966)	Czechoslovakia √	Mexico √
India	Mali	Denmark (-1968)	Costa Rica (1958-1974)	Finland	Moldova √
Italy (1994-2001) †√	Mauritius	Dominican Rep. (1978-90)	Cyprus √	Germany (1957-) √	Namibia
Jamaica	Mongolia (1992)	Ecuador (1998)	Denmark (1971-) √	Latvia √	Netherlands √
Japan (1996-) †	Nicaragua (1995-)	El Salvador (-1994)	Estonia √	Macedonia (2002)	New Zealand (1996-)
Lithuania †√	Panama (1989)	France (1946-1956)	Honduras (1993-)	Mozambique √	Slovakia √
Macedonia (-1998)	Paraguay	France (1986) √	Indonesia √	Poland (1991)	South Africa
Madagascar †	Peru (2001-)	Greece √	Nicaragua (1990)	Poland (2001-) √	Uruguay
Malawi	Thailand (1992-1996)	Guatemala	Norway (1953-)	Sweden (1970-) √	
Mongolia (1996-)	Venezuela (1993-)	Guyana (1992-1997)	Peru (1980)	Switzerland (-1963) √	
Nepal		Honduras (1989)	Poland (1993-1997) √		
New Zealand (-1993)		Hungary √	Romania		
Panama (1994-) †√		Ireland (-1965, 1981-)	Sri Lanka (2001-)		
Papua New Guinea		Japan (-1993)	Sweden (-1968) √		
Philippines (-1993)		Norway (1949)	Taiwan †√		
Philippines (1998-) †√		Peru (1985-1990)			
Russia †√		Portugal			
Sri Lanka (-1977)		Serbia & Montenegro			
South Korea †		Spain √			
Thailand (2001) †√		Switzerland (1967-1999) √			
Trinidad & Tobago		Turkey √			
Ukraine		Venezuela (-1998)			
United Kingdom					
United States					

Note: † indicates a mixed-member parallel system. √ indicates a legal threshold for representation.

Figure 2. Trade-Off Between Disproportionality of Representation and Party System Fragmentation
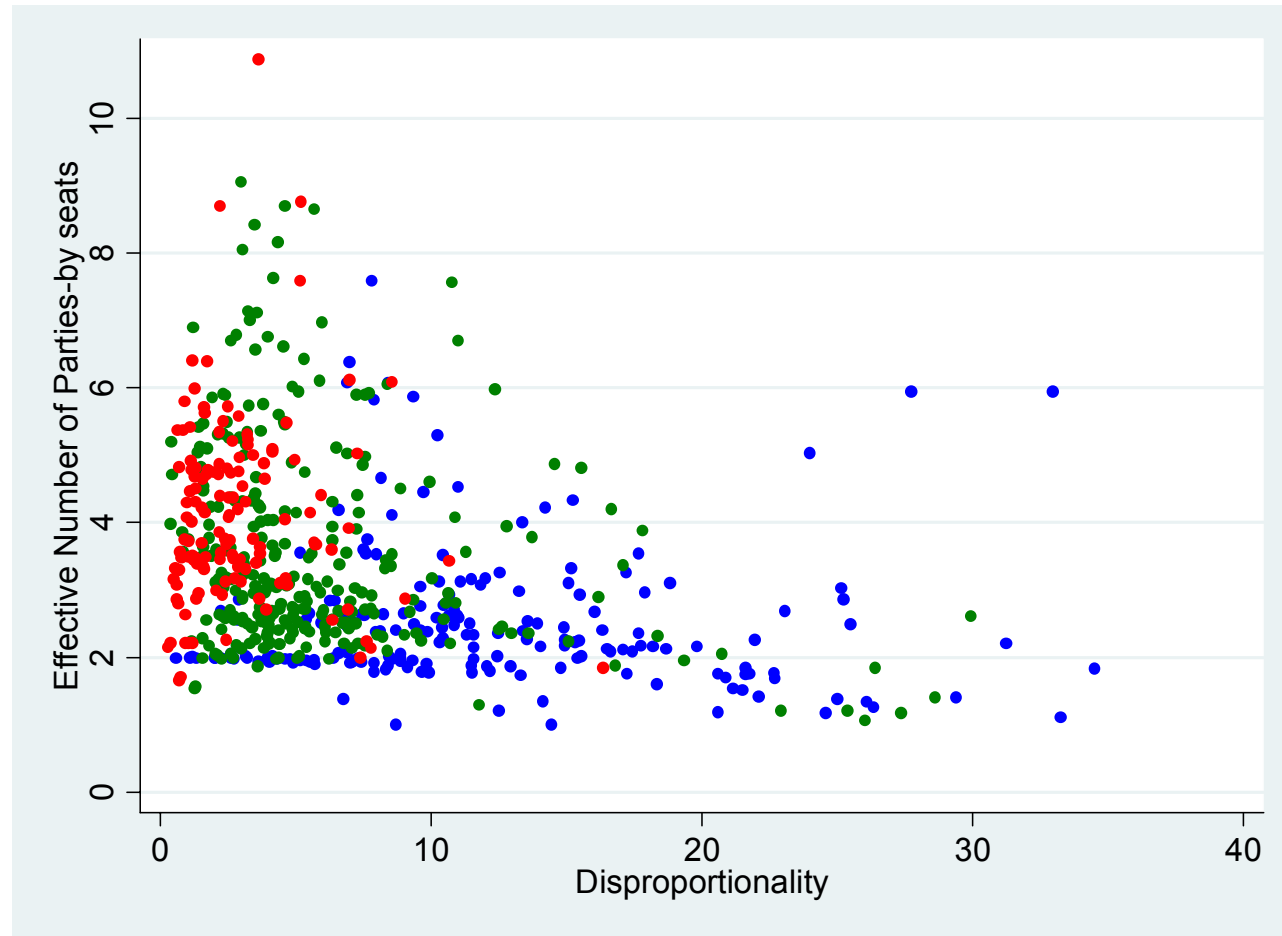
Note: Blue = system with single-member districts, Green = system with a median district magnitude of between 2 and 10. Red = system with a median district magnitude greater than 10.

