

**Polarizing Disproportionality:
A Cross-Country Analysis of 117 Countries**

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Date of submission: 25-06-2023

Wordcount: 9819

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Abstract

This study investigates the relationship between disproportionality, quality of democracy, and societal polarization using a cross-country design. The primary focus is to examine how societal polarization emerges as a consequence of political system polarization. The study proposes that specific characteristics of political systems contribute to its polarization, influencing citizens' beliefs through party affiliation and subsequently leading to societal polarization. Particularly, I argue that disproportionality, as a characteristic of political systems, increases societal polarization. I also propose that two of the main elements of disproportionality: the lower number of parties and the higher competitiveness, increase societal polarization. However, the quality of democracy is expected to dampen these relationships, as it is indicated that the institutionalization of democratic norms can constrain polarization. A sample of 117 countries is subjected to multiple bootstrapped hierarchical linear regressions. The results indicate a significant effect of the level of disproportionality and the number of parties on societal polarization if the relationship is moderated by the quality of democracy. In full democracies, it shows that societal polarization increases with higher levels of disproportionality and a lower number of parties. Interestingly, in flawed democracies and hybrid regimes, the contrary is true. The findings highlight the influence of contextual factors such as institutions and political systems on citizens. Suggesting that citizens are both impacted by the behavior they see between political parties and by the characteristics of political systems that shape those parties.

Keywords: Cross-country analysis, disproportionality, quality of democracy, societal polarization

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Polarizing Disproportionality

In light of several recent civilian uprisings, I inquire into the relationship between disproportionality and societal polarization, while also investigating the moderating effect of the quality of democracy. The last two years are characterized by several citizens' uprisings. First, there was the Capitol riot of 2021 in the United States of America (BBC, 2021). Followed by the storming of the Brazilian capitol in early 2023 (Nicas, 2023). Around March and April of that same year, both France and The United Kingdom were struck by massive protests and strikes against reforms of their governments (Breedon, 2023; Knibbs, 2023). Less attention went to the more brutal uprisings in Peru, Bangladesh, and Myanmar. Uprisings that led to the overthrow of the former Peruvian president, violent clashes between government forces and civilians in Bangladesh, and a revolutionary war of pro-democratic forces against a military coup in Myanmar (Al Jazeera, 2023; Coronel, 2023; Paddock, 2022). All these uprisings have two characteristics in common: a sentiment of broader societal polarization, and a quite disproportional political system. They also differ in an important aspect. The more serious and violent the civil uprisings were, the lesser the quality of democracy in the countries in which they took place. In this article, I argue that the level of disproportionality in a country increases societal polarization due to more partisan citizens, but that its effect is moderated by the quality of democracy.

Societal polarization is the split of society into two antagonistic groups, separated on one dimension in a political sphere that is marked by 'us versus them' rhetoric, which influences everyday interactions. There is an important distinction between political polarization and societal polarization, which is that the latter is dependent on the former via partisanship. I theorize that citizens polarize in their everyday life if the political parties on which they base their partisanship are polarized.

Partisanship is identifying with a political party and categorizing new information according to party lines. It develops naturally to order oneself and one's political identity in a complex system (Boutyline & Vaisey, 2017). Via partisanship, one can see the relationship citizens have with political systems. If people form their political identity via a political party, they are partly formed by the characteristics of the political system that enables the party.

One major system characterization in which political systems differ is the level of disproportionality, which is the imbalance between the votes a political party receives, and the number of seats acquired (Riedwyl et al., 1995). This makes it easier for a few older parties to keep their dominant position while making it more difficult for newer parties to gain power. The direct effect hereof is two of disproportionality's main elements: the lower number of parties and a higher level of competitiveness.

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Disproportionality and its elements are more susceptible to political polarization compared to proportional systems. Political parties are found to be more polarized in disproportional systems due to their lower numbers which are often in direct opposition (Bol et al., 2019; Fischer et al., 2021; Gladdish, 1996). Additionally, the level of competitiveness is higher since a small number of oppositional parties need to gain more votes to win an election (Fisher et al., 2021; Hooghe & Stier, 2016). Both elements indicate a more polarized political system. This shapes the expectation that countries with a disproportional system have an increased level of societal polarization that stems from its politically polarized system.

However, there is much uncertainty on how disproportionality actually impacts societal polarization due to how challenging this concept is to measure. As Bértoa & Rama (2021) and Dalton (2008) put it, one needs experts in every country to have a good measure of societal polarization. So, there are indications that disproportional systems are more susceptible to societal polarization via increased political polarization, however, definitive evidence is missing due to measurement difficulties.

The quality of democracy can dampen polarization. Previous research has shown that democracies of higher quality, with for example a developed civil society, and secured, free and fair elections, can dampen polarizing effects (Mauk, 2021; Nooruddin, 2010). This means that theoretically, countries can experience heightened levels of polarization due to two highly competitive parties in a disproportional system, but that this effect is dampened via the institutionalization of democratic norms and stable democratic institutions. However, the moderating effect of the quality of democracy on the relationship between disproportionality and societal polarization is yet to be studied.

To address these gaps in understanding, I first want to *investigate the relationship between disproportionality and its elements on societal polarization in a worldwide population of countries*. Second, I want to *investigate the moderating effect of the quality of democracy on this relationship*. This is done by using the V-Dem dataset, the Gallagher index, and the Democracy Index. The V-Dem dataset uses aggregated expert judgments to measure societal polarization and is used in hopes of overcoming the obstacle stated by Bértoa & Rama (2021) and Dalton (2008). The Gallagher index is commonly used for disproportionality measurement and the Democracy Index is widely used as a categorization of democracies via an expert questionnaire on multiple democratic qualities (Graziano & Quaranta, 2022). This is analyzed via multiple bootstrapped hierarchical linear regressions.

The study forms an addition to the broader tradition of comparative research. Its scientific relevance is most prominent in the focus on societal polarization as the polarization of citizens' everyday interactions, measured via the V-Dem dataset. Via the use of this dataset, it can overcome the obstacle earlier mentioned by Bértoa & Rama (2021) and Dalton (2008), successfully

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understanding the effect of political systems on citizens. The focus on the societal aspect of polarization is novel and worthwhile in order to gain a better understanding of the contextual influences, such as institutions and political systems, on general citizens' behavior. Furthermore, the moderation of the quality of democracy shows the interaction between political system characteristics, which too is a novel take. The social relevance of this study is in the increased understanding of the protective elements against the destructive effects of polarization. Polarization has been found to slowly increase the erosion of democratic institutions (Arbatli & Rosenberg, 2021). The increased hostility between camps furthers the likelihood of partisans accepting anti-democratic measures against their opponents. If comparative research indicates that disproportionality indeed furthers polarization, this knowledge can have a valuable contribution to the defense of democratic quality and its institutions.

Theoretical Framework

Polarization, Partisanship, and Political Systems

Polarization is defined by an increasing antagonism between two groups, separated on a single dimension, where the concept of 'us versus them' is intensified. For this definition, I rely on various definitions provided by earlier research (Baldassarri & Gelman, 2008; Casal Bértoa & Rama, 2021a; DiMaggio et al., 1996; McCoy et al., 2018). In these articles, polarization is made up of three elements. So, first the increasing division between two antagonistic groups, e.g., Republicans versus Democrats or pro-, and anti-vaccination. Second, the opinions held by the antagonistic groups align on one dimension. Here one can think of several major debates of the last twenty years. For example, refugees, climate change, or European integration. The last element is that the political landscape is increasingly viewed as 'us versus them'. This means that both groups see each other as detrimental to society or as inherently wrong in part of their opinions. These three elements together signal polarization. An example hereof are the events leading up to the United States Capitol riots. Rhetoric from both parties was antagonistic, divided on a single dimension (Democrats versus Republicans), and had strong 'us versus them' inclinations¹. Societal polarization does not differ from this definition, it only emphasizes that political polarization is felt in the day-to-day interactions of everyday life and is therefore important to understand uprisings such as those mentioned in the introduction.

Societal polarization forms via a top-down process from political polarization via partisanship, which is: the identification with a political party and the categorization of information along partisan

¹ Republicans versus Democrats are mentioned in this example as a division on a single dimension. This is different from the previous examples such as climate change and European integration. However, in countries with fewer numbers, such as the United States, parties diverge so much on topics that the party division becomes a dimension (Gladdish, 1996).

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lines. Partisanship can have different effects, such as partisan bias and partisan heuristics. Via the use of bias or heuristics, new information is received along partisan lines, as well as categorized and understood according to these lines (Colombo & Steenbergen, 2020; Ditto, Clark, et al., 2019; Ditto, Liu, et al., 2019; Jerit & Barabas, 2012; Schaffner & Streb, 2002). The core idea behind these forms of partisanship is that an individual selects a political party as a political identity and categorizes new beliefs, opinions, and values accordingly along partisan lines (Boutyline & Vaisey, 2017). To conclude, for the development of partisanship, a citizen is not only dependent on political parties but also on the political system that enables the existence of the political parties.

As partisanship develops in citizens' lives via political parties within political systems, so does societal polarization. As citizens select a political party as their political identity, they are likely to reproduce the experienced polarization. For example, if a political system allows for only two big parties that are highly polarized, as exemplified in the United States, it seems natural that part of the political polarization transfers into broader society. Hence, there seems to be a link connecting societal polarization to the political parties on which they base their opinions and the political system that enables those parties.

I argue that between political systems, disproportional systems are more sensitive to political polarization thereby increasing societal polarization. In parliamentary politics, it is shown that political polarization tends to be higher in disproportional systems (Bol et al., 2019; Fisher et al. 2021). This means that there is increased antagonism between the political parties in disproportional systems, which also suggests that societal polarization is higher in disproportional systems (hypothesis 1).

The number of parties and the level of competitiveness are the elements most influenced by the level of disproportionality in a political system. To understand the effect that disproportionality has on societal polarization, I also investigate the relationship between these two main characteristics of disproportionality in their relationship with societal polarization. In the following section, I expand on these two characteristics and how they connect to disproportionality, partisanship, and polarization.

Disproportionality

Disproportionality creates barriers for new parties to come into power, constructing a political arena with only a few parties that experience higher levels of competitiveness. As shortly introduced in the introduction, proportionality is defined by how balanced the received parliamentary seats are divided compared to the number of votes a party gets (Bernauer et al., 2015; Riedwyl et al., 1995). So, in a perfectly proportional system, 10% of the votes equals 10% of the seats. In a disproportional system, this percentage is out of balance via the constructed barriers. A common barrier is, for example, the electoral threshold. Simply stated, with an electoral threshold, a party needs to gain a certain

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percentage of votes before they are allowed in parliament. If the electoral threshold is 5% and a party succeeds in getting these votes, they are accepted. If the party gains 4.9% or less, they are not accepted. Barriers such as the electoral threshold form the level of disproportionality, the more these barriers are constructed, the more disproportionality increases.

Disproportionality makes it easier for a few parties to hold on to power, however, these parties also experience more competition from each other. Due to the barriers, it is easier for old parties to hold on to their seat since newer and smaller parties are held back. This also means that the few parties that are already in power, are mostly older parties that are firmly rooted in society since more effort is necessary to have a significant change in the party structure (Gladdish, 1996). See, for example, the disproportional United Kingdom where in the 19th and 20th centuries the main rivalry was between the Liberal and the Conservative Party. The liberal party was only replaced as the main rival by the Labour Party in the 1920s. A replacement that has not changed since then. Additionally, this structure leads to high competition since only a few ideologically different parties compete over the votes. Most often parties compete for the majority vote during the election (think of The United States), or form very small coalitions that form a majority (The United Kingdom) (Lijphart, 2012).

In the next section, I theorize how these two characteristics of disproportionality, the low number of parties and high competitiveness, enable parties to form stronger partisan identities for citizens and increase societal polarization.

Parties

The disproportionality of a country shapes its political arena, especially its most prominent effect, the number of parties. While there are exceptions, there are significantly more political parties in proportional countries compared to their disproportional counterparts (Lijphart, 2012; Pierzgalinski, 2018). This can increase polarization by constraining political identity flexibility.

