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Effect of Electoral Systems on the Quality of Political Representation

Abstract:

Legislatures as elected institutions are expected to provide the voices of citizens in the policymaking process. In order to determine the extent that electoral systems affect the quality of political representation, we conducted a cross-sectional study. Legislative elections in free democracies were sampled and measures of many-to-many congruence were constructed to test the ideological preferences of citizens and representatives for similarity on the left-right issue dimension. Results indicated that electoral systems indirectly affect the quality of political representation, whilst controlled for the effect of the number of parliamentary parties, the evidence is marginal. For the benefit of making inferences about the direct effect of electoral systems, there might be a need for longitudinal data collection and further research on a more comprehensive conceptualization for electoral systems.

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1. Introduction

In democratic countries with an open political elite, nourished within a context of education and the availability of many informational sources in which democratic representation implies competitive elections and related democratic processes that systematically induce substantive linkages between voters and their representatives, citizens can develop preferences about policy directions and should be able to assess the performance and either change their minds about policy or penalize the policymakers (Powell, 2014, pp. 4-6).

According to Powell (2010), the election of representatives “is the essential institution that systematically induces policymakers to take account of what the people want in national policymaking” (p. 225). Legislatures as elected institutions are expected to provide the voices of citizens in the policymaking process, so a common assumption among political scholars is that these voices should correspond to the votes that parties receive in elections (p. 232).

One way to evaluate this correspondence is through the ‘mechanical aspect of representation’ by measuring the ‘process of vote-seat translation’ (Golder & Stramski, 2010, p. 98), thereby distinguishing proportional (i.e. close vote-seat ratio) and disproportional (i.e. distant vote-seat ratio) electoral systems. Though, measures of proportionality insufficiently estimate how well the citizenry as a whole is represented inasmuch as the scores do not capture the preferences of citizens who did not cast a vote. Withal, measures of proportionality do not hold the ‘strategic aspect of representation’ in that the ‘process of preference-vote translation’ is not assessed (Golder & Stramski, 2010, pp. 91-92, 95, 98).

Proportional electoral systems do not inherently have higher quality of political representation than disproportional systems. Dolný and Baboš (2015) referred to Powell who proposed to examine the linkage between citizens and representatives by way of ‘ideological congruence’ via ‘substantive representation’, whereas “the study of left-right congruence between electors and representatives is crucial to understanding the quality of political representation” (pp. 3-5). Golder and Stramski (2010) introduced with emphasis on “the ideal of having a legislature that accurately reflects the ideological preferences of the citizenry as a whole” (p. 104), ‘many-to-many congruence’ as a conceptualization for substantive representation (p. 95). Many-to-many congruence captures the variance in the ideological preferences of many citizens (i.e. voters and non-voters) and policy positions of many representatives (i.e. incumbents and non-incumbents) by means of evaluating similarity

between their preferences on the left-right issue dimension (i.e. scale ranging from '0' to '10') (pp. 96, 104-105).

Citizens' preferences influence policy through elections that are facilitated by electoral systems (Blais & Massicotte, 2002, p. 40; Ezrow, 2010, p. 3). Scholars who conceptualized electoral systems as certain electoral mechanisms, mostly used the classification by electoral formula: 'majoritarian', 'proportional representation', and 'mixed' (Bormann & Golder, 2013, p. 361). Nonetheless, more mechanisms are considered part of electoral systems (Gallagher & Mitchell, 2005; Lijphart, 2012; Norris, 2004). While not judged appropriate for conceptualizing political representation, measures of proportionality that are directly influenced by four mechanical sources: 'electoral formula', 'district magnitude', 'malapportionment', and 'electoral threshold' (Gallagher, 1991, p. 43), became of particular utility to conceptualize electoral systems.

Electoral mechanisms exert influence on proportionality and the number of parties (Lijphart, 2012, p. 144; Norris, 2004, p. 211). In this regard, Ezrow (2010) found evidence that electoral systems are influential with respect to the level of niche party competition that "in turn has dramatic implications for the way in which representation works" (p. 119). However, although the number of parliamentary parties is not integral part of electoral systems, most studies neglected to account for its effect on the quality of representation. As a consequence, these studies made inferences about the 'indirect' effect of electoral systems; like Golder and Stramski (2010) who combined 'Duverger's law' and 'Downs' theory of party competition' to explain the link between electoral system proportionality and many-to-many congruence (pp. 99-100), and found highly significant coefficients (pp. 103-104). Yet mere evidence exists that electoral systems 'directly' affect the quality of political representation.

In order to determine the extent that electoral systems affect the quality of political representation, we will conduct a cross-sectional study. This study proceeds as follows: first, the conceptualizations of 'quality of representation' as 'many-to-many congruence' and 'electoral systems' as 'proportionality' are discussed and justified; second, the measurement of many-to-many congruence for recent legislative elections in democratic states is explained; and third, the extent to which proportionality (in)directly predicts levels of many-to-many congruence is scrutinized.

2. Theory

2.1 Views on Political Representation

The meaning of representation has “very different applications depending on what is being made present or considered present, and in what circumstances” (Pitkin, 1967, p. 10). Often referred to as ‘the paradox of representation’ (i.e. being present, while not being present, to be represented), representation has developed into an etymological ambiguous concept.

To accommodate the paradoxical requirements, Pitkin termed the ‘non-objection criteria’ that is met if the represented who is absent does not object to the representative’s do’s or don’ts; the “presence [in parliament] comes from the ability of individuals to object to what is done in their name” (Runciman, 2007, p. 95). Most political decisions are made by a majority in which some individuals who did object are overruled, so political representation requiring the non-objection criteria is difficult to claim. Runciman (2007) argued that in acceptance that groups act “through the wishes of the majority of their members, then it would follow that the outvoted minority are still being represented as members of the group” (p. 101), and the representation of citizens is expected to cease if enough individuals object (i.e. by vote) to what is done in their name (pp. 100-102).

Table 1 shows that Pitkin made a distinction between views on representation, each providing a different approach for examining representation (Dovi, 2014; Pitkin, 1967, pp. 60-61, 111, 212-213).

Table 1
Views on Representation and Research Areas

| View | Focus | Research Area |
|-------------|---------------|---|
| Formalistic | Institutional | Legislature is Authorized and Accountable |
| Symbolic | Beliefs | Legislature Stands For citizens |
| Descriptive | Resemblance | Legislature Shares Similarities with citizens |
| Substantive | Actions | Legislature Acts in Accordance with policy preferences of citizens |

It is a matter of definition how the concept of representation is adopted. Representation in formalistic, symbolic, or descriptive sense is possible in the context of arbitrary choice, but impossible for situations that involve issues of interest, that demand substantive representation (Pitkin, 1967, pp. 167, 212, 238).