Table 2. Effect of District Magnitude on Representation

Dependent variable =	Disproportionality				Voter-government distance			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Median district magnitude	-.05***	-.01**	-.10***	-.02	-.01	.02	-.09	.01
	(.004)	(.003)	(.03)	(.03)	(.02)	(.02)	(.08)	(.10)
1 / (median district magnitude)		10.05***		8.66***		15.08***		14.14*
		(.96)		(1.71)		(3.04)		(8.11)
Legal threshold	-.21*	.38***	.04	.28	-1.27**	.02	-3.15*	-1.14
	(.12)	(.11)	(.39)	(.38)	(.55)	(.66)	(1.69)	(2.04)
Mixed-member parallel	3.61**	-2.67**	3.46**	-1.52	3.48	-9.15**	-.14	-14.31
	(1.42)	(1.35)	(1.61)	(1.86)	(3.00)	(3.69)	(5.73)	(9.93)
Mixed-member compensatory	-.56	.77	-1.94***	-1.69	-3.57*	2.70	3.34	9.21
	(.81)	(.63)	(1.51)	(1.47)	(2.05)	(2.37)	(5.12)	(6.12)
Country fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
N	610	610	610	610	310	310	314	314
R-squared	.43	.56	.12	.16	.14	.19	.08	.09

Note: Method: OLS regression. Standard errors in parentheses. Models that pool observations across countries are estimated with panel-corrected standard errors. * $p \le .1$, ** $p \le .05$, *** $p \le .01$. All models contain the following control variables: Presidential regime, Hybrid regime, Parliamentary regime, Election year, Political freedom, Economic freedom, Population, GDP/head, Economic growth, GINI index, Age of democracy, Federalism. The models without country fixed effects also contain the following control variables: Ethnic fractionalization, Latitude, Former colony of the UK, Former colony of Spain or Portugal, Former colony of another country, Americas region, Western Europe region, Former Communist region, Pacific region, South Asia region, and Africa and Middle-East region. The full results are available on request.

Table 3. Effect of District Magnitude on Accountability

| Dependent variable =	Effective number of parties (by seats)				Number of parties in government				Single party government	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Method =	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	Logit	Logit
Median district magnitude	.01***	.01***	.003	-.007	.02***	.01***	.0001	.001	-.04***	-.03***
	(.002)	(.001)	(.006)	(.007)	(.001)	(.001)	(.007)	(.008)	(.01)	(.01)
									-.01	*-.01*
1 / (median district magnitude)		-1.23***		-.99**		-.82***		.13		1.75***
		(.27)		(.40)		(.22)		(.45)		(.51)
										.44
Legal threshold	-.01	-.09***	-.29***	-.32***	.05*	.004	-.05	-.05	-.10	-.04
	(.03)	(.03)	(.09)	(.09)	(.03)	(.04)	(.10)	(.10)	(.08)	(.09)
									-.03	*-.01*
Mixed-member parallel	-.04	.72	.23	.80*	-.01	.53	-.39	-.47*	.73	-.37
	(.45)	(.63)	(.37)	(.43)	(.41)	(.56)	(.43)	(.52)	(.58)	(.67)
									.18	*-.09*
Mixed-member compensatory	.43***	.27***	1.66***	1.63***	.41**	.29	.97**	.98**	-2.35***	-2.38***
	(.13)	(.08)	(.35)	(.34)	(.17)	(.18)	(.40)	(.40)	(.71)	(.72)
									-.41	*-.42*
Country fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No
N	610	610	610	610	572	572	572	572	567	567
R-squared	.31	.34	.17	.18	.38	.39	.25	.25	.31	.32

Note: Standard errors in parentheses. Models that pool observations across countries are estimated with panel-corrected standard errors. In models 17 and 18, the Pseudo R-squared is reported and the marginal effects are in italics. * $p \leq .1$, ** $p \leq .05$, *** $p \leq .01$. All models contain the following control variables: Presidential regime, Hybrid regime, Parliamentary regime, Election year, Political freedom, Economic freedom, Population, GDP/head, Economic growth, GINI index, Age of democracy, Federalism. The models without country fixed effects also contain the following control variables: Ethnic fractionalization, Latitude, Former colony of the UK, Former colony of Spain or Portugal, Former colony of another country, Americas region, Western Europe region, Former Communist region, Pacific region, South Asia region, and Africa and Middle-East region. The full results are available on request.