In a more disproportional system with fewer parties that are often in direct opposition, choices of political identity are limited. This means that if someone bases their political identity on a political party, as is expected, their choices are constrained and their political identity less flexible (Dassonneville & Dejaeghere, Yves, 2012; Ezrow, 2007; Klein, 2021). To change from opinion in a disproportional system means a radical break from one party to the other (e.g., Democrat to Republican). Therefore, one is more likely to hold on strongly to their partisanship. So, in disproportional systems, the few parties are in polarized opposition to each other, which leads partisans to develop more polarized and less flexible identities, increasing societal polarization.

In more proportional democracies, however, it is easier for minority or niche parties to participate in the political arena (Lijphart, 2012; Riedwyl et al., 1995). The effect thereof is the

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diversification and politicization of (more) topics (Bergman & Flatt, 2020; Dow, 2011; Lijphart, 2012). Since there are more parties with more diversity in political orientation, this creates a more flexible political identity (e.g., one can move from center-left-wing to more radical left-wing or back). This lowers the levels of societal polarization since it is not such a big jump to go from one party to another. Partisanship to one specific party is lower and therefore societal polarization too. Hence, I expect that a lower number of parties increases polarization (hypothesis 2).

Competitiveness

Due to the nature of disproportional systems, the votes that are needed to gain a seat are higher which creates a sense of competitiveness that increases the level of societal polarization. Within disproportional systems, often only a limited number of parties battle over electoral domination. In some of the disproportional countries, the elections are only won once there is a definitive majority. This is for example the case with France and Türkiye, where multiple rounds of elections are held until there is a definitive winner. This factor increases the level of competitiveness experienced during elections. It also creates an increased sense of winners and losers in disproportional systems, especially in comparison to more proportional systems (Fisher et al., 2021; Hooghe & Stier, 2016). The winner-loser concept in disproportional systems makes it more likely to harden one's partisanship to a specific party (Davis, 2014). For example, in a disproportional system with only three parties, a loss is more directly perceived compared to a proportional system where there are often multiple small gains and losses, and where people eventually still work together (Gladdish, 1996). Due to the ideological opposition between the parties in a disproportional system, a citizen is not likely to change or nuance their opinion after a loss. Thus, in disproportional systems, parties have more to lose in a more competitive election, which reflects on their partisans' identities, increasing societal polarization.

In proportional systems, this competitive element is tempered due to the consensus nature of these systems. Since there are more parties, consensus politics are necessary to govern a country. This takes away part of the competitiveness of disproportional systems, leading to less polarization. So, in proportional systems, the hardening of partisanship is avoided because of the emphasis on cooperation. Hence, I expect that higher competitiveness leads to more societal polarization (hypothesis 3).

Quality of Democracy

Not all democracies are similar. While many countries identify broadly speaking as democracies, there are still widespread differences between these democracies. The differences are found in the impartiality of public servants, the overall democratic conviction held by the citizens, the openness of the public sphere for debate, and the guarantee of free, fair, and secure election processes.

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In its relationship with polarization, Casal Bértoa & Rama (2021a) suggests that it is precisely this institutionalization of democracy and the widespread conviction of the democratic value that provides an antidote to increasing polarization. Mauk (2021) and Nooruddin (2010) show that these norms and institutionalized processes help normalize a democratic ruling and prevent major societal divisions). Additionally, their research indicates that the quality of democracy lowers polarization. So, one way in which democracies are different is in the quality of their democracy, which can impact the level of polarization in a country.

I argue that a difference in democratic quality can explain why one disproportional system does increase the level of societal polarization while another disproportional system does not. The level of democratic institutionalization and the normativity of democratic norms can influence the ease with which disproportionality polarizes society. For example, France and the United Kingdom which are both labeled by the Economic Intelligence Unit as full democracies, had major civilian protests, but no clashes between two antagonistic political parties. This is in contrast with the United States and Brazil, which are both labeled as flawed democracies, characterized by: flaws in democratic institutionalization, guarantees of civil liberties, regulations of election processes, and lack of normativity in democratic norms. These two countries had two major civilian uprisings out of dissatisfaction with election results. While these countries share disproportionality in the political system, the effect that it has on polarization differs. An important difference between the two is the quality of their democracy and the ease with which polarization can be constrained. Therefore, this study argues that the interaction between disproportionality and the quality of democracy is key to disproportionality's relationship with polarization. If both disproportionality and the quality of democracy are high, the former moderates the effect of the latter. This leads to less polarization than if disproportionality is high, but the quality of democracy is low.

To conclude, I argue that the level of democratic quality moderates the relationship between disproportionality and societal polarization (hypothesis 4). Additionally, since the number of parties and the level of competitiveness are characteristics of disproportionality, I expect a similar moderation of the quality of democracy on the relationship between these elements and societal polarization.

Hypotheses

The core of my argument is the following: since people base their political identity on political parties, the political system that shapes these parties also shapes these people. Polarization at the political level, according to the theoretical framework, increases broader societal polarization via a top-down process, namely party affiliation (partisanship). Citizens look at their political system and its parties as a heuristic to form their identity and easily categorize friends from foes. So, if the political

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system is polarized, so are its citizens. It is predicted that disproportional systems have higher levels of societal polarization (hypothesis 1); and that elements of disproportional systems increase societal polarization namely, the lower number of political parties (hypothesis 2); and the higher level of competitiveness (hypothesis 3). Lastly, it is expected that the quality of democracy moderates the effect between disproportionality and societal polarization (hypothesis 4). The next section expands on how this relationship is investigated.

Data, Operationalization & Method

Data

Variables from three datasets are used for the analyses. Most of the data is gathered from the V-Dem dataset (Coppedge et al., 2023a). This dataset includes a wide set of variables related to democratic political systems. The V-Dem dataset makes various concepts measurable via a survey filled in by experts from different countries. It uses five experts per country/year combination. However, expert judgments can differ both per individual and structurally per expert field. Therefore, the data is aggregated. By aggregating the data with the use of a measurement model, it is secure against expert bias and uncertainty estimates (Pemstein, 2023). The dataset includes data from 178 countries with their most recent dataset being released in March 2023. This recently published dataset is used for the analyses because it has data for the year 2022. Since the analyses are cross-country, the use of the most recent year increases the relevance of the analyses. From this dataset, multiple variables are gathered for the final analysis. These variables include one polarization variable, one independent variable (competitiveness), and multiple control variables.

The other two independent variables, disproportionality, and the relative number of parties, are manually added from the Gallagher index. This index is widely used for disproportionality measurements². The Gallagher index indicates the level of disproportionality for most countries and depending on the country it goes back to 1950. The index shows the disproportionality between the number of votes a party receives and the seats they get assigned (Gallagher, 2023). Furthermore, the Gallagher index also has an index of the relative number of parties at the parliamentary level. It shows a combination of the number of parties and their relative strength. The index has the exact same country/year combinations as the disproportionality index (Laakso & Taagepera, 1979).

The categorical moderator variable, quality of democracy, is also manually merged to the dataset from the Democracy Index by the Economic Intelligence Unit (EIU). The EIU creates an annual index

² During the gathering of data, the Gallagher Index was taken offline. Therefore, the Index was accessed via the Wayback Machine on the most recent data possible, 12 November 2022.

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of the quality of democracies around the world. This is done via a 60-question survey filled in by experts. The survey covers five categories; electoral process and pluralism; civil liberties; the functioning of government; political participation and lastly political culture. Together these five categories form a final score for the quality of democracy (Economic Intelligence Unit, 2023). Based on this score, countries are categorized in one of four groups, full democracies, flawed democracies, hybrid regimes, and authoritarian regimes.

The dataset is based on the variables selected for all the countries from the V-Dem dataset for the year 2022 ($N = 178$). The V-Dem dataset forms the base for the dataset, because most variables are gathered from this dataset and the dataset has data on the most countries compared to the other datasets. The choice is made to include as many countries as possible because by using a more diverse population, the effect of disproportionality on polarization is tested in a broader context. One can make the argument that democracies are too different and that diversity in the population obstructs potential results. However, this obstacle is overcome via the quality of democracy moderation. By separating the population into similar subgroups, the relation between disproportionality, its elements, and polarization can be distinguished more precisely.

After this initial selection, the disproportionality index and the number of parties are both manually added to this dataset. This is done for the selected countries from the V-Dem dataset and the year 2022. If the year 2022 is not available, the closest year before 2022 is selected. The V-Dem dataset is more extensive than the Gallagher index and therefore multiple countries are removed³ due to missing data. This left the dataset with 119 countries. Closer inspection indicated that three countries lack data on the acceptance of election results by losers, and two countries lack data on polarization. The two countries that lack polarization data are excluded from the analyses, while the countries with missing data on the independent variables are still analyzed via listwise exclusion. This left the dataset with a population of 117 countries. In the end, the Democracy Index is added. This dataset too is not as extensive as the V-Dem dataset. Five countries had no categorization in the Democracy Index⁴ and are therefore excluded from the moderation analysis. This means that the moderation analyses had a population of 114 countries. A full overview of the descriptive statistics is found in Appendix 1.

Operationalization

³ Yemen, Haiti, Mali, Pakistan, South Sudan, Sudan, Vietnam, Afghanistan, Ethiopia, North Korea, Lebanon, Nigeria, Philippines, Zimbabwe, Ivory Coast, Burundi, Central African Republic, Ecuador, Iran, Jordan, Maldives, Mongolia, Papua New Guinea, Qatar, Syria, Azerbaijan, Belarus, Cameroon, Chad, China, Congo, Djibouti, Eritrea, Gabon, Kazakhstan, Laos, Libya, Madagascar, Rwanda, Somalia, Eswatini, Tajikistan, Turkmenistan, Somaliland, Uzbekistan, Bahrain, Comoros, Cuba, Hong-Kong, Kuwait, Oman, Saudi-Arabia, Solomon Islands, Vanuatu, United Arab Emirates, Zanzibar.

⁴ Kosovo, Barbados, Sao Tome and Principe, Seychelles, Uruguay.

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Disproportionality

The degree of disproportionality is gathered from the Gallagher index⁵. This variable is added to the dataset by hand for every country that has proportionality data and that has data from the V-Dem dataset. The data is gathered for the year 2022, however, if this is not available, the closest year before 2022 is chosen. The range of the Gallagher index is between zero and one hundred, with zero being fully proportional and increasing to one hundred. The higher the score on the Gallagher index, the more disproportional a political system is.

The Number of Parties

The effective number of parties at the parliamentary level is an index originally calculated by Laakso & Taagepera (1979) and the index has been regularly updated since then⁶. The index considers both the number of parties as well as their relative strength. It is used to account for both the number of parties and the fragmentation in a country. The variable is used to operationalize the number of parties in a country.

The choice for the relative number of parties instead of the factual number of parties is made because the relative number better reflects the actual power that parties have and the influence they can have over citizens. For example, factually there are 12 political parties in the United Kingdom's House of Commons. However, in the political arena, two parties: the Conservatives and the Labour Party are the main influential factors. In this case, the relative number of parties of the United Kingdom, 2.39, is a better reflection of the actual political arena and the potential influence parties have on their citizens.

It is added by hand to the dataset for the year 2022, however, if this year is not available, the closest year is chosen. It has a range from 1 to 10 with the variable increasing as the effective number of parties increases.

Competitiveness

To account for the competitiveness of a country the variable, election losers accept results, are added from the V-Dem dataset. The variable indicates how accepting the losing parties and candidates of a national election are of their loss within three months. While this variable might not perfectly operationalize the competitiveness during elections, it does show competitiveness by indicating how hardened citizens are in their opinion regarding the election loss. In the section on competitiveness, it

⁵ The formula for the disproportionality index can be found on the website, see Gallagher (2023) for the URL.

⁶ For the formula of the relative number of parties, see the study by Laakso & Taagepera (1979).

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was theorized that competitiveness was related to a winner-loser concept (David, 2015; Hooghe & Stier, 2016). The more competitive a political system is, the more a winner-loser concept is experienced. Due to how related these concepts are it is acceptable to use this variable as an indicator of competitiveness.

To construct this variable, experts are asked how accepting loser parties and candidates were of their loss within the three months after the election. The experts rate this acceptance on a scale from 0, none of the candidates or parties accepted their loss to 4, all parties accepted their loss. After the ratings are gathered, they are aggregated. The aggregated variable is constructed on an interval range from 0 to 4.