2.1.1 Quality of Political Representation: Focus on Substance

Pitkin described substantive representation as: “the activity of representatives; that is, the actions taken on the behalf of, in the interest of, as an agent of, and as a substitute for the represented” (Dovi, 2014), in which the ‘substance’ as guiding principle of the activity of representing is to ‘promote the represented interests’ (Pitkin, 1967, pp. 118, 155).

Compared to the formalistic, symbolic, and descriptive views on representation, Pitkin (1967) argued that substantive representation is “by far the most difficult” (p. 118) to comprehend, because “this concept supplies us with standards for judging the representative's action” (p. 142); like a representative who is assumed to act for the represented but as a member of the legislature is also supposed to pursue the national interest (pp. 215-216).

According to Pitkin (1967), each view on representation is not a substitute to other views, but an additive (p. 111). Accurate substantive representation not necessarily means good representation because it does not hold conditions like representatives who have “to act after authorization or to act before being held to account” (i.e. formalistic) (p. 59), nor at “working on the minds of those who are to be represented or who are to be the audience accepting [to be represented]” (i.e. symbolic) (p. 111), and neither at “parliamentary representatives [who] are substitutes for the rest of the people” (i.e. descriptive) (p. 85).

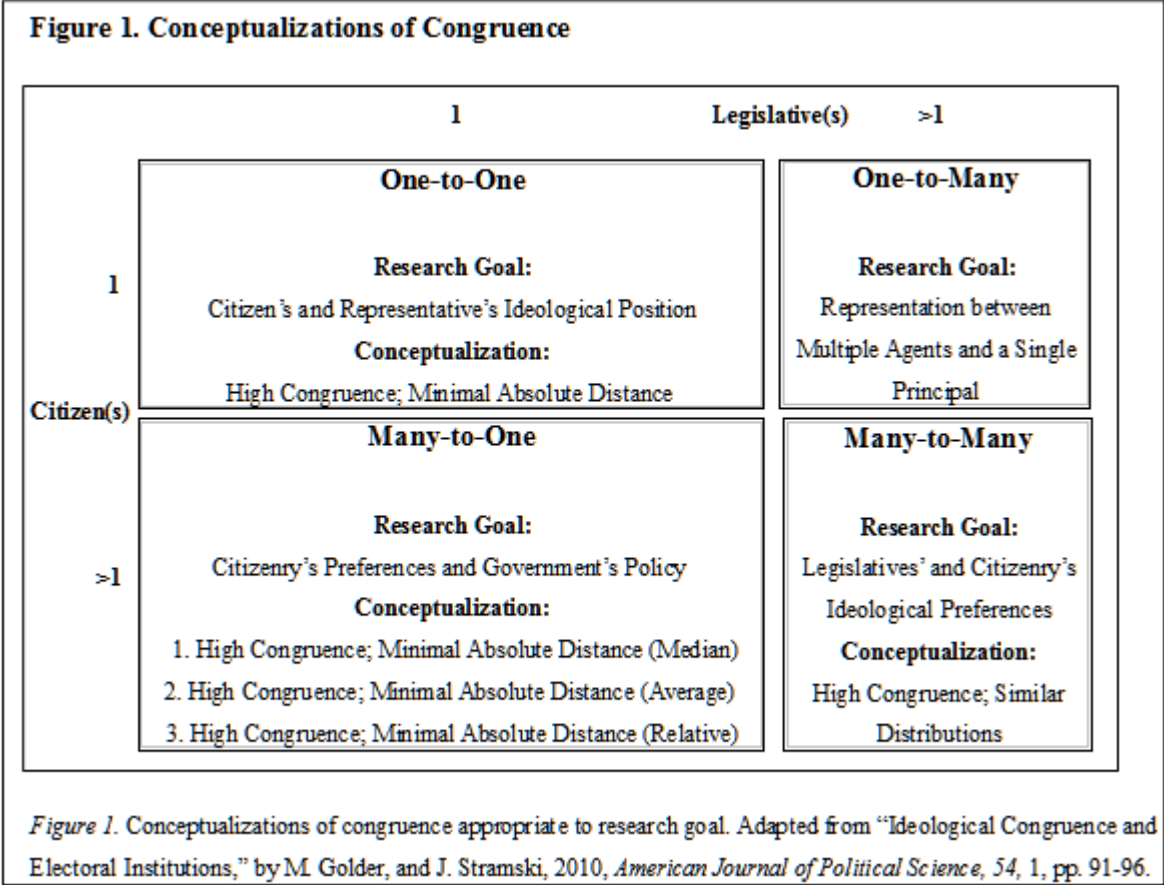
While the descriptive view on representation could be adopted for studying representation of certain segments within a population (e.g. women) as for determining single issue correspondence (e.g. welfare spending), Pitkin argued that “an over-emphasis upon the composition of political bodies [as regards the descriptive view on representation] prevents a proper focus upon the activity of representation” ... “political representation should be conceived of in a substantive way, defining it as acting in the interest of the represented, in a manner responsive to them” (Celis & Childs, 2008, p. 419). Representation focused on interest “gives greater weight to the activities of citizens in seeking to understand, clarify, and achieve their preferences than do alternative models of representations”, and should therefore be “the starting point in a democratic view” (Plotke, 1997, p. 32).

2.1.2 Substantive Representation as a Many-to-Many Relationship

Powell (2014) stated that “good congruence between the preferences of citizens and the positions of those who represent them in making policies is a measure of good substantive

representation” (pp. 2-3), whither good ideological congruence implies minimizing the ideological distance between citizens and their policymakers (Powell, 2013, pp. 10-11).

Figure 1 shows that any appropriate conceptualization of congruence depends on one’s research goals (Golder & Stramski, 2010, p. 91).



Albeit the ‘One-to-One’ and ‘One-to-Many’ relationship are of main importance from the perspective of an individual, with respect to cross-sectional studies, evaluating congruence of representatives is infeasible because of the wide variety among citizens’ ideological preferences. Scholars largely conceptualized congruence as a ‘Many-to-One’ relationship that involves measurements on the absolute distance between the median citizen and government (Golder & Stramski, 2010, pp. 92-93, 95). Many-to-one congruence ignores representatives who belong to the opposition; and hence, is not an appropriate conceptualization concerning our research goal: ‘to measure ideological congruence between legislatives and citizens of democratic states in order to determine the extent that electoral systems affect levels of substantive representation,’ whereas the ‘Many-to-Many’ relationship becomes relevant.

