Research Paper

# Effect of disproportionality on voter turnouts across Europe

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Zurich, June 7th, 2021

Submitted to Prof. Dr. Jonathan Slapin

Modul: «Forschungsseminar: Strategy, Institutions, Politics»

7’434 Words

University of Zurich

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# Abstract

Scholars in political science and politicians have often argued that a high participation of voters in elections is a good sign for a proper democracy. Voter turnouts have been regarded by scientists in several ways, examining different factors lowering or rising participation. The effect of disproportionality of an electoral system on voter turnout has been examined in several case studies, regarding one single country or comparing a few countries. Hence, this paper wants to fill this gap by focusing on the effect of disproportionality, measured by using the Gallagher Index, on voter turnouts in national elections across European countries, using individual level data. By using the latest available data from the European Social Survey (ESS), the Gallagher Index and the voter turnout in every country as well as self-reported participation in elections of respondents of the ESS, this study shows the effect of disproportionality on electoral participation. I run several regression analyses, controlling for well-known factors according to current research literature that influence the individual probability of participating elections. I found proof for a significant effect of electoral disproportionality on voter runout. Four countries of the sample appeared to be outliers, weakening the effect-strength of disproportionality. By taking a closer look at those, I found several reasons, lying in two electoral system reforms and the special nature of one electoral system and one party-system, explaining their outlying positions sufficiently. This stresses the theory of a significant and relatively strong effect of disproportionality on voter turnout in all European countries.


# Introduction

There are various scholars who have analyzed the existence and methods of measurement of disproportionality between the percentual number of votes and the effective number of seats parties gain in parliamentarian elections. Effects of different electoral systems, entailing different levels of disproportionality, on voting behavior and electoral turnouts have been regarded yet – but only in case studies or comparative studies including a small number of cases. Other Scholars analyzed effects of e.g. education in individual level analyses on voter turnout (Persson, 2013), but regarded disproportionality as a control variable only. In this paper, the level of disproportionality of the electoral system is considered the main independent variable of interest.

Political scientists as well as politicians and voters are interested in "fair" electoral systems and tend to use disproportionality as one of several criteria's for their evaluation (Plescia et al., 2020). Hence, there is a wide range of people and groups interested in the effects of

disproportionality in electoral systems. In consequence, the results of this paper may deliver some answers for European parties, people, and organizations, which want to learn more about the effects of disproportionality on voter turnouts.

There are several factors, which affect the probability of individuals to participate elections, for example, age, gender, income, and education. These factors have already been examined regarding European Parliament Election as well as National Parliamentary Elections in the member states of the European Union (Vries et al., 2021). As a case study of Spain shows, there is merely no effect of disproportionality on voter turnout to expect in new democracies. But there is a significant effect when a democracy grows older (Gallego et al., 2012). This shows the effect of time and stresses, that in established democracies, a significant effect ought to be observable. Considering the effect of disproportionality as an important factor within a democracy (Lijphart, 1990; Plescia et al., 2020), the question, how it affects voter turnouts regarding a larger group of cases nowadays ought to bring new knowledge by stressing or rejecting existing theories or adding new findings to those.

The aim of this research paper is to analyze the effect of disproportionality across European countries on voter turnout. The latest available data sets from European Surveys are taken into account for computing a regression analysis. By holding other factors of voting behavior and turnout constant, confounding due to other factors shall be prevented. Europe includes many established democracies since the end of the iron curtain, which happened about thirty years ago. All these democracies have different electoral systems. To measure disproportionality, I will use the Gallagher Index, that is computed by using the least square of the differences between votes and gained seats in parliament (Gallagher, 1991).

## Literature review

There are different mathematical methods to measure the amount of disproportionality of electoral systems. For this paper, I choose to use the Gallagher Index, established in 1991 (Gallagher, 1991). There are many other ways to measures electoral system disproportionality and party system volatility. According to a comparison study by Taagepera et. al., the Gallagher Index seems to be the most appropriate measure for this paper, since it offers the most desirable combination of features (Taagepera & Grofman, 2003). A further look at the Gallagher Index shows, that while it is affected by district magnitude and the effective threshold, the number of wasted votes remains unaffected, when changing the independent variables (Anckar, 1997).

One central point of interest for politicians and political scientists but also for voter is the "fairness" of an electoral system. Proportionality might affect the number as well as the ideological dispersion of the competing parties. The "best" voting system does not exist, since every electoral system has its biases and no system can perfectly reflect voters' preferences and guaranty stability and accountability at the same time (Plescia et al., 2020). Lijphart examined the relationship between central variables of electoral systems, such as electoral formulas, district magnitudes and ballot structures, on one hand, and electoral outcomes on the other hand. His findings suggest that the effects of electoral formula and district magnitude on proportionality are very strong, while their effect on numbers of parties participating in elections is very weak. Ballot structures ought to affect the degree of multipartyism only in single-member district systems (Lijphart, 1990).

What leads people to participate elections in Europe? Basically, we could assume that individuals go vote when the costs of voting are lower than its benefits. Benefits are hereby considered as the effect of participating the election on election results and, due to this, policy outcomes. Costs on the other hand can be considered as the effective amount of time and energy an individual must spend to make his or her voting decision and hand in the ballot. A very important factor seems to be the question: does my very vote make a difference? In case it is assumed to potentially do, especially in tight races between rivaling candidates or parties, the probability of an individual to go vote is higher as in other cases. Further we can observe, that age, income, and education are important factors too, affecting the probability of an individual to vote (Vries et al., 2021).

Since voter turnouts in elections do not depend on disproportionality only, we must regard other possible factors that affect these variables. One factor often examined by scholars is the age of voter. Age affects the probability of participating an election at the election day. The probability of joining elections increases with age, except for very old people where the probability decreases again. With higher age, the support for ones' preferred party also increases (Arzheimer et al., 2016). This can be seen for example in the case of Finland, where the probability of participating the national elections increases with age, regarding the elections from 1975 until 2003 (Wass, 2007).

Another variable affecting voting behavior and turnout, is the gender of people. A lot of scholars regarded the topic of this "gender gap" in political research. Most studies focused on individual level explanation. The modern gender voting gap is found in most of 25 European Union member states. But its size varies across countries (Abendschön & Steinmetz, 2014).