Table 4. Effect of District Magnitude on Government Performance

| Dependent variable =	Total government spending				Budget surplus(deficit)				Human development index			
	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Median district magnitude	.06*** (.02)	.07*** (.02)	-.07 (.07)	.07 (.26)	.03*** (.01)	.03*** (.01)	.08 (.06)	.28 (.21)	.0005*** (.00004)	.0004*** (.00006)	-.0001 (.0002)	.00003 (.0003)
1 / (median district magnitude)		2.74 (2.59)		6.03 (10.57)		.49 (.99)		8.39 (8.58)		-.02** (.01)		.007 (.009)
Legal threshold	-1.01*** (.33)	-.77 (.54)	.48 (.72)	1.22 (1.48)	-.28 (.29)	-.24 (.36)	-.26 (.58)	.80 (1.23)	.005*** (.001)	.004*** (.002)	.004*** (.001)	.004*** (.001)
Mixed-member parallel	7.61*** (1.51)	4.89 (4.32)	5.27 (3.24)	4.55 (3.47)	-2.57** (.97)	-3.06** (1.61)	-.13 (2.68)	-1.04 (2.84)	.03*** (.01)	.04*** (.01)	-.01* (.01)	-.01* (.01)
Mixed-member compensatory	.23 (2.57)	.60 (2.99)	-6.92*** (2.24)	-8.33** (3.34)	2.71*** (.55)	2.79** (.59)	2.22 (1.99)	.06 (2.97)	-.04*** (.01)	-.04*** (.01)	.004 (.005)	.003 (.006)
Country fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
N	324	324	324	324	320	320	320	320	440	440	440	440
R-squared	.76	.76	.54	.54	.35	.35	.15	.15	.76	.76	.87	.87

Note: Method: OLS regression. Standard errors in parentheses. Models that pool observations across countries are estimated with panel-corrected standard errors. * p ≤ .1, ** p ≤ .05, *** p ≤ .01. Models of government spending and surplus/deficit contain the following control variables: Presidential regime, Hybrid regime, Parliamentary regime, Election year, Political freedom, Economic freedom, Population, GDP/head, Economic growth, Trade, Proportion of population aged 15 to 64, Proportional of population over 65, GINI index, Age of democracy, Federalism. Models of HDI shown here do not include GDP/head or GINI. Including both does not affect estimated effects of district magnitude or 1/DM. The models that pool observations across countries also contain the following control variables: Ethnic fractionalization, Latitude, Former colony of the UK, Former colony of Spain or Portugal, Former colony of another country, Americas region, Western Europe region, Former Communist region, Pacific region, South Asia region, and Africa and Middle-East region. The full results are available on request.

Figure 3. Estimation of the Effect of District Magnitude on Disproportionality
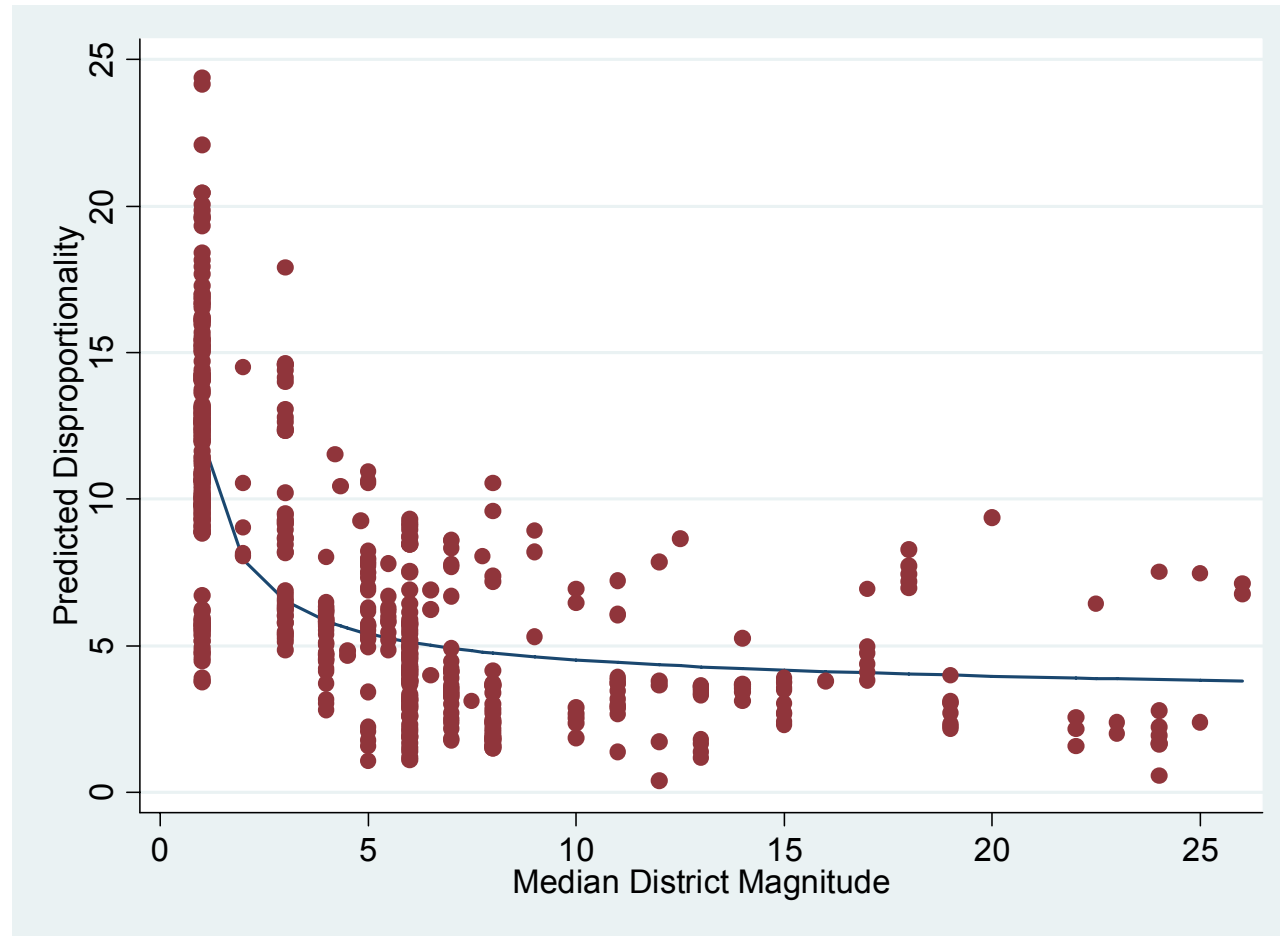
Note: The line is a bivariate asymptotic regression model, using the predicted values for disproportionality from model 4 in Table 2 for electoral systems with a median district magnitude of less than 30.