Polarization

The polarization index is gathered from the V-Dem dataset. There is one variable that functions as the dependent variable for societal polarization, namely, political polarization. This variable is recently used as an indicator for polarization due to the increasing use of the V-Dem dataset (McCoy & Press, 2022; McCoy et al., 2018; UNDP, 2023). It is unique in its measurement of polarization in day-to-day interactions. Due to this focus, the variable aligns neatly with the theoretical definition provided for polarization, namely, an emphasis not on the political division in parliament, but the split of broader society into antagonistic camps. This means that it focuses on how, for example, friends and family treat each other differently due to political differences. Therefore, it captures the societal aspect more accurately.

For the variable political polarization, experts are asked to identify the extent to which society is split up into antagonistic camps; to what degree this division impacts day-to-day life; and conversation with the opposite camp. For example, experts are asked to identify if political polarization impacts family or work relationships. The experts answered on a scale from 0, no polarization to 4, highly polarized. This variable is aggregated and ranges on an interval scale from 0 to 4.

Quality of Democracy

Quality of democracy is manually merged with the dataset from the Democracy Index of 2023 of the EIU. It is widely used to categorize democracies based on quality in comparative research (Graziano & Quaranta, 2022) and functions as a categorization⁷ variable to test the moderation effect.

⁷ The variable is included as a categorical and not an ordinal variable because there is no inherent hierarchy in the political systems. Some might prefer the full democracies over authoritarian regimes, however, for the sake of this study the systems are regarded as equal with differing characteristics that define how well they constrain polarization.

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The democracy index ranges from zero to ten with eight or higher indicating a full democracy, six to eight indicating a flawed democracy, four to six indicating a hybrid regime, and everything below four indicating an authoritarian regime (Economic Intelligence Unit, 2023). Full democracies ($N = 23$) are characterized by a political culture that emphasizes democracy, independent media and judiciary, and a well-functioning government. Examples are Finland, South Korea, and Costa Rica. Flawed democracies ($N = 45$) have free and fair elections, but deal with governmental problems, a lack of political participation, or underdeveloped political culture. Examples are The United States of America, Brazil, Belgium, and Singapore. Hybrid regimes ($N = 28$) have irregular elections and are therefore less fair and free. Furthermore, they are characterized by a corruptible judiciary, media, and opposition. Civil society is also severely underdeveloped. Examples are Turkey, North-Macedonia, Tanzania, and Paraguay. Lastly, Authoritarian regimes ($N = 18$) are characterized by a general lack of elections, democratic institutions have a severe lack of substance, media and judiciary are state-controlled, and there are infringements on civil liberties. Examples are Russia, Egypt, and Myanmar.

Via this index, I want to investigate an interaction effect between the quality of government and disproportionality, the relative number of parties, and competitiveness. Since the interaction uses a categorical variable, namely, the democracy index, dummy variables are created. Three dummy variables are formed for the different categories, one for every category with full democracies as the base groups. In the dummy variables, the countries that belonged to a specific category are coded 1, everything else is coded 0. Full democracies are coded 0 in every dummy to form the reference group. The three dummy variables are squared with the centered variables⁸ of disproportionality, the relative number of parties, and election losers accept results, resulting in a total of nine interaction variables.

Control Variables

Multiple control variables are included. Firstly, the media is found to exaggerate the level of experienced polarization (Bail et al., 2018; Kubin & von Sikorski, 2021; Van Bavel et al., 2021). Especially social media is found to exaggerate citizens' opinions via the formation of echo chambers which traps consumers in opinion bubbles (Bail et al., 2018). Furthermore, due to selective exposure, people radicalize themselves further (Bail et al., 2018; Steppat et al., 2021). Additionally, the polarization of media itself also influences those who consume it. So, if news channels have a specific bias or highlight a specific event in their polarized perspective, this polarization also polarizes their consumers (Arceneaux et al., 2012; Levendusky, 2013). Due to this extensive research, I control for several media variables. The variable online media fractionalization and online media perspectives

⁸ The variables are centered as per moderation procedure described in Field (2018).

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indicate if different online news outlets give similar presentations of political issues and how diverse the media outlets are. Furthermore, the variables print/broadcast media perspectives, media self-censorship, and media bias have similar definitions, but for broadcasted and printed media. These three variables are merged into one mean variable called diversity of classic media ($M = 2.6$, $SD = .57$) due to multicollinearity indications. All these variables are gathered from the V-Dem dataset and are therefore based on aggregated expert opinions. The variables all indicate the divisiveness of media. Experts are for example asked to what extent all opinions are equally represented in the media or to what extent the media is likely to self-censor their information. Therefore, these variables are used to control for the polarizing effects of (social) media.

Secondly, the quality of the governmental administration is found to both increase and decrease polarization depending on its level. Furthermore, its impartiality and especially its sensitivity to corruption are related to increased polarization (Apergis & Pinar, 2023; Hegre & Nygård, 2015). Therefore, I control for the variables rigorous and impartial public administration, transparent laws with predictable enforcement, and political corruption. The first two are merged into one mean variable called quality of government ($M = 3$, $SD = .66$) due to multicollinearity concerns. These variables too are added from the V-Dem dataset and are based on aggregated experts' opinions. The first two variables measure the level to which a country's effective and clear system of law is enforced by an impartial government public administrator. Together these variables most closely resemble the quality of government described in articles. Therefore, the variables are transformed into the variable quality of government. The political corruption variable is a more specific variable measuring the corruption of public administrators and politicians. These three variables cover the effectiveness of governmental administration, its impartiality, and corruption, which provides ample security against its influencing effect.

Method

To analyze the effect of disproportionality and its different elements on polarization, multiple bootstrapped hierarchical linear regressions are conducted. For every element, one regression is conducted. The moderation effect of the quality of democracy is also analyzed via bootstrapped hierarchical linear regressions. So, for disproportionality and the two elements a moderation analysis is conducted. This means that a total of 6 regressions are performed. These regressions are bootstrapped to increase the reliability of the results. The sample is quite small and is therefore sensitive to the influence of outliers in the dataset. Outliers cannot be deleted from the population because the results need to reflect the international population. One other way to deal with the influence of the outliers is by bootstrapping (Field, 2018). This process creates random new samples by selecting

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and duplicating countries from the original sample (Field, 2018). From these samples, coefficients, significance, and confidence intervals can be calculated, which all together form a more reliable and robust result compared to only the original sample. For the analyses in this study, a thousand extra samples are created from the original population ($N = 117$). Additionally, bias-corrected accelerated (BCa) is turned on to further increase its reliability (Field, 2018). This process secures the robustness and reliability of the results.

Before the analyses, the assumptions are checked. Particular attention is spent on the investigation of potential outliers. Due to bootstrapping, the effects of outliers are limited, however, it is evidently important to be aware of potential outlying countries. The data is also checked for multicollinearity.

After these checks, the bootstrapped hierarchical linear regressions are conducted to trace a relationship between disproportionality and its elements on polarization. These analyses provide the means to directly analyze the relationship between disproportionality and polarization while controlling for the other fixed variables (Field, 2018). The moderation effect of the quality of democracy on the relationship between disproportionality and its different elements on polarization is also tested via three bootstrapped hierarchical linear regressions. The analyses include three blocks, the first includes the control variables, the second includes the dummy variables and the independent centered variable, and the third includes the interaction variables.

The robustness of the results is checked after the main analyses. The bootstrapped analyses show both the non-bootstrapped coefficients, significance, and standard error as well as the bootstrapped results. To trace the robustness of the results, these non-bootstrapped results are inspected. Since the results are non-bootstrapped it means that outliers and skewness in the data have more influence on the results. However, since the bootstrap procedure randomizes the population and sees all the countries as equal in their value, it undervalues the uniqueness of very high and low scores. Hence, the results without a bootstrap procedure can differ from the bootstrapped results, which is worth investigating.

Results

Cross-country Analyses

The Assumptions

To ensure the generalizability and reliability of the results, linearity, normally distributed error, independence, homoscedasticity, and multicollinearity are checked. Furthermore, potential outliers are also investigated. In Appendix 2, an overview is given of the boxplots for the dependent and independent variables. Multiple outliers are seen in the boxplots for the variables, the level of

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disproportionality, and the relative number of parties. Figures 1, 2, and 3 can be checked for linearity. Here the scatterplots indicate straight to slight linear relationships between the independent variables and political polarization.

Appendix 3 shows a histogram and a P-P Plot (Figures 1 and 2) that indicate a relatively normal distribution. While there are slight deviations from normality, the bootstrapped analyses compensate for this lack of reliability (Field, 2018). In Appendix 3, figure 4, 5, 6, and 7 scatterplots of the dependent and independent z-score variables can be found. These indicate both a linear and homoscedastic pattern except for figure 6 of the variable, acceptance of election results by losers. The funnel in the figure indicates a heteroscedastic pattern. This is compensated for via bootstrapping (Field, 2018). Lastly, figure 3 in Appendix 3 shows a scatterplot of the standardized residual and the standardized predictive values. The random distribution of this scatterplot indicates that independence of error is provided.

Both a correlation matrix and a collinearity analysis are provided in Appendix 5. Multicollinearity is preventively accounted for with the creation of the control variables quality of government and diversity of classic media. This was done due to high correlations between the separate variables that make up these two variables. The tables in Appendix 5 shows that after the creation of these variables, no multicollinearity issues arise. To conclude, all assumptions are met, and the deviations or violations are compensated via bootstrapping.

Observations

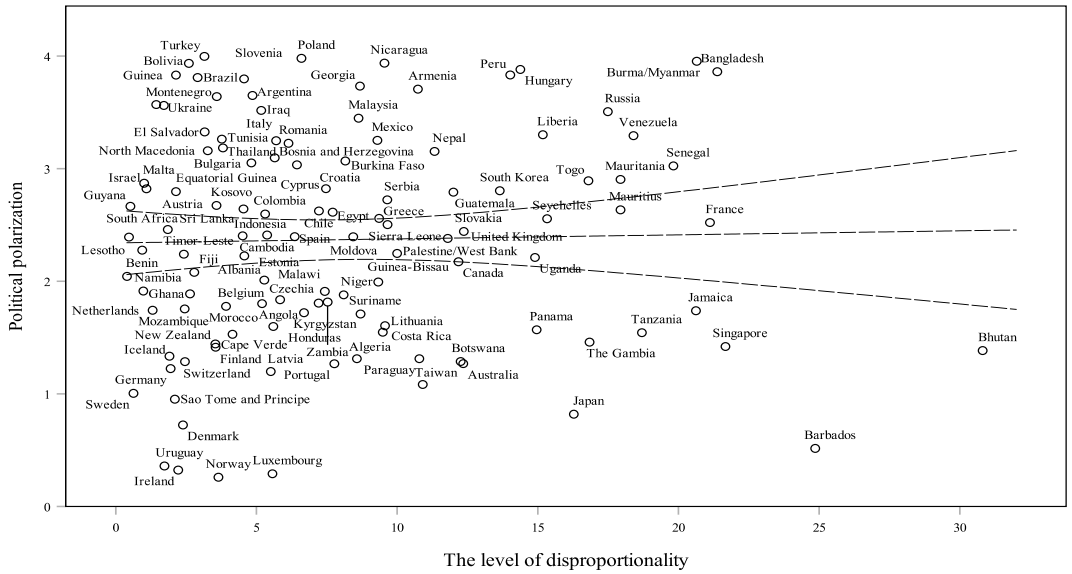
At first glance, the data seems to partly align with the theoretical framework. Figure 1 shows a straight line between polarization as disproportionality grows, while figure 2 shows that polarization slightly decreases as a country has more parties. So, one can see, for example, the disproportional countries that are discussed in the introduction, France, Bangladesh, Peru, Myanmar, The United Kingdom, and The United States on the right side of figure 1. It also shows the relationship between disproportionality and the number of parties by comparing figures 1 and 2. For example, if one checks the same countries in figure 2, all the disproportional countries are more on the left, indicating fewer parties. On the other hand, proportional countries such as Belgium, The Netherlands, and Indonesia are found on the left in figure 1 and on the right in figure 2.

Furthermore, polarization also decreases as people are more accepting of election results, which indicates lower levels of competitiveness. However, as stated before, the variables have several outliers that can significantly influence the relationships. Therefore, the next section shows the more reliable bootstrapped results.

