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Local Districts, National Contexts, and the Number of Parties

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To date, electoral systems are conceptualised as setting an 'upper bound' to, or defining a 'carrying capacity' for, the number of parties or lists, and their effect is assessed at the district level. This article adds to the empirical study of electoral systems by analysing a vast database of district-level electoral returns. The argument focuses on the demand and supply of viable electoral candidates, which are conditioned by the interplay of strategic entry (by the party rank and file) and strategic voting (by the electorate). Drawing on a database of almost 18,000 electoral districts taken from 15 West European countries, the empirical analysis yields a number of insights: most specifically, (1) district magnitude only becomes binding and effective when a higher social demand meets a lower carrying capacity of the electoral district; (2) the provision of upper tiers undermines the emergence of Duvergerian equilibria within the primary electoral districts.

This article provides a comparative analysis of the political consequences of electoral systems at the district level. It concentrates on the effects of (local) district magnitudes on the fragmentation of (local) electorates and explicitly models the context-dependency of electoral system effects. Relating electoral system features, predominantly the 'all-important factor' of district magnitude, to the number of candidates or lists has been labelled the 'core of the core' of electoral system research, and many have argued that it is time to close the book on these largely settled research questions (Shugart 2005: 31). Various studies have effectively compiled a vast body of empirical evidence and detected robust associations of district magnitude with fragmentation indicators at the national level (see Amorim Neto and Cox 1997; Brambor *et al.* 2006; Clark and Golder 2006; Filippov *et al.* 1999; Golder 2006; Lijphart 1994; Ordeshook and Shvetsova 1994; Taagepera and Shugart 1989, 1993).

This contribution aims at moving the perspective to the district level and testing the robust evidence gathered by national-level analyses with a rich and context-sensitive dataset that includes almost 18,000 electoral districts from 17

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West European countries. Although the principal findings of this article actually reinforce many results previously demonstrated with national-level electoral data, it is far too early to close the book on these important matters. The focus on the district level addresses the arena where the causal forces behind Duverger's law actually operate and exploits rich datasets that have only recently been made available for empirical analysis. The key analytical benefit is to explore contextual variation in the empirical links of district magnitude with the number of viable electoral contenders. This cogently relates interactions of the demand for (as given by the number of societal groups seeking representation) and the supply of political parties (as determined by the permissiveness of the electoral system). While there are currently only a few studies which introduce district-level electoral returns to a full-fledged comparative analysis (see Chhibber and Kollman 1998, 2004; Singer 2013; Singer and Stephenson, 2009), I am not aware of any previous attempt to systematically model contextual heterogeneity and thereby explore the consequences of district magnitude across various elections and countries.

Theoretically, this article builds upon two different theoretical strands which their respective authors have labelled 'generalisations' of Duverger's law: The 'generalized Duverger's law' by Taagepera and Shugart (1989, 1993) links district magnitude and the number of viable competitors by unconditional comparative statics, specific magnitudes produce a specific number of candidates or lists plus an error interval. The more recent 'direct generalization of Duverger's law' by Cox (1994, 1997) instead proposes conditional comparative statics: district magnitude merely provides a specific carrying capacity for candidates or lists and whether local district magnitudes may become binding and effective or not actually depends on the societal demands by groups seeking representation. The empirical results underscore both the significance of electoral systems for the structure of (local) electorates and their profound context-dependency: (1) district magnitude only becomes binding when a higher social demand meets a lower carrying capacity of the electoral district; (2) the magnitude of primary electoral districts only tends to be binding when the electoral structure provides no upper tiers or allocates only a very limited share of seats in the upper tiers.

The Two 'Laws' of Electoral Systems

This paper explores the empirical links of district magnitude and the number of electoral contenders both within and across heterogeneous electoral and national contexts. So as to clarify these pivotal issues of electoral systems research, this section builds upon and discusses two different generalisations of Duverger's law: the 'generalized Duverger's law' derived by Rein Taagepera and Shugart (1993); and the 'direct generalization of Duverger's law', the $M + 1$ rule proposed by Gary W. Cox (1994, 1997). The first one refers to an inductive generalisation at the macro level, and the second one spells out a theoretically valid model at the district level.

Comparative Statics of District Magnitude

Taagepera and Shugart (1989, 1993) aimed at unifying 'Duverger's law' and 'Duverger's Hypothesis'. Searching for a general expression that ties together both propositions, the authors turn towards an inductive inspection of empirical electoral returns. They reason that their measure of electoral fragmentation, being the effective number of electoral parties, is linked to district magnitude by something like

$$E[N|M] = 1.25 \cdot \lg M + 2.5$$

with N_v denoting the effective number of electoral parties and M denoting the average district magnitude at the national level. The equation allows for the prediction of fragmentation levels that will, as Taagepera and Shugart (1989) argue, usually fall within an interval of +/–1 unit from the proposed comparative statics. Note that the (common) logs capture the diminishing marginal effects of increasing district magnitudes.

Linking the effective number of electoral parties with logged district magnitudes has been one of the cornerstones of the empirical literature. Although diverse cases have been included, different decisions have been taken to measure key concepts and to include controls for any seminal analyses regarding the political consequences of electoral systems started out by linearly relating some party count with some logged or otherwise transformed indicator of district magnitude (Lijphart 1994; Taagepera and Shugart 1989, 1993). Subsequent studies regularly added interactions of institutional and societal structures and allege that more proportional electoral systems are empirically associated if (and only if) there is also a high level of societal diversity. This line of thinking is clearly more in line with the original emphasis made by Duverger (see Amorim Neto and Cox 1997; Brambor *et al.* 2006; Clark and Golder 2006; Filippov *et al.* 1999; Golder 2006; Ordeshook and Shvetsova 1994).

While this tradition has contributed to a cumulative research programme, there are still a number of ambiguities and conceptual problems. First, any linkage between the national number of parties and the national average features of the respective electoral system will be a rough, inductive generalisation. Secondly, Taagepera and Shugart (1989) also stick with the problematic idea of a multiplying effect of electoral rules: The more permissive an electoral system (i.e. the higher the district magnitude), the more viable parties will be in the electorate. This notion is established as a quasi-deterministic argument which does not take into account intervening factors such as social heterogeneity or the collective action problems partisans face when setting up their platforms (as spelled out in detail by Olson 1965).