Other scholars examined the effect of economic factors on voting. On average, a large analysis shows, that there is an effect of the income height on voter turnout. But the found relationship seems not to be monocausal, since there are interdependences indicating a multicausal mode of operation (Jensen & Jespersen, 2017). One further variable affecting the probability of an individual to vote is education. The policy preferences differ in between low-skilled and high skilled labor market participants. Hence, labor market vulnerability differs across educational levels of people. These groups have different policy preferences especially in welfare support and therefore differences in voting behavior and voter turnout (Häusermann et al., 2015).

# Theory

Regarding the studies made to examine the effect of disproportionality between votes gained in elections and seats gained in parliaments, a certain effect is assumed by scholars so far. Citizens care about how votes are converted into seats. Voters evaluate this in a rational and reasoning way. But they also do consider, how their own party performs – or how it would perform under different conditions. Support for the voting system decreases with higher disproportionality, no matter if voters are in favor of small or large parties. These findings come from a comparative analysis between Austria, England, Ireland and Sweden (Plescia et al., 2020). In the case of Spain, there was no significant effect observable in the first democratic election, but in further elections, as the democracy grew older. Small parties optimized their mobilization only after the first democratic elections and the turnout rates between small party supporters and large party supporters grew over time. Maybe, in new democracies voters as well as parties do not know the full preferences of the voters within a district and the institutional effects (Gallego et al., 2012). The effect of electoral formula is a central one to explain the electoral outcome (Lijphart, 1990).

Based on these findings and assumptions, a casual effect of electoral disproportionality on voting behavior should be observable across almost all established democracies. Literature indicates, that the larger the disproportionality of an electoral system is, the lower the voter turnouts in elections within this system are. Therefore, the hypothesis I want to examine in this paper is:

*$h_1$: an increase of disproportionality leads to a decrease of voter turnout.*

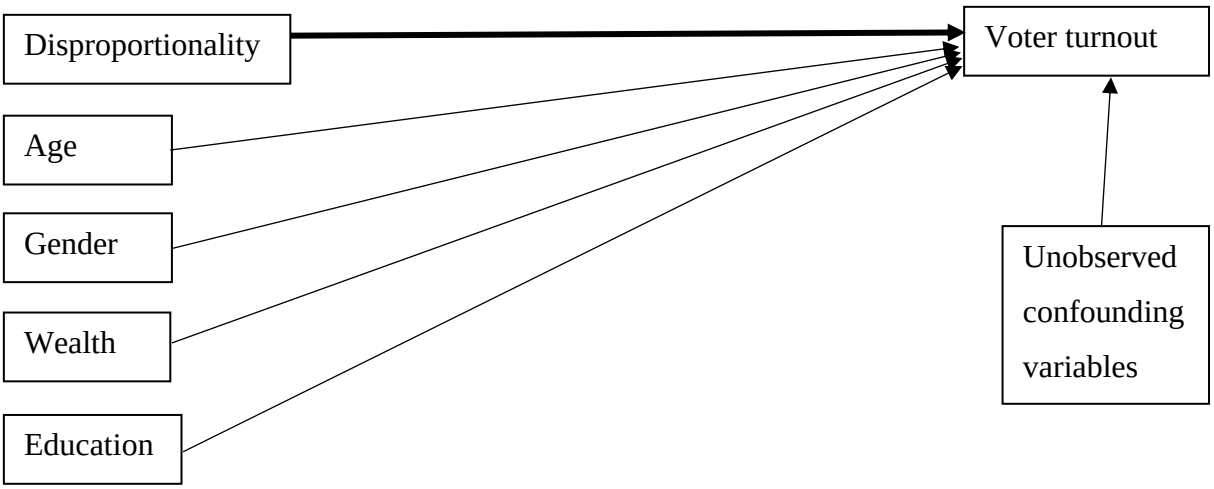
As logic consequence, the null hypothesis is:

*$h_0$: an increase of disproportionality has no effect on voter turnout.*

When analyzing this thesis, we must pay attention to potential confounding variables, such as gender, age, income, or education, which can affect the electoral outcome and the voter turnout, as shown above. The very effect of disproportionality on voter turnout might appear, because the possibility of not being represented in parliament due to the possibility of the preferred candidates or parties being elected and gaining one respectively several seats in the voting district of a voter, might become salient due to experience. These possibilities are, depending on the voting system, the voting district and the political preferences of a voter, but also on the electoral system, that delivers the formula that calculates the seats in parliament depending on votes gained in a district. One formula that is used to calculate the disproportionality of an electoral system, that will also be used in this paper, is the formula of the Gallagher Index:

$$LSq = \sqrt{\frac{1}{2}\sum_{i=1}^{n}(V_1 - S_1)^2}$$

According to the Gallagher Index, the disproportionality of an electoral system when calculating the number of seats for a certain number of votes, is the least square (LSq) of the sum of differences of vote shares and seat shares. In other words: the square root of the half of the sum of the squares of the differences of vote shares and seat shares in parliament.




As seen in the direct acyclic graph above, the potential effects of unobserved variables are considered in the model as well. Even though the model already contains control variables to take care for effects on the dependent variable caused by these, we have to recognize the possibility, that other factors that are not covered by scholars' examinations yet, may affect voter turnout in a significant way. This underlines one limitation of the model.

Another limitation lays in the selection of cases. I regard a certain number of European democracies only, and not all democracies in the world. Therefore, the findings of this term paper can not be generalized all over the world, without paying attention to local factors that may have a certain impact in other parts of the globe.

## Empirical strategy

Across Europe, we find a wide field of democratic countries, that have been using different electoral systems for quite a long time. In other parts of the world, democracy is not developed and established in a comparable way, regarding for example east Asian or African countries. In further parts of the globe, there are quite established democracies, for example the federal states of the USA, but theses do not vary that much in their electoral systems as European countries do.

The timespan a democracy or an electoral system has been used and became used to voters and political actors, also needs to be considered with care (Gallego et al., 2012). Most democracies in Europe have existed for decades now. Nevertheless, changes in electoral systems affect voter turnouts, at least in the first elections, according to literature (Gallego et al., 2012). This circumstance will be payed attention in the analysis. Especially the case of Italy shows several effects of changes of the electoral system over time. Luckily, the data set from the ESS includes information about the control variables that shall be taken care of in this examination, namely gender, age, income, and education, on the individual level.

