



Model based clustering of political finance regimes: Developing the regulation of political finance indicator

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ABSTRACT

Political finance literature lacks a common framework for classifying regulatory systems. As these tools are influential in the identification of generalizable relationships, studies assessing political finance in areas such as corruption, competition, and electoral outcomes, often present case specific findings. Using updated International IDEA data, the application of a Multiple Correspondence Analysis and Model Based Clustering framework presents a variable to measure levels of regulation; the 'Unregulated', 'Partially Regulated' and 'Strongly Regulated' system types; and statistics for assessing the certainty of each country's classification. Applying this methodology to a 180-country sample represents an improvement on previous studies which, due to data limitations, have often used reductive methods and limited sampling. In closing, the 'Regulation of Political Finance Indicator' is introduced via Multinomial Logistic Regression, where analyses from prior literature are revisited. Avenues for further study are provided, which may seek to identify generalizable relationships in the areas described above, while also looking to produce ongoing panel data.

1. Introduction

Despite an increased focus on comparative study in the 21st Century (see [Falguera et al., 2014](#); [Mendilow and Phélippeau, 2018](#); [Naßmacher, 2009](#)), political finance research remains 'under-theorized' ([Scarrow, 2007](#), p. 195). The formulation of a consistent model for the cross-country comparison of political finance systems would help to develop greater understanding of the origins and impact of varied regulatory approaches. Prior efforts have been made; some researchers have produced a single index measuring 'levels' of regulation ([Hummel et al., 2019](#); [Lopez et al., 2017](#); [van Es, 2016](#); [Whiteley, 2011](#)), while others have developed multi-dimensional frameworks for classifying system types ([Casas-Zamora, 2005](#); [van Biezen, 2010](#); [Wiltse et al., 2019](#)). Current approaches are generally limited, for at least three reasons.

Firstly, to produce the most generalizable insights, large-n comparative research should seek to incorporate as many cases as possible. Though some examples incorporate a global sample ([Lopez et al., 2017](#); [van Es, 2016](#)), others rely on smaller or region specific samples ([Ben-Bassat and Dahan, 2015](#); [Casas-Zamora, 2005](#); [van Biezen, 2010](#)). Secondly, according to [Lijphart \(1971\)](#), researchers dealing with large amounts of data should consider the use of formal dimension reduction techniques when building constructs for comparative research. Despite this, most studies in this area compare levels of regulation by adding the number of controls present in each country. Though this appears intuitive, it relies on the untested assumption

that every individual regulation has an *identical* impact within the overall system. Finally, some strategies focus solely on *party* finance regulations, and consequently exclude those aimed at candidates and third-party groups ([Ben-Bassat and Dahan, 2015](#); [van Biezen, 2010](#); [Wiltse et al., 2019](#)). Consequently, the exclusion of this aspect of political finance may be problematic in countries with candidate-oriented electoral frameworks. This article aims to address these issues by developing a cross-country measurement and classification tool that incorporates wider areas of political finance regulation.

For the purposes of this article, 'political finance' is defined as 'all financial flows to and from political parties and candidates. It includes formal and informal income and expenditure, as well as financial and in-kind contributions' ([International IDEA, 2020](#)). Though this incorporates *direct* transactions to political actors, the definition is extended further to include 'campaign spending by actors that are neither political parties nor candidates' ([Ohman, 2014b](#), p. 27). These campaigners, which contribute to *indirect* spending, are commonly referred to as 'third-parties'. Thus, 'political finance regulation' refers to all rules that are in place to regulate the income and spending of political parties, candidates, and third parties. Since 2003, the International Institute for Democracy and Electoral Assistance (IDEA) have hosted the 'Political Finance Database', providing detailed information on regulation in 180 countries. Though prior versions have been used in some of studies described above, the 2020 release has yet to be

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examined in this way. Updated data provides an opportunity to work toward: (i) the development of a robust method for comparing and classifying systems of political finance regulation; (ii) the examination of the widest sample of countries possible; and (iii) the development of a consistent and replicable methodology for the production of panel data. Working toward these aims, this study applies a combination of multiple correspondence analysis (MCA) and model based clustering (MBC). To date, neither MCA nor MBC have been applied to the study of political finance regulation.

The remainder of this paper is divided into four parts. Section one critically reviews the suite of existing approaches to political finance classification. Section two introduces the data used in this study, before discussing the methods that are used to develop the Regulation of Political Finance Indicator (RoPFI).¹ Findings suggest the presence of a single dimension of political finance regulation, alongside three classes of system, labelled as 'Unregulated', 'Partially Regulated', and 'Strongly Regulated'. Section three reproduces analyses undertaken in prior literature to illustrate how the RoPFI may be used in subsequent research, as well as the ways in which its use can improve upon previous analyses. Finally, section four concludes by clarifying the scholarly contributions, limitations, and implications of this study. Through the construction of three classes of political finance system, the RoPFI provides opportunities to work toward the identification of generalizable insights into the causes and consequences of political finance reforms, while also supplying small-n researchers with a methodologically robust tool for case selection.

2. Existing approaches to political finance classification

According to Smilov (2007), variations in political finance regulation can be conceptualized as a trade-off between the opposing values of libertarianism and egalitarianism. Libertarian influenced systems lack restrictions, allowing those with legitimately acquired wealth to commit their resources toward political competition. Conversely, systems founded on egalitarianism incorporate state funding and controls on private donations, seeking to equalize economic disparities in electoral contests. Viewing these positions as extremities, research has focused on constructing mono-dimensional measurement tools for cross-country comparison of political finance regulation (Lopez et al., 2017; van Es, 2016; Whiteley, 2011). Although these approaches can be viewed within the diametric positions discussed by Smilov (2007), further research finds that countries may 'simultaneously display both libertarian and egalitarian characteristics' (Dawood, 2013, p. 300). The concurrent incidence of competing ideological positions suggests that countries may adopt different strategies for different areas of regulation. Research has considered this when developing models to compare *areas of regulation* within a multi-dimensional system (Casas-Zamora, 2005; van Biezen, 2010; Wiltse et al., 2019). Table 1 summarizes the most cited and recently published typologies that are used to measure political finance regulation. Ranging between one and four dimensions, models vary from simple additive indices (Casas-Zamora, 2005; Lopez et al., 2017; Wiltse et al., 2019) to more methodologically complex factor analytic (van Es, 2016) and item response theory models (Coppedge et al., 2021). The following subsections critically examine these approaches. Key limitations are found, including: (i) the reliance on unverified assumptions linked to dimensionality and grouping of cases; (ii) a frequent tendency to focus on *specific* areas of political finance (e.g. the exclusion of candidate-focused regulations); and (iii) the common use of regional sampling. These will be expanded upon below.

¹ All analysis is performed in R. Package links and replication instructions are presented in Supplementary Materials, which also contains information on source data, detailed results of multiple correspondence analysis, and clustering validation tests.