Establishing an Upper Bound

For Duverger, the primary dependent variable is the number of political parties at the national level, but he was ready to assert, 'the true effect of the simple-majority [plurality] system is limited to local bi-partism ... the creation of a two-party system inside the individual constituency' (Duverger 1954: 223). Gary W. Cox has picked up the earlier arguments. His work utilises and combines both classic statements of formal theory and the inductive tradition of data analysis in comparative political science. He was able to strengthen the causal argument, broaden its applicability, and attach conditions to its functionality (Cox 1994, 1997, 1999).

Formal modelling suggests that in each single-member plurality district ($M = 1$) there will be only two vote-getting candidates in a game-theoretic equilibrium. Subsequently, Cox (1997: 99) extends his arguments to multi-member districts ($M > 1$). As a 'direct generalization of Duverger's law', he suggests that there may be no more than $M + 1$ viable candidates in each district of the magnitude M. This proposition, labelled the '$M + 1$ rule', is the central building block of Cox's contribution to the analysis of electoral systems. The formal statement does not imply any unconditional comparative statics of electoral systems, but in contrast conceptualises institutional constraints as erecting an upper limit or a carrying capacity for the number of viable candidates or lists in a game-theoretic equilibrium.

Cox also provides a thorough discussion of the conditions and the limits of the $M + 1$ rule. Focusing on the analysis of real-world data, he posits that strategic voting seems 'to fade out rapidly for district magnitudes above 5' (Cox 1997: 100, 141). He continues to argue that larger magnitudes do not tend to be binding, because these districts imply much smaller and effectively almost indistinguishable vote gaps, which separate winners from losers and thus undermine strategic behaviour by voters and parties. These claims are supported by district-level returns from Columbian, Japanese, and Spanish elections. The notion that strategic entry and strategic voting happen to be ineffective in medium-sized and large proportional representation (PR) districts has indeed been contested. Empirical contributions have referred to evidence on strategic behaviour that also applies to larger districts. For instance, Gschwend (2007) and Gschwend and Stoiber (2012) urge for a closer look at the expectation formation processes and demonstrate that voters may effectively also react strategically when incentives are allegedly much weaker. Their analyses of district-level data from Portuguese and Finnish elections show that voters even continue to strategically desert trailing parties when district magnitudes are at about $M = 20$.

A Context-Sensitive Model of Electoral Systems

This contribution follows the trails of Duverger (1954) and Cox (1997) in conceptualising electoral systems as an institutional means to regulate the supply

of candidates and lists by setting an 'upper bound' for or a carrying capacity of viable competitors within an electoral district. The sum of these features is key to understanding how electoral systems are dependent upon and embedded within their social and political context.

Providing the Demand for Candidates or Political Parties

Electoral system theories, however, usually do not address the demand side, meaning that the actual number of societal groups or interests seeking representation is usually considered to be exogenous and left unexplained. The sociological perspective has traced back the nature and number of candidates or political parties to the type and the number of substantial cleavages in a society (Grumm 1958; Lipset and Rokkan 1967; Lipson 1964; Rokkan 1970).

The sociological approach comes in pure variants which put forward an all-out criticism of institutional analysis: 'the method of voting remains a rather small consideration among the complex and infinitely diverse factors that, combined differently in each national society ... condition political life' (Lavau 1953: 46). Authors who suggest a more actor-centred perspective have contested these notions. Most notably, Olson (1965) has sharply criticised the apparent belief that social interests will somehow automatically organise in political parties to ignore imminent collective action problems which may, among other sources, arise from the institutional context. Therefore, most scholars to date subscribe to an interactive perspective that traces the number of parties back to a societal demand of groups seeking representation and an institutional supply by the electoral system.

Party Formation from Bottom Up and from Top Down

Note that the model proposed by Cox (1997) effectively implies a bottom-up logic of electoral competition and party formation. Strategic coordination happens in two successive stages within each analytically isolated electoral district and across the various electoral districts in a country. It therefore evolves in another, second-stage coordination game when the locally viable competitors decide to link (or not to link), to coordinate (or not to coordinate) across the various districts of an electoral system so as to form a nationalised political party (or to remain a regionalised political force). Cox (1997: 181–202) specifies national policy goals, the presidency, the premiership, and the existence of upper-tier seats in the electoral system as potential factors pressing towards cross-district linkage. Chhibber and Kollman (1998, 2004) add that the regionalisation or nationalisation of the British, Canadian, Indian, and US party systems depends on the competencies assigned to hierarchically ordered levels of government.

This perspective could, however, be contested by the possibility of a reverse top-down logic when parties have been previously established at the

national level and subsequently field candidates or lists in local electoral districts. Once political parties are established as organised, national-level political institutions, local lists and candidates may frequently be launched top-down by political elites who, by branding a candidate, make him/her eligible. Any organised and ambitious political party will tend to field candidates in any possible electoral district, regardless of the actual chances of winning a seat, in order to showcase itself as a serious contender for national-level political office. In an early reply to Duverger, Colin Leys has tried to redirect the focus towards the macro level and argued that strategic voting 'occurs in favor not of the two parties which are in the lead locally, but *in favor of the two parties which have the largest number of seats in Parliament, regardless of their local strength*' (Leys 1959: 149; emphasis original). Leys emphasises that voters may care more about party competition at the national than at the local level, because any vote that does not contribute to strengthening a party that could realistically enter government may be considered wasted. Furthermore, voters might also know much more about national than about local party competition and thus use the national race as a proxy to reason about potential local circumstances. If this argument can be sustained, the presence of top-down logics may seriously undermine the independence of strategic coordination in each isolated electoral district and thereby limit the applicability of the $M + 1$ rule.