Figure 4. Estimation of the Effect of District Magnitude on the Number of Parties in Government
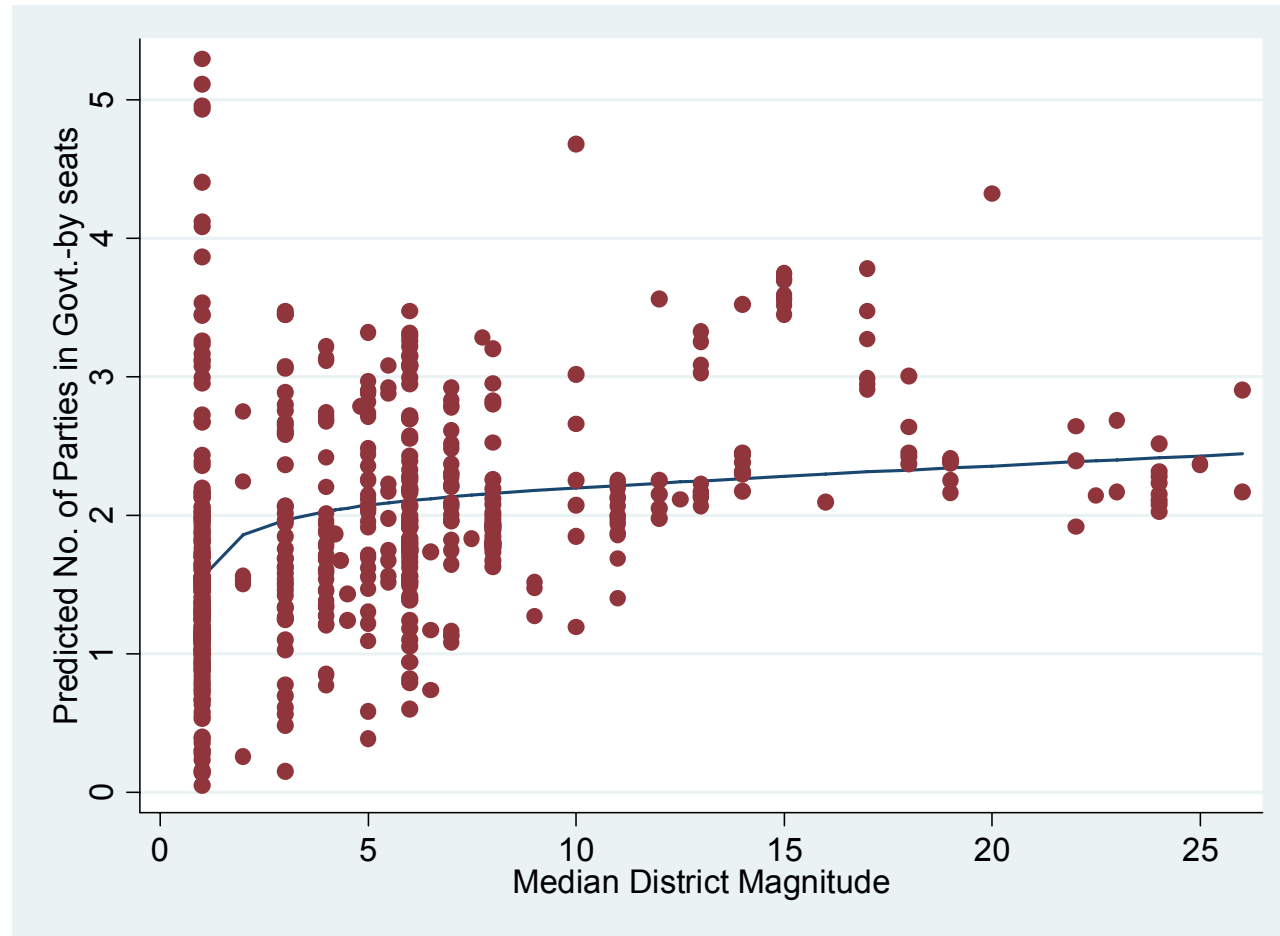
Note: The line is a bivariate asymptotic regression model, using the predicted values for the number of parties in government from model 16 in Table 3 for electoral systems with a median district magnitude of less than 30.