As already mentioned, there are some factors that will not be operationalized in the regression analysis and may confound the results, some unobserved confounders. According to the principle of parsimony, a model is always a simplification of reality. The variables chosen to be considered in the model, base on several examined and well-known factors, due to current literature. Further, the results might lose some of their explanatory power when taking to many variables as controls into account, since the adjusted R-square values punish models with an overflowing number of controlling variables. Nevertheless, the chosen controlling variables ought to reduce inferences of the most powerful confounders, according to literature (Arzheimer et al., 2016).

Cultural and historic factors might influence voter turnout as well. It is quite complicated to model a country's history in a regression analysis, especially regarding the fact, that the borders of countries in Europe changed several times during the 20$^{th}$ century; in some cases, even in the 21$^{st}$ century. Cultural differences, based on factors such as for example religion, might influence

voter turnout as well. Also, weekday, daytime, or the possibility of voting by letter or at the ballot box only may influence the voter turnout in the end.

Since this paper regards many elections, some of these effects, in case they exist in a significant magnitude, might not have an impact on the final results, because election dates or the possibility of voting postal, differ between countries indeed, but can be considered as de facto randomized across Europe. Further, many researchers did not regard these factors yet too in their analyzes. So, these factors might, in case that they have significant effects, be interesting research objects for other papers and maybe might make a future replication of this very paper with potentially different findings not only possible, but even necessary.

## Data and operationalization

First, we need to get the dependent variable, the voter turnout, regarded in this analysis. Therefore, we need data including the election results of European states. These can be found in the European Election Database (EED) (*European Election Database (EED)*, n.d.). To make sure, that the measured Gallagher Index value influences an election's voter turnout, we cannot regard Gallagher Index and voter turnout of the same election, since the level of disproportionality appears after and not before voters go vote. Therefore, I consider the Gallagher Index value for each national election that took place one period before the last election that is covered in the ESS. In the ESS, people were asked if they participated the last elections. This shows us the self-reported instead of the effective voter turnout. Since we are not interested in how many people go vote in the first place, but primary in why people do and do not participate national elections, the self-reported voter turnout is a sufficient variable operationalization – especially since it is measured on individual-level.

The control variables can be found in the ESS too, where representative data is available (*European Social Survey | European Social Survey (ESS)*, n.d.). These data sets include the age of people, their gender, their income split in classes, and the time they spent for their education, measured in years. Not all countries across the geographical region of Europe are covered by the ESS and the EED. Therefore, this analysis will except countries that do not provide data to these two data sets. Finally, about 35 countries will be analyzed in this paper – almost whole Europe.

The main independent variable, the explanatory variable of this analysis, the disproportionality, operationalized by using the Gallagher Index, luckily can be found already calculated on the homepage of the Trinity College Dublin, Department of Political Science (*Electoral Systems:*

*Michael Gallagher Electoral Systems Site - Department of Political Science - Trinity College Dublin*, n.d.).

The controls are considered by using the individual level data provided by the ESS. Age is operationalized by regarding the number of years since a participant was born. Gender is regarded as a dichotomous variable, regarding male and female. Therefore, participants having another gender identity or refusing to answer the question about their sex, will not be considered in the analysis. Education is operationalized as the number of years a participant spent on education during his or her lifetime. Income is measured in ten ordinal values. In the ESS, participants are grouped by their self-reported income level, reaching from 1 (very low) to 10 (very high).

The explanatory variable, the Gallagher Index, is added as variable to each participant of the survey, depending on the country where the participant lives and is allowed to participate elections. On individual level, all over the countries participating the survey, the effect of disproportionality can be measured then, controlling for the four control variables this paper pays attention to.

There is one critical points that must be mentioned before going on with the analysis. The Gallagher Index is only calculated for each country, and not for each constituency in each country. But in fact, it depends beside other element on one factor of the formula of calculating votes into seats in parliament: the size of constituencies in proportional electoral systems. Hence, in cases where the size of constituencies differs widely, an unobserved regional effect might confound the final findings. We might assume, that the psychological effect of the perceived “fairness” of the whole electoral system of a country overrules the regional effect, but that would be an assumption without sufficient scientific arguments. So, this must be kept in mind when evaluating the results of the examination of this paper.

# Data Analysis

## General Results

In a very first step, I want to take a short look on the European map. Do voter turnout and Gallagher value per country correlate? *Figure 1* shows the value of the Gallagher Index for each country that participated the last available ESS-Round in 2018. Each value refers on the last election held before the very election the answers of the participants of the ESS refer on. *Figure 2* shows the voter turnout of each election of the same sample of countries and refers on the vote, on which the participants of the ESS from 2018 referred on.