The balancing of pressures from above and from below is certainly crucial for the decision-making by voters and party elites and affects the emergence of strategic voting and strategic entry. If the top-down argument can be theoretically defended and empirically sustained, the effectiveness of strategic entry may be seriously undermined and the ballots presented to the voters in small and large districts may effectively look the same. In turn, this implies that the Duvergerian logic would be exclusively (or at least predominantly) driven by strategic voting. But this also implies that voters are able to sort out strategic incentives at the local and at the national level when they cast their vote. The argument by Duverger (1954) and Cox (1997) assumes that voters are aware of local district magnitudes, the thresholds set for the representation of small parties, the presence and effects of upper tiers, and the potential outcome of the local electoral race. In contrast, the argument by Leys (1959) implies that voters potentially know a lot more about and react to the political programmes and candidates, the potential outcome of the elections, and options for coalition-building at the national level. Sure enough, voting for a locally hopeless candidate does not make any 'rational' sense at either the local or the national level, but the voters' perception might of course be a different one.

These arguments leave us with two competing perspectives on the goals and the informational resources that condition strategic coordination: The bottom-up hypothesis implies that voters and party elites are informed about and respond to local electoral standings and incentives within their respective district. In contrast, the top-down perspective presumes that voters care very little and know very little about the institutional features of and likely electoral

results within each local district and instead use proxies taken from the national level.

Single-Tier and Multi-Tier Districting

The district structure also comes with strong implications for strategic coordination and determines whether district magnitudes may be empirically binding or not. According to Cox (1997: 48), any electoral district that cannot be partitioned into smaller districts in which seats are allocated are 'primary' electoral districts, while those which can be partitioned into a number of primary districts are called 'secondary' districts.

In single-tier systems, when only primary districts are present, district magnitude as specified by the $M + 1$ rule may be binding. In the model proposed by Duverger (1954) and Cox (1997), parliamentary seats can only be won and lost within each of the individual districts, and both voters and party elites need to react to the institutional incentives established by district magnitude (and other electoral system features). Whether these district magnitudes are actually binding depends on the district structure. When there are only primary electoral districts, voting for a locally hopeless candidate or list does not make any instrumental sense, district magnitude may be binding and induce the emergence of Duvergerian equilibria.

In contrast, if the primary districts are grouped into secondary districts, the impact of the $M + 1$ rule might easily be watered down since voters and political elites might support lists or candidates which are out of the running in the primary districts in order to potentially win a seat in one of the secondary, upper-tier districts. As a consequence, votes that were unsuccessful in the primary districts could still be converted to seats in the secondary electoral districts if both tiers are connected. The applicability of the $M + 1$ rule is seriously undermined when the individual districts cannot be modelled as a series of independent coordination games. In single-tier electoral systems local district magnitudes may be binding given that the aforementioned contextual conditions are also met. More complex two- or multi-tier electoral systems effectively render district magnitude less binding and potentially irrelevant for the number of viable competitors in local districts.

Testing the Consequences of District Magnitude

This section aims at deriving a statistical model that is suitable for a systematic test of the key hypotheses. In general terms, I conceptualise the emergence of a party system to be driven by demand and by supply: (1) the demand for political parties is driven by the multiplicity of societal factions seeking representation in the political system (e.g. ethnic or religious groups); (2) the supply of political parties is not only affected by these groups' organisational capabilities, but also limited by the institutional rules of the game, most significantly

by the electoral system. Given that the aforementioned contextual and informational conditions which facilitate the emergence of Duvergerian equilibria at $M + 1$ are met, I explain the interaction of societal demand and institutional supply of political parties by three exemplary scenarios:

(1) In the first scenario, the societal demand for parties, as proxied by the number of societal groups seeking representation, is comparatively low or at least consistently lower than the electoral district's carrying capacity. As a consequence, district magnitude will not be binding and there should be no association between district magnitude and the number of viable parties or lists (or at least no association that is generated by electoral system).
(2) The second scenario implies that the number of candidates or lists which emerge from societal conflicts is consistently higher than the carrying capacity of $M + 1$ candidates or lists established by the district magnitude. From this, it follows that district magnitude will be binding and there should be a co-variation of magnitude and the number of candidates or lists in Duvergerian equilibrium.
(3) The third scenario specifically applies to electoral systems, which employ a wide range of different district magnitudes. Smaller districts, which have a carrying capacity below the number of groups seeking representation, may be limiting the proliferation of candidates and lists, while larger district magnitudes that have a carrying capacity higher than the number of groups will often not be binding at all. This also implies that N_v does not linearly increase with M, but that the empirical association of these core variables levels off for larger districts.

While strategic voting and strategic entry still operate even in larger PR districts (Gschwend 2007; Gschwend and Stoiber 2012), there are a number of reasons to assume that the marginal effect of district magnitude decreases at higher levels. It is much more difficult to gather precise information about which candidates or lists are competitive and which are trailing when districts become larger, although voters may of course also act upon less precise guesses about the standing of electoral races. Beyond the key features of the electoral system, the formal requirements which regulate the inclusion on the ballot and the organisational prerequisites for gaining sufficient visibility and, in turn attracting success, clearly increase when district magnitudes and local electorates become larger. Therefore, in the subsequent analysis, I will adhere to the idea of modelling district magnitude on a logged scale.[1]

As indicated before, the $M + 1$ rule does not posit unconditional comparative statics of district magnitude. The second and third scenarios, however, propose a conditional and context-sensitive association of these key variables. M and N will be related whenever the number of electoral contenders reaches or exceeds the carrying capacity of the electoral district and the specified contextual conditions for strategic coordination on $M + 1$ viable candidates or lists

are fulfilled. An upper bound is therefore either established by the institutional carrying capacity of the electoral system, as defined by the $M + 1$ rule, or set by the ethnic or religious fragmentation of a society. This implies that these two equations may be treated as exchangeable:

$$\mathrm{E}[N|M;F] = \min(M+1, F) = \beta_0 + \beta_1 \mathrm{lg}M + \beta_2 F + \beta_3 \mathrm{lg}M \cdot F$$

This implies that the number of viable contenders in a local district (N) is less than or equal to the minimum of the carrying capacity of the district (as defined by $M + 1$) and the degree of societal fragmentation (F). The interactive relationship of electoral systems and societal heterogeneity implies that $\beta_1 = \beta_2 = 0$ and $\beta_3 > 0$.