Measuring congruence between the ideological positions of representatives and substantive preferences of citizens, “requires evaluating how similar the distributions of citizen and representative preferences are on the left-right issue dimension” (Golder & Stramski, 2010, p. 96). Moreover, Cox (1990) noted that the left-right dimension is applicable due to its unidimensional scale (i.e. from ‘0’ to ‘10’) for approximating many countries, and that in multidimensional politics the degree of ideological preferences of legislatures is “not one of the things that changes radically with the dimensionality of the policy space” (p. 908).

2.2 Electoral Systems

Ezrow (2010) argued that the most straightforward way how citizens’ preferences influence policy is through voting in elections (p. 3). Elections are facilitated by an electoral system that signifies “one important set of electoral rules that defines how votes are cast and seats allocated” (Blais & Massicotte, 2002, p. 40). The most common options to conceptualize electoral systems is by its mechanisms or by measures of proportionality (Carter & Farrell, 2010, pp. 25-26).

Table 2 shows the mechanisms that are considered part of electoral systems (Gallagher & Mitchell, 2005; Lijphart, 2012; Norris, 2004).

Table 2
Overview of Electoral Mechanisms

| Mechanism | Description |
|------------------------|---|
| Electoral Formula | How votes are counted and allocated into parliamentary seats |
| District Magnitude | Number of seats per district |
| Malapportionment | District magnitudes that are not in constant ratio with the voting population |
| Electoral Threshold | Minimum amount of votes needed by a party to secure a parliamentary seat |
| Size of Assembly | Total number of parliamentary seats |
| Presidential Elections | Influence on legislative elections due to tendency of voting for presidential party |
| Inter-Party Links | Vote aggregation among separately listed parties |

Conceptualizing electoral systems by any electoral mechanism falls short in capturing the wide variety of mechanisms among and within electoral systems. Instead, we put our attention on measures of proportionality, depicting the difference between parties’ shares of the votes and their shares of the seats (Gallagher & Mitchell, 2005, p. 602).

2.2.1 Electoral Mechanisms Affecting Proportionality

Electoral mechanisms have direct effects flowing from electoral rules and the structural conditions to which these rules consistently affect degrees of proportionality (Norris, 2004, p. 22; Lijphart, 2012, pp. 153-154). Four mechanical sources directly influence degrees of proportionality: (1) Electoral Formula, (2) District Magnitude, (3) Malapportionment, and (4) Electoral Threshold (Gallagher, 1991, p. 43).

First, electoral formula is the most widely used nominal conceptualization for electoral systems. Bormann and Golder (2013) proposed a threefold classification of Majoritarian, Proportional Representation (PR), and Mixed electoral systems (p. 361). In majoritarian systems, candidates or parties need to win more votes than any other (i.e. plurality), or over fifty percent of votes (i.e. majority) in order to win all respective parliamentary seats of a particular constituency. 'First-Past-The-Post' (FPTP) along single-member district plurality is the most widely used electoral rule in majoritarian electoral systems (Diamond & Plattner, 2006, p. 17; Lijphart, 2012, p. 130), and is practised by voters who cast a vote in one round for a single candidate. This design intends to concentrate legislative power in the hands of a single-party government and simultaneously creates hurdles for smaller parties that have diffused support (Norris, 2004, pp. 35, 42).

In PR systems, parties need to win a minimum number of required votes (i.e. List PR) or a candidate needs to win a required quota of preferential votes (i.e. Single Transferable Vote) (Bormann & Golder, 2013, pp. 362-363). List PR along multi-member districts is the most widely used electoral rule in PR systems (Diamond & Plattner, 2006, p. 20; Lijphart, 2012, p. 134), and is practised by voters who cast a vote in one round for a party (i.e. closed list), or an individual candidate (i.e. open list) from lists that are drawn up by political parties. This design aims at sharing power between multiple political actors to maximize deliberation, bargaining, and compromise (Norris, 2004, p. 67).

Massicotte and Blais (1999) considered electoral systems as mixed if "its mechanics involves the combination of different electoral formulas for an election to a single body" (p. 345). Mixed systems could take advantage from both formulas by providing voters more freedom to elect a local representative by FPTP and conjointly to elect a political party on national level by List PR (Shugart & Wattenberg, 2001, pp. 1, 9).

Second, district magnitude implicitly determines the average number of legislative seats corresponding to a certain constituency. It is expected that if in a plurality system district

magnitude increases, stronger parties are likely to win more seats and that proportionality will decrease (Lijphart, 2012, pp. 132, 153). Due to the impossibility of distributing a single seat to many parties, PR can only be employed in multi-member districts, and attends to produce multi-party politics (Blais & Massicotte, 2002, p. 45; Gallagher & Mitchell, 2005, pp. 30-31, 497).

Third, malapportionment occurs whenever districts have unequal ratios of voting populations and district magnitudes. It is hardly avoidable in majoritarian systems with single-member districts. PR systems are associated with larger districts and varying district magnitudes, so that parliamentary seats can be proportionally allocated. In PR systems that have a single nationwide district, malapportionment is non-existent (Lijphart, 2012, p. 143).

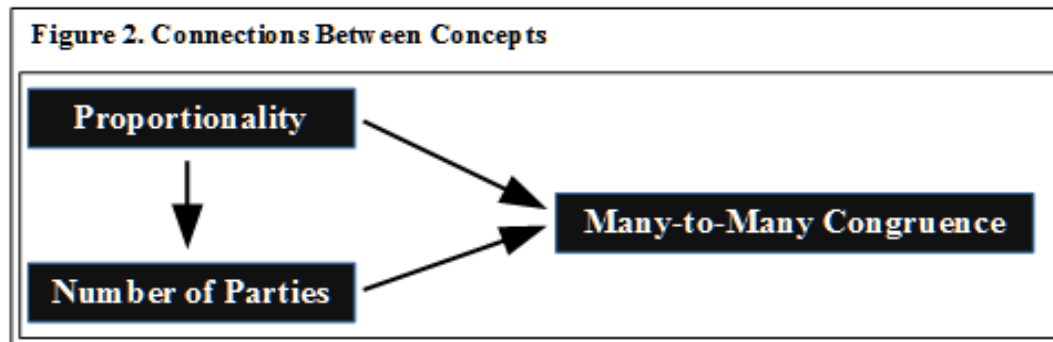
And fourth, an electoral threshold determines explicitly the minimum amount of votes that is needed by a party to secure a parliamentary seat. An effective threshold is mathematically dependent on district magnitude, while a legal threshold could arbitrarily be set from zero to hundred percent.