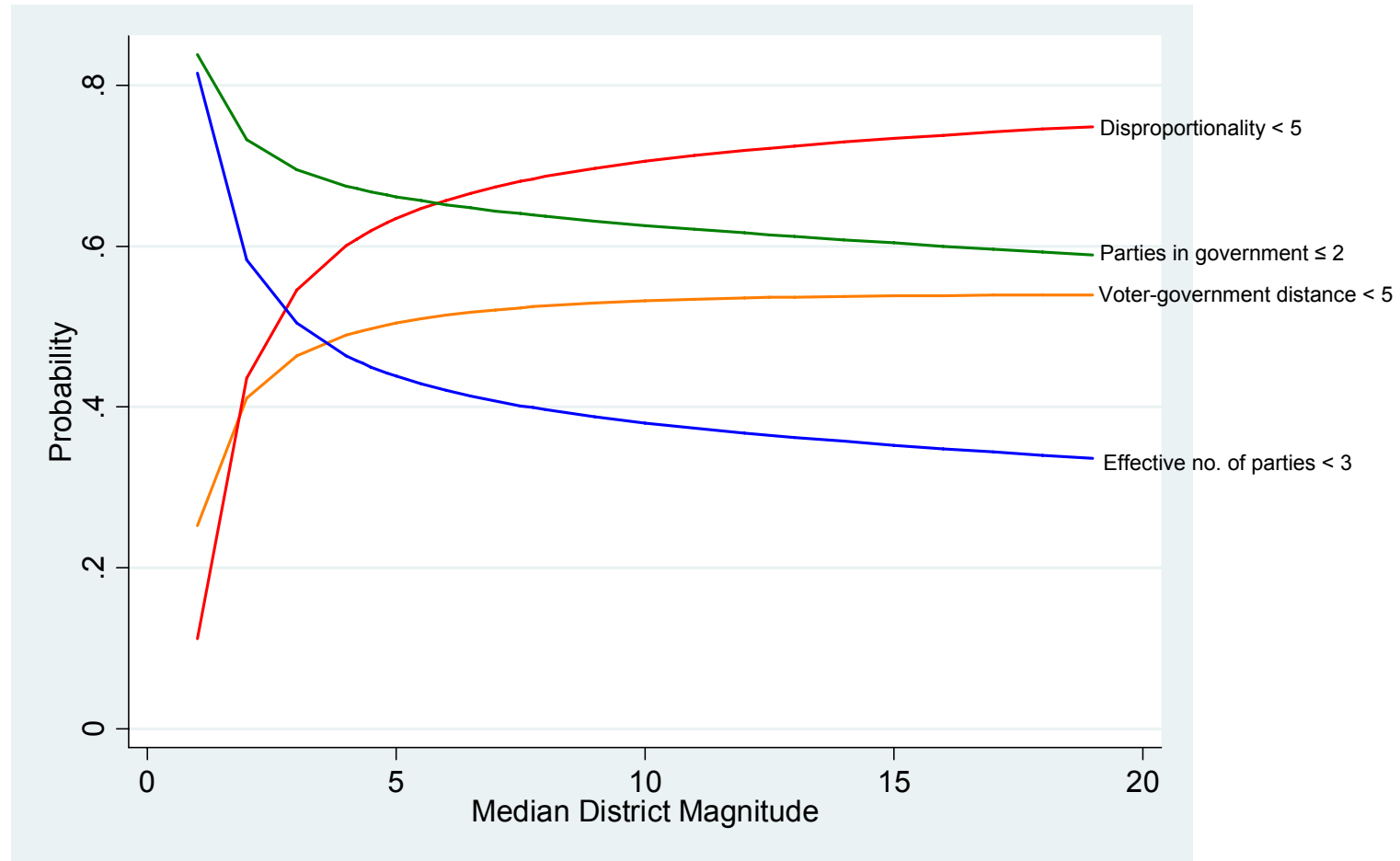**Figure 5. District Magnitude and the Probability of Favorable Outcomes**