Concerning the institutional context, the provision of upper tiers conditions the mechanisms of strategic voting and strategic entry. When upper and lower tiers are linked by some sort of remainder, seat, or vote transfer, upper tiers might actually weaken the incentives set forth by the electoral system, inflate its carrying capacity, and render district magnitude less binding. In connected multi-tier systems, any votes that did not elect a candidate or list in the primary electoral districts could still be successful in the secondary ones, so that it may often be instrumentally rational in the short term to cast a vote for a locally hopeless candidate. Upper tiers may thus undermine the incentives produced by the wasted resources and wasted vote arguments and thus weaken strategic entry and strategic voting:

$$\mathrm{E}[N|M;F] = \beta_0 + \beta(\mathrm{lg}M + F + \mathrm{upper})$$

$$= \beta_0 + \beta_1 \mathrm{lg}M + \beta_2 F + \beta_3 \mathrm{upper} + \beta_4 \mathrm{lg}M \cdot \mathrm{F} + \beta_5 \mathrm{lg}M \cdot \mathrm{upper}$$

Since the provision of upper tiers tends to undermine the logics of strategic entry and strategic voting, I generally expect a higher number of candidates or lists in equilibrium when there is a significant share of upper-tier seats (this implies $\beta_3 > 0$). In addition, when seats are not exclusively allocated within the primary electoral districts, but also within secondary districts, I do not expect any covariance of local district magnitudes and the number of locally viable candidates or lists (i.e. $\beta_5 < 0$).

In order to fully address empirical variation in the rich dataset at hand, we estimate hierarchical linear models, which include random intercepts and random slopes at the election level (j). We assume that the random effects and the error term are independent and identically distributed (i.i.d.) and drawn from a multivariate normal distribution with $\zeta_{0j} \sim N(0, \psi_0); \zeta_{1j} \sim N(0, \psi_1)$ and $\varepsilon_{ij} \sim N(0, \theta)$:

$$\mathrm{E}[N|M;F] = (\beta_0 + \zeta_{0j}) + (\beta_1 + \zeta_{1j})\mathrm{lg}M + \beta_2 F + \beta_3 \mathrm{upper} + \beta_4 \mathrm{lg}M \cdot F + \beta_5 \lg M \cdot \mathrm{upper} + \varepsilon_{ij}$$

Data and Measurement

This section turns from theoretical concerns towards the presentation of the empirical data at hand. In the first step, the data and data sources are briefly reviewed, and in the second step basic decisions regarding the operationalisation of the key indicators at the district level and at the national level are introduced and defended.

District-Level Data Sources

For a long period of time, there has often been an asymmetry of electoral system theories, which focused on the district level, and the availability of reliable empirical information that was regularly only accessible for the national level. In past years there have been considerable achievements in the collection and publication of district-level electoral returns. One of the most exhaustive datasets was prepared by Daniele Caramani (2000), who compiled systematic and standardised district-level general election results, where available, for 18 West European countries from as early as 1830 until the end of the twentieth century.

In this study, I draw heavily on this rich database, but I settle on the interval from 1945 to 1998 in order to obtain parallel, synchronous observations taken from as many countries as possible. In this period, detailed district-level data is available for 169 elections to the respective national parliaments. Thus, the dataset comprises 17,248 single observations (i.e. electoral districts). This number includes 14,152 single-member districts in Germany, Italy, and the United Kingdom and 3,096 multi-member districts in Austria, Belgium, Finland, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland. In addition, the dataset has, where available, been carefully augmented by information on the magnitude of electoral districts, several other electoral system features and national-level data regarding social heterogeneity or basic features of the political systems taken from a variety of sources. (More extensive information on data and data sources, the elections covered, and the variation of district magnitude are provided in the Online Appendixes A, B, and C.)

Key Indicators in a Hierarchical Context

Previous studies have settled on a consensus regarding the measurement of the effects, which are assessed at the district level (the key variables effective number of electoral parties and effective magnitude) and at the national level (the conditioning variables social heterogeneity and the provision of upper tiers):

The effective number of electoral parties (N). In any analysis of Duverger's law the primary dependent variable is the number of viable contenders in an election. Analyses at the national level usually apply the effective number of

parties suggested by Laakso and Taagepera (1979). Students of district-level electoral returns, however, did not unanimously settle on a specific measure of (local) party system fragmentation. Some contributions have concentrated on counts of the raw numbers of candidates or party lists. Other approaches have somewhat narrowed that down and have addressed a more or less defined number of 'viable' contenders within an electoral district (see Cox 1994, 1997). Others have also applied the effective number of parties as a weighted count of the number of parties at the district level.

Certainly, the choice of an appropriate measure depends on the research question. Focusing on strategic entry, counts of raw or 'viable' parties would clearly be appropriate. Focusing on strategic voting, I prefer the weighted party count, as given by the effective number of parties, also for the analysis of district-level data. The basic rationale provided by Cox refers to the desertion of trailing candidates and the strategic switching towards more competitive candidates in an electoral district, meaning the further weakening of weak and the further strengthening of strong competitors for the public vote. I believe that an unweighted count of candidates or parties addresses only one side, namely the desertion of trailing platforms. In contrast, weighted vote counts address directions, vote gains and vote losses due to strategic coordination. The effective number of electoral parties is given by $N = [\sum v_i^2]^{-1}$.

Local effective magnitude (M_{eff}). Since Douglas W. Rae (1967) referred to district magnitude as the 'all-important factor', this quantity has become the key concept for measuring the impact of alternative electoral systems. In the equilibrium of strategic coordination – that is, strategic entry by political elites and strategic voting by the electorate – larger district magnitudes tend to be permissive towards the proliferation of candidates, while lower magnitudes, above all single-member districts, tend to limit the number of viable contenders. Taagepera and Shugart (1989: 117, 126–41, 266–9, 274–7) have modified this concept so as to introduce the 'effective magnitude' combining information on district magnitudes and electoral thresholds. The authors propose the expressions $T = 50\%/M$ and $M = 50\%/T$ to roughly express formal thresholds in district magnitudes equivalents and vice versa.