Blais and Bodet (2006) proposed the use of ‘Gallagher’s Least Squares Index’ as practical solution for ascertaining overall degrees of disproportionality of electoral systems (p. 1250). Gallagher (1991) advocated the index to measure disproportionality per election, and favoured it from other indices due to the proficiency to “registers a few large discrepancies more strongly than lot of small ones” (p. 40).

2.3 Connections Between Proportionality, Number of Parties, and Congruence

The primary consensus in political science is that an electoral system exerts influence on proportionality and the number of parties (Carter & Farrell, 2010, p. 33; Ezrow, 2010, p. 48; Gallagher & Mitchell, 2005, p. 21; Lijphart, 2012, p. 144; Norris, 2004, p. 211). Powell (2013) mentioned the two most used theories among scholars: (1) Duverger’s Law and (2) Downs’ Theory of Party Competition (p. 11).

Figure 2 displays the theoretical connections.



According to Powell (2013), Duverger’s Law associates election rules with the number of parliamentary parties (p. 11). In majoritarian systems, voters are likely to restrict their votes for candidates related to a strong party that has a chance of winning the election, otherwise assuming that the vote is lost if one votes for a weaker party with less chance of winning (i.e. strategic voting) (Norris, 2004, p. 82). At legislative level, in single-member constituencies the winner of a parliamentary seat needs to win most votes, so it is expected that since pre-election stronger parties structure coalitions among candidates who instead of joining a third party ally with one of the larger parties to obtain a majority (Grofman & Lijphart, 2003, p. 21; Lijphart, 2012, p. 154).

In proportional systems, voters are less likely to vote strategically, and are more likely to cast a vote for a smaller party (Gallagher & Mitchell, 2005, p. 322; Klingemann, 2009, pp. 293-294; Norris, 2004, p. 82). For representatives there is less motive to create a two-party system because it is not a necessity to maximize votes to win parliamentary seats, wherefore it is subordinate to form coalitions during pre-election (Grofman & Lijphart, 2003, p. 21). Due to the unlikelihood for one party to obtain a majority of votes, proportional systems are expected to be associated with coalitions among several parties that are formed after the elections (Klingemann, 2009, p. 198).

On the basis of Duverger’s Law, the first hypothesis is:

H1: *Democratic states deploying proportional electoral systems are associated with more parliamentary parties than democratic states deploying disproportional electoral systems*

Downs’ Theory of Party Competition predicts ‘party convergence’ in two-party systems and ‘non-convergence’ in multi-party systems (Powell, 2013, p. 11). In this respect, Cox (1990)

argued that “the number of political competitors affects the relative strength of the centripetal and centrifugal forces in the system” (p. 904).

In systems dominated by centripetal incentives, the optimal vote-maximizing strategy leads politicians to “converge on some centrally located point, such as the median of the voter distribution” (Cox, 1990, p. 927). For instance, with a view on not losing the votes of the bulk electorate, representatives or parties are more likely to adopt policy positions that are not too conservative or too progressive. As a result, the ideological placements of representatives are expected to be somewhere in the middle of the left-right issue dimension.

In systems dominated by centrifugal incentives, “optimal strategies lead to a dispersion across the ideological spectrum” (Cox, 1990, p. 927). These systems tend to generate legislatures with a greater variety of political views, so the ideological placements of representatives are expected to range more widely on the left-right issue dimension. By reason of voters having more choice, congruence should increase with the number of parties (Blais & Bodet, 2006, pp. 1243-1244, 1259).

On the basis of Downs’ Theory of Party Competition, the second hypothesis is:

H2: *Democratic states deploying electoral systems associated with more parliamentary parties have higher levels of many-to-many congruence than democratic states deploying electoral systems associated with less parliamentary parties*

Golder and Stramski (2010) combined Duverger’s and Downs’ theories to explain the indirect link between proportionality and many-to-many congruence (pp. 99-100).

On the basis of Duverger’s Law and Downs’ Theory of Party Competition, the third hypothesis is:

H3: *Democratic states deploying proportional electoral systems have higher levels of many-to-many ideological congruence than democratic states deploying disproportional electoral systems*

3. Method

3.1 Sampling Legislative Elections in Free Democracies

We conducted a cross-sectional study in which legislative elections in free democracies were sampled and measures of many-to-many congruence were constructed to test the ideological preferences of citizens and representatives for similarity on the left-right issue dimension. The benefits of choosing this research design were its facilitation to compare populations of citizens and their representatives across different democratic states, and that relationships between several variables could be analysed at once.

We used *Dataset Module 3 2006-2011* (dataset) of the Comparative Study of Electoral Systems (CSES) that includes surveys from respondents in democratic states who placed themselves and up to nine political parties on a 10-point left-right scale (CSES, 2013). The left-right dimension is applicable in that ideological preferences placed on a unidimensional scale do not change radically in case of multidimensional politics across many countries (Cox, 1990, p. 908).

In addition, assessments from Freedom House (FH); *Freedom in the World* (FH, 2015a) and *Individual Country Ratings and Status* (FH, 2015b) were used to assess if countries were considered free democracies. In free democracies legislative elections are the essential institutions in which representatives take account of the preferences of citizens who in turn are able to develop preferences about policy directions of their policymakers (Powell, 2010, p. 225; Powell, 2014, pp. 4-6). Moreover, the fact that all countries can be labelled as free democracies should increase the external validity of inferences (Goodin, 2006, p. 24).

We sampled 39 elections in next 31 democracies: Australia, Austria, Canada, Chile, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Latvia, Mexico, The Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, United States, and Uruguay.¹

¹ Due to data incompleteness, the elections of Brazil, Romania, Taiwan, Japan, and South Korea were excluded for analysis.

3.2 Conceptualizing Electoral Systems: Proportionality

Table 3 shows that electoral formula as a nominal conceptualization for electoral systems generated unequal and relatively small sample sizes.

Table 3

Mean Degrees of Proportionality by Electoral Formula

| Dependent Variable | Majoritarian | Mixed | Proportional Representation |
|--------------------|--------------|--------------|-----------------------------|
| Proportionality | 90.51 (3.99) | 94.76 (3.29) | 95.84 (2.53) |
| n | 4 | 5 | 30 |

Note. Standard deviations are reported in parentheses. Tukey post-hoc test revealed that proportionality was significantly higher in PR systems (95.84 ± 2.53 , $p = .003$) than in majoritarian systems (90.51 ± 3.99). There were no significant differences between PR systems and mixed systems ($p = .703$), and between majoritarian and mixed systems ($p = .071$). The results are available on request. Adapted from “Election Indices”, by M. Gallagher 2015, pp. 6-39.