Figure 1

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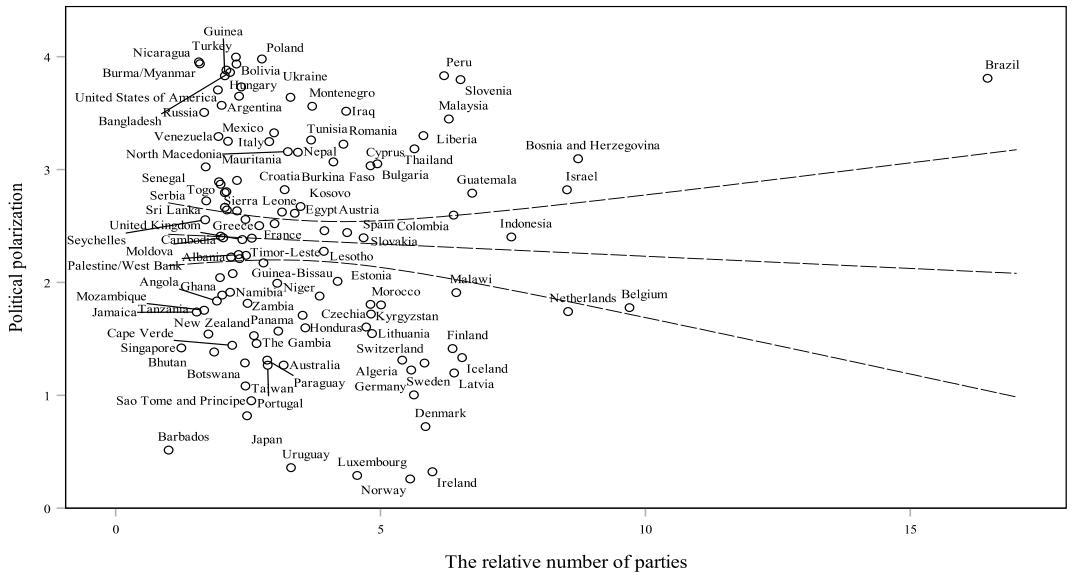
Scatterplot of Political Polarization and the Level of Disproportionality With a Linear Regression Line and 95% Confidence Interval Indications



Note. Polarization increases from one to four. The level of disproportionality also increases.

Figure 2

Scatterplot of Political Polarization and the Relative Number of Parties With a Linear Regression Line and 95% Confidence Interval Indications

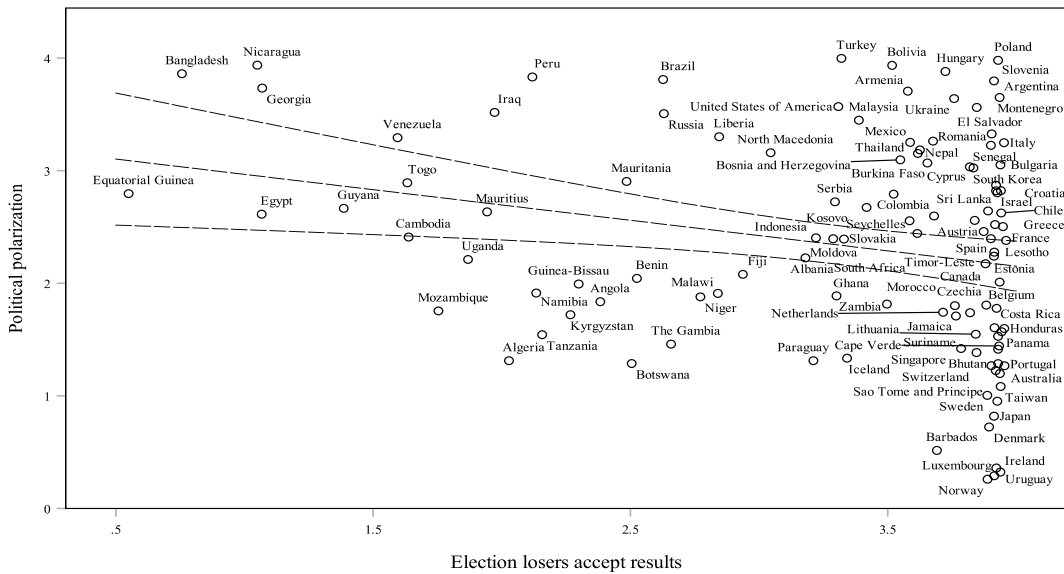


Note. Polarization increases from one to four, the relative number of parties also increases from zero to fifteen.

Figure 3

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Scatterplot of Political Polarization and Loser Acceptance of Election Results With a Linear Regression Line and 95% Confidence Interval Indications



Note. Polarization increases from one to four. Losers' acceptance of election results increases from zero indicating no acceptance to four indicating full acceptance.

Analyses

The results of the analyses are shown in table 1. Multiple conclusions are reached. First and foremost, as shown in models 1, 2, and 3, *the analyses do not provide sufficient evidence for the direct effects* (rejecting hypotheses 1, 2, and 3). This means that there is no significant direct effect of disproportionality, the relative number of parties, or competitiveness on societal polarization.

There is however sufficient evidence for an indirect effect of disproportionality and the relative number of parties if moderated by the quality of democracy (corroborating hypothesis 4). Model 4 shows that flawed democracies significantly differ in the effect that disproportionality has on societal polarization compared to full democracies. The interaction is more clearly visualized in figure 4 and shows that *flawed democracies grow less polarized as they grow in disproportionality*. The contrary is true for *full democracies that grow more polarized as they become more disproportional*. Additionally, model 5 shows that the interaction between the relative number of parties and the quality of democracy is also significant for flawed democracies and authoritarian regimes. Visualized in figure 5, *flawed democracies grow significantly more polarized as the relative number of parties increases* compared to full democracies. Authoritarian regimes have the same direction as full democracies, both decrease in polarization as the number of parties increases, however, *authoritarian regimes decline more steeply*. Model 6 shows the interaction between the quality of democracy and competitiveness. However, no significant results are provided for this relationship.

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Two interesting findings are worth highlighting. First, the significance of multiple interaction effects indicates that the *lack of significant direct effects might be caused by a difference in the quality of democracy*. Second, it is difficult to conclude if the quality of government constrains polarization, since not all countries are negatively affected by disproportionality. If the constraining effect of the quality of democracy was present, all the different levels had to have the same direction or at least the full and flawed democracies should be similar. However, *since both the hybrid regimes and the flawed democracies grow less polarized as they become more disproportional, it is not possible to trace a constraining effect*.

Table 1*Hierarchical Regression Models for Polarization*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Direct effects</i>						
Disproportionality	.004 (.01)					
Relative number of parties		.05 (.04)				
Acceptance of election results by losers			.13 (.12)			
<i>Interaction terms</i>						
Disproportionality x flawed democracies (ref.: full democracies)				-.43 (.22)*		
Disproportionality x hybrid regimes (ref.: full democracies)				-.19 (.23)		
Disproportionality x authoritarian regimes (ref.: full democracies)				.2 (.26)		
Number of parties x flawed democracies (ref.: full democracies)					.34 (.17)*	
Number of parties x hybrid regimes (ref.: full democracies)					.19 (.23)	
Number of parties x authoritarian regimes (ref.: full democracies)					-.51 (.24)*	
Acceptance of loss x flawed democracies (ref.: full democracies)						.3 (.63)
Acceptance of loss x hybrid regimes (ref.: full democracies)						.03 (.63)
Acceptance of loss x authoritarian regimes (ref.: full democracies)						.53 (.67)

(Continued)

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Table 1. (Continued)

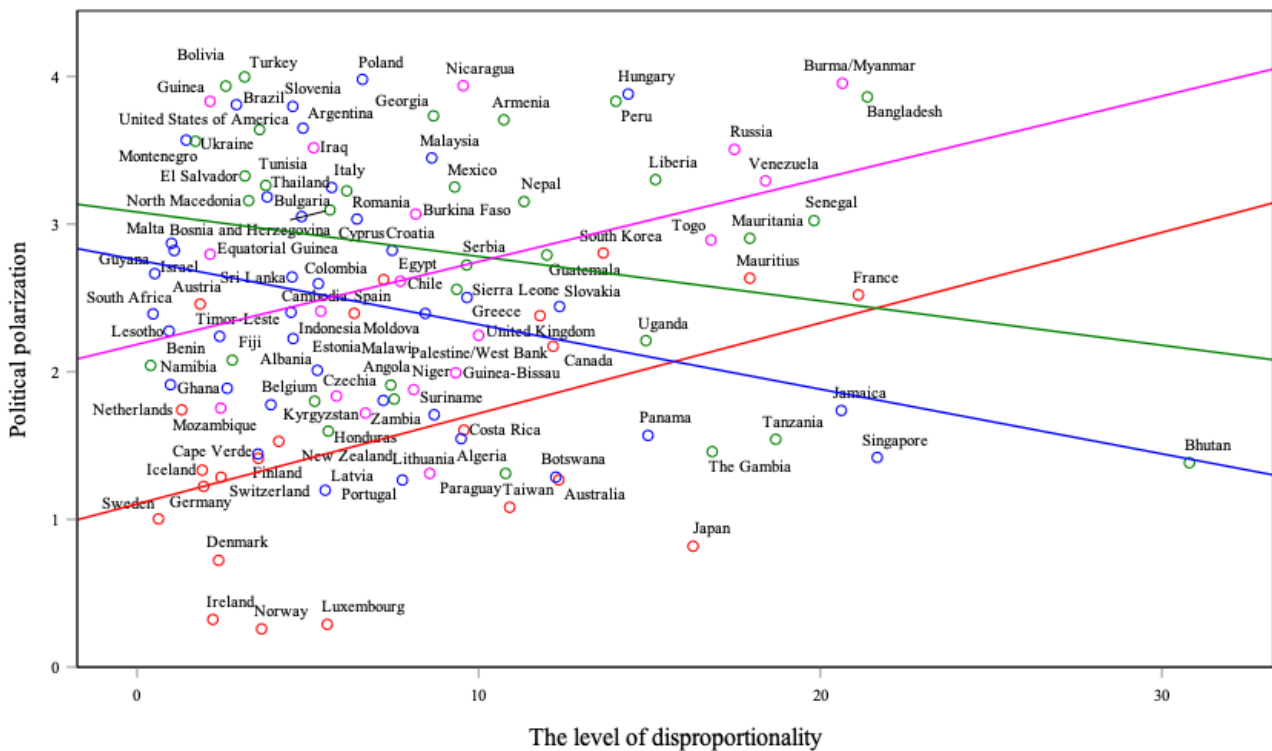
Control variables						
Online media perspectives	.42 (.16)**	.42 (.16)*	.38 (.16)*	.45 (.16)**	.44 (.16)**	.39 (.18)*
Online media fractionalization	-.3 (.1)**	-.31 (.1)**	-.31 (.1)**	-.22 (.09)*	-.29 (.09)**	-.28 (.1)**
Diversity of classic media	-.39 (.21)	-.45 (.21)*	-.33 (.22)	-.57 (.22)*	-.46 (.21)*	.51 (.25)*
Political corruption	.35 (.48)	.26 (.5)	.45 (.54)	.2 (.51)	.21 (.56)	.31 (.56)
Quality of government	-.49 (.16)**	-.51 (.17)**	-.53 (.19)**	-.38 (.18)*	-.41 (.18)*	-.43 (.2)*
R²	.41	.42	.4	.5	.52	.48
N	117	117	114	117	117	114

Note. All results are based on a bootstrap of 1000 samples. It shows the coefficients and the standard error in the brackets.