2.1. Mono-dimensional approaches

When developing mono-dimensional tools for the measurement of political finance, most previous studies have constructed indices by calculating the number of regulations employed within each country (Hummel et al., 2019; Lopez et al., 2017; Whiteley, 2011). Although these approaches provide simplicity, their linear structure may be problematic, as combinations of regulations often provide greater impact than their constituent parts. If the goal of public funding is to reduce the reliance on political donors, for example, subsidies are likely to have greater impact if introduced alongside restrictions on donations from private sources (Ohman, 2014b). Consequently, indices constructed in these studies rely on a previously untested assumption that the addition of individual regulations provides an identical impact on the overall restrictiveness of a country's political finance system. van Es (2016) considers this issue when producing the 'Political Finance Regulation Index' (PFRI). This model measures 'the degree to which states have various laws and official procedures regulating the flow of money into politics'. Defining the PFRI as a measure of 'state interventionism', the study views this concept as 'indirectly observable', with levels of intervention *indirectly* represented by the relative level of regulation in each country (van Es, 2016, p. 210). Using International IDEA's Political Finance Database (PFD) as a foundation, the PFRI is built in two stages. The first stage converts the nominal PFD data into four ordinal sub-indices, by calculating the number of regulations that each country has in the areas of *Private Income, Public Funding, Spending, and Reporting, Oversight and Sanctions*, as a proportion of each category's total. Though divided across four categories of regulation, these indices are constructed via a similar additive approach to those discussed above (Hummel et al., 2019; Lopez et al., 2017; Whiteley, 2011). Thus, levels of regulation are represented on linear scales, where higher values indicate more regulation, and vice versa. The second stage of the model applies a factor analytic model to the four sub-indices, which produces the latent measure of interventionism. As a result, the PFRI methodology provides a means to determine the weighting of sub-indices within the mono-dimensional model. Despite the suggestion that this produces a model which is 'more than simply a linear additive measure' of regulation (van Es, 2016, p. 211), the intervening step to construct sub-indices follows a similar additive approach to those taken elsewhere. Consequently, the first stage of the model relies on the same untested assumptions deemed to be questionable in alternative mono-dimensional measures of political finance. In order to relax this assumption, formal dimension reduction techniques should be applied *directly* to data on *individual* political finance regulations. To the author's knowledge, no studies have explored this possibility, providing an opportunity for additional research in this area.

2.2. Multi-dimensional approaches

Currently, the number of dimensions used in multi-dimensional frameworks ranges between two and four. As part of a wide ranging and ongoing study into several features of democracy, the V-Dem project incorporates two variables linked to political finance. The first focuses on *disclosure* of campaign donations, with the second measuring *public campaign finance* (Coppedge et al., 2021). Following the V-Dem methodology, an average of five expert surveys were undertaken in each country, and levels of regulation in each area were measured on an ordinal scale. Findings were subsequently combined through an item response theory model (see Pemstein et al., 2022) to produce standardized comparative measures for disclosure and public funding. As an ongoing project, the V-Dem provides a significant amount of panel data, which ranges across 202 countries and more than 200 years. Despite this, the variables measure only two *specific* areas of political finance, and consequently fail to account for regulations on donations and expenditure.

Table 1
Existing methods for classifying political finance systems.

| Name | Cases | Dimensions | What do Dimension(s) measure? |
|--|---------------|------------|--|
| Campaign Finance Regulatory Stringency Index (Kulesza et al., 2016; Witko, 2005) | 50 US States | 1 | Regulatory stringency; sub-indices measure <i>Disclosure, Spending Limits/Public Financing, and Contribution Limits</i> . |
| Party Regulation Index (Whiteley, 2011) | 36 Countries | 1 | General levels of regulation. |
| Political Finance Regulation Index (Lopez et al., 2017) | 180 Countries | 1 | Levels of regulation; sub-indices measure <i>Bans and Limits on Private Income, Public Funding, Regulation of Spending, and Reporting, Oversight and Sanctions</i> . |
| Political Finance Regulation Index (van Es, 2016) | 169 Countries | 1 | Levels of interventionism in political finance. |
| Varieties of Democracy (V-Dem) Dataset (Coppedge et al., 2021) | 202 Countries | 2 | <i>Disclosure of campaign donations and Public campaign finance</i> . |
| Typology of Party Finance (Wiltse et al., 2019) | 120 Countries | 2 | Regulations on party <i>Income and Transparency</i> ; presents <i>Market Based, Public Utility, State Co-opted, and Unregulated</i> classificatory groups. |
| Typology of Financing Regimes (van Biezen, 2010) | 53 Countries | 3 | <i>Party Regulation, Transparency, and Subsidization</i> . |
| Political Finance Indices (Ben-Bassat and Dahan, 2015) | 82 Countries | 3 | <i>Party Contribution Limits, Public Funding, and Transparency</i> . |
| Typology of Comparative Political Finance Systems (Casas-Zamora, 2005) | 40 Countries | 4 | <i>Regulation of Expenditure, Regulation of Contributions, Transparency Rules, and Subsidization</i> . |

Differing from the V-Dem, further multi-dimensional approaches are built on the PFD data. The two-dimensional ‘Typology of Party Finance’ (TPF), developed by Wiltse et al. (2019, p. 245), divides regulations on *income intervention* from those targeted at *transparency*. Within this model, the first dimension refers to regulations on party income and spending, while the transparency dimension compares the legal obligations of parties to disclose their finances. Viewing systems as the intersection of three dimensions, Ben-Bassat and Dahan’s ‘Political Finance Indices’ (PFI) and van Biezen’s ‘Typology of Financing Regimes’ (TFR), differ from the TPF by separating controls on private and public income into individual dimensions, alongside a similar dimension measuring disclosure requirements (Ben-Bassat and Dahan, 2015; van Biezen, 2010). Despite these differences, these models are common in their sole focus on party finance regulation. Though influenced by data availability issues, this is significant. Research shows the continued impact of candidate spending in some countries, as individuals often have to finance their campaigns independently of parties (Ohman, 2014a). Moreover, Super-PACs continue to be influential in post-*Citizens United* elections in the US (Hasen, 2014), and third-party campaigners have become a ‘sustained phenomenon’ in Australia (Orr and Gauja, 2014, p. 82). The sole focus on parties, therefore, fails to provide a holistic account of wider systems of political finance regulation. Casas-Zamora (2005) considers this when developing a four-dimensional framework, quantifying *political expenditure, contributions, state subsidization, and transparency*, inclusive of party and candidate regulations.

Further issues concern the technique for identifying system types. Previous methods have divided countries into categories on each dimension, often using the mean value to split cases. With every country defined as ‘low’ or ‘high’ on each dimension, the interaction of these positions provides various classificatory groups. Using this method on two dimensions results in four classifications (Wiltse et al., 2019), and a three-dimensional framework produces nine categories (van Biezen, 2010). Applied to a four-dimensional model, Casas-Zamora (2005) identifies sixteen types of political finance system. While this method is easily interpretable, it provides no means to determine whether the resulting categories are an accurate representation, or whether the countries within each group constitute a similar profile of political finance system. As a method which seeks to find ‘meaningful’ and ‘internally cohesive’ groups of cases, cluster analysis is oriented toward ‘find[ing] groups whose members have something in common that they do not share with members of other groups’ (Bouveyron et al., 2019, p. 1). Though the use of clustering would provide an empirically

grounded method for grouping cases, these methods remain unexplored within political finance literature.

The frameworks outlined in this section share the characteristic of measuring regulations across multiple scales yet, while unified in this respect, the optimum number of dimensions is contested. Despite Wiltse et al. (2019, p. 245) claiming to ‘clarify the dimensionality’ of political finance through a two-dimensional approach, little supporting evidence is provided. In addition, though Casas-Zamora (2005) identifies sixteen classes of political finance system, six groups contain no cases, suggesting that a more parsimonious approach may be available. These observations are compounded further by sampling limitations. Countries examined in Casas-Zamora’s study are gleaned predominantly from the Americas and Western Europe. Moreover, Ben-Bassat and Dahan’s PFI covers a sample size of eighty-two countries, and van Biezen’s TFR includes fifty-three cases. Consequently, while these frameworks may provide regional insights, they fail to capture a globally representative picture of political finance. Conclusions modelled on these frameworks should therefore consider whether wider generalizations are likely to be valid.

2.3. Limitations of existing approaches

This section has critiqued those approaches to measuring political finance regulation that currently appear most influential. Through doing so, it can be observed that: (i) to date, researchers have used between one and four dimensions to measure levels of regulation, often without clear justification; (ii) to varied extents, all measures assume some form of linear structure and, consequently, no study has applied dimension reduction techniques directly to the PFD data; (iii) previous studies have grouped countries via the mean value of each dimension, with no study exploring the use of clustering methods. This has the potential to classify countries that are dissimilar within a common category; (iv) a subsection of previous studies have suffered due to a lack of data availability and, subsequently, have excluded key areas of regulation, including those targeted at candidates; and (v) some previous studies rely on regional samples, potentially producing findings that are not generalizable to a global sample. The following section outlines the methodology of the study, which is designed to address these limitations.