Because of the wide variety of electoral mechanisms among and within electoral systems (Gallagher & Mitchell, 2005; Lijphart, 2012; Norris, 2004), we conceptualized the independent variable, electoral systems, as proportionality to increase the internal validity of inferences. To avoid ambiguousness in the directions of the relationships, we recalculated the disproportionality measures from *Election Indices* by Gallagher (2015) into degrees of proportionality. On a continuous scale, the conceptualization distinguishes electoral systems with least proportional (i.e. ‘0’) and most proportional outcomes (i.e. ‘100’); in which perfect proportionality implies that all parties obtain parliamentary seats exactly according to the proportion of won votes by each party.

3.3 Conceptualizing Quality of Political Representation: Many-to-Many Congruence

We conceptualized the dependent variable, the quality of political representation, as many-to-many congruence. Partisan representatives were assumed to be politically dependent and subjected to vote on behalf of their affiliated parties, thereby acting according to their ideological preferences. We adopted Golder and Stramski’s (2010) conceptualization for substantive representation as many-to-many congruence; “congruence is high when the distributions of citizens’ and representatives’ preferences are similar; it is perfect when the two distributions are identical” (p. 96).

For each election we constructed levels of many-to-many congruence by means of evaluating similarity between the distributions of citizen and representative preferences on the left-right scale.² In what follows, we explain how levels of many-to-many congruence were measured by illustration of two distinctive electoral systems; the 2006 Dutch elections for a multi-party assembly and the 2008 United States (US) elections for a two-party assembly.

3.3.1 Positioning Parliamentary Parties on the Left-Right Scale

Based on valid answers given by the respondents on question 11a-i: “*in politics people sometimes talk of left and right. Where would you place (PARTY A) on a scale from 0 to 10 where 0 means the left and 10 means the right?*” (CSES, 2013), the mean party-placement was calculated. In deviation with Golder and Stramski (2010), who included only the top 40% of most educated respondents to reduce wrongful party-placements by the more uninformed (p. 98), we included the top four educated groups of respondents for workable statistics.

The dataset is composed out of responses by participants who gave answers on fixed questionnaires, so we filtered out all responses on irrelevant questions together with invalid responses. Then, we divided the sum-total of ideological positions affiliated for each party by the size of the sample in order to measure mean party-placement. The distance between the (Cumulative) Distribution Functions ((C)DFs) of citizens’ and representatives’ preferences had to be determined, necessitating the allocation of party seat shares to discrete points on the scale (Golder & Stramski, 2010, p. 103). We reallocated the seats of the parties that had no whole mean placement in proportion to relative closeness of the mean to its integers.

As for the Dutch elections, the CDA won 41 seats and had a mean placement of ‘6.75’, so two integers; ‘6’ and ‘7’ are relevant. The mean is closer to ‘7’ than ‘6’; in proportion 75% of the seats were reallocated to point ‘7’ and 25% to point ‘6’. Rounded to whole numbers, 10 seats were reallocated to point ‘6’ and 31 seats to point ‘7’ on scale. Likewise, we reallocated 11 seats to point ‘7’ and 11 seats to point ‘8’ for the VVD, and 1 seat to point ‘6’ and 1 seat to point ‘7’ for the SGP. Amassed, 43 seats were allocated to point ‘7’ on the scale.

As for the US elections, the Democrats won 257 seats and had a mean placement of ‘4.31’, so two integers; ‘4’ and ‘5’ are relevant. The mean is closer to ‘4’ than ‘5’; in proportion 69% of the seats were reallocated to point ‘4’ and 31% point ‘5’. Rounded to whole numbers, 177 seats were reallocated to point ‘4’ and 80 seats to point ‘5’ on the scale.

2 This measure is related to the Kolmogorov-Smirnov test statistic applicable for determining if two one-dimensional probability distributions are the same (Golder & Stramski, 2010, p. 97).

Likewise, we reallocated 119 seats to point ‘6’ and 59 seats to point ‘7’ for the Republican party. Amassed, 59 seats were allocated to point ‘7’ on the scale.

Hereupon, we divided the number of allocated seats per discrete integer point by the total number of seats to calculate the DFs. With regard to point ‘7’ on the scale, a DF of 29.05% (i.e. 43/148 multiplied by 100%) and 13.56% (i.e. 59/435 multiplied by 100%) resulted for the Dutch and US elections, respectively.

3.3.2 Positioning Voters and Non-Voters on the Left-Right Scale

On the basis of question 13: “*where would you place yourself on this scale?*” (CSES, 2013), the DFs for self-placement were calculated. On account of including the citizenry as a whole, we included all respondents with valid answers on question 13. Because each respondent could place one self chosen preferential placement on the scale, frequencies were allocated to discrete integer points on the same left-right scale as for party-placement.

As for the Dutch and US elections, respectively 409 out of 2203 and 205 out of 1889 respondents placed themselves to point ‘7’ on the scale. As a result, a DF of 18.57% was calculated for the Dutch elections, and a DF of 10.85% for the US elections.

3.3.3 Measuring Many-to-Many Congruence

We subtracted the CDFs of party-placement from the CDFs of self-placement. In line with Andeweg (2010), the lowest percentages were enumerated for each point on the scale, emanating the overlap between the distributions of party-placement and self-placement as a measure of many-to-many congruence.