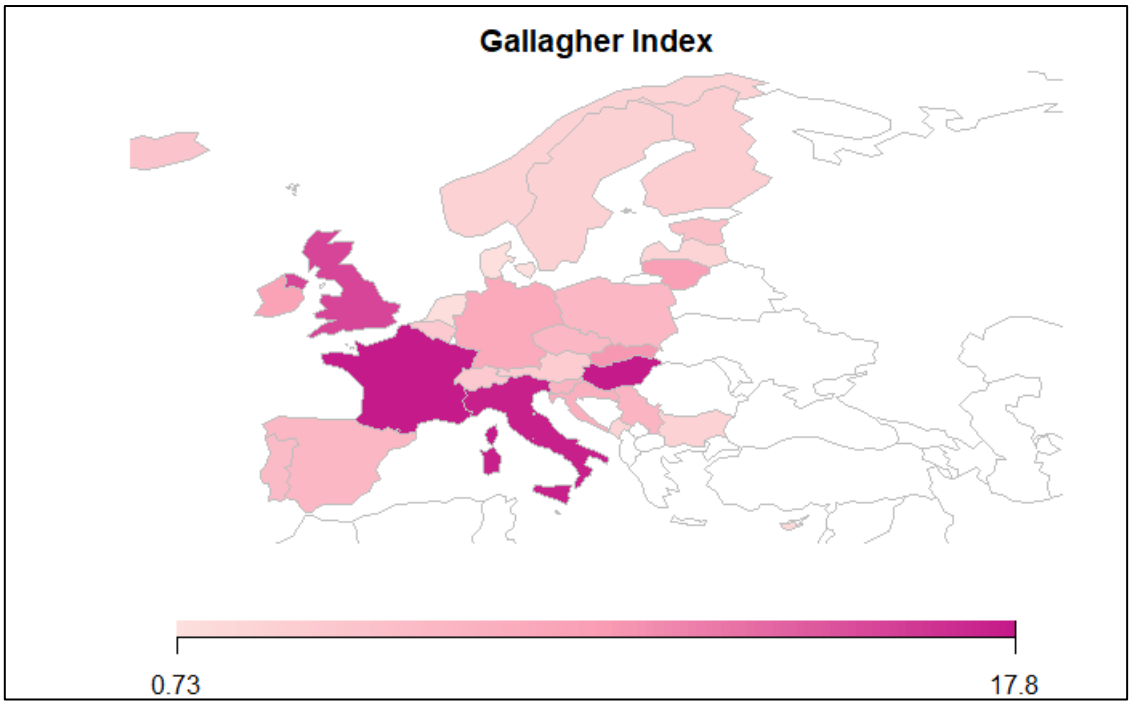



*Figure 1: Gallagher Index per country.*

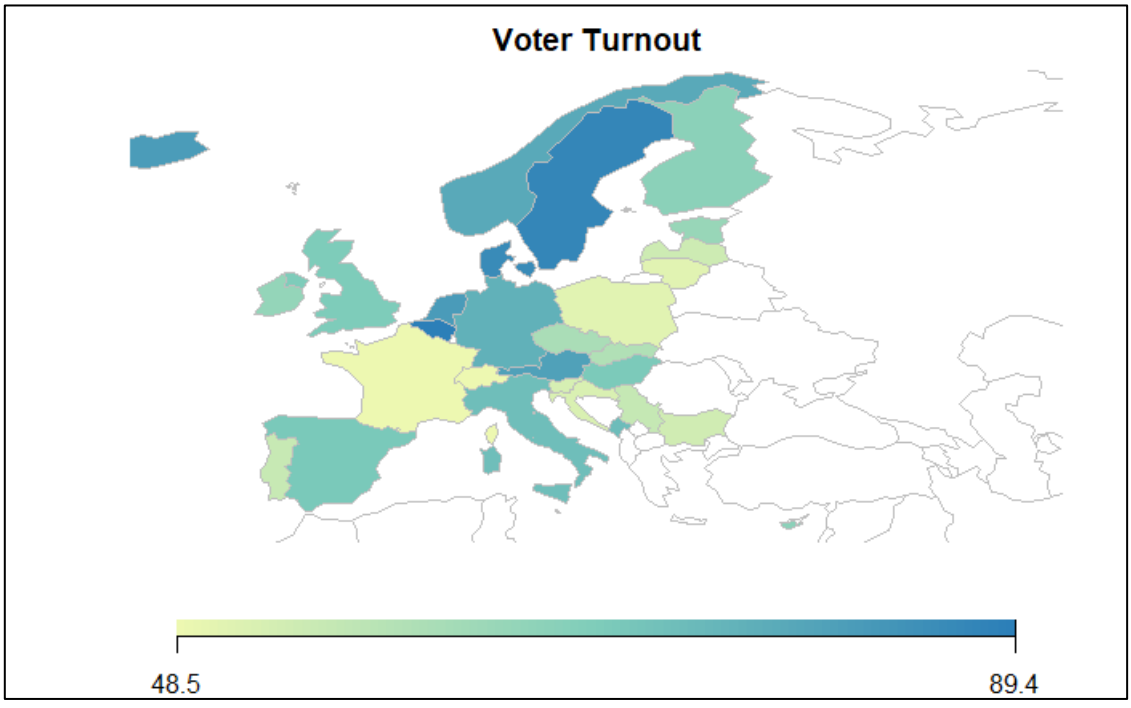



*Figure 2: voter turnout per country in percent.*

On a first glance, it seems as if there is no correlation between voter turnout and electoral disproportionality at all. Great Britain, France, Italy, and Hungary stand out with very high values of the Gallagher Index, while the other 25 countries seem to have similar values. And a look at the map showing voter turnout, northern and middle Europe show up higher values than the rest. Looking on the potential correlation between these two variables, the plot in Figure 3 shows something a little different.

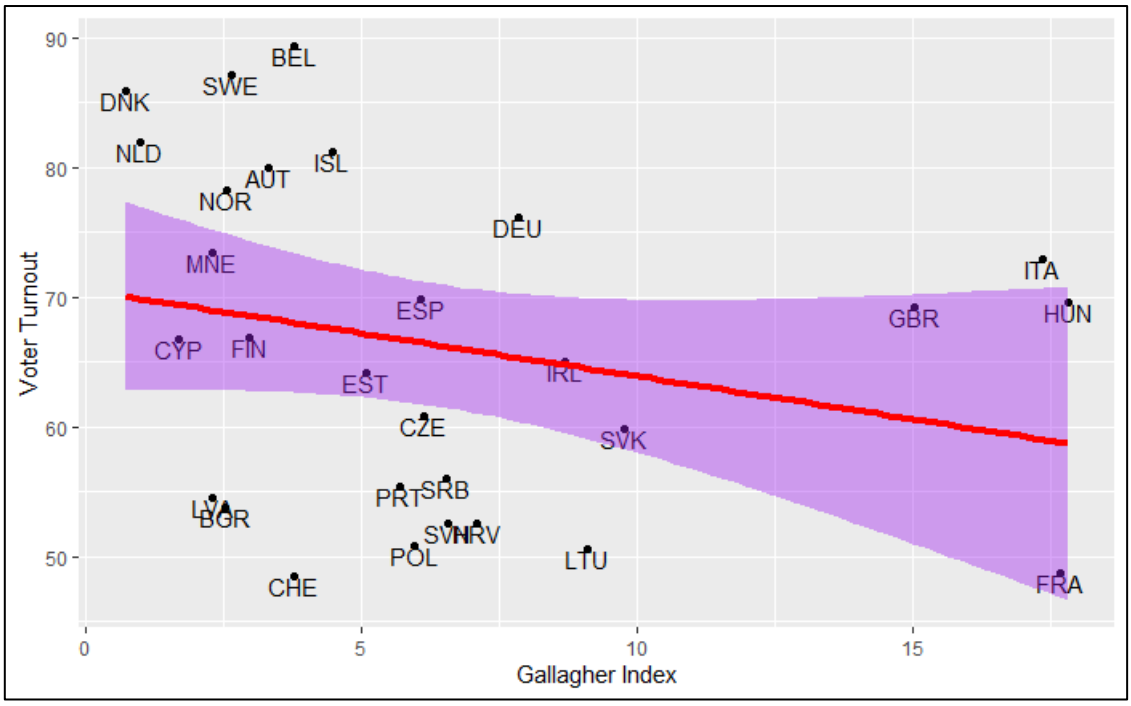



*Figure 3: correlation between Gallagher Index and voter turnout.*

The plot in *Figure 3* shows a slight correlation, as it is was to expect according to theory: the higher the value of the Gallagher Index, the lower the voter turnout. Further, we see two groups of countries. On the left hand, there are 25 countries with Gallagher values below 10 and on the right hand, there are four outliers, each with a Gallagher value above 15. These four countries came up in *Figure 1* already, where they were very eye-catching. What would happen to our model when we simply excluded these four outliers is shown in *Figure 4.*