3. Data and methods

The methodology of this study is divided into three main stages; data selection, dimension reduction, and grouping of cases. Accordingly, each stage was designed to address the limitations outlined in the prior section. Firstly, the use of updated data from International IDEA's 'Political Finance Database' (PFD) allows for the inclusion of regulations in *all* areas of political finance, as well as the consideration of a 180-country sample. Though alternative approaches have used similar data to produce additive indices (Casas-Zamora, 2005; Lopez et al., 2017; Wiltse et al., 2019), or to produce additive sub-indices for inclusion in factor analysis (van Es, 2016), the second stage of this study utilizes methods designed specifically for use on nominally coded data. The application of MCA *directly* to individual instances of regulation allows for an empirically robust method of dimension reduction, and further provides a means to weight variables within the eventual model (Di Franco, 2016; Husson et al., 2011). The final stage, which uses MBC to group cases, is grounded in probability theory. Consequently, its use provides a more 'principled' method for grouping cases, relative to the techniques used previously (Bouveyron et al., 2019, p. 15).

This section outlines data and methods used in this study, and is structured as follows: subsection one introduces the data sample and discusses the pre-processing stages; subsection two outlines the use of MCA to reduce the dimensionality of the data; and subsection three runs an MBC algorithm to group cases.

3.1. Pre-processing political finance data

Originally published in 2003, International IDEA's PFD was developed by legal scholars and political scientists via a standardized survey. To determine the most suitable sample, the survey excluded all countries where political parties are legally banned, or where no elections had been held in the past 30 years. Consequently, the PFD contains data on political finance regulation in 180 countries (International IDEA, 2020). Updates in 2012, 2016, 2018 and 2020 expanded the resource to produce a panel dataset on regulations in four areas: *Bans and Limits on Private Income, Public Funding, Regulations on Spending, and Reporting, Oversight and Sanctions*. At the time of writing, the current iteration is accurate as of January 2020. Most variables are measured on a nominal scale. For example, the variable *Is there a limit on the amount a donor can contribute to a candidate* may take the values 'yes' or 'no'. Though these binary variables indicate the presence or absence of particular regulations, supplementary variables clarify any related thresholds. Using Canada as an illustrative example, the nominally coded variable tells us that Canada *does* have limits on donations to candidates, while the supplementary variable explains that donors are limited to CA\$1,500 per candidate, per year. The inclusion of nominally coded variables for each type of regulation provides a simple way to compare how countries differ in their approach. While the addition of supplementary variables presents further information, the lack of standardization makes cross-country comparisons challenging. In a study of State-level regulations in the US, Witko (2005, p. 298) reasons that comparisons of donation, spending, and disclosure thresholds are problematic, as 'many states do not limit these behaviours or do not limit them on a dollar-level basis.' This issue is exacerbated further when considering the global sample of the PFD, where thresholds are set through various currencies. To ensure cross-national comparability, all data other than nominally coded variables were removed. In order to reduce overall proportions of missing data, variables missing values for more than 20 percent of cases were dropped. This reduced the proportion of missing values to 8 percent of the total. Following these pre-processing steps, 45 nominally coded variables remained. Of these, 23 are categorized by International IDEA as limits on private income, 7 as public funding, 4 as regulations on spending, and 11 as controls on reporting and oversight (see Table 2).

3.2. Quantifying political finance regulation

Advances in machine learning methodology have provided opportunities for the development of model based clustering (MBC) approaches (Ahlquist and Breunig, 2012; Bouveyron et al., 2019; Waggoner, 2020). Despite this, application of these methods to categorical data has received 'relatively little attention' and remains underdeveloped (McNicholas, 2016, p. 356). As a traditional approach, feature extraction methods such as principal component analysis may be used prior to cluster analysis. These techniques are complementary to one another as they provide 'a continuous view (the tendencies identified by the principal components) and a discontinuous view (the clusters obtained by the clustering) of the same set of data' (Husson et al., 2011, p. 190). Indeed, Ahlquist and Breunig (2012, p. 98) affirm that MBC is 'well suited' to this approach. Though this is the case, the use of principal component analysis is not applicable to categorical input data (as is the case with all variables displayed in Table 2). Multiple correspondence analysis (MCA) is an optimal scaling technique designed for this purpose. As such, MCA is generally 'regarded as principal component analysis with unordered categorical variables' (Blasius and Thiessen, 2012, p. 46). When working with this type of data, therefore, MCA may be used to reduce data dimensionality prior to clustering (Husson et al., 2011; Josse et al., 2012). Following this approach, the next stage of analysis applies MCA to the variables displayed in Table 2.

As outlined in the previous section, pre-screening of data retained 45 nominally coded variables on political finance regulation in 2020. Of more than 8,000 observations, the data contained 8 percent missing values; 82 countries were identified as complete cases. To undertake MCA on incomplete data, Josse et al. (2012) develop a two stage approach. The first stage employs a 'regularized iterative multiple correspondence analysis' (RiMCA) single imputation method to impute missing values, with the second stage applying MCA to the complete dataset. The RiMCA method uses an iterative expectation maximization (EM) type algorithm, where missing values are imputed during the expectation stage, while components are extracted during the maximization step. Studying the performance of RiMCA on simulation and real world data, results indicate strong performance across a range of missing data conditions. These included datasets ranging from 8 percent to 30 percent missing data, as well as instances of data missing at random (MAR) and missing completely at random (MCAR). The RiMCA procedure ensures that missing values are imputed with consideration of the relationships between both cases *and* variables and, as such 'predict[s] the coordinates of the individuals on the first components in spite of the missing values'. Consequently, the use of RiMCA prior to MCA provides a method to 'perform clustering on incomplete categorical variables' (Josse et al., 2012, p. 114).

Following RiMCA imputation, MCA was undertaken on the complete dataset. The first stage of MCA converts input data into a disjunctive table, which represents each variable as a series of individual dummy coded response categories, referred to as 'modalities'. A binary variable is converted to two modalities, for example, while a three level categorical variable is recoded into three. The 45 variables under examination in this study are represented by a total of 100 modalities. As with all dimension reduction methods, a key stage of MCA is to determine the number of dimensions to retain. The scree plot, which displays the percentage of variance explained by each extracted dimension, is examined to identify the optimum number of dimensions for retention. With 100 modalities, this value theoretically ranges between one and 100. Fig. 1 shows values for the first five dimensions, adjusted through the calculation offered by Greenacre (2006).

The first dimension always retains the largest percentage of variance, with each subsequent dimension providing reduced explanatory value. While no rule of thumb exists for determining the optimum number of dimensions to retain, Di Franco (2016, p. 1303) suggests a similar logic to the Kaiser criterion, by retaining factors whose

Table 2
Variables included in MCA.