* $p < .05$

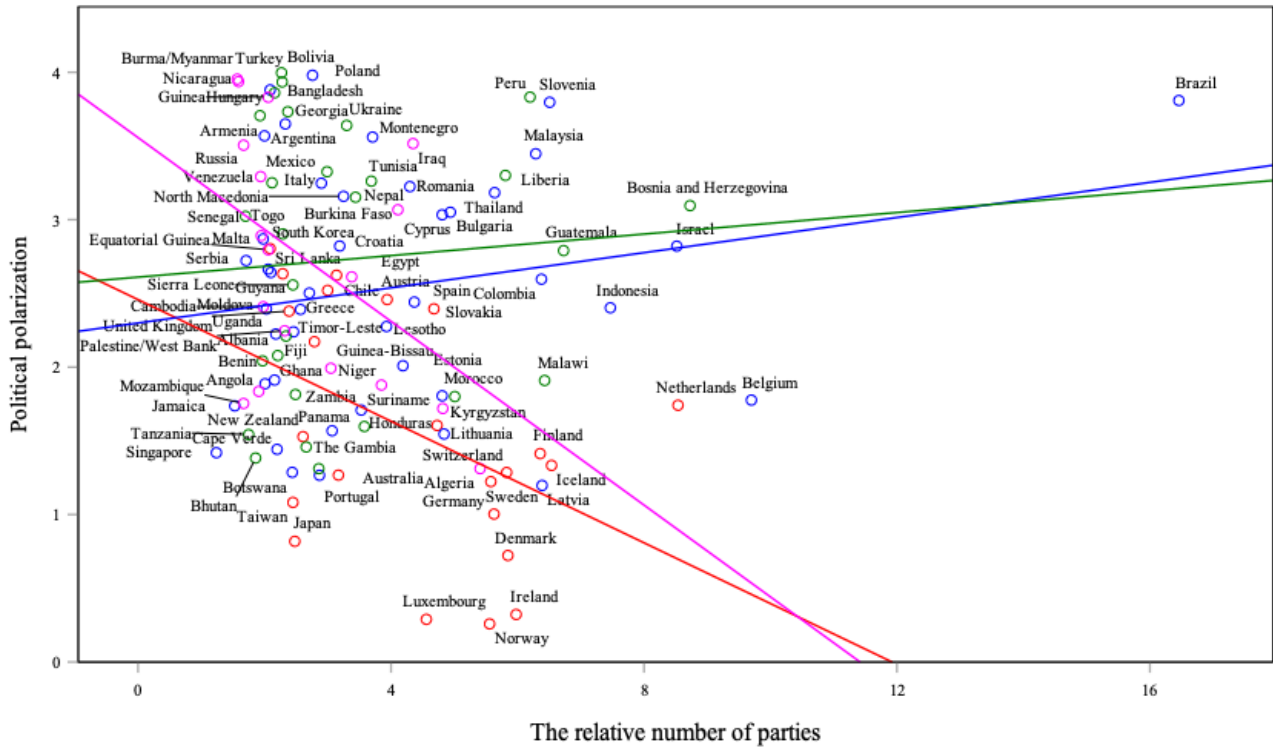
** $p < .01$

Figure 4



Note. Full democracies are red, flawed democracies are blue, hybrid regime are green, and authoritarian regimes are pink.

Figure 5



Note. Full democracies are red, flawed democracies are blue, hybrid regime are green, and authoritarian regimes are pink.

Robustness check

To check the robustness of the results the non-bootstrapped results of the analyses are checked. The results of these analyses are shown in table 2 and indicate no major changes in for example significance. The only changes are changes in standard error, however, this is normal and expected. As bootstrapping is used, the sample increases which also increases the specificity of the standard error (Field, 2018). Therefore, the changes in the standard error can be ascribed to the smaller sample in the case of the non-bootstrapped analyses. To conclude, the results hold their significance and demonstrate robustness.

Table 2

Hierarchical Regression Models for Polarization

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Direct effects</i>						
Disproportionality	004					
	(.01)					

(Continued)

Table 2. (Continued)

Relative number of parties	.05 (.03)
Acceptance of election results by losers	.13 (.12)
<i>Interaction terms</i>	
Disproportionality x flawed democracies (<i>ref.: full democracies</i>)	-.43 (.21)*
Disproportionality x hybrid regimes (<i>ref.: full democracies</i>)	-.19 (.24)
Disproportionality x authoritarian regimes (<i>ref.: full democracies</i>)	.2 (.26)
Number of parties x flawed democracies (<i>ref.: full democracies</i>)	.34 (.17)*
Number of parties x hybrid regimes (<i>ref.: full democracies</i>)	.19 (.23)
Number of parties x authoritarian regimes (<i>ref.: full democracies</i>)	-.51 (.24)*
Acceptance of loss x flawed democracies (<i>ref.: full democracies</i>)	.3 (.36)
Acceptance of loss x hybrid regimes (<i>ref.: full democracies</i>)	.03 (.35)
Acceptance of loss x authoritarian regimes (<i>ref.: full democracies</i>)	.53 (.38)

Note. The results are not bootstrapped. Bold text indicates a change compared to the main analyses.

The results are controlled for the control variables.

* $p < .05$

Discussion

This study sought to investigate missing insights into the potential polarizing effect of disproportionality and its elements, and the moderating effect of the quality of democracy on this relationship. Previous studies indicated that disproportional political systems are susceptible to political polarization (Bol et al., 2019; Carlin & Love, 2018; Fitzgerald & Wolak, 2016; Kirchner et al., 2011; Lee, 2022; Torcal & Thomson, 2023; Van Der Meer, 2010). However, evidence of a polarizing effect on broader society had yet to be provided. Evidence for this relationship was hindered by measurement difficulties associated with a concept such as societal polarization (Bértoa & Rama, 2021; Dalton, 2008). Furthermore, previous research indicated a dampening effect of the quality of democracy on polarization (Mauk, 2021; Nooruddin, 2010). These studies provided a robust foundation to base a novel moderation effect on. Specifically, the moderation of the quality of democracy on the relation between disproportionality, its elements, and societal polarization.

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I theorized that citizens base their political identities on the political parties present in a political system, if this system is more polarized, so are its citizens. Disproportional systems were expected to be more polarized. Especially, two elements of disproportionality: the low number of parties and the increased competitiveness between these parties, explain this polarizing effect. I theorized that these elements create an adverse environment that citizens adapt to in their personal life. Citizens affiliate with a political party by which they then form their identity. This means that a depolarized political system, with friendly parties, means friendly interacting citizens and the other way around. The quality of democracy can moderate this effect. The stronger democratic values and norms are institutionalized, and the more vigorously government institutions defend these norms, the less likely polarization is to take root (Casal Bértoa & Rama, 2021a; Mauk, 2021; Nooruddin, 2010).

The results indicate significant direct effects of disproportionality and the relative number of parties on societal polarization if moderated by the quality of democracy. The analyses indicate that neither disproportionality nor one of its elements have a direct effect on societal polarization. However, once moderated by the quality of democracy, the interaction effects did prove significant for the level of disproportionality and the relative number of parties. This reveals a direct effect of disproportionality and the relative number of parties on societal polarization, which was obstructed in the direct effect analyses. It presumably was obstructed by the diversity of the population which shows that too much diversity was indeed a justified concern. Several findings are worth discussing in more depth.

First, the directions of the interaction effects are contrary to the theoretical expectations and suggest the influence of another more important variable. As shown in figures 4 and 5, full democracies increase in societal polarization as they become more disproportional or if they have fewer political parties. This aligns with the proposed hypotheses and theoretical expectations. Despite this result, it is not possible to state whether the quality of democracy dampens the polarizing effect of disproportionality. This is due to the decrease in polarization in both flawed democracies and hybrid regimes. Both grow less polarized once they become more disproportional or have fewer parties. For the dampening effect, all systems had to show an increase in polarization as disproportionally grew, or at least the full and flawed democracies. Full democracies would show the lowest starting point in polarization and would grow only slightly, because of the constraining effect of the quality of democracy. All the other systems would have a higher starting point and polarize more quickly, due to a less functional quality of democracy. Since this is not the case, it can only be said that the quality of democracy interacts with the relation of disproportionality on polarization, however, evidence is lacking to reliably conclude a dampening effect. Why these types of democracies tend to grow less polarized instead of more polarized is beyond the scope of this study. It does suggest that another

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important variable might overrule the polarizing effect of disproportionality. For example, citizens in flawed democracies and hybrid regimes can experience more insecurities surrounding their democratic institutions which leads them to prefer the stability of a disproportional system.

Second, the lack of significant effects on competitiveness suggests the need for another operationalization or an adaptation of the theoretical framework. As is made clear in the results, there were no significant effects for competitiveness. Neither as a direct effect nor in the interaction with the quality of democracy. Two suggestions can be reached from this result. First, the used variable might be wrong. The variable, acceptance of election results by losers, from the V-Dem dataset was used to operationalize the variable. In figure 3 it can be seen that this variable is slightly skewed. Most countries have very accepting election losers. This variable can be a wrong operationalization, and a different variable needs to be used to better measure the competitiveness in a country. The second conclusion is that the theoretical framework is wrong. It can for example be the case that in proportional systems, competitiveness is just as high as in disproportional systems. The flexibility in a proportional system can cause parties to lose a lot of seats and be more insecure about their position. Additionally, parties experience higher levels of competition from smaller parties that gain momentum or via the sudden rise of a new party. Hence, the increased need to firmly defend one's position and thus increases the level of competitiveness. This can explain the lack of significance in the results and might suggest that increased competitiveness is not a defining characteristic of only disproportional systems.

The most important theoretical implication of this study is the visualization of political systems' interaction with, and influence on broader society. While one needs to be careful not to generalize trends unto individuals as in stating that all individuals are more polarized in disproportional systems, it is valuable to trace trends. In this case, a trend indicating an effect of disproportionality on societal polarization. The trend found in this study, suggests a process of citizen socialization via political systems. The term socialization is merely used to describe the main theory of this study: citizens form a political identity, based on the political parties available in a political system. If the system is more polarized, so are its citizens, hence a socializing effect of the political system. In the case of a disproportional country, citizens look at the political system for their political identity, which is most often a more polarized two or three-party system, to which they then accommodate their identity. And so, the system molds the interactions of citizens in their everyday interactions. In short, friendly political parties equals friendly citizens. This is what is meant by socialization via political systems, and what is partly shown in this study. It is partly shown since the study indicates a correlational trend between polarizing system characteristics and general citizen attitudes, it does not show causation. To gain a more robust understanding of this socializing process, qualitative studies are necessary to trace

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to what extent people are influenced by the polarization in parliament, and how prominent parties are in the formation of a political identity. Nevertheless, this study helped to achieve an in-depth comparative overview of how different systems and parts of these systems help form broader societal behavior.

The practical implications of the study are intertwined with the theoretical conclusions. Particularly in full democracies, as the political system becomes more disproportional their citizens grow in hostility towards one another. This can form an important argument for the preference towards more proportional systems. For example, organizations such as the Electoral Reform Society⁹ trace the influence that a change in the political system can have in The United Kingdom. They show that if the 2019 election was in a proportional system, parliament would see the rise of two new parties (The Brexit Party and the Ulster Unionist Party). Furthermore, the Conservative Party would lose at least 10% of its seats, while the Liberal Democrats would win 10% more seats. This would result in a more fragmented but diverse parliament, where the two dominant parties can experience new opposition, and where citizens experience an influx of new ideas and options. Via this study, it can be argued that the use of a proportional system would decrease societal polarization in full democracies such as the United Kingdom. However, for less stable regimes, this study provides evidence, that a less fragmented, rigid disproportional system is preferred over the diversity that a proportional system brings.

The study also had several limitations. The most important limitation is the temporality of the research design. The cross-country design can be improved by the inclusion of more years via for example a multilevel design. A multilevel or longitudinal design can better trace the trends indicated in this study. This paints a more reliable picture of the effect that different elements have. Another option is to focus on only one country, but a country that went from a disproportional to a more proportional system, to trace the polarization developments there. An example is to focus on New Zealand. New Zealand changed its democratic system from a disproportional first-past-the-post system to a mixed-member proportional system in 1993.

Another limitation is this study's in- and exclusion of different elements. It was theorized that disproportionality increases societal polarization and that the different elements are impacted by disproportionality further showing its polarizing effect. However, by selecting these elements, the study disregarded factors such as party volatility, regime durability, voter turnout, and the maturity of democracy. Some of these factors are measured by the Quality of Government Institute and can be

⁹ For a concrete overview of the changes in the parliamentary seat allocation, see the following [link](#).

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incorporated into a broader theoretical framework on how disproportionality impacts broader societal polarization.

Lastly, this study can only trace different trends and theorize why certain results are expected. However, to fully understand why there is a trend of citizens becoming more polarized in disproportional systems compared to proportional systems; or to understand why in full democracies citizens do become polarized in the case of a disproportional system, but in flawed democracies and hybrid regimes, the contrary happens; one needs a qualitative study to guide the interpretation of these results. Therefore, a qualitative study questioning citizens from multiple countries with different proportionality levels on how they experience the political system, and the party structure is a certain asset to this study and the understanding of the socializing effect of institutions.