Upper tiers (upper). The presence and proportion of upper-tier seats are crucial features of any electoral system and determine whether local district magnitudes can be considered strictly binding or not. If there is only one tier, parliamentary seats can only be achieved within the respective electoral districts of magnitude M, and local district magnitudes may, given the aforementioned contextual conditions, be binding. When there are additional tiers so that, for instance, unsuccessful votes within a specific district are used in a second, regional or national stage of seat allocation, local district magnitudes cannot be binding in a strict sense. Voting for a locally hopeless candidate or list may still be instrumentally rational in the short term when these votes potentially help the specific party to gain parliamentary seats at the upper levels of the

electoral system. The independent variable upper therefore captures the share of the seats that is awarded in the upper tiers of the electoral system, roughly ranging from 0 (single-tier electoral systems, for instance in Finland, Portugal, or Spain) up to about 0.5 for more complex systems like the German mixed-member proportional system (Shugart and Wattenberg 2001).

Social fractionalisation and heterogeneity (F_{eth}; F_{rel}). In addition to the key electoral system variables, the main arguments of this contribution require the careful consideration of the effects of social heterogeneity and the interactions of institutional and societal structures. In any sociological argument, party system fragmentation is supposed to increase with the number of political cleavages or issue dimensions (see Lipset and Rokkan 1967). According to this view, longstanding multipartyism is determined by the existence of multiple, stable, and politicised lines of division within a society, whereas two-party systems are to be explained by fewer lines of division in politics and by the relative mildness of these issues.

Although ethnic heterogeneity features prominently in the existing literature, one has of course to admit that these measures provide a very poor proxy for capturing social and political conflict/diversity as outlined by Lipset and Rokkan (1967). Given that the heterogeneity of West European societies is defined by more than just the ethnic dimension, I have opted for more detailed data on ethnic and religious diversity which has been published by Alesina *et al.* (2003). So as to measure empirical fragmentation levels, the authors utilised a fragmentation index which is computed as one minus the Herfindal index of the respective group shares: $F = 1 - [\sum g_i^2]$. Substantively, this index captures the probability that two randomly selected individuals are members of different ethnic, linguistic, or religious groups. An in-depth discussion of more adequate and advanced empirical measurement strategies for assessing the societal inputs to the political process is provided by Stoll (2013: chapter 3).

The Empirics of Supply and Demand

There are numerous methods and perspectives for measuring the political consequences of electoral systems. Some contributions have turned to the microfoundations of strategic voting and tried to determine the share of voters that responded strategically to the incentives of the electoral systems (Alvarez and Nagler 2000; Blais and Nadeau 1996; Gschwend 2007; Gschwend and Stoiber 2012). Other contributions have looked for patterns of strategic desertion of trailing candidates at the district level and, for instance, focused on the vote ratio of the second and first losers (the so-called 'SF-Ratio') in any primary electoral district (Cox 1997). Instead of focusing on the whole battery of potential indicators, this contribution adopts a straightforward perspective on the number of candidates or lists competing in a local district as the substantively most meaningful dependent variable.

Merging Supply with Demand

Table 1 presents three multi-level models which consider that electoral districts i are nested in the contexts of elections j and their more or less stable social and institutional contexts. Random coefficients and random slopes at the election level capture contextual heterogeneity in the association between local effective magnitudes and the number of viable candidates or lists. Evident contextual variation is, in turn, accounted for by the higher-level covariates: ethnic and religious heterogeneity and the presence of upper tiers.

I begin the presentation of the results with some simple bivariate evidence which does not straightforwardly relate to the $M + 1$ rule, but rather adopts the inductive perspective embodied in the 'generalized Duverger's law': Model 1 in Table 1 shows empirically that, as hypothesised, more permissive electoral districts (i.e. larger effective magnitudes) are closely associated with higher fragmentation levels of the local electorates, while lower district magnitudes are regularly coupled with a lower number of locally viable candidates or lists. The estimates for intercept and slope closely resemble the inductive rule of thumb provided by the 'generalized Duverger's law' (Taagepera and Shugart 1989) and also correspond with previous empirical findings with national-level data (see Amorim Neto and Cox 1997; Clark and Golder 2006; Golder 2006; Lijphart 1994; Ordeshook and Shvetsova 1994). Plugging in the unconditional empirical estimates from Model 1 yields something like $N = 1.21 \cdot \lg M_{\text{eff}} + 2.49$.

TABLE 1
EFFECTIVE MAGNITUDE AND THE NUMBER OF PARTIES

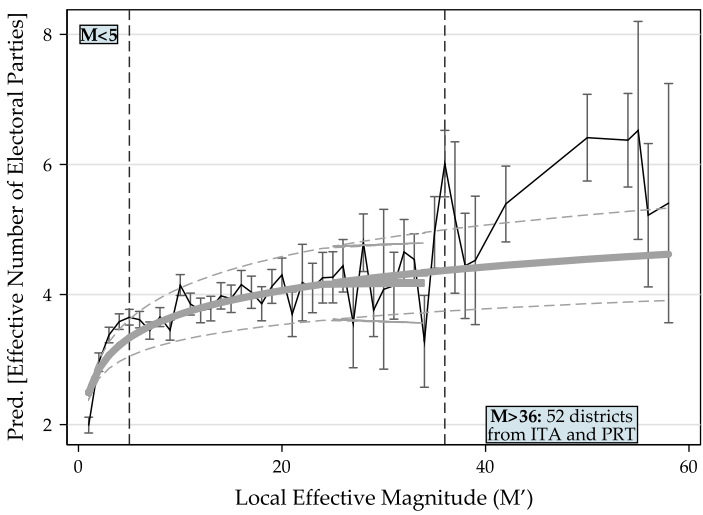
	(1)		(2)		(3)	
1: Electoral system						
lg M_{eff}	1.21***	(0.09)	0.44*	(0.19)	0.71***	(0.18)
upper					1.23***	(0.31)
2: Social diversity						
– ethnic: F_{eth}			−0.73**	(0.27)	−0.74**	(0.27)
– religious: F_{rel}			−0.65**	(0.24)	−0.81***	(0.25)
3: Interaction terms						
lg M_{eff} * F_{eth}			1.23**	(0.40)	1.62***	(0.39)
lg M_{eff} * F_{rel}			1.30**	(0.42)	0.92*	(0.41)
lg M_{eff} * upper					−4.20***	(0.94)
Constant	2.49***	(0.05)	2.93***	(0.12)	2.85***	(0.12)
4: Random effects						
$\sqrt{\varphi_0}$	0.89	(0.012)	0.75*	(0.11)	0.64**	(0.09)
$\sqrt{\varphi_1}$	0.35***	(0.05)	0.31***	(0.05)	0.29***	(0.04)
$\sqrt{\theta}$	0.22***	(0.01)	0.22***	(0.01)	0.22***	(0.01)
N	17,248		17,248		17,248	
log. Likelihood	−11787.42		−11773.50		−11757.87	