| Category | Variable |
|------------------------------------|---|
| Bans and Limits on Private Income | 1. Is there a ban on donations from foreign interests to political parties? |
| | 2. Is there a ban on donations from foreign interests to candidates? |
| | 3. Is there a ban on corporate donations to political parties? |
| | 4. Is there a ban on corporate donations to candidates? |
| | 5. Is there a ban on donations from Trade Unions to political parties? |
| | 6. Is there a ban on donations from Trade Unions to candidates? |
| | 7. Is there a ban on anonymous donations to political parties? |
| | 8. Is there a ban on anonymous donations to candidates? |
| | 9. Is there a ban on donations from corporations with government contracts to political parties? |
| | 10. Is there a ban on donations from corporations with government contracts to candidates? |
| | 11. Is there a ban on donations from corporations with partial government ownership to political parties? |
| | 12. Is there a ban on donations from corporations with partial government ownership to candidates? |
| | 13. Is there a ban on donations from any other source? |
| | 14. Are there bans on state resources being used in favour or against a political party or candidate? |
| | 15. Is there a limit on the amount a donor can contribute to a political party over a time period (not election specific)? |
| | 16. Is there a limit on the amount a donor can contribute to a political party in relation to an election? |
| | 17. Is there a limit on the amount a donor can contribute to a candidate? |
| | 18. Is there a limit on the amount a candidate can contribute to their own election campaign? |
| | 19. Is there a limit on in-kind donations to political parties? |
| | 20. Is there a limit on in-kind donations to candidates? |
| | 21. Are there provisions regarding political parties engaging in commercial enterprises? |
| | 22. Are there restrictions regarding political parties taking loans in relation to election campaigns? |
| | 23. Are there provisions requiring donations to go through the banking system? |
| Public Funding | 24. Are there provisions for direct public funding to political parties? |
| | 25. If there are provisions for direct public funding to political parties, are there provisions for how it should be used ('ear marking')? |
| | 26. Are there provisions for free or subsidized access to media for political parties? |
| | 27. Are there provisions for free or subsidized access to media for candidates? |
| | 28. Are there provisions for any other form of indirect public funding? |
| | 29. Is the provision of direct public funding to political parties related to gender equality among candidates? |
| | 30. Are there provisions for other financial advantages to encourage gender equality in political parties? |
| Regulations on Spending | 31. Is there a ban on vote buying? |
| | 32. Are there limits on the amount a political party can spend? |
| | 33. Are there limits on the amount a candidate can spend? |
| | 34. Are there limits on traditional media advertising spending in relation to election campaigns? |
| Reporting, Oversight and Sanctions | 35. Do political parties have to report regularly on their finances? |
| | 36. Do political parties have to report on their finances in relation to election campaigns? |
| | 37. Do candidates have to report on their campaign finances? |
| | 38. Is information in reports from political parties and/or candidates to be made public? |
| | 39. Must reports from political parties and/or candidates reveal the identity of donors? |
| | 40. Must reports from political parties and candidates include itemized income? |
| | 41. Must reports from political parties and candidates include information on itemized spending? |
| | 42. Is it specified that a particular institution(s) is responsible for examining financial reports and/or investigating violations? |
| | 43. Is there an institution that receives financial reports from political parties and/or candidates? |
| | 44. Do any other institutions have a formal role in political finance oversight? |
| | 45. Are sanctions provided for political finance infractions? |

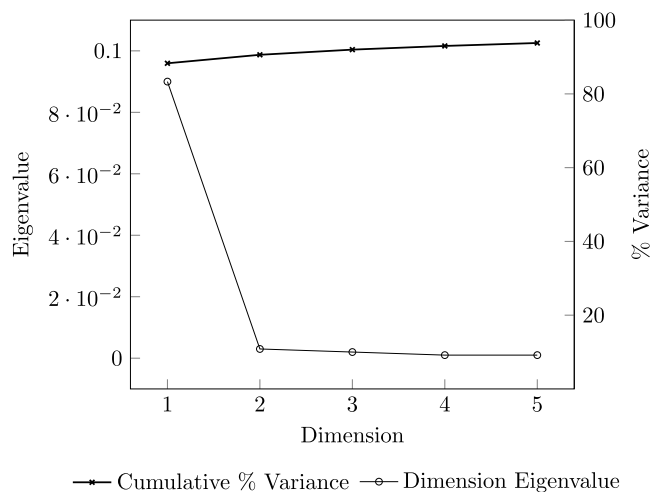


Fig. 1. MCA Scree Plot.

contributions to the overall variance of the data are 'higher than average'.² Following this recommendation here suggests that all dimensions with an eigenvalue exceeding 0.01 should be retained. As shown in Fig. 1, the first dimension has an eigenvalue of roughly 0.9, while the second falls below the threshold for retention. As an alternative recommendation, Husson et al. (2011) suggest that researchers should retain dimensions that account for eighty to ninety percent of variance. Fig. 1 indicates that Dimension 1 explains roughly eighty-eight percent, with further dimensions appearing to be little more than noise.³ These observations suggest that a single dimension is sufficient to compare levels of political finance regulation.

To understand what this dimension measures, MCA geometrically represents modalities and cases in a Euclidean space (Greenacre, 2017). While the second dimension offers little additional power in terms of variance explained, it is retained for visualization purposes. On these plots, points positioned proximate to one another have similar

² This value is calculated by dividing 1 by the total number of modalities. In this case, the resulting figure is 0.01.

³ Examination of squared cosine values for each modality supports this claim. Dimension 1 represents categories well, with all 'yes' and 'no' responses having a value above 0.6. Overall, Dimension 2 is a weak construct, with a maximum value of 0.4.

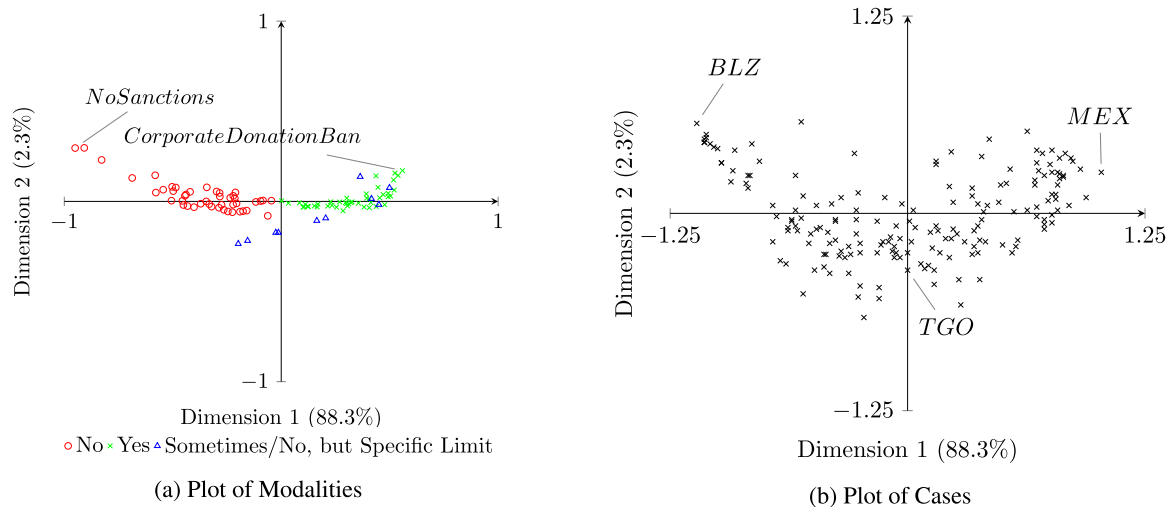


Fig. 2. Dimensions Extracted via MCA.

structure. Conversely, large distances between points indicate dissimilarity. Fig. 2(a) shows the positioning of modalities on the first two extracted dimensions. The plot shows a clear division between all ‘no’ and ‘yes’ categories, which are clustered to the left and right-hand sides of the first dimension. With ‘Sometimes’ and ‘No, But Specific Limit’ modalities generally lying between, the spread of categories across Dimension 1 indicates a natural ordering within the variables. As an additional interpretation of this plot, the further a modality is positioned from the origin, ‘the greater the contribution it makes toward the formation of the axis itself’ (Di Franco, 2016, p. 1305). Thus, points positioned proximate to the origin provide the smallest contribution to the dimension. In Fig. 2(a), the leftmost point indicates that a country has no sanctions in place for political finance violations. Consequently, the absence of sanctions is more highly weighted than an absence of regulations in any other area. The opposite is true for prohibitions on corporate donations to candidates which, as the rightmost point, is the most highly weighted modality in the positive direction. Considering the polarized nature of these points, we find that no country in the sample is coded in both categories. The interpretation of cases, displayed in Fig. 2(b), follows the same logic. Highlighted points show that Mexico and Belize are the most and least regulated countries respectively. Revisiting the input data confirms this to be the case, with Mexico making use of 43 of the 45 regulations under study, and Belize only employing a single regulation.