To conclude, this study set out to investigate the influence of disproportional systems on social polarization. It showed that, based on the level of democracy, both disproportionality and the relative number of parties significantly impact social polarization. The study has made progress in the comparative investigation of the influence of political systems and made a constructive contribution to the inquiry into democratic refinement and institutional influence on behavior.

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Appendix 1, Descriptive Statistics

Figure 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Democracy index	114	1	4	2.36	.979
The level of disproportionality	119	.40	30.81	8.0631	6.16581
The relative number of parties	119	1.00	16.46	3.6380	2.17466
Election losers accept results	116	.55	3.96	3.2945	.85210
Political polarization	117	.26	4.00	2.3694	.95988
Valid N (listwise)	109				

Appendix 2, Boxplots

Figure 1

Boxplot Level of Disproportionality

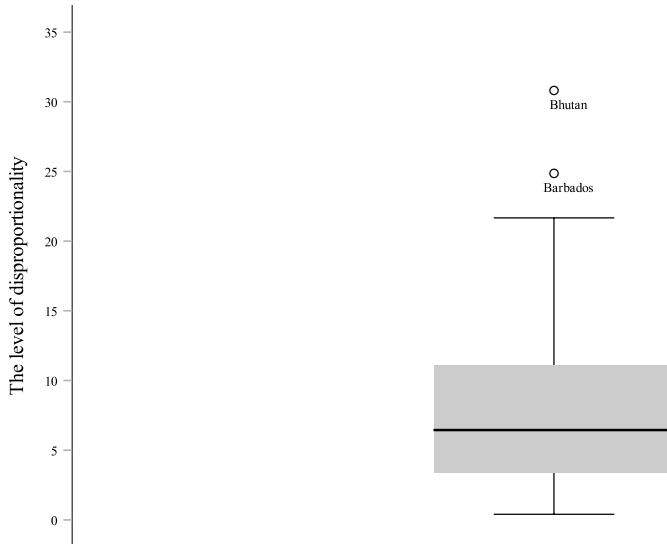


Figure 2

Boxplot Relative Number of Parties

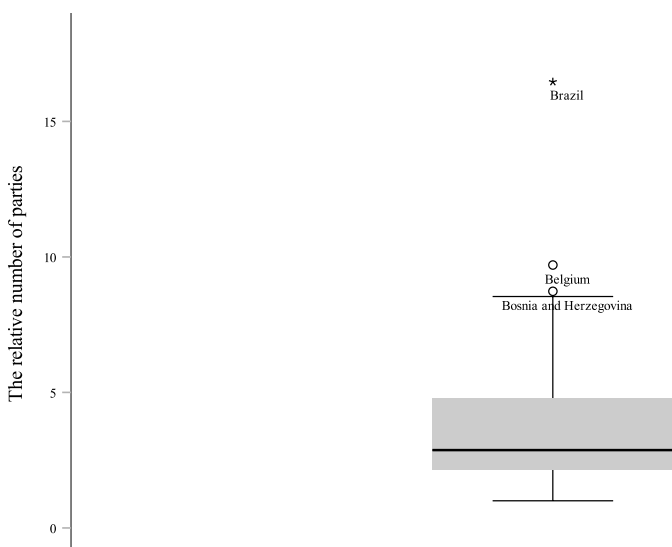


Figure 3

Boxplot Election Loser Acceptance

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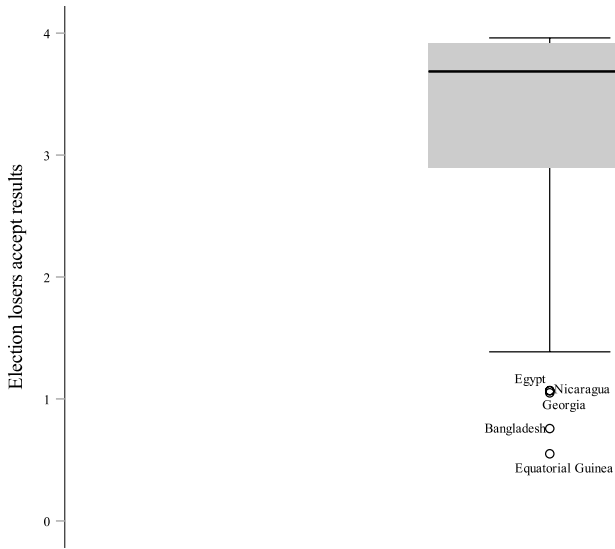
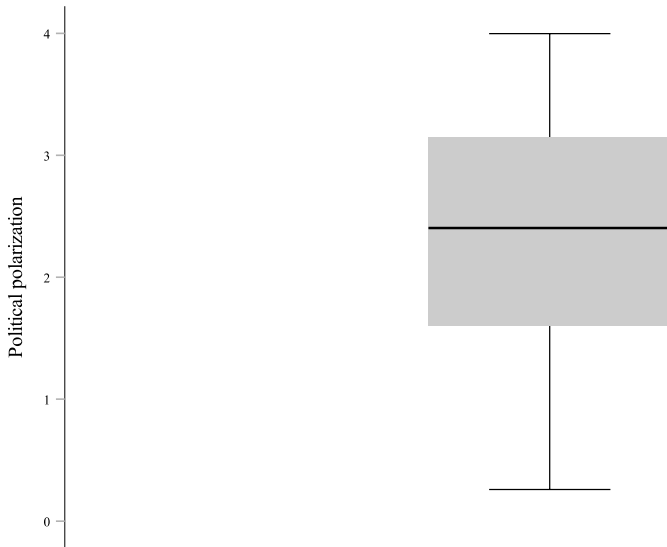
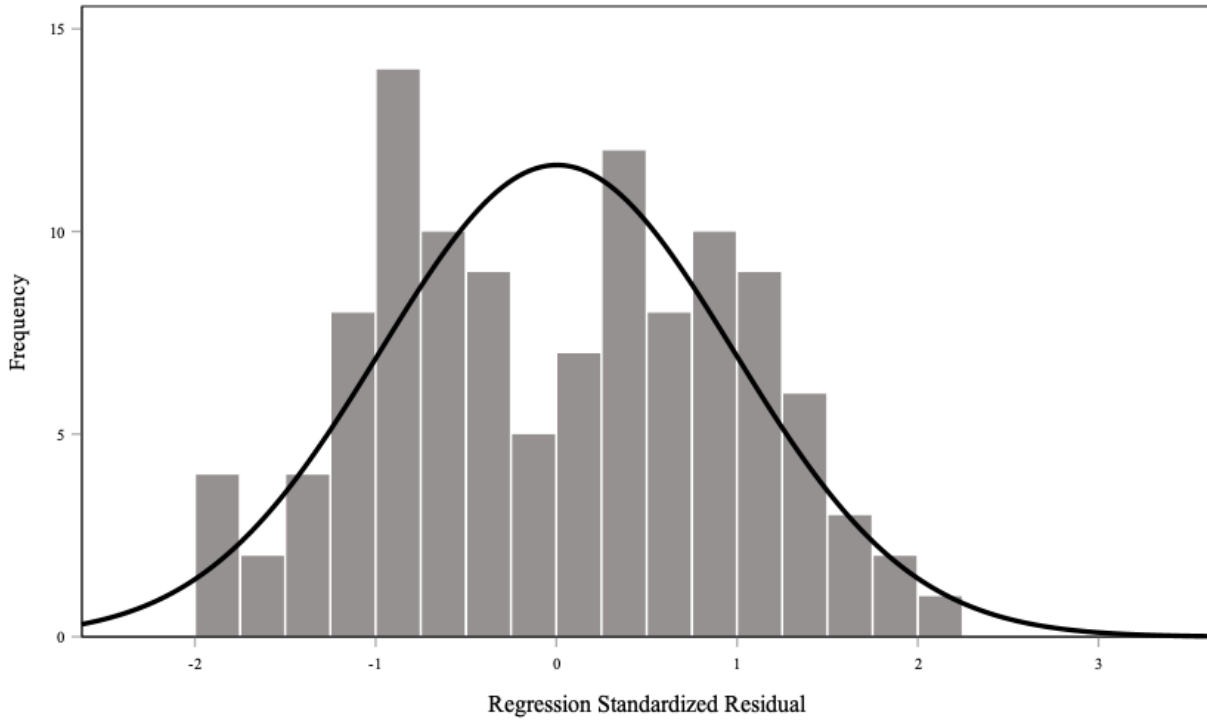
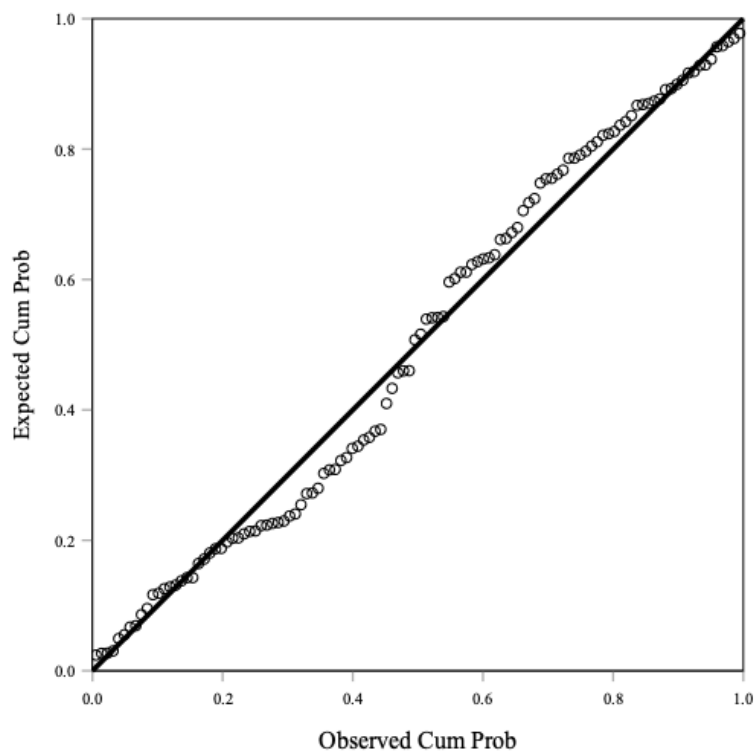


Figure 4

Boxplot Political Polarization



Appendix 3, Assumption Figures

Figure 1*Histogram of Political polarization***Figure 2***Normal P-P Plot of Regression Standardized Residual for Political Polarization*