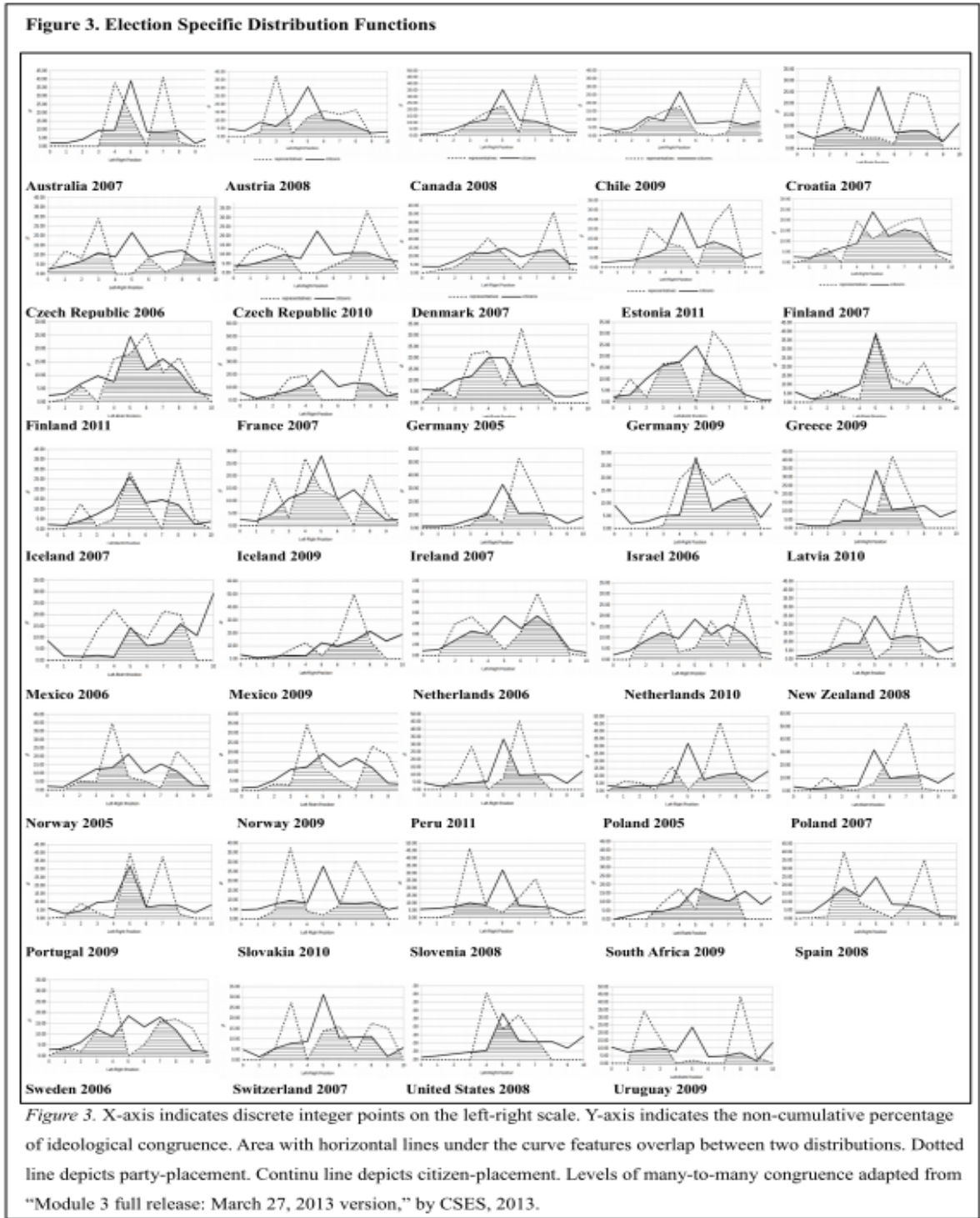
Table 4 shows that 74.02% and 46.24% of underlying ideological preferences of the citizenry were translated into legislative seats after respectively the Dutch and US elections.

Table 4
Measuring Levels of Many-to-Many Congruence for the Dutch and US Elections

| Left-Right Scale | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|--------------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|
| DF Party Placement | 0 | 0 | 14.86 | 18.24 | 10.81 | 2.7 | 10.81 | 29.05 | 12.84 | 0.68 | 0 | 100 |
| | 0 | 0 | 0 | 0 | 40.69 | 18.39 | 27.36 | 13.56 | 0 | 0 | 0 | 100 |
| DF Self Placement | 2.18 | 2.81 | 7.17 | 11.44 | 9.9 | 18.52 | 12.66 | 18.57 | 12.76 | 2.63 | 1.36 | 100 |
| | 1.38 | 2.28 | 3.44 | 4.5 | 5.51 | 28.16 | 11.49 | 10.85 | 11.17 | 6.93 | 14.29 | 100 |
| Many-to-Many | 0 | 0 | 7.17 | 11.44 | 9.9 | 2.7 | 10.81 | 18.57 | 12.76 | 0.68 | 0 | 74.02 |
| Congruence | 0 | 0 | 0 | 0 | 5.51 | 18.39 | 11.49 | 10.85 | 0 | 0 | 0 | 46.24 |

Note. DF = Distribution Function. Figures for the Dutch elections are set in boldface. Levels of congruence adapted from “Module 3 full release: March 27, 2013 version,” by CSES, 2013.

Figure 3 displays the DFs of selected legislative elections in the sampled democracies. The larger the area with horizontal lines under the curve, the higher the level of many-to-many congruence. The diagrams of the Dutch and US elections show clear signs of dispersion and convergence across the ideological spectrum, respectively.



4. Results

4.1 Election Specific Characteristics and Calculations

Table 5 shows the figures that were used to test the hypotheses.

Table 5

Election Specific Characteristics: Electoral Formula, Degrees of Proportionality, Number of Parliamentary Parties, and Levels of Many-to-Many Congruence

| Country | Year | Formula | Proportionality | Parties | Congruence |
|----------------|------|--------------|-----------------|---------|------------|
| Australia | 2007 | Majoritarian | 89.73 | 3 | 39.13 |
| Austria | 2008 | PR | 97.08 | 5 | 49.76 |
| Canada | 2008 | Majoritarian | 89.91 | 4 | 58.35 |
| Chile | 2009 | PR | 94.35 | 6 | 59.42 |
| Croatia | 2007 | PR | 92.42 | 9 | 43.18 |
| Czech Republic | 2006 | PR | 94.28 | 5 | 44.06 |
| Czech Republic | 2010 | PR | 91.24 | 5 | 52.6 |
| Denmark | 2007 | PR | 99.28 | 8 | 69.11 |
| Estonia | 2011 | PR | 94.91 | 4 | 50.23 |
| Finland | 2007 | PR | 96.80 | 8 | 71.62 |
| Finland | 2011 | PR | 97.05 | 8 | 71.04 |
| France | 2007 | Majoritarian | 86.42 | 5 | 37.86 |
| Germany | 2005 | Mixed | 97.84 | 6 | 60.53 |
| Germany | 2009 | Mixed | 96.60 | 6 | 60.03 |
| Greece | 2009 | PR | 92.71 | 5 | 71.75 |
| Iceland | 2007 | PR | 96.51 | 5 | 63.91 |
| Iceland | 2009 | PR | 97.42 | 5 | 56.69 |
| Ireland | 2007 | PR | 94.15 | 6 | 38.96 |
| Israel | 2006 | PR | 97.51 | 6 | 62.84 |
| Latvia | 2010 | PR | 97.20 | 5 | 39.07 |
| Mexico | 2006 | Mixed | 93.66 | 8 | 46.92 |
| Mexico | 2009 | Mixed | 89.54 | 7 | 44.7 |
| Netherlands | 2006 | PR | 98.97 | 9 | 74.02 |
| Netherlands | 2010 | PR | 99.19 | 9 | 60.29 |
| New Zealand | 2008 | Mixed | 96.16 | 7 | 45.13 |
| Norway | 2005 | PR | 97.33 | 7 | 51.42 |
| Norway | 2009 | PR | 96.99 | 7 | 52.48 |
| Peru | 2011 | PR | 89.77 | 6 | 35.51 |
| Poland | 2005 | PR | 93.03 | 6 | 42.84 |
| Poland | 2007 | PR | 95.33 | 4 | 33.48 |
| Portugal | 2009 | PR | 94.37 | 5 | 58.3 |
| Slovakia | 2010 | PR | 92.54 | 6 | 43.63 |
| Slovenia | 2008 | PR | 96.11 | 7 | 39.61 |
| South Africa | 2009 | PR | 99.70 | 8 | 41.14 |
| Spain | 2008 | PR | 95.51 | 9 | 48.69 |
| Sweden | 2006 | PR | 96.98 | 7 | 61.43 |
| Switzerland | 2007 | PR | 97.44 | 6 | 54.82 |
| United States | 2008 | Majoritarian | 95.99 | 2 | 46.24 |
| Uruguay | 2009 | PR | 98.90 | 4 | 29.42 |