The use of MCA here has provided empirical support for the presence of a single dimension of political finance regulation. As a consequence, countries can be ranked on a scale of ‘least’ to ‘most’ regulated in this area, providing tacit support for the mono-dimensional approaches used elsewhere (Kulesza et al., 2016; Lopez et al., 2017; van Es, 2016; Whiteley, 2011). Where MCA improves upon the aforementioned approaches, however, is in its consideration of regulations as individual input variables. While previous approaches treat regulations as equal via the construction of additive linear scales, MCA relaxes assumptions of linearity. This is achieved by breaking down response categories into modalities, which are weighted as individual points. Consequently, the *absence* of a specific regulation may have a greater weight than its *presence* would in the opposing direction. As an example highlighted above, sanctions for political finance violations are much more conspicuous by their absence than by their presence. Identification of regulations of interest, as well as their individual weighting, is not possible when using simple additive approaches. While van Es (2016) utilizes factor analysis to weight *types* of regulation, the creation of additive indices as a precursory step presents similar limitations.

3.3. Clustering political finance systems

Although MCA provides a foundation for the development of a mono-dimensional construct, the method does not provide any approach to classify cases into groups. Previous studies have used the axis origin as a breakpoint for dividing cases (see Casas-Zamora, 2005; van Biezen, 2010; Wiltse et al., 2019), however this method has the potential to force cases into clusters they do not naturally fall within. The positioning of Togo in Fig. 2(b) shows the limitations to this strategy. If one were to use the axis to divide cases, points lying directly on the intercept would present methodological difficulties. Furthermore, countries grouped proximate to the origin may be divided across different classifications, despite being qualitatively similar. To address these issues, the next section applies MBC to the MCA output.

Cluster analysis is an umbrella term for a selection of machine learning techniques which seek to ‘[detect] and [map] degrees of similarity between objects in some feature space’ (Waggoner, 2020, p. 2). Political scientists have previously used these techniques to group types of democracy (McMenamin, 2004), political attitudes (Webb, 2008), and welfare regimes (Rudra, 2007). While traditional methods require the analyst to make decisions regarding model choice and number of clusters, MBC runs several models that differ in their treatment of cluster distribution, volume, shape, and orientation. Each model is initialized through hierarchical agglomerative clustering, with an iterative EM algorithm used to optimize its fit. Finally the optimal model is chosen by examining the Bayesian Information Criterion (BIC). Thus, MBC is often viewed as a more robust method than commonly used alternatives, including hierarchical or *k*-means algorithms (Ahlquist and Breunig, 2012; Bouveyron et al., 2019). The magnitude of difference between two BIC values indicates the dissimilarity of two models. Interpretation follows guidelines presented by Kass and Raftery (1995, p. 777), where differences exceeding 10 indicate ‘very strong’ evidence of a more suitable model fit, and differences below 2 are ‘not worth more than a bare mention’. Running MBC on the findings displayed in Fig. 2(b), the three models with largest BIC values are compared in Table 3. A Hopkins statistic of 0.63 suggested the presence of natural clusters within the data (Waggoner, 2020).

Following Kass and Raftery’s guidelines, examination of BIC values suggests that Models 1 and 2 are preferable to Model 3. The difference of just 0.36 between values for the first two models indicates a negligible difference between three and four cluster classifications. When cluster shapes are held equal, MBC suggests a four cluster solution while, when shapes are permitted to be variable, a three cluster solution is deemed appropriate. Although the BIC provides a useful metric for model comparison, its use alone ‘does not necessarily give the best

Table 3
Specification and BIC values for optimal model selection.

| Model | Distribution | Volume | Shape | Orientation | Code | Clusters | BIC | Difference |
|-------|--------------|----------|----------|-------------|------|----------|---------|------------|
| 1 | Ellipsoidal | Variable | Equal | Variable | VEV | 4 | -922.41 | - |
| 2 | Ellipsoidal | Variable | Variable | Variable | VVV | 3 | -922.77 | 0.36 |
| 3 | Ellipsoidal | Variable | Equal | Variable | VEV | 3 | -926.02 | 3.61 |

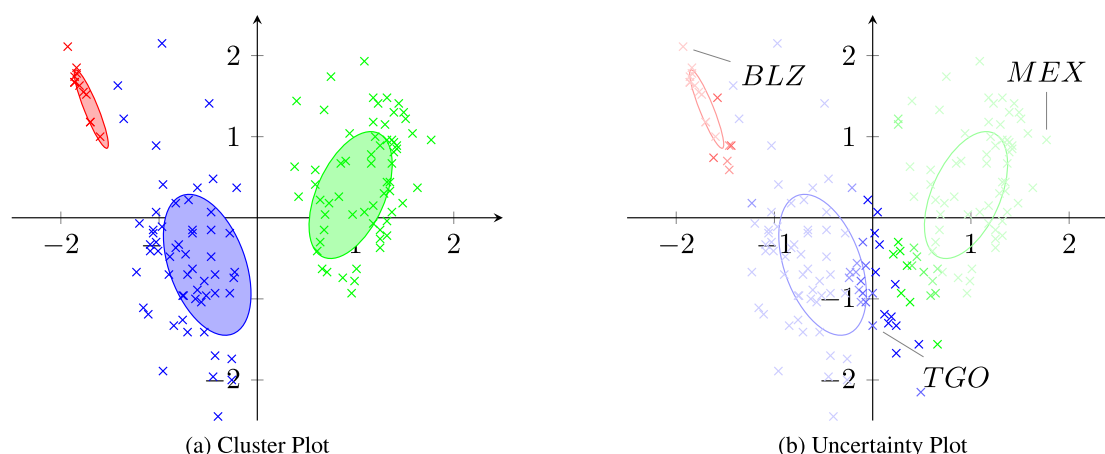


Fig. 3. MBC Cluster and Uncertainty Plots. Model specification follows an Ellipsoidal Distribution, with Variable Volume, Shape and Orientation (VVV). Three cluster internal validation measures: Connectivity (28.974), Dunn Index (0.027), Average Silhouette Width (0.415).

classification among the candidate models' (McNicholas, 2016, p. 338). As Models 1 and 2 are essentially identical via consideration of the BIC, further internal validation techniques were applied to aid model selection. Connectivity, Dunn Index, and Average Silhouette Width tests were undertaken to ascertain the number of clusters that optimize 'connectivity between observations in a cluster, density within clusters, and then separation between clusters' (Waggoner, 2020, p. 22). All three tests indicated support for a three cluster model. Combining these test results from those of the BIC, Model 2 was selected as optimal. Fig. 3 presents the results of MBC.

Fig. 3(a) shows the shape of the clusters, revealing two large groups to the right and centre-left of the plot, and one smaller group to the far-left. With the majority of variance explained by the horizontal dimension, those clustered to the left of the plot are the least regulated, with overall levels of regulation increasing as clusters move rightward. These results indicate three main classes of political finance system, outlined and defined below:

- **Unregulated:** No substantive regulation of political finance. Where controls exist, they rarely extend beyond a ban on vote buying or a rudimentary form of indirect public funding.
- **Partially Regulated:** Countries utilize some controls on political finance, through various combinations of restrictions on private income and spending, requirements for disclosure, and public funding.
- **Strongly Regulated:** Countries utilize extensive controls in most, and sometimes all, areas of political finance, including controls on private income and spending, requirements for disclosure, and public funding.