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Figure 3

Scatterplot of Standardized Scores for Political Polarization

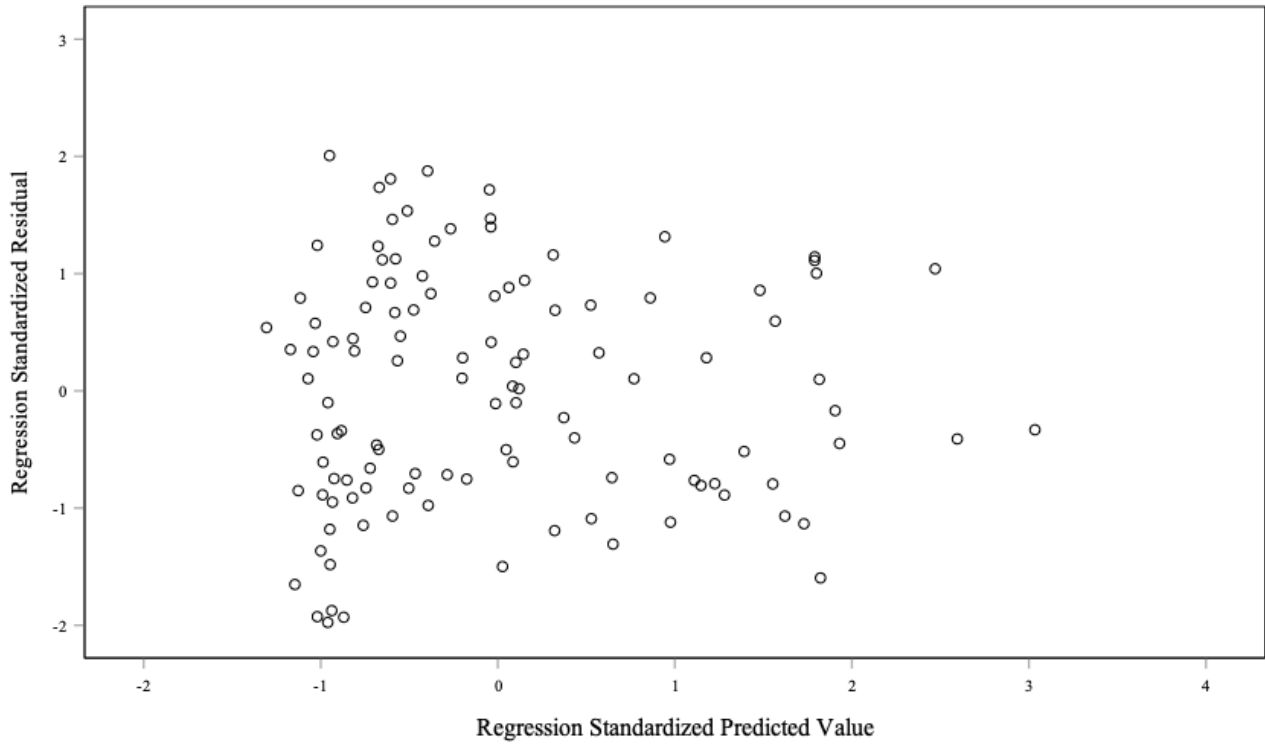


Figure 4

Partial Regression Plot of Political Polarization and Disproportionality

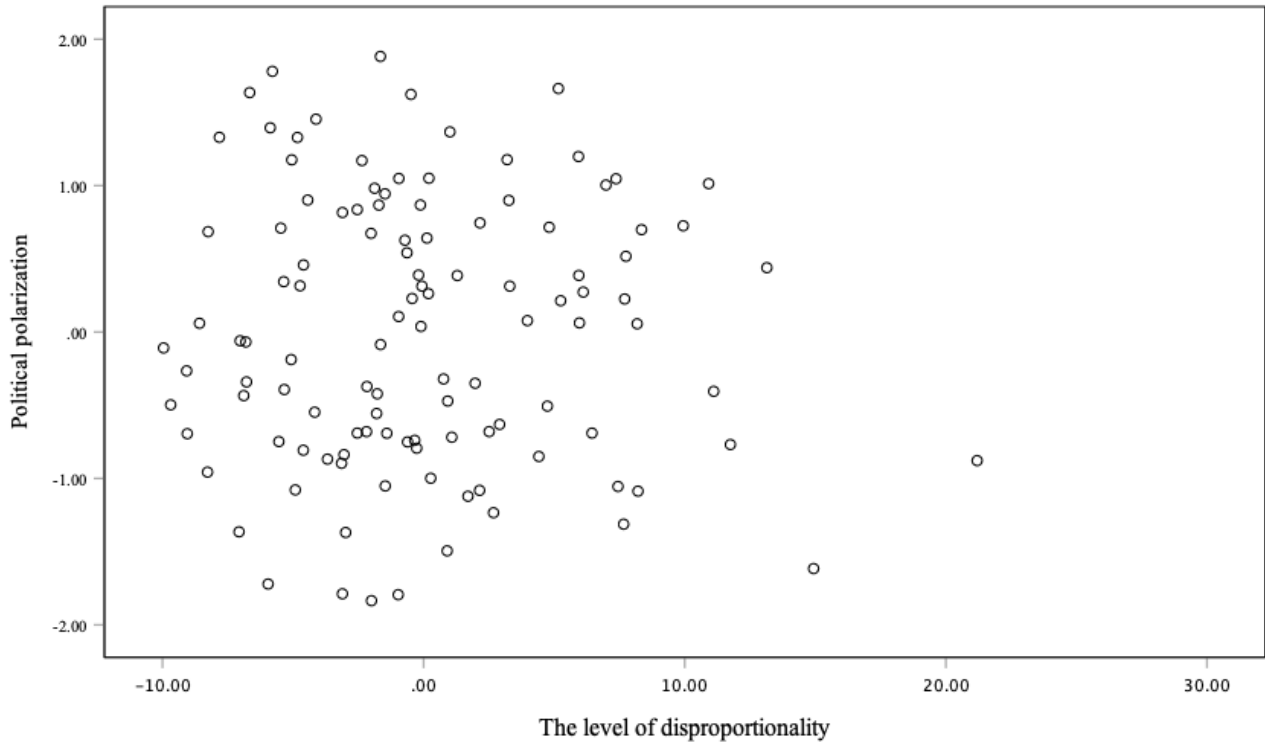


Figure 5

Partial Regression Plot of Political Polarization and the Relative Number of Parties

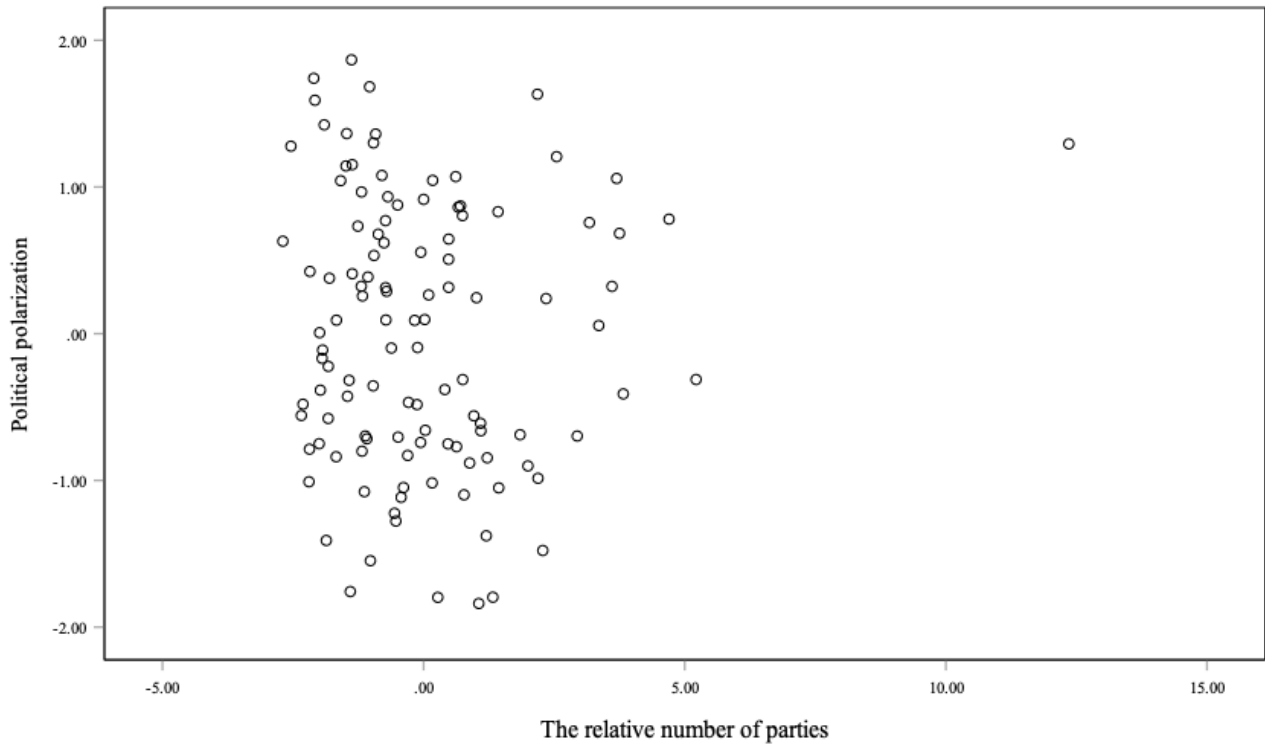
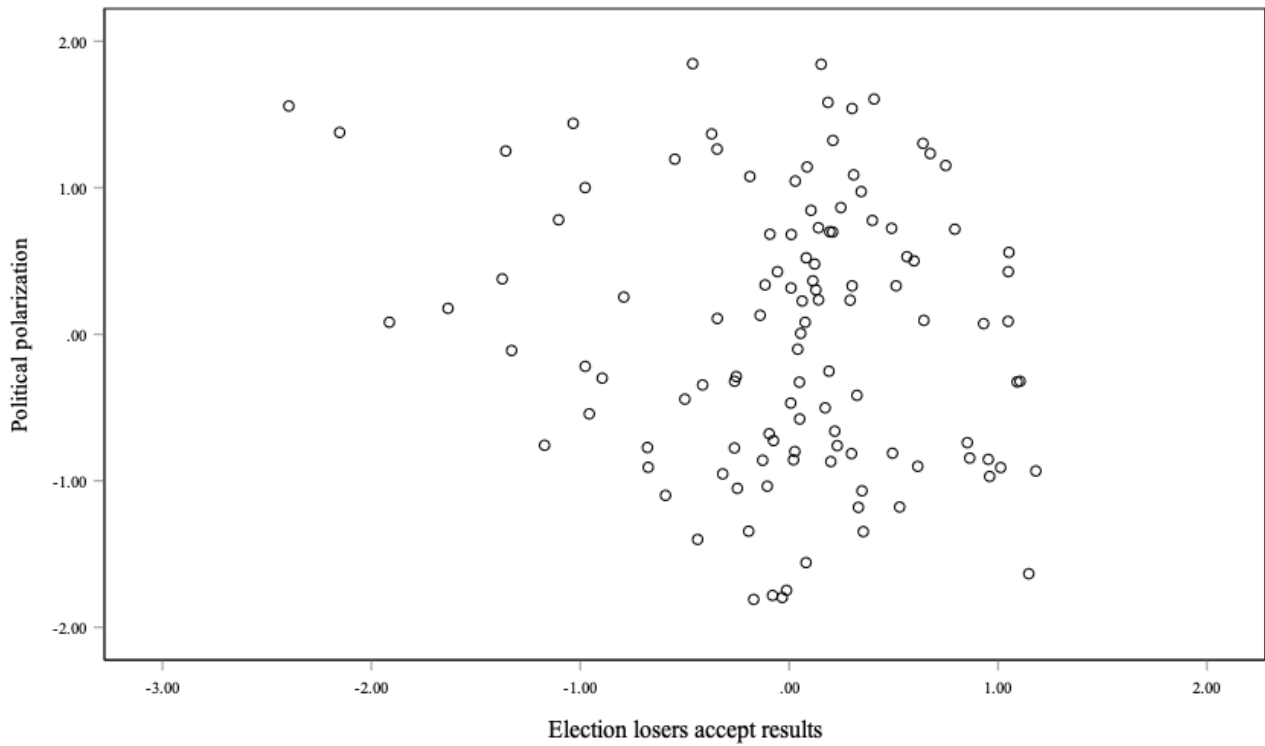


Figure 6

Partial Regression Plot of Political Polarization and Acceptance of Election Results by Losers



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Appendix 4, Multicollinearity

Table 1

Correlations

		Democracy index	The level of disproportionality	The relative number of parties	Election losers accept results
Democracy index	Pearson Correlation	1	.185*	-.241**	-.630**
	Sig. (2-tailed)		.048	.010	<.001
	N	114	114	114	111
The level of disproportionality	Pearson Correlation	.185*	1	-.332**	-.148
	Sig. (2-tailed)	.048		<.001	.114
	N	114	119	119	116
The relative number of parties	Pearson Correlation	-.241**	-.332**	1	.175
	Sig. (2-tailed)	.010	<.001		.061
	N	114	119	119	116
Election losers accept results	Pearson Correlation	-.630**	-.148	.175	1
	Sig. (2-tailed)	<.001	.114	.061	
	N	111	116	116	116
Political polarization	Pearson Correlation	.379**	.023	-.049	-.246**
	Sig. (2-tailed)	<.001	.804	.598	.008
	N	112	117	117	114
Political corruption index	Pearson Correlation	.745**	.062	-.088	-.585**
	Sig. (2-tailed)	<.001	.505	.341	<.001
	N	114	119	119	116
Online media perspectives	Pearson Correlation	-.585**	-.180*	.185*	.497**
	Sig. (2-tailed)	<.001	.050	.044	<.001
	N	114	119	119	116
Online media fractionalization	Pearson Correlation	-.171	.143	.181*	.148
	Sig. (2-tailed)	.069	.121	.049	.112
	N	114	119	119	116
The impartiality of classic media	Pearson Correlation	-.563**	-.174	.267**	.471**
	Sig. (2-tailed)	<.001	.058	.003	<.001
	N	114	119	119	116
The quality of government	Pearson Correlation	-.713**	-.097	.187*	.623**
	Sig. (2-tailed)	<.001	.295	.041	<.001