Note. Recalculated degrees of proportionality adapted from "Election indices," by M. Gallagher, 2015, pp. 6-39. Levels of many-to-many congruence and the number of parliamentary parties adapted from "Module 3 full release: March 27, 2013 version," by CSES, 2013.

4.2 Assumptions for Regression Analysis

Table 6 shows the assumptions that have to be met in order to make valid inferences concerning regression analysis. If required, the assessments are included in Appendix A.

Table 6

Linear Regression Analysis: Assessment and Indication of Assumptions

| Assumption | Description | Assessment | Indication |
|------------------|---|-------------|---|
| Linearity | Independent variables and dependent variable have a linear relationship | Scatterplot | Proportionality: moderate and positive Number of Parties: moderate and positive |
| Normality | Data of variables are normally distributed | Q-Q Plot | Proportionality: weak Number of Parties: strong Many-to-Many Congruence: weak |
| Homoscedasticity | Normally distributed error around regression line | P-P Plot | No tendency in the error terms |
| Collinearity | High correlation between at least two independent variables | VIF | VIF < 10 (VIF = 1.113) |

Accounted for the small size of the sample (N = 39), the assumption of normality for degrees of proportionality and many-to-many congruence cannot be ruled out, so we proceeded with regression analyses.

4.3 Regression Results

Table 7 shows that bivariate regression analysis was performed to test if proportional electoral systems positively affect the number of parliamentary parties.

Table 7

Regression Results for the Number of Parliamentary Parties

| | |
|-----------------|-----------------|
| Constant | -10.363 (8.071) |
| Proportionality | .173** (.085) |
| R ² | .101 |
| N | 39 |

Note. Standard errors are reported in parentheses. The unstandardised coefficients are reported in the table.

* p < 0.10; ** p < 0.05; *** p < 0.01 (two-tailed). The results are available on request.

Results indicated that proportionality significantly predicted the number of parliamentary parties, $t(37) = 2.041$, $p = .048$. Proportionality also explained a significant proportion of variance in the number of parliamentary parties, $F(1, 37) = 4.167$, $p = .048$.

Table 8 shows that bivariate regressions were performed to test if the number of parliamentary parties (i.e. Model A) and proportionality (i.e. Model B) indirectly positively affect levels of many-to-many congruence. In extension, multiple regression was performed to test if proportionality (i.e. Model C) directly positively affects levels of many-to-many congruence.

Table 8

Regression Results for Levels of Many-to-Many Congruence

| | A | B | C |
|-------------------|-----------------|------------------|------------------|
| Constant | 38.01 (6.721) | -73.472 (54.350) | -56.761 (54.676) |
| Number of Parties | 2.218** (1.061) | | 1.613 (1.09) |
| Proportionality | | 1.314** (.571) | 1.035* (.593) |
| R ² | .106 | .125 | .175 |
| N | 39 | 39 | 39 |

Note. Standard errors are reported in parentheses. The unstandardised coefficients are reported in the table.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed). The results are available on request.

Results for Model A indicated that the number of parliamentary parties significantly predicted levels of many-to-many congruence, $t(37) = 2.09$, $p = .044$. The number of parliamentary parties also explained a significant proportion of variance in levels of many-to-many congruence, $F(1, 37) = 4.367$, $p = .044$.

Results for Model B indicated that proportionality significantly predicted levels of many-to-many congruence, $t(37) = 2.301$, $p = .027$. Proportionality also explained a significant proportion of variance in levels of many-to-many congruence, $F(1, 37) = 5.297$, $p = .027$.

Results for Model C indicated that after controlling for the effect of the number of parliamentary parties, proportionality marginally significantly predicted levels of many-to-many congruence, $t(36) = 1.746$, 2.301 , $p = .089$. Proportionality and the number of parliamentary parties explained a significant proportion of variance in levels of many-to-many congruence, $F(2, 36) = 3.828$, $p = .031$.

5. Discussion

The results of this cross-sectional study suggest that electoral systems indirectly affect the quality of political representation. We find that democratic states deploying proportional electoral systems are associated with more parliamentary parties and higher levels of many-to-many congruence than democratic states deploying disproportional electoral systems. The results confirmed previous findings by Golder and Stramski (2010) who combined Duverger's and Downs' theories in order to explain the link between electoral system proportionality and many-to-many congruence. What is more, however marginally, our findings suggest that electoral systems directly affect the quality of representation.

Although the dataset is useful for positioning distributions of substantive preferences of citizens and ideological positions of representatives on the left-right scale, it has some limitations. In contrast to Gallagher's (2015) indices, the dataset restrictively includes up to nine parliamentary parties, so we were necessitated to normalize the number of parliamentary seats in case of divergent assembly sizes. Moreover, while there are over eighty free democracies (FH, 2015b), the dataset includes about half of them. As a consequence, the sample was rather small. Furthermore, because the dataset is comprised out of data that were gathered at a single point in time, we could not make definite inferences about cause-and-effect relationships. We suggest to include longitudinal surveys from respondents in more free democracies.