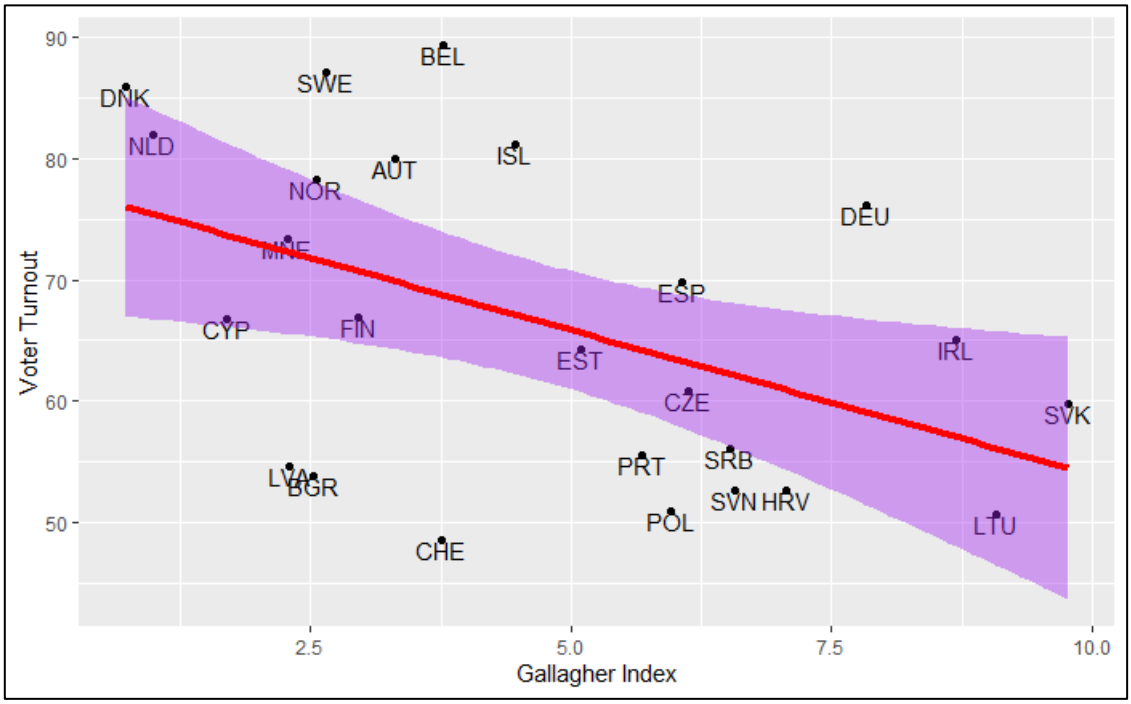



*Figure 4: Gallagher Index and voter turnout without the four outliers.*

Now, this model seems to be much more accurate to show the possible interaction of electoral disproportionality and voder turnout than the first one. But still this shows only a correlation on state level. At this point it is not clear yet, why Great Britain, France, Italy, and Hungary have that high values for the Gallagher Index without having much lower voter turnouts. I will come back on this point in the next subchapter.

For the main analysis on individual level data, there are four groups that can be regarded. The first group is the full sample of all 29 countries. An analysis including data from all these countries would ignore the fact, that this sample includes four outliers. Hence, a second analysis considering the same dependent, independent, and controlling variables for a reduced sample that includes only those 25 countries that are plotted in *Figure 4* makes sense. Further, an analysis of the four outlier countries might show, why they are standing that far away from the other countries. Finally, when we take a closer look at the four outliers, we see that in this group, one country is an outlier too. In *Figure 3*, we can see that France has a much lower Voter turnout than the other three outliers. To make sure that a possible interaction seen in the regression analysis is not confounded by this fact, a fourth analysis will be done, including only Great Britain, Italy, and Hungary.

Table 1: Full (1), Reduced (2), ITA+GBR+HUN+FRA (3), ITA+GBR+HUN (4)

| | *Dependent variable:* | | | |
|---|---|---|---|---|
| | Vote | | | |
| | (1) | (2) | (3) | (4) |
| Gallagher | −0.043*** | −0.123*** | −0.144*** | 0.004 |
| | (0.003) | (0.006) | (0.029) | (0.034) |
| Age | 0.033*** | 0.035*** | 0.031*** | 0.026*** |
| | (0.001) | (0.001) | (0.002) | (0.002) |
| GenderFemale | −0.046* | −0.003 | −0.171*** | −0.209*** |
| | (0.027) | (0.030) | (0.066) | (0.080) |
| Income | 0.108*** | 0.104*** | 0.123*** | 0.106*** |
| | (0.005) | (0.006) | (0.013) | (0.016) |
| Education | 0.096*** | 0.102*** | 0.071*** | 0.105*** |
| | (0.004) | (0.004) | (0.010) | (0.012) |
| Constant | −1.756*** | −1.523*** | 0.570 | −1.794*** |
| | (0.079) | (0.089) | (0.547) | (0.655) |
| Akaike Inf. Crit. | 34,093.190 | 28,021.560 | 5,838.792 | 4,005.024 |
| *Note:* | | | | *p<0.1; **p<0.05; ***p<0.01 |

*Table 1* shows the regression analysis of each of the four models mentioned before. In the first row, the full sample including the complete data form all 29 countries of our sample are computed. The second row shows the reduced sample, where the four outliers are excluded. In both cases, a higher Gallagher Index has a highly significant reducing effect on voter turnout. According to what might have been expected, this effect is much stronger in the second row, where the reduced sample of 25 countries is taken into account. Here, the four outliers that have much higher voter turnouts than one shall expect according to the correlation of the reduced sample, are excluded. Regarding the control variables in the first two columns, there are only small differences in between them. The main difference lays in the strength of the effect of the independent variable, the disproportionality.