Though previous studies have used a pre-defined partition to force cases into 'low' and 'high' categories (Casas-Zamora, 2005; van Biezen, 2010; Wiltse et al., 2019), MBC provides a 'soft' approach to partitioning. This method permits a calculation of uncertainty around each country's classification (Ahlquist and Breunig, 2012). To illustrate how soft partitioning is beneficial when compared to a simple mean partition, Fig. 3(b) highlights uncertain classifications as darker points. Returning to the three cases discussed previously, the points of Belize in the Unregulated cluster, and Mexico in the Strongly Regulated classification, are barely visible, indicating that their cluster assignment comes

with a high degree of certainty. Lying within the Partially Regulated group, the position of Togo is much more visible. As the associated p -value of 0.14 does not fall below conventional thresholds of statistical significance, we can choose whether to approach this finding with some caution. In the context of political finance, this model is distinctive in its ability to identify cases that do not appear to naturally cluster into a group. Taken together, these classifications form the foundation of the Regulation of Political Finance Indicator.⁴

4. Applying the regulation of political finance indicator (RoPFI)

Previously, the models displayed in Table 1 have been used as predictor variables when researching political participation (Whiteley, 2011) and corruption (Ben-Bassat and Dahan, 2015; Lopez et al., 2017), and for use as an outcome variable in both regional (Casas-Zamora, 2005) and global contexts (van Es, 2016; van Biezen, 2010; Wiltse et al., 2019). Applications as a dependent variable have sought to examine which factors influence regulatory development, often pointing to variables including *legal system origin*, *age of democracy*, type of *electoral system*, and levels of *corruption*. The following section will build on this research, by examining how these factors associate with the three RoPFI classes. In so doing, the benefits of utilizing the RoPFI categories and uncertainty statistics will be outlined.

Table 4 shows the data source and coding strategy for each predictor variable. The *legal system origin* variable is obtained from the highly cited data of La Porta et al. (1999), and is coded to examine the association between English legal origin and the RoPFI classifications. Data for the *electoral system* variable is derived from International IDEA's Electoral System Design Database. Countries adopting a proportional or mixed system were grouped together, with majoritarian systems coded as the reference category. While proportional and mixed systems are often examined independently, these categories were combined to avoid data sparsity issues (Agresti, 2019). The *age of democracy* variable uses the BMR to produce a trichotomous measure that classifies countries as

⁴ As a robustness test, all preceding analyses were undertaken via complete cases analysis. Results supported a mono-dimensional approach and three cluster solution. See Supplementary Materials for further information.

Table 4
Data coding table for MLR.

| Variable | Source | Coding | Notes |
|---------------------|--|---|--|
| Legal System Origin | Quality of Government (La Porta et al., 1999) | 0: Other 1: English | 'Other' code contains legal systems of French, German, Scandinavian, and Socialist origin. |
| Electoral System | International IDEA Electoral System Design Database (International IDEA, 2018) | 0: Majoritarian System 1: Proportional/Mixed System | 'Other' systems coded as NA. |
| Age of Democracy | Boix–Miller–Rosato (BMR) Coding of Democracy, V3.0 (Boix et al., 2013) | 0: Pre-1974 Democracy 1: Non-Democracy 2: Post-1974 Democracy | Countries coded as pre-1974 democracies defined as those with unbroken period of democracy until 2015. |
| Corruption | Worldwide Governance Indicators (WGI) (Kaufmann and Kraay, 2020) | Min: Low corruption level Max: High corruption level | Reverse coded continuous indicator, used as a proxy for levels of corruption. Data relates to 2019. |

Table 5
MLR models.

| | Model 1: Full Sample | | Model 2: 90% Sample | | Model 3: 95% Sample | |
|-------------------------|----------------------|----------------------|---------------------|---------------------|---------------------|----------------------|
| | Unregulated | Strongly Regulated | Unregulated | Strongly Regulated | Unregulated | Strongly Regulated |
| Constant | -2.013* (1.067) | -0.013 (0.597) | -2.789* (1.606) | 0.144 (0.664) | -2.421 (1.626) | 0.327 (0.744) |
| English Legal Origin | -0.172 (0.892) | -1.235*** (0.474) | 0.983 (1.447) | -1.411** (0.570) | 0.762 (1.446) | -1.816*** (0.627) |
| PR Electoral System | -2.718*** (1.023) | 0.225 (0.458) | -2.783* (1.485) | 0.044 (0.535) | -2.885* (1.475) | -0.075 (0.581) |
| Non-Democracy | 0.335 (1.057) | -0.733 (0.663) | -1.120 (1.361) | -0.770 (0.739) | -1.124 (1.367) | -0.836 (0.813) |
| Post-1974 Democracy | 2.673*** (0.946) | 0.934* (0.550) | 2.304** (1.101) | 1.024 (0.624) | 2.227** (1.134) | 1.127* (0.675) |
| Corruption | -1.104*** (0.408) | -0.143 (0.244) | -1.236** (0.570) | -0.226 (0.272) | -1.118* (0.572) | -0.140 (0.293) |
| McFadden R ² | 0.211 | | 0.259 | | 0.282 | |
| AICc | 297.435 | | 222.141 | | 202.557 | |
| N | 180 | | 141 | | 129 | |

Partially Regulated classification as Reference Category; Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

pre-1974, post-1974, or non-democracies. Although the categorization of a continuous variable inevitably incurs a loss of information, this decision was made to retain consistency with prior research and, thus, to produce comparable conclusions. As we seek to compare practice in new and established democracies, countries democratized prior to 1974 are used as a reference category. Finally, a reverse-coded version of the continuous WGI *control of corruption* indicator was used as a proxy for levels of corruption.⁵

As discussed previously, the use of 'soft' partitioning in MBC permits opportunities to consider the certainty associated with a country's classification. A researcher using the RoPFI, therefore, may opt to adjust the sample based on pre-specified measures of certainty. By excluding countries whose natural classification is unclear, the validity of a model may be improved. As an illustrative example, we opted to run three Multinomial Logistic Regression models on the data, and compare analyses applied to the full sample to those with the sample cut at the ninety and ninety-five percent confidence thresholds (see Table 5). In practice, these thresholds may be adjusted to the researcher's preference. Remaining subsections will expand upon these findings, by comparing observations for each predictor to those drawn in prior literature, before a series of brief conclusions are made. To illustrate the use of the RoPFI, a particular emphasis is placed on the comparable findings drawn from mono-dimensional (van Es, 2016), two-dimensional (Wiltse et al., 2019), and three-dimensional (van Biezen, 2010) frameworks.

⁵ Out of 180 countries, the *legal system origin* variable was missing data for seven cases, with the *electoral system* and *corruption* variables missing six and two values, respectively. An iterative regularized 'Factorial Analysis for Mixed Data' (FAMD) imputation model was used (see Audiger et al., 2016).

4.1. Legal system origin and political finance

Summarizing research by Rafael La Porta et al. the legal origins of countries can generally be classified as English, French, German, Scandinavian, or Socialist. Though developed in these countries/regions, the foundations of these systems were 'spread through the world through conquest, colonization, imitation, and voluntary adoption' (La Porta et al., 1999, p. 231). In comparing governance practices, the authors present evidence to suggest that socialist systems are often the most interventionist in areas of property rights, government regulation, and taxation. Further comparisons reveal a tendency for countries of French legal origin to be much more interventionist than those grounded in an English-style common law framework. Extending these analyses to the study of political finance, Clift and Fisher (2004) discuss the differing nature of legal tradition to explain why France have adopted a more interventionist regulatory system than the United Kingdom.

Although Clift and Fisher highlight these differences with respect to two countries, Wiltse et al. (2019) apply the two-dimensional TPF to examine this pattern with a broader sample. Findings suggest that countries of English legal origin apply fewer regulations on party income than those modelled on the French tradition. No difference is found with respect to disclosure requirements, however. These observations reflect an extension of the findings of La Porta et al. (1999) and, consequently, support those of Clift and Fisher (2004). Further examination in this area comes from van Es (2016, p. 218) who, when utilizing the mono-dimensional PFRI, finds legal origin to be 'by far the most substantively and statistically significant predictor of state interventionism' in political finance, concluding that countries of socialist tradition tend to be the most interventionist in this area. Further comparisons seemingly contradict those of prior research, by

suggesting that countries of English legal origin are *more* interventionist than those moulded in the French or German tradition.