Notes: Dependent variable = N.
Hierarchical linear models; standard errors in parentheses.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Figure 1 summarises these findings graphically and provides some additional checks on the association of the number of candidates or parties and its specific functional form: the thick line indicates the logarithmic mapping of effective magnitude upon the effective number of electoral parties, the thin dashed lines show the respective confidence intervals (all printed in grey). The diagram displays another model so as to facilitate specification checks: instead of treating logged effective magnitude as a continuous predictor, I break district magnitude down into a series of dummy variables ($1 \leq M \leq 58$). The vertical error bars capture the effect of district magnitude on the effective number of parties and the related confidence intervals (all printed in black). Both specifications produce almost identical results as long as district magnitudes are small. When district magnitudes become very large (e.g. from $M > 35$), the predictions derived from the series of dummy variables are increasingly unstable and somewhat off the scale. Note that these predictions are only based on about 50 districts, which are all taken from Italy (up until 1992) and Portugal (until 1991).

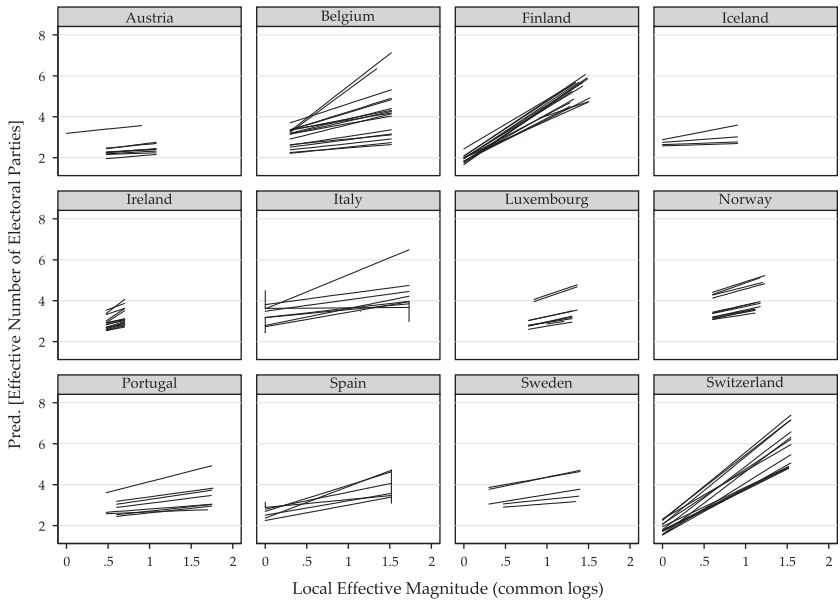
The random effects part of the model also reveals considerable contextual heterogeneity regarding both the baseline levels of electoral fragmentation (the random intercepts) and the marginal effect of logged district magnitude on the number of candidates or lists.[2] Figure 2 explores the context dependency of

FIGURE 1
DISTRICT MAGNITUDE AND THE NUMBER OF PARTIES



Notes: This figure is based on Model 1 in Table 1. The thick curve illustrates the impact of effective magnitude M_{eff} on the effective number of electoral parties N_v, and the thin dashed lines represent the 95 per cent confidence bands. Moreover, the thin solid line and the vertical bars capture the coefficients for the categorical representation of district magnitude and their respective confidence intervals. (The large nationwide districts employed in the PR elections to the Dutch 'Tweede Kamer' [$N = 100$ in 1952 and $N = 150$ since 1956] have been omitted to make the figure more readable.)

FIGURE 2
ELECTION- AND COUNTRY-WISE VARIANCE



Notes: The dashed lines represent distinct elections, while the bold solid lines refer to the theoretical baseline given by the 'generalized Duverger's law' (Taagepera and Shugart 1989). Germany and the UK have been excluded because both these countries employ, as assessed by this dataset, exclusively single-member districts and thus exhibit no empirical variation. Denmark and Greece have also been excluded due to some missing data and interruptions in the time series.

electoral systems in more detail. The effect of local district magnitudes on the fragmentation of local electorates, as indicated by the random slope on logged effective magnitude, significantly varies by election and by country. Each of the lines in the various panels of the trellis captures the empirical Bayes predictions for the marginal effects of district magnitude. Flat regression profiles refer to the absence of electoral system effects and the number of candidates or lists is about the same in small and in large districts. In contrast, steep profiles indicate that strong marginal effects and district magnitudes may potentially be binding. In this case, small district magnitudes are linked with low, and large magnitudes are linked with high numbers of electoral parties.