Looking at the four, respectively the three, outliers in the regressions shown in column three and four, we see much higher differences between the effects of the control variables as well as of those of the independent variable. When regarding these two regressions, you must consider that they are based on a much smaller sample than the first two regressions. Since the independent variable, the Gallagher Index, has one value per country only, it has 29 respectively 25 possible values in the first two regressions. In regression number three and number four, it only has four respectively three possible values. This additionally lowers the expressive power of the last two regressions compared to the first two.

Nevertheless, regarding the third and the fourth regression, the impact of the Gallagher Index on voter turnout is once very strong and once nor strong nor significant at all. The effects of the control variables do not vary very much in between these two regressions, so a significant national-based difference of them is unlikely to be the reason for the intense difference between the effects of the Gallagher Index in these cases, at least not based on including versus excluding France from the sample.

To answer the research question of this paper, if an increase of disproportionality leads to a decrease of voter turnout, we must now take two steps. In the first step, I therefore will take a closer look on the regression analyses of the first two columns, so the full and the reduced sample. In a second step, I will take a closer look at the four outliers to identify the reasons for their outstanding nature. This maybe or maybe not, will affect the derived expressiveness and validity of the results we see in the first regressions.

## Main findings

As we see in the first two regressions, the level of disproportionality has a significant lowering effect on voter turnout. The model takes into account other affecting variables, namely gender, age, income, and education, as controls. It is still possible, that the measured effects are affected by them due to an interaction with one of the control variables, or an effect of an interaction between some of the control variables.

Table 2: Full Sample Variation

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | Vote | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Gallagher | −0.042*** | −0.045*** | −0.043*** | −0.041*** | |
| | (0.003) | (0.003) | (0.003) | (0.003) | |
| Age | 0.028*** | 0.031*** | 0.033*** | | 0.033*** |
| | (0.001) | (0.001) | (0.001) | | (0.001) |
| GenderFemale | −0.020 | −0.102*** | | −0.021 | −0.056** |
| | (0.027) | (0.027) | | (0.027) | (0.027) |
| Income | 0.145*** | | 0.109*** | 0.068*** | 0.112*** |
| | (0.005) | | (0.005) | (0.005) | (0.005) |
| Education | | 0.117*** | 0.096*** | 0.054*** | 0.095*** |
| | | (0.004) | (0.004) | (0.003) | (0.004) |
| Constant | −0.464*** | −1.298*** | −1.780*** | 0.642*** | −2.045*** |
| | (0.059) | (0.075) | (0.078) | (0.051) | (0.077) |
| Akaike Inf. Crit. | 34,737.280 | 34,496.400 | 34,094.000 | 35,778.640 | 34,354.390 |
| *Note:* | | | | | *p<0.1; **p<0.05; ***p<0.01 |

In *Table 2* several models, based on the full sample of all 29 countries are compared. Reducing the number of control variables does only lead to very small differences in the effect of the main independent variable. We herby can observe several interactions between the controls: gender and income interact, as well as education and income, and age and income. In column one, the interaction between age, education and income can be observed very good. The older you are the more years you were able to spend on education, and the more did so, the higher your income becomes – ceteris paribus. So, regarding the full sample, a variation of the controls of our model shows, that leaving out one of the control variables would lead to a similar result as the main model, regarding the effect of disproportionality on voter turnout only, but this would overestimate the effects of the remaining controls. Therefore, for the full sample of all 29 countries is best modelled by taking into account all four control variables.

Table 3: Reduced Sample Variation

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | Vote | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Gallagher | −0.116*** | −0.127*** | −0.123*** | −0.111*** | |
| | (0.006) | (0.006) | (0.006) | (0.006) | |
| Age | 0.029*** | 0.031*** | 0.035*** | | 0.033*** |
| | (0.001) | (0.001) | (0.001) | | (0.001) |
| GenderFemale | 0.024 | −0.057* | | 0.020 | −0.030 |
| | (0.030) | (0.030) | | (0.030) | (0.030) |
| Income | 0.143*** | | 0.104*** | 0.056*** | 0.109*** |
| | (0.006) | | (0.006) | (0.006) | (0.006) |
| Education | | 0.122*** | 0.102*** | 0.061*** | 0.098*** |
| | | (0.004) | (0.004) | (0.004) | (0.004) |
| Constant | −0.185*** | −1.042*** | −1.525*** | 0.914*** | −2.049*** |
| | (0.068) | (0.085) | (0.088) | (0.060) | (0.085) |
| Akaike Inf. Crit. | 28,613.760 | 28,321.330 | 28,019.570 | 29,462.650 | 28,439.180 |
| *Note:* | | | | | *p<0.1; **p<0.05; ***p<0.01 |

Regarding now *Table 3*, we see a similar picture. Compared to column one in *Table 1*, the strength of the effect of the Gallagher index on voter turnout is very similar. Too, reducing our model does not have very strong effects on the effect of the independent variable. Interactions in between the control variables can be observed in a similar way as in *Table 2*. Further, taking into account all four control variables still seems to be the most reasonable, since reducing our model by leaving out one of the controls would lead to a little overestimation of the effect of the remaining control variables, due to their interaction.

Concluding this subpart, the regression model for 25 out of all 29 countries of the base sample finds the strongest and still highly significant effect for the independent variable. Regarding voters across these 25 countries of Europe, a higher disproportionality of the electoral system, operationalized by using the Gallagher Index, leads to a lower voter turnout. Further we see that other variables, that affect voter turnout according to previous research literature, affect voter turnout too, but also interact with each other in several cases. But still we do not know, why four outliers appear: Great Britain, France, Italy, and Hungary do not fit into our model. Actually, including those four countries lowers the effect of the independent variable on the individual level analysis. I now want to take a closer look on these four outliers to find out, why there is such a strong divergence to the rest of the countries of the sample.