Figure 6. District Magnitude and the Probability of Combined Favourable Outcomes

Disproportionality < 5 &
V-G distance < 5 &
Effective no. of parties < 3 &
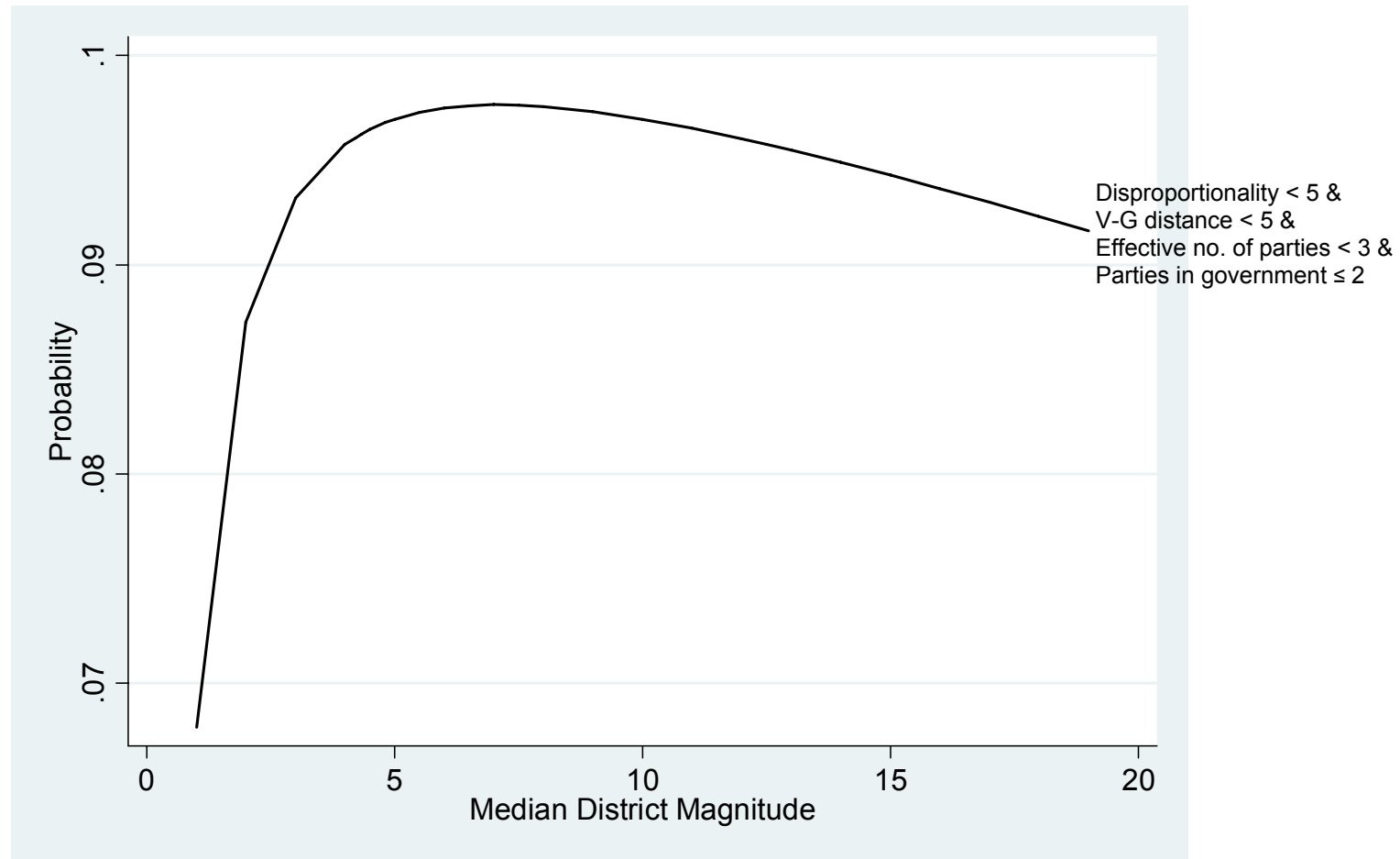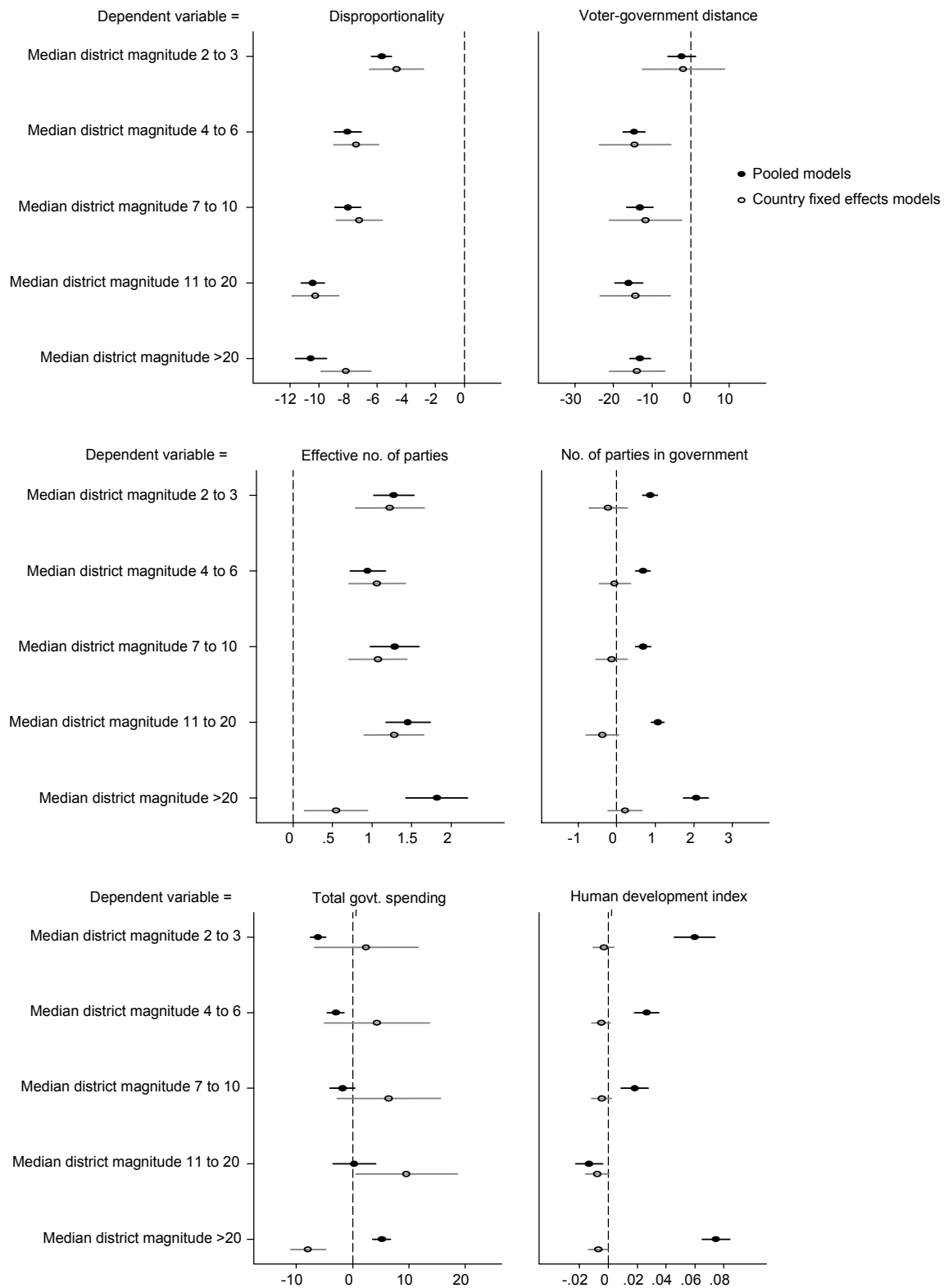Parties in government ≤ 2