This allows us to shed some light on the political consequences of effective magnitude: In the first group of countries, there is a particularly steep slope indicating a significant marginal effect of local district magnitudes on electoral fragmentation. This is clearly visible in countries that are comparatively more heterogeneous in ethnic and religious terms and/or have implemented single-tier PR systems. Countries like Finland, Ireland, and Switzerland and,

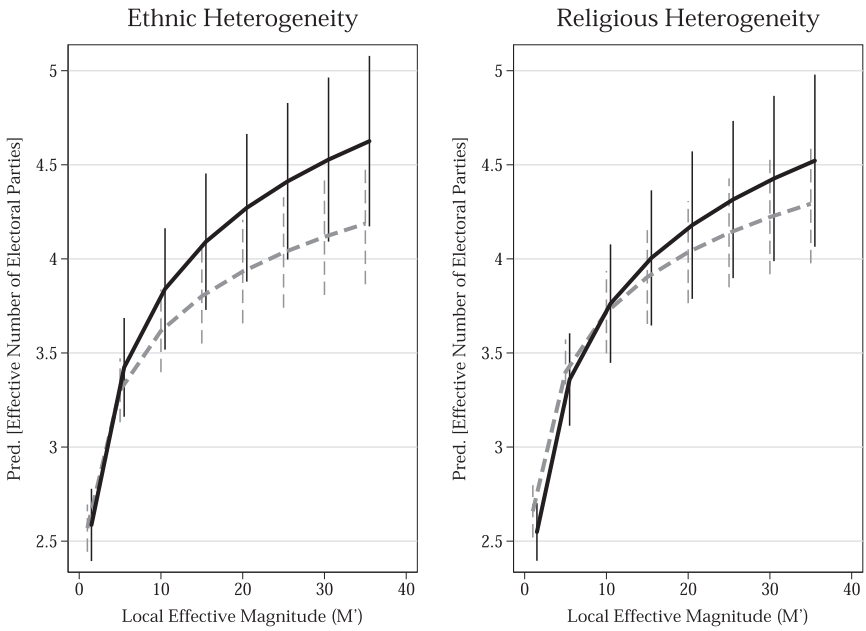
somewhat less clearly, Portugal and Spain fall into that category. The second cluster of countries also unambiguously reveals significant marginal effects, but these are somewhat weaker or unstable across repeated elections: Belgium, Italy, and Luxembourg. In a final cluster of countries, there is only limited evidence for the marginal effects of district magnitude. Almost flat predictions for the election-specific regression profiles indicate that institutional incentives are obviously not effective and/or binding. This refers to countries which are either socially homogeneous and/or have implemented more complicated PR electoral systems with upper tiers and vote or seat transfers such as Austria, Iceland, Norway, or Sweden.

So far, we have presented some inductive generalisations and unconditional comparative statics which follow the traits of the 'generalized Duverger's law' (Taagepera and Shugart 1989, 1993), but which do not fully address the original argument made by Duverger and do not pick up the logics which lie at the heart of the $M + 1$ rule. When evaluating whether district magnitude becomes binding, the analytical scope cannot be limited to the supply side given by the electoral system, but also needs to consider the demand side given by the number of societal groups, which organise into political parties and strive for representation in parliament. In empirical terms, the extensive database on ethnic, linguistic, and religious fragmentation, compiled by Alesina *et al.* (2003), provides the principal indicators for social heterogeneity. Because the measures of ethnic and linguistic diversity are highly collinear, only the ethnic and religious dimensions are available for the empirical analysis.

Model 2 in Table 1 provides very conclusive evidence in favour of the joint supply and demand model. Note that interactive regression models usually (need to) include both the constitutive (here: $\lg M_{\text{eff}}$ with F_{eth} or F_{rel}, respectively) and their multiplicative terms ($\lg M_{\text{eff}} * F_{\text{eth}}$ and $\lg M_{\text{eff}} * F_{\text{rel}}$, respectively).[3] Introducing interactions of effective magnitude and the two diversity indicators renders the constitutive terms of effective magnitude statistically barely significant and substantively smaller. Notwithstanding, there are significant and substantively meaningful interactions of effective magnitude with both ethnic and religious fractionalisation. If there is a high demand for parliamentary representation by various ethnic or religious groups in a society and if local electoral districts have a sufficient carrying capacity, the upper bound may become binding.

Figure 3 displays the predictive margins of these interactive effects. Regarding ethnic (the left-hand panel) and religious diversity (the right-hand panel), the marginal effects of district magnitude are substantively stronger in heterogeneous than in homogeneous countries. By and large, the marginal effect of ethnic heterogeneity seems to be somewhat more meaningful and robust than the consequences of religious diversity. These arguments conform to the analytical concept of the $M + 1$ rule in a more straightforward manner. Effective magnitude becomes binding when there is a high number of groups forming parties and contesting the elections; in contrast, the marginal effects of

FIGURE 3
PREDICTIVE MEANS OF LEVELS OF SOCIAL HETEROGENEITY



Notes: The solid black lines and confidence intervals refer to countries with higher than average diversity, the dashed grey lines and confidence intervals refer to more homogeneous countries with lower than average diversity.

district magnitude are much weaker in more homogeneous countries where the proliferation of candidates or parties will often be below the carrying capacity established by the electoral rules from the outset.

That said, there are also some limitations to the preceding analyses: we could only obtain comparable indicators of social diversity at the national level, but we lack any similar data for the district level of the 17 countries in the analysis. This implies an emphasis on what we have called a top-down perspective on strategic entry. The downside, of course, is that we lack any data on controls for district-level variables other than their magnitude, which may also affect the number of candidates or lists. For instance, smaller districts are often (but not always) employed in the countryside, while larger districts often (but not always) tend to be set up in larger cities. One could perhaps speculate that larger communities tend to employ larger districts and are at the same time characterised by more complex and diverse coalitions of societal interests. This might easily run counter the institutional argument and, lacking data on the social composition of the primary districts, this alternative scenario is difficult to refute.

When I utilise national averages as proxies for the diversity of individual districts, I introduce measurement bias to a key independent variable, because the 'real' social diversity scores will be different from their average. Therefore, there is a risk of introducing bias to our estimates of these key effects (see King *et al.* 1994: 163–8). In order evaluate its magnitude (and thus to check the robustness of the empirical evidence), I have conducted a series of statistical simulations with varying degrees of unsystematic intra-election variation. More specifically, I have added i.i.d. distributed random terms to the indicators of ethnic and religious diversity (F_{eth} or F_{rel}), and, for each level of variation, I have repeated the simulation and estimation procedures 1,000 times. Note that these counterfactuals are even biased against the key hypotheses since one may usually assume that larger, urban districts tend to be more heterogeneous than small, rural ones.