# The four outliers

Table 4: ITA+GBR+HUN+FRA

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | Vote | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Gallagher | −0.188*** | −0.127*** | −0.144*** | −0.165*** | |
| | (0.028) | (0.029) | (0.029) | (0.028) | |
| Age | 0.026*** | 0.030*** | 0.031*** | | 0.032*** |
| | (0.002) | (0.002) | (0.002) | | (0.002) |
| GenderFemale | −0.154** | −0.231*** | | −0.147** | −0.171*** |
| | (0.065) | (0.065) | | (0.064) | (0.065) |
| Income | 0.153*** | | 0.126*** | 0.111*** | 0.119*** |
| | (0.012) | | (0.013) | (0.012) | (0.013) |
| Education | | 0.100*** | 0.070*** | 0.023*** | 0.081*** |
| | | (0.009) | (0.010) | (0.008) | (0.009) |
| Constant | 2.307*** | 0.603 | 0.479 | 3.187*** | −1.983*** |
| | (0.492) | (0.543) | (0.545) | (0.508) | (0.185) |
| Akaike Inf. Crit. | 5,894.718 | 5,933.659 | 5,843.581 | 6,095.364 | 5,861.724 |
| *Note:* | | | | | *p<0.1; **p<0.05; ***p<0.01 |

Table 5: ITA+GBR+HUN

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | Vote | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Gallagher | −0.094*** | 0.025 | 0.003 | −0.031 | |
| | (0.032) | (0.034) | (0.034) | (0.033) | |
| Age | 0.020*** | 0.025*** | 0.026*** | | 0.033*** |
| | (0.002) | (0.002) | (0.002) | | (0.001) |
| GenderFemale | −0.192** | −0.251*** | | −0.202** | −0.056** |
| | (0.079) | (0.079) | | (0.079) | (0.027) |
| Income | 0.148*** | | 0.109*** | 0.090*** | 0.112*** |
| | (0.015) | | (0.016) | (0.016) | (0.005) |
| Education | | 0.131*** | 0.104*** | 0.062*** | 0.095*** |
| | | (0.012) | (0.012) | (0.011) | (0.004) |
| Constant | 1.250** | −1.878*** | −1.902*** | 0.749 | −2.045*** |
| | (0.543) | (0.655) | (0.653) | (0.598) | (0.077) |
| Akaike Inf. Crit. | 4,081.629 | 4,047.768 | 4,009.876 | 4,126.067 | 34,354.390 |
| *Note:* | | | | | *p<0.1; **p<0.05; ***p<0.01

*Table 4* and *Table 5* show different models for the four outliers, as well as of three of them, excluding France. As mentioned before, due to the very small number of observations in comparison to the base sample of all 29 countries as well as to the reduced sample including only 25 of them, these results must be regarded with care. Nevertheless, some effects are visible here.

Comparing *Table 4* and *Table 5*, we see how including versus excluding France has a big effect on the effect of the independent variable on the dependent variable. This seems logic, since France is once included and once excluded for its outstanding nature within the group of outliers. Comparing – with care – *Table 4* and *Table 5* now with *Table 2* and *Table 3*, we see one very clear difference: the effect of the variable gender. Being female seems to have a significant and much stronger negative effect on voter turnout in all four outlier countries then in the full and the reduced sample. Do women just go vote very less often on those countries, than in the other 25 states? It is not that simple. Since beside the sample size as well the possible values of the independent variable are much lower in the last two tables than before, this cannot be concluded that simple. Therefore, a closer look on the electoral systems of the four outlier countries in a qualitative analysis will show if there is another explanation, a sufficient one, or not.

Let us start with Hungary, the only country out of the four outliers that can be considered a relatively young democracy, since it was ruled by a communist dictatorship until the fall of the iron curtain. After the downfall of the communist dictatorship, in 1990 Hungary had its first free elections. The electoral rules were similar to the electoral system of Germany (Kovács & Vida, 2015). Disproportionality and voter turnout are affected by the age of a democracy, as the analysis of elections in Spain after the end of the dictatorship in the first elections show (Gallego et al., 2012). Therefore, a different level of disproportionality might be observed in Hungary too, at least in its first free elections.

After the national election in 2010, the FIDEZ Party came into power. One of the first thing the new government alliance did, was a reform of the electoral system, that passed parliament in 2011 and came into effect. Hence, the national elections in 2014 as well as future ones are hold under new rules. Nevertheless, this new system is quite comparable to the electoral system of Germany (Kovács & Vida, 2015). But there is one important difference: the number of MPs. In Germany, the Bundestag has no fixed number of seats and has grown up on 709 MPs in 2017. In Hungary, the number of seats was fixed and reduced from 386 before the reform of 2011 to 199 thereafter (*Electoral Systems: Michael Gallagher Electoral Systems Site - Department of*

*Political Science - Trinity College Dublin*, n.d.). So, as well the change of the electoral system as well es the reduction of the number of seats in parliament might have led to a higher level of disproportionality. The less MPs there are, the lower the chance of small parties in general are to receive some seats and therefore, a higher Gallagher Index value might appear. Especially after a reform of the electoral system, since nor parties nor voters had experience and time to accommodate their campaigns and their behavior on the new system. *Figure 5* shows the development of the Gallagher Index for Hungary since its first free elections, blue highlighted the elections held since the reform of 2011.