Measures of proportionality are considered to be influenced by four mechanical sources: electoral formula, district magnitude, malapportionment, and electoral threshold (Gallagher, 1991, p. 43). Next to degrees of proportionality, an improved conceptualization for electoral systems has to hold the size of the assembly, the existence of presidential elections, and the occurrence of inter-party links in order capture the electoral mechanisms that are considered part of electoral systems (Gallagher & Mitchell, 2005; Lijphart, 2012; Norris, 2004). Beneficial to confine the direct effects of electoral systems from the intervening effects of the number of parliamentary parties on the quality of political representation, we suggest further research on a more comprehensive conceptualization for electoral systems.

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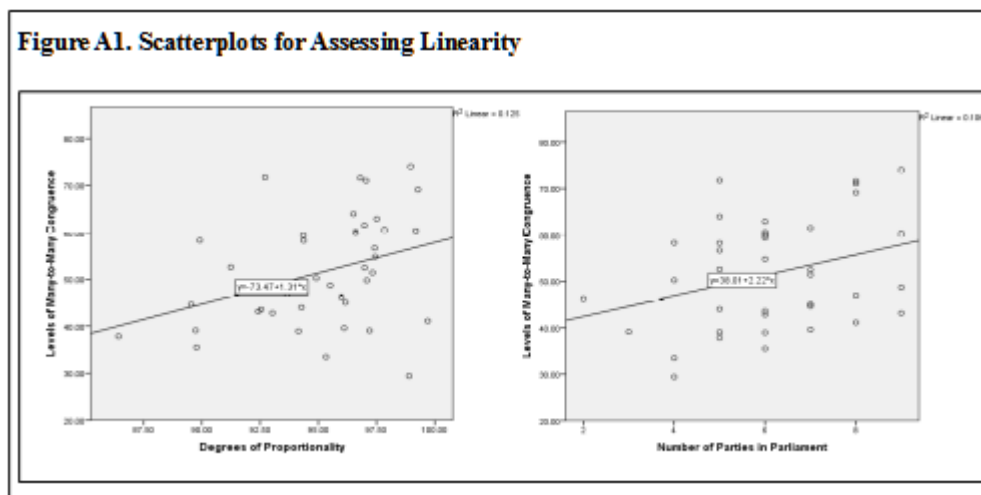
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Appendix A: Assessing Assumptions for Regression Analysis

Linear regression analysis is founded on key assumptions that have to be met in order to make valid inferences. We considered four assumptions relevant for this cross-sectional study in which data were used from CSES (2013) that have been gathered at a single point in time: (1) Linearity, (2) Normality, (3) Homoscedasticity, and (4) Collinearity.

A1.01 Linearity

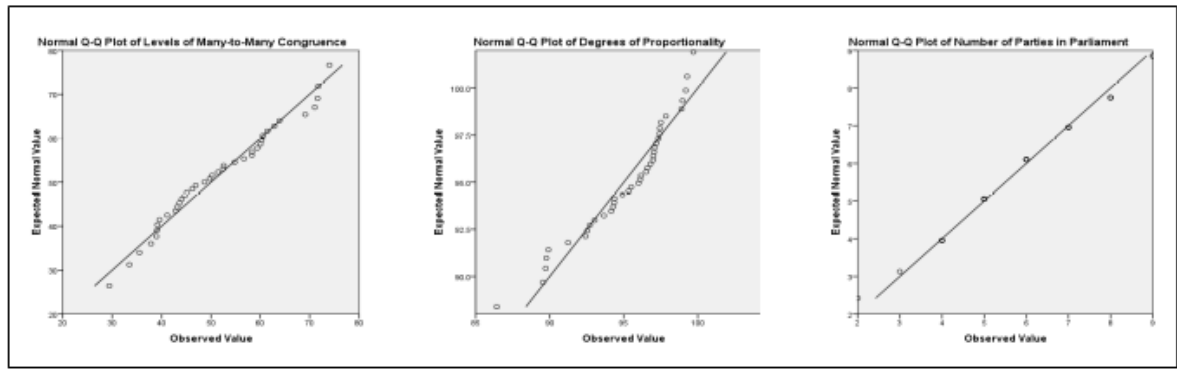
As shown in Figure A1, we checked the existence of a linear relationship between the predictor variables (i.e. proportionality and the number of parties) and the dependent variable (i.e. many-to-many congruence) with scatterplots. These indicated a moderate (positive) linear relationship for proportionality and the number of parties on many-to-many congruence.



A1.02 Normality

As shown in Figure A2, we assessed the presence of normality with Q-Q Plots. There were strong signs of normality in the data regarding the number of parliamentary parties, and weaker signs of normality for degrees of proportionality and many-to-many congruence. However, accounted for the small size of the sample ($N = 39$), the assumption of normality cannot be ruled out.

Figure A2. Q-Q Plots for Assessing Normality



A1.03 Homoscedasticity

As shown in Figure A3, we checked the assumption of homoscedasticity with P-P Plots. These indicated no tendency in the error terms.

Figure A3. P-P Plots for Assessing Homoscedasticity

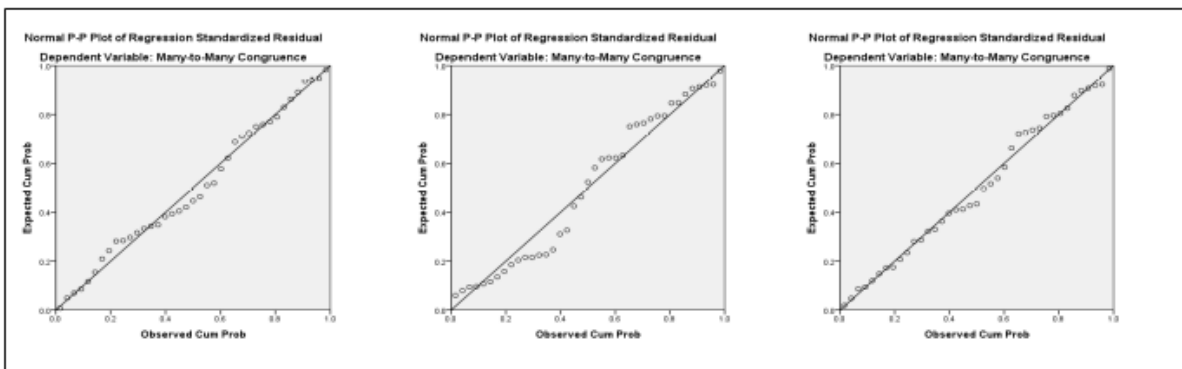


Figure A3. Predictor variables: first plot, degrees of proportionality; second plot, number of parliamentary parties; and third plot, degrees of proportionality and number of parliamentary parties.

A1.04 Collinearity

The Variance Inflation Factor (VIF) of '1.113' indicated no signs of collinearity.