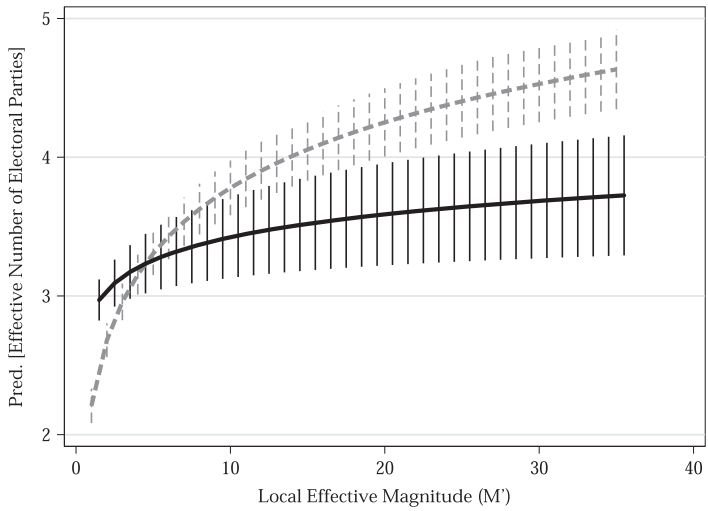
Below the line, the evidence from these simulation studies suggests that the core findings on the interactive and conditioning effects of social diversity are very robust. Both concerning ethnic and religious diversity, the interactive effects of electoral and social structures are robustly maintained even if I allow for significant levels of within-context heterogeneity. (For the details of simulation and estimation please refer to Online Appendix D, especially Figures D-1 and D-2 summarising the simulations.)

The Effects of Upper Tiers

As hypothesised, the provision of upper tiers may render local district magnitudes less binding and the $M + 1$ rule less applicable or invalid. In single-tier electoral systems, where seats are exclusively allocated within the primary electoral districts, votes for unsuccessful candidates or lists are wasted. When two- or multi-tier systems allow for the transfer of unused votes or seats towards the regional or national level, this is not necessarily the case. Model 3 in Table 1 adds the share of seats which are awarded in upper tiers to the interactive specification. The empirical findings indicate a strongly significant negative interaction of local effective magnitudes with the provision of the upper tier at the election level. Effectively, the larger the share of seats assigned to secondary or higher districts, the smaller the marginal effect of district magnitude on the number of viable electoral contenders.

Figure 4 illustrates the predictive margins associated with this model. Controlling for social heterogeneity, the number of candidates or lists visibly increases with district magnitudes if there are only primary electoral districts, and local district magnitudes thus tend to be binding. In contrast, the effects of district magnitude almost completely diminish when we focus on those electoral systems that do employ secondary (or even tertiary) districts. In the presence of upper tiers, the local number of candidates or parties in small and in large districts is almost the same.

FIGURE 4
PREDICTIVE MEANS OVER SINGLE- AND MULTI-TIER PR



Notes: The dashed grey line and confidence bands refer to single-tier electoral systems without any secondary districts, the solid black line and confidence bands indicate more complex two- or multi-tier electoral systems that emply upper tiers for seat allocation.

Summary and Conclusion

Any generalisation of a well-established hypothesis, most notably the proposition of a 'Law', suggests the very impression of scientific progress. Theoretical studies have, during recent decades, made significant progress in terms of the clarity of the argument, the formalisation and sophistication of propositions. However, empirical analyses still lag way behind these theoretical achievements. While the strategy of gross national-level generalisation seems to be exhausted and does not provide any new insight, sophisticated research based on district-level data, for instance the growing literature on mixed-member electoral systems, is too often confined to single-case studies yielding heavily context-dependent results and almost no scope for systematic generalisation.

The research design adopted in this contribution has picked two attempts to restate Duverger's original propositions as the conceptual point of departure: (1) the inductive generalisation implied by the 'generalized Duverger's law' (Taagepera and Shugart 1989, 1993) and (2) the causal argument stated by the 'direct generalization of Duverger's law' (Cox 1997). The first perspective implies unconditional, the second conditional comparative statics of district magnitude.

The multi-level framework employed in the empirical analysis allows for systematic assessments of heterogeneous contexts and the fruitful procession of more extensive and detailed empirical datasets. The findings presented here are

threefold. First, the analysis of district-level electoral returns refers to the adequacy of a multi-level perspective, and the significant causal force and empirical validity of the key causal mechanism embodied in the $M + 1$ rule. Both within and across the contexts of individual elections the number of viable contenders in a district co-varies with its magnitude. The political consequences of district magnitude cannot, however, be modelled by unconditional comparative statics, but are dependent upon the provision of candidates or political parties by social (for instance ethnic or religious) division lines.

The second finding regards the fundamental context-dependency of electoral coordination. In some countries, district magnitude and local fragmentation are closely connected, for instance in Finland or Switzerland, while in other polities the empirical association is much weaker or even absent. The constraining effects of (low) district magnitudes are thus moderated by contextual factors at the election or country levels. Individual electoral districts, taken from the same contexts, tend to closely resemble each other. Significant intra-class correlations refer to potential top-down effects of strategic entry that, in turn, interact with the bottom-up logics of strategic voting.

Thirdly, I have proposed some causal mechanisms that might either encourage or prevent the strategic moves by voters and by partisans that lie at the heart of Duverger's psychological effect. The marginal effect of (logged) district magnitude becomes significantly smaller when upper tiers of the electoral systems render local district magnitudes less binding.

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Notes

1. The utilisation of logged scales was pioneered by Taagepera and Shugart (1989, 1993) and it has been common practice in a number of analyses which focused on national-level electoral returns (see Amorim Neto and Cox 1997; Benoit 2002; Brambor *et al.* 2006, Clark and Golder 2006; Filippov *et al.* 1999; Golder 2006; Ordeshook and Shvetsova 1994). Logged scales have also been utilised for the study of district-level electoral returns (see Singer and Stephenson 2009). Other contributions even go beyond that and suggest an inverse quadratic relationship of district magnitude and the number of viable candidates or lists.
2. A Lagrange multiplier test confirms these results. The random slope model fits the data considerably better than the more restrictive random intercept specification ($\chi 2 = 1174.79^{***}$) so that any model that fails to account for this variant of contextually induced heterogeneity has to be considered severely misspecified.
3. The application and interpretation of interactive regression models in political science are discussed in depth by Kam and Franzese (2007).

Notes on Contributor

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