Initial examination of the RoPFI classifications appears to support the findings of [Clift and Fisher \(2004\)](#), where France is classified as Strongly Regulated and the United Kingdom as Partially Regulated. Observing the findings displayed in [Table 5](#) affirms this relationship. Countries of English legal origin are much less likely to be classified as Strongly Regulated than the Partially Regulated reference category. Moreover, in models two and three, this group of countries appear more likely to be classified as Unregulated, albeit at reduced levels of statistical significance. These findings suggest that, in countries influenced by the English-style common law tradition, political finance governance tends to be less interventionist than in countries of other legal origins.

4.2. Electoral systems and political finance

The second predictor in [Table 5](#) examines the relationship between political finance regulation and electoral system type. Extant literature in this area has consistently observed stricter political finance controls in countries with proportional electoral systems (see [Casas-Zamora, 2005](#); [Ewing and Issacharoff, 2006](#); [Pinto-Duschinsky, 2002](#)), leading scholars to provide theoretical explanations for this relationship. With proportional systems tending to encourage the development of multi-party politics, per [Duverger \(2003\)](#), [van Biezen \(2010\)](#) theorizes that public funding reforms may be introduced to promote competition among a greater number of parties. Moreover, [Wiltse et al. \(2019\)](#) suggest that more stringent controls on disclosure may be expected as an increased number of parties seeks to hold opponents to account. Finally, following the assumptions of the cartel party thesis, established parties may use the tightening of regulations to insulate against competition (see [Katz and Mair, 1995](#)).

The three models under study observe a common finding regarding electoral systems and political finance, associating proportional and mixed systems with greater controls on political finance, relative to majoritarian frameworks. [van Biezen \(2010\)](#), for example, finds that proportional electoral systems tend to coexist with public subsidization and disclosure, while [Wiltse et al. \(2019\)](#) observe that countries utilizing proportional systems are more likely to adopt disclosure requirements. Finally, [van Es \(2016\)](#) finds evidence to associate proportional systems with increased interventions in *all* areas of political finance.

Following this empirical and theoretical grounding, we should expect to see negative associations between the Unregulated RoPFI classification and the proportional electoral system variable, and a positive coefficient relative to the Strongly Regulated column. Patterns in [Table 5](#) seemingly meet these expectations. Countries utilizing a proportional electoral system are much less likely to be classified as Unregulated, relative to the Partially Regulated reference category. This finding is consistent across all three models. Although a small positive association is observed between the proportional electoral system variable and the Strongly Regulated RoPFI classification in model one, this is nullified and reversed as the sample is adjusted in models two and three. These findings suggest that countries utilizing a majoritarian electoral system are much more likely to be classified as Unregulated and, consequently, supports the argument that political finance controls are more likely within a proportional electoral framework.

4.3. Age of democracy and political finance

Several studies have focused on the varied approaches to, and impacts of, political finance regulation in both new and established democracies ([Bolleyer, 2018](#); [Rashkova and Su, 2020](#)). Generally focussing on Europe, literature has found that political parties in established democracies tend not to rely on public funding ([Koß, 2010](#)), with this form of financing being much more prevalent in newly emerging

democracies ([van Biezen, 2003](#)). Variations in approach are often understood to be a feature of party system development. Whereas parties in established Western European democracies developed independently through the mass party funding model of voluntary membership ([Hopkin, 2004](#)), third-wave European democracies are more likely to codify parties as ‘procedurally necessary and democratically desirable institutions’ and, in doing so, are more likely to trend toward state intervention in party politics ([van Biezen and Borz, 2012](#), p. 328). With this in mind, comparisons of regulation in countries democratized pre and post-1974 should yield results indicating more interventionist systems in new democracies. Despite these expectations, [van Biezen \(2010](#), p. 83) finds ‘minimal’ evidence of a link between political finance and levels of democratization. Models presented by [van Es \(2016\)](#) and [Wiltse et al. \(2019\)](#) provide similar insights, with no significant evidence of a relationship in this area.

Examination of [Table 5](#) indicates a strong and statistically significant association between age of democracy and type of political finance system. While coefficients relative to non-democracies offer little interpretation, countries democratized in the third wave and beyond show a much stronger association with the Unregulated classification of the RoPFI, relative to longer established democracies. This finding remains constant across all three models. Additional findings suggest that post-1974 democracies are also more likely to be classified in the Strongly Regulated group than the Partially Regulated reference category; this observation is presented with reduced levels of significance.

Upon closer examination, it appears that these findings may be influenced by confounding factors that are absent from the model. Examining the RoPFI classifications reveals that sixty-eight percent of Unregulated countries are post-1974 democracies. Of these countries, the majority are Caribbean and Pacific island states, with an observed lack of regulation displaying trends consistent with previous research findings ([Barrow-Giles, 2011](#); [Ohman, 2012](#); [Pinto-Duschinsky, 2002](#)). An initial conclusion, therefore, may be that newly democratized states *within these regions* are less likely to employ strict regulations on political finance. While it is beyond the scope of this study to fully explore the reasoning behind this observation, preliminary suggestions may focus on demographic, economic, and cultural factors. Population size may contribute to the lack of disclosure requirements in these regions, for example, with the introduction of regulations having the potential to deter donors who are unwilling to reveal their political affiliation within an electorate where ‘everybody knows everybody’ ([Corbett, 2015](#), p. 66). With respect to economic factors, poorer countries may opt against public party funding in the knowledge that resources could be better applied elsewhere ([Pinto-Duschinsky, 2002](#)). Finally, the political norms of these regions may explain the light touch approach to regulating political finance. Since gaining independence throughout the 1970s and 1980s, the Caribbean and Pacific islands have developed a distinct form of clientelism, characterized by direct personal relationships between electors and representatives, as well as an acknowledged prevalence of vote-buying ([Veenendaal and Corbett, 2020](#)). As such, there may simply be no incentives for newly democratized countries in these regions to regulate political finance.

With regards to the Strongly Regulated classification, these findings appear to be influenced by the presence of a large number of post-1974 European democracies within this group. Roughly forty percent of Strongly Regulated countries can be defined in this way, suggesting that patterns in Europe may differ to those viewed elsewhere. The combination of these findings, therefore, suggests that observations drawn from European studies, particularly with regards to political finance, may not be applicable when applied to a global sample.

4.4. Corruption and political finance

Several studies have examined the link between corruption and political finance; the majority of which have treated measures of corruption as a dependent variable. Findings lack unanimity, with conclusions indicating that regulations may reduce corruption ([Hummel](#)

et al., 2019), encourage corruption (Bértoa et al., 2014; Casas-Zamora, 2005; Pinto-Duschinsky, 2002), or have neutral or no impact on corruption (Evertsson, 2013; van Es, 2016). Additional scholarship has reversed the focus of analysis to examine whether regulations are likely to be introduced to *respond* to high levels of corruption. Findings have been more consistent in this area, indicating that political finance regulations in established democracies tend to be justified by concerns over corruption (Booth and Robbins, 2010; Power, 2017), and that highly publicized scandals are likely to trigger reforms in this area (Koß, 2008; Pujas and Rhodes, 1999). Indeed, Nwokora (2014) expands this relationship further by suggesting that allegations of corruption are more likely to prompt the passage of tighter controls when the incumbent is a left-leaning party. The combination of these findings suggests a role for corruption in determining the direction of political finance regulation.