Figure 7. The Effect of District Magnitude Thresholds

Note: These figures plot the coefficients and standard errors from a series of regression. The baselines in the model are the outcome of elections with single-member districts. The models that pool observations across countries are estimated with panel-corrected standard errors. See the note to Table 2 for the list of control variables which are included but not reported here. The full results are available on request.

Appendix A. Descriptive Statistics and Full Results

Table A1. Descriptive Statistics on Key Variables

	Obs	Mean	Median	Std.Dev.	Minimum	Maximum
Dependent Variables						
Disproportionality	610	7.09	5.07	6.24	.28	34.52
Voter-government distance	314	8.44	5.90	8.32	0	46.43
Effective number of parties (by seats)	610	3.36	2.96	1.50	1	10.87
Parties in government	572	2.06	2	1.49	1	14
Single party government	567	.49	0	.50	0	1
Total government spending	327	27.92	26.41	11.16	9.09	57.07
Budget surplus/deficit	322	-3.28	-2.44	4.07	-18.72	13.54
Human development index	440	.81	.85	.13	.32	.97
Electoral System Variables						
Median district magnitude	610	14.24	5	31.49	1	150
1/(Median district magnitude)	610	.42	.20	.40	.007	1
Legal threshold	610	1.26	0	1.99	0	10
Mixed-member parallel	610	.04	0	.20	0	1
Mixed-member compensatory	610	.05	0	.22	0	1

Appendix B. Coding of the Variables and Sources

Age of democracy. Measured as election year minus the year in which the country first scored +6 or above on the Polity IV index, plus 1 (i.e. first year a country is democratic = 1).

Budget surplus/deficit. Central government budget surplus (if positive) or deficit (if negative), as a percentage of GDP, constructed using the item Government Finance-Deficit and Surplus in the IFS, divided by the GDP at current prices and multiplied by 100. Source: Persson and Tabellini (2003).

Disproportionality. Disproportionality index (Gallagher formula). Source: Gallagher (2007), except Latin American elections calculated from data in Nohlen (2005); certain African countries (Benin, Bostwana, Ghana, Lesotho, Madagascar, Malawi, Mali, Mauritius, Mozambique and Namibia) calculated from data in Nunley (2004), and others (Benin, Botswana, Malawi, Mali, and Mauritius) calculated from data in Nohlen, Krennerich and Thibaut (1999).

Economic freedom. Freedom House score. Data for early elections entered at value of earliest datapoint. Source: most values from Norris (2005).

Effective number of parties (by seats). Effective number of (legislative) parties in the election, according to lower chamber seat shares. Source: Golder (2005); Gallagher (2007).

Effective number of parties (by votes). Effective number of (electoral) parties in the election, according to vote shares. Source: Golder (2005); Gallagher (2007).

Election year. Year of election. Source: Golder (2005); various web-based sources.

Ethnic fractionalization. Ethnic fractionalization index according to Fearon (2003). The index includes ethnic, linguistic and religious groups, using data from CIA World Factbook, the Encyclopedia Britannica, relevant Library of Congress Country Studies, the Minorities at Risk dataset, national censuses, and various other sources. Fearon's data is from 1990 to 1995, but his numbers are constant values for this period. We have entered the same value for all elections in each country, which means that our coding of this variable only varies across countries and does not vary within countries. Two missing values (for Serbia and Montenegro and Taiwan) were entered as the mean value of this variable.

Federalism. 1 = country has a federal political structure, 0 = other. Source: Adserà, Boix and Paine (2003).

Former colony of another country. 1 = former colony of a country other than UK, Spain or Portugal, 0 = other.
Former colony of Spain or Portugal. 1 = former colony of Spain or Portugal, 0 = other.
Former colony of the UK. 1 = former colony of United Kingdom, 0 = other.
Source: Persson and Tabellini (2003).