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	N	114	119	119	116
<i>Table 1. (Continued)</i>					
		Political polarization	Political corruption index	Online media perspectives	Online media fractionalization
Democracy index	Pearson Correlation	.379**	.745**	-.585**	-.171
	Sig. (2-tailed)	<.001	<.001	<.001	.069
	N	112	114	114	114
The level of disproportionality	Pearson Correlation	.023	.062	-.180*	.143
	Sig. (2-tailed)	.804	.505	.050	.121
	N	117	119	119	119
The relative number of parties	Pearson Correlation	-.049	-.088	.185*	.181*
	Sig. (2-tailed)	.598	.341	.044	.049
	N	117	119	119	119
Election losers accept results	Pearson Correlation	-.246**	-.585**	.497**	.148
	Sig. (2-tailed)	.008	<.001	<.001	.112
	N	114	116	116	116
Political polarization	Pearson Correlation	1	.503**	-.268**	-.390**
	Sig. (2-tailed)		<.001	.003	<.001
	N	117	117	117	117
Political corruption index	Pearson Correlation	.503**	1	-.606**	-.279**
	Sig. (2-tailed)	<.001		<.001	.002
	N	117	119	119	119
Online media perspectives	Pearson Correlation	-.268**	-.606**	1	.070
	Sig. (2-tailed)	.003	<.001		.449
	N	117	119	119	119
Online media fractionalization	Pearson Correlation	-.390**	-.279**	.070	1
	Sig. (2-tailed)	<.001	.002	.449	
	N	117	119	119	119
The impartiality of classic media	Pearson Correlation	-.429**	-.605**	.788**	.152
	Sig. (2-tailed)	<.001	<.001	<.001	.098
	N	117	119	119	119
The quality of government	Pearson Correlation	-.548**	-.844**	.701**	.228*
	Sig. (2-tailed)	<.001	<.001	<.001	.013
	N	117	119	119	119

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Table 1. (Continued)

		The impartiality of classic media	The quality of government
Democracy index	Pearson	-.563**	-.713**
	Correlation		
	Sig. (2-tailed)	<.001	<.001
	N	114	114
The level of disproportionality	Pearson	-.174	-.097
	Correlation		
	Sig. (2-tailed)	.058	.295
	N	119	119
The relative number of parties	Pearson	.267**	.187*
	Correlation		
	Sig. (2-tailed)	.003	.041
	N	119	119
Election losers accept results	Pearson	.471**	.623**
	Correlation		
	Sig. (2-tailed)	<.001	<.001
	N	116	116
Political polarization	Pearson	-.429**	-.548**
	Correlation		
	Sig. (2-tailed)	<.001	<.001
	N	117	117
Political corruption index	Pearson	-.605**	-.844**
	Correlation		
	Sig. (2-tailed)	<.001	<.001
	N	119	119
Online media perspectives	Pearson	.788**	.701**
	Correlation		
	Sig. (2-tailed)	<.001	<.001
	N	119	119
Online media fractionalization	Pearson	.152	.228*
	Correlation		
	Sig. (2-tailed)	.098	.013
	N	119	119
The impartiality of classic media	Pearson	1	.749**
	Correlation		
	Sig. (2-tailed)		<.001
	N	119	119
The quality of government	Pearson	.749**	1
	Correlation		
	Sig. (2-tailed)	<.001	
	N	119	119

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

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Table 2*Coefficients^a*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B
		B	Std. Error	Beta			Lower Bound
1	(Constant)	3.856	.702		5.495	<.001	2.465
	Political corruption index	.378	.480	.114	.786	.433	-.574
	Online media perspectives	.405	.170	.295	2.374	.019	.067
	Online media fractionalization	-.305	.093	-.259	-3.277	.001	-.490
	The impartiality of classic media	-.348	.230	-.203	-1.516	.133	-.803
	The quality of government	-.473	.188	-.420	-2.510	.014	-.846
	2	(Constant)	3.583	.750		4.780	<.001
Political corruption index		.333	.488	.101	.682	.497	-.635
Online media perspectives		.391	.171	.285	2.284	.024	.052
Online media fractionalization		-.342	.096	-.291	-3.567	<.001	-.533
The impartiality of classic media		-.387	.232	-.226	-1.666	.099	-.848
The quality of government		-.548	.193	-.487	-2.836	.005	-.931
The level of disproportionality		.012	.013	.075	.917	.361	-.013
The relative number of parties		.056	.037	.129	1.521	.131	-.017
Election losers accept results		.127	.109	.114	1.165	.247	-.089

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Table 2. (Continued)

Model		95,0% Confidence Interval for B		Correlations		Collinearity Statistics	
		Upper Bound	Zero- order	Partial	Part	Toleranc e	VIF
1	(Constant)	5.247					
	Political corruption index	1.329	.488	.075	.059	.265	3.779
	Online media perspectives	.743	-.243	.223	.178	.362	2.761
	Online media fractionalization	-.121	-.406	-.301	-.245	.895	1.117
	The impartiality of classic media	.107	-.409	-.144	-.113	.313	3.200
	The quality of government	-.099	-.528	-.235	-.188	.200	4.995
2	(Constant)	5.070					
	Political corruption index	1.301	.488	.066	.051	.254	3.944
	Online media perspectives	.730	-.243	.218	.170	.356	2.807
	Online media fractionalization	-.152	-.406	-.329	-.266	.836	1.197
	The impartiality of classic media	.074	-.409	-.160	-.124	.302	3.314
	The quality of government	-.165	-.528	-.267	-.211	.188	5.312
	The level of disproportionality	.037	.007	.089	.068	.833	1.200
	The relative number of parties	.128	-.027	.147	.113	.776	1.289
	Election losers accept results	.342	-.246	.113	.087	.576	1.736

a. Dependent Variable: Political polarization

Appendix 5, Ethics

**CHECKLIST ETHICAL AND PRIVACY ASPECTS OF RESEARCH****INSTRUCTION**

This checklist should be completed for every research study that is conducted at the Department of Public Administration and Sociology (DPAS). This checklist should be completed *before* commencing with data collection or approaching participants. Students can complete this checklist with help of their supervisor.

This checklist is a mandatory part of the empirical master's thesis and has to be uploaded along with the research proposal.

The guideline for ethical aspects of research of the Dutch Sociological Association (NSV) can be found on their website (http://www.nsv-sociologie.nl/?page_id=17). If you have doubts about ethical or privacy aspects of your research study, discuss and resolve the matter with your EUR supervisor. If needed and if advised to do so by your supervisor, you can also consult Dr. Jennifer A. Holland, coordinator of the Sociology Master's Thesis program.

PART I: GENERAL INFORMATION

Project title: The Impact of Proportionality on Polarization: A Cross-Country Analysis

Name, email of student: Gijs Huppertz, gijs@huppertz.com

Name, email of supervisor: dr. Kjell Noordzij, k.noordzij@essb.eur.nl

Start date and duration: 06-04-2023.

Is the research study conducted within DPAS

YES - NO

If 'NO': at or for what institute or organization will the study be conducted?
(e.g. internship organization)

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PART II: HUMAN SUBJECTS

1. Does your research involve human participants. YES - NO

If 'NO': skip to part V.

If 'YES': does the study involve medical or physical research?

YES -NO

Research that falls under the Medical Research Involving Human Subjects Act ([WMO](#)) must first be submitted to [an accredited medical research ethics committee](#) or the Central Committee on Research Involving Human Subjects ([CCMO](#)).

2. Does your research involve field observations without manipulations that will not involve identification of participants. YES -NO

If 'YES': skip to part IV.

3. Research involving completely anonymous data files (secondary that has been anonymized by someone else). YES - NO data

If 'YES': skip to part IV.

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PART III: PARTICIPANTS

1. Will information about the nature of the study and about what participants can expect during the study be withheld from them? YES - NO
2. Will any of the participants not be asked for verbal or written ‘informed consent,’ whereby they agree to participate in the study? YES - NO
3. Will information about the possibility to discontinue the participation at any time be withheld from participants? YES - NO
4. Will the study involve actively deceiving the participants? YES - NO
Note: almost all research studies involve some kind of deception of participants. Try to think about what types of deception are ethical or non-ethical (e.g. purpose of the study is not told, coercion is exerted on participants, giving participants the feeling that they harm other people by making certain decisions, etc.).
5. Does the study involve the risk of causing psychological stress or negative emotions beyond those normally encountered by participants? YES - NO
6. Will information be collected about special categories of data, as defined by the GDPR (e.g. racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, genetic data, biometric data for the purpose of uniquely identifying a person, data concerning mental or physical health, data concerning a person’s sex life or sexual orientation)? YES - NO
7. Will the study involve the participation of minors (<18 years old) or other groups that cannot give consent? YES - NO
8. Is the health and/or safety of participants at risk during the study? YES - NO
9. Can participants be identified by the study results or can the confidentiality of the participants’ identity not be ensured? YES - NO
10. Are there any other possible ethical issues with regard to this study? YES - NO

If you have answered ‘YES’ to any of the previous questions, please indicate below why this issue is unavoidable in this study.

What safeguards are taken to relieve possible adverse consequences of these issues (e.g., informing participants about the study afterwards, extra safety regulations, etc.).

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Are there any unintended circumstances in the study that can cause harm or have negative (emotional) consequences to the participants? Indicate what possible circumstances this could be.

Please attach your informed consent form in Appendix I, if applicable.

Continue to part IV.

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PART IV: SAMPLE

Where will you collect or obtain your data?

What is the (anticipated) size of your sample?

What is the size of the population from which you will sample?

Continue to part V.

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Part V: Data storage and backup

Where and when will you store your data in the short term, after acquisition?

The gathered data will be downloaded from the V-Dem dataset website and afterward stored on the author's personal secured university Onedrive account. The same goes for the data regarding proportionality and the quality of democracy. Both are gathered online and will be stored on the Onedrive account. All the datasets are publicly available, therefore the data will be downloaded once and will be deleted after the analysis is done.

Who is responsible for the immediate day-to-day management, storage and backup of the data arising from your research?

Day-to-day management will not directly be necessary, however, all management, storage, and backup of data will be planned and organized by the author of this paper.

How (frequently) will you back-up your research data for short-term data security?

The data will be backed-up once after the analysis is done and once after the finalization of the results. However, due to the availability of the data, further back-ups won't be necessary.

In case of collecting personal data how will you anonymize the data?

Note: It is advisable to keep directly identifying personal details separated from the rest of the data. Personal details are then replaced by a key/ code. Only the code is part of the database with data and the list of respondents/research subjects is kept separate.

The data downloaded from the V-Dem dataset, and the Gallagher index are both country-level data. Both datasets have no individual participants but only aggregated country information. Anonymization is therefore not necessary.

DISPROPORTIONALITY, DEMOCRACY & POLARIZATION

PART VI: SIGNATURE

Please note that it is your responsibility to follow the ethical guidelines in the conduct of your study. This includes providing information to participants about the study and ensuring confidentiality in storage and use of personal data. Treat participants respectfully, be on time at appointments, call participants when they have signed up for your study and fulfil promises made to participants.

Furthermore, it is your responsibility that data are authentic, of high quality and properly stored. The principle is always that the supervisor (or strictly speaking the Erasmus University Rotterdam) remains owner of the data, and that the student should therefore hand over all data to the supervisor.

Hereby I declare that the study will be conducted in accordance with the ethical guidelines of the Department of Public Administration and Sociology at Erasmus University Rotterdam. I have answered the questions truthfully.

Name student: Gijs Huppertz

Name supervisor: Kjell Noordzij

Date: 16-04-2023

Date: 16-04-2023

A handwritten signature in black ink, appearing to read 'G. Huppertz', with a large, sweeping flourish underneath.A handwritten signature in black ink, appearing to read 'Kjell Noordzij', with a long, horizontal flourish extending to the right.