Though Wiltse et al. (2019) do not examine the relationships between corruption and political finance, van Es and van Biezen's mono and three-dimensional approaches arrive at similar conclusions to one another. van Biezen (2010), for instance, observes more stringent private income restrictions in countries with a higher prevalence of corruption, albeit at a low level of statistical significance. Similarly, van Es (2016) finds that, as perceived levels of corruption escalate, intervention in political finance tends to increase. Utilizing the RoPFI, an examination of Table 5 indicates an association between perceived levels of corruption and type of political finance system. When accounting for *legal origin*, *electoral system*, and *age of democracy*, the likelihood of a country being classified as Unregulated decreases as levels of corruption increase. This relationship remains consistent across models two and three. Differences between the Strongly Regulated and Partially Regulated groups are negligible, and do not reach a conventional threshold of statistical significance. These observations support the suggestion that regulations may be tightened in response to increased perceptions of corruption. However, the nature of this relationship cannot be fully explored, as we lack time series data.

4.5. Beyond 'under-theorized' political finance

The RoPFI's use as a dependent variable has provided some general contributions to our understanding of the origins of political finance regulation. Although brief theoretical explanations are provided, more detailed exploration should be sought in future research. With respect to levels of political finance regulation, the clearest results of our analysis can be summarized as follows:

- Countries of English legal tradition tend to be *less regulated*, relative to countries of other traditions
- Countries utilizing a proportional or mixed electoral system tend to be *more regulated*, relative to countries using a majoritarian system
- Countries with higher levels of corruption tend to be *more regulated*, relative to those with lower levels of corruption

Comparisons with previous research have produced varied results; while relationships related to *electoral systems* and *corruption* largely appear consistent with those of extant literature (see Casas-Zamora, 2005; Ewing and Issacharoff, 2006; Koß, 2008; Pinto-Duschinsky, 2002; Pujas and Rhodes, 1999), those linked to *legal system origin* present new insights. The findings of van Es (2016) and Wiltse et al. (2019) are varied in this area, with the former suggesting that countries built on an English-style framework tend to be *more* interventionist than French-style systems, and the latter suggesting the inverse to be true. As shown above, the use of the RoPFI supports the findings of Wiltse et al. as well as those of additional literature in this area (Cliff and Fisher, 2004; La Porta et al., 1999).

Perhaps the most insightful finding, however, relates to *age of democracy* and political finance. Previous research has suggested that

newly democratized countries tend to incorporate party regulations, including those linked to financing, as part of the democratization process (van Biezen, 2003; van Biezen and Borz, 2012). These findings are highly Eurocentric, however. When examined by extant mono and multi-dimensional models, no relationship is found in this area. The use of the RoPFI offers a different conclusion; although some evidence supports the conclusions of prior European literature, the most significant finding suggests that newly democratized countries generally have *less* regulation in political finance, relative to longer established democracies.

The findings presented above are likely influenced by aspects of predictor selection, sample size, and data availability in alternative approaches. Firstly, as suggested by Wiltse et al. (2019, p. 245), the inclusion of highly correlated variables in van Es' analyses 'rais[es] concerns about biased estimates' in their explanatory model. This may be a factor in explaining why the conclusions of van Es (2016), with respect to legal system origin, differ to those presented both here and elsewhere. Secondly, the impacts of sample size and structure appear to be significant. van Biezen (2010), for example, bases their analyses on fifty-three cases. Almost half of this sample are European countries, while African states are drawn exclusively from the Sub-Saharan region. Generalizations for the Asia-Pacific region are based upon practice in just four highly populous, high GDP countries (Australia, India, Japan, New Zealand). Thus, regional observations do not account for the democratic small states of the Pacific. Indeed, similar observations can be made with regards to alternative mono (Whiteley, 2011) and multi-dimensional (Ben-Bassat and Dahan, 2015; Casas-Zamora, 2005) approaches. When considering observations based upon the RoPFI, therefore, it appears that the assumptions of prior Eurocentric research, particularly with reference to our *age of democracy* analyses, are not wholly applicable to wider global contexts. Finally, the incorporation of a richer form of data in the RoPFI provides a holistic account of political finance regulation, moving beyond prior measures that 'cannot say much about how states regulate candidate and interest group financing' (Wiltse et al., 2019, p. 245). Such measures include those of Wiltse et al. as well as Ben-Bassat and Dahan (2015) and van Biezen (2010).

In concluding, while the use of cross-sectional data provides little rationale to claim causal relationships in some areas, factors linked to *legal system origin* and *age of democracy* appear to be influential in the development of political finance regulation. This is because the suggested cause clearly takes temporal precedence over the observed effect. When considering the role of *electoral systems* and *corruption*, however, the direction of causality cannot be fully determined without further study. In future years, the development of panel data based on the RoPFI should present opportunities to explore these relationships further, by providing solutions to the 'chicken and egg' paradox (Bértoa et al., 2014, p. 360).

5. Conclusion

To date, research has lacked a consistent method for classifying types of political finance system. This article sought to develop a classificatory framework by applying a novel methodology to a global data sample. The 2020 update of International IDEA's PFD presented a platform on which to base this study, and the combined use of MCA and MBC provided the means to identify and define three classes of political finance system. Though the presentation of these constructs was the primary goal of this article, the latter stages reproduced a series of analyses undertaken in prior literature. In some areas, results were consistent with previous research. Countries using proportional electoral systems were more likely to employ regulations on political finance, for example, with a similar pattern found as a country's perceived levels of corruption increased. Although prior findings of European party literature suggested that newly democratized countries were more likely to utilize political finance regulation, the strongest evidence

presented here suggested that new democracies were much more likely to be positioned within the Unregulated category. Findings appeared to be influenced by the relatively new democratic small states within the Caribbean and Pacific regions, which do not tend to regulate political finance in any considerable way. This finding displayed the benefits of using a global sample when classifying political finance systems, suggesting limitations in generalizing the findings of European-focused party literature within these regions.

In sum, the three components of the RoPFI provide a substantive contribution to comparative literature on political finance, institutions, and governance. Firstly, the continuous indicator provides a means to compare levels of regulation across a wide sample of countries. Secondly, the three clusters allow researchers to easily group countries based on similarities within their overall structures of regulation. Finally, the RoPFI provides a statistical measure of the certainty of each country's cluster assignment. As shown in our MLR models, this allows the user to adjust the sample by removing outliers or countries for which assignment is not certain. This provides researchers with an opportunity to improve the validity and fit of any statistical models utilizing the RoPFI, while also offering an additional test of robustness. To the author's knowledge, this is the first study to have applied MBC's 'soft partitioning' to political finance regulation.

Despite providing these contributions, potential limitations need to be considered. As an inductive study, the development of the RoPFI relies on the accuracy of its underlying data. While International IDEA ensure cross-validation by providing links to primary legislative sources, the scale of the project (in excess of 11,000 data-points) means that some inaccuracies may exist. Moreover, the data selection procedure in developing the RoPFI required the exclusion of a series of variables for which cross-country comparison was not possible. Though the measures account a country's use of donation or spending limits, for example, they do not consider the thresholds associated with these restrictions. Finally, despite providing insights into the de jure state of regulations in each country, further research is required to examine the de facto realities of global political finance practices. Researchers should consider these limitations when drawing inferences based on the RoPFI.

Nonetheless, the development of the RoPFI provides implications for future research. In qualitative studies, classification groups may be used as a tool to identify cases for small-n comparative analysis, through most similar or most different designs. As an example identified here, we may look to explore why Caribbean and Pacific island states have, for the most part, failed to implement any regulations on political finance. For quantitative scholars, combined use of the continuous scale and categorical classifications provides myriad opportunities. The continuous indicator, extracted from the first dimension of MCA, may be used as an independent variable in linear regression models. Studies may focus on examining the relationship between levels of regulation and variables linked to corruption or electoral competition. As briefly explored here, researchers may also opt to use the three classification groups as a dependent variable in logistic models. Studies may use more sophisticated models to identify additional factors that influence the structure of political finance regulation. Finally, the combination of MCA and MBC can be replicated for any future versions of the PFD. Opportunities to produce panel data would provide an additional tool for researchers to identify causal impacts of regulation. This may be particularly useful in the area of corruption, where causal mechanisms remain unclear.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.electstud.2022.102524>.

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