GDP/head. GDP per capita, 1990 International Geary-Khamis dollars, divided by 1000. Source: Maddison (2007), except for Cyprus, from Groningen Growth and Development Centre data, http://www.ggdc.net, and Guyana and Papua New Guinea, from Norris (2005).

GINI index. Gini index of economic inequality. Source: Deininger (2006); United Nations University-World Institute for Development Economics Research (2005). Data imputed for missing values from nearest year where data are available.

Growth. Mean three-year GDP growth (two years prior to election year + election year). Source: Maddison (2007), except for Cyprus, from Groningen Growth and Development Centre data, http://www.ggdc.net, and Guyana and Papua New Guinea, from Cheibub (2006b). One missing value (Israel 1949) entered as the mean value of the variable.

Human Development Index. United Nations Human Development Index. Source: http://hdr.undp.org/en/statistics/.

Latitude. Latitude of the capital city of a country (ranging from 90˚S to 90˚N), rescaled between 0 (90˚S) and 1 (90˚N). I.e. a measure of how far north a country is. Source: http://www.mapsofworld.com/utilities/world-latitude-longitude.htm.

Legal threshold. National-level legal threshold. Source: Center on Democratic Performance (2006), Mainwaring (1991).

Median district magnitude. Median district magnitude in the election. This means the magnitude (M) of the district for which there are an equal number of districts with greater, and lesser, values on M. We measure the median district magnitude as follows: in non mixed-member systems, M is the magnitude of the district with an equal number of larger and smaller districts; in compensatory mixed-member system, M is the median size of the PR districts; and in mixed-member parallel systems, M is the median size of all districts. Source: Golder (2005); Center on Democratic Performance (2006); Reynolds, Reilly and Ellis (2005); Benoit and Schiemann (2001).

Median district magnitude 1. 1 = median district magnitude of 1, 0 = other.
Median district magnitude 2 to 3. 1 = median district magnitude of between 2 and 3 (inclusive), 0 = other.

Median district magnitude 4 to 6. 1 = median district magnitude of between 4 and 6 (inclusive), 0 = other.
Median district magnitude 7 to 10. 1 = median district magnitude of between 7 and 10 (inclusive), 0 = other.
Median district magnitude 11 to 20. 1 = median district magnitude of between 11 and 20 (inclusive), 0 = other.
Median district magnitude >20. 1 = median district magnitude of more than 20, 0 = other.
Source: Golder (2005); Center on Democratic Performance (2006); Reynolds, Reilly and Ellis (2005); Benoit and Schiemann (2001).

Mixed-member parallel. 1 = a mixed-member (single-member district plus multi-member district) system in which seats in the multi-member tier are *not* allocated to compensate for disproportionalities in the single-member tier, 0 = other.
Mixed-member compensatory. 1 = a mixed-member (single-member district plus multi-member district) system in which seats in the multi-member tier are allocated to compensate for disproportionalities in the single-member tier, 0 = other.
Source: Golder (2005).

No. of parties in government. Variable denotes the total number of parties holding cabinet portfolios in first government formed after election. Source: Huber (2007) for Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom. Data for all other cases calculated from information in *Keesing's Record of World Events*.

Political freedom. Political freedom score from Polity IV. Source: most values from Norris (2005).

Population. Population of a country in the year of the election, divided by 1 million. Source: UN Population Division annual estimates. Where data is missing, the estimated population for the nearest year is entered.

Proportion of pop'n aged 15-64. Percentage of population between 15 and 64 years old in the total population.
Proportion of pop'n over 65. Percentage of population over the age of 65 in the total population.
Source: Persson and Tabellini (2003).

Regime-Hybrid. 1 = hybrid (parliamentary-presidential, semi-presidential) system, 0 = other.
Regime-Parliamentary. 1 = parliamentary system, 0 = other.
Regime-Presidential. 1 = presidential system, 0 = other.
Source: Cheibub (2006a), except for Switzerland, which we code as Hybrid.

Region-Africa and Middle-East. 1 = Benin, Botswana, Ghana, Israel, Lesotho, Madagascar, Malawi, Mali,. Mozambique, Namibia, South Africa, Turkey, 0 = other.

Region-Americas. 1 = Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, USA, Uruguay, Venezuela, 0 = other.

Region-Former Communist. 1 = Albania, Armenia, Bulgaria, Croatia, Czech Republic, Czechoslovakia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Serbia and Montenegro, Slovakia, Ukraine, 0 = other.

Region-Pacific. 1 = Australia, Fiji, Japan, New Zealand, Papua New Guinea, Philippines, South Korea, Taiwan, 0 = other.

Region-South Asia. 1 = Bangladesh, India, Indonesia, Mauritius, Mongolia, Nepal, Sri Lanka, Thailand, 0 = other.

Region-Western Europe. 1 = Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, 0 = other

Total government spending. Central government expenditures as a percentage of GDP, using the item Government Finance-Expenditures in the IFS, divided by GDP at current prices and multiplied by 100. Source: Persson and Tabellini (2003).

Trade. Sum of exports and imports of goods and services, as a share of GDP. Source: Persson and Tabellini (2003).

Voter government distance. Voter-government distance, based on location of median voter and median member of government, as calculated by HeeMin Kim and Richard Fording. The data for the US are dropped, so that only data for parliamentary systems are entered. For minority governments, we use difference between the location of the median voter and the median member of parliament. Source: Kim, Powell and Fording (2009).