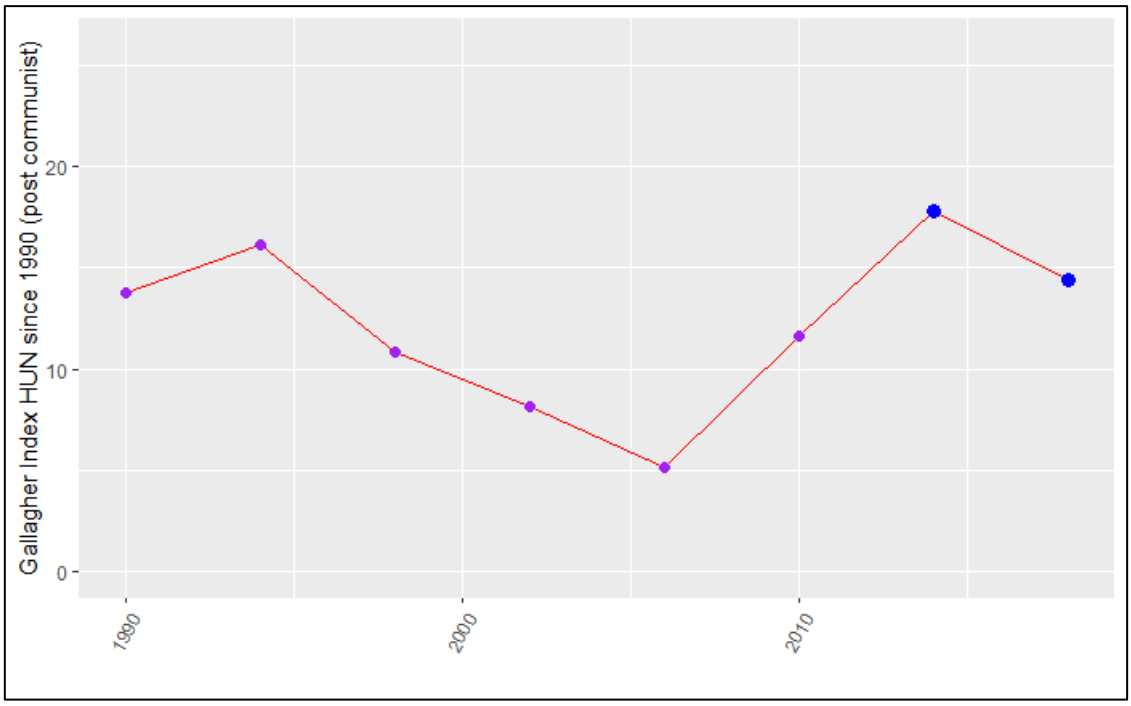



*Figure 5: Gallagher Index for Hungary (1990 – 2018).*

Regarding the Graph in *Figure 5*, we see that elections held under a new electoral system tend to have higher values for the Gallagher Index. After the first two elections in the 1990s, the Gallagher Index for Hungary was between 5 and 12. Such a level would fit into our model, without appearing as an outlier. The reform of 2011 delivers a sufficient explanation for the Hungary being an outlier.

Now let us look at France. Like Hungary, France faced a political reform that led to the building of the 5$^{th}$ Republic. But in difference to Hungary, France was not ruled by a communist dictatorship until 1990, nor did it face a significant electoral reform in the latest past. As we see in *Figure 6*, French elections are always characterized by a relatively high value of the Gallagher Index as well as by a very high variance of it.

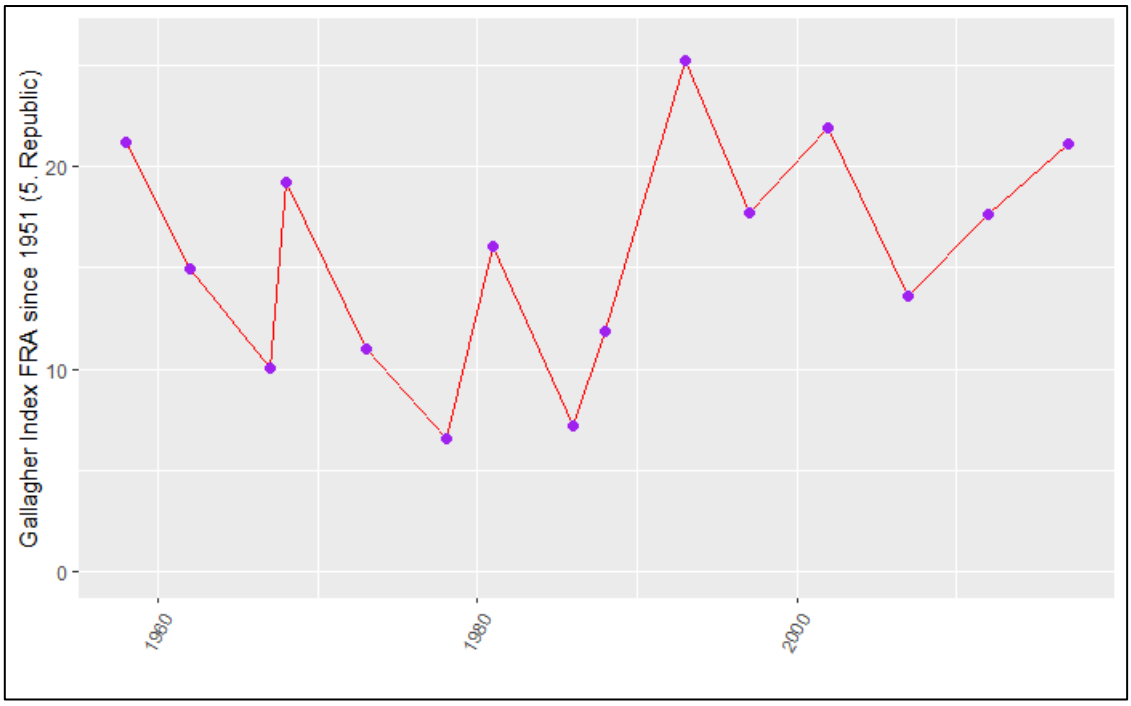



*Figure 6: Gallagher Index for France (1958 – 2017).*

France is the only established democracy where the elections for the legislative are hold with two rounds since the 5th Republic was established. In elections for the seats in parliament, a candidate needs the support of at least 12.5 per cent of registered electors in the first round to be able to run again for the seat in the second round. A candidate needs an absolute majority in the first round to be elected directly (Blais & Loewen, 2009). This unique system might lead to the high level of disproportionality. But would a system like this not have led to an accommodation of the number of parties as well as on the voting behavior of the electors (Gallego et al., 2012)? Or is this effect too weak (Lijphart, 1990)?

In fact, research shows that there is probably as much strategic voting in France as in single-member plurality systems. But due to its different nature, regarding the two-round system of its parliamentary elections, there is a higher variance. Further, signaling variety appears to be at least as important as strategic desertion of weak candidates. Because of this, strategic voting does not contribute to a reduction of the number of parties or candidates in France. Therefore, France, like single-round majoritarian electoral systems, has voting outcomes with few strong parties in parliament, but nevertheless a lot of parties and candidates in the election process (Blais & Loewen, 2009). France, different to Hungary, shows such a high level of disproportionality due to its special electoral system and not due to a reform.

Regarding a single-round majoritarian electoral system now, by examining Great Britain, we will see that some effects that are observable in France also held true here – and some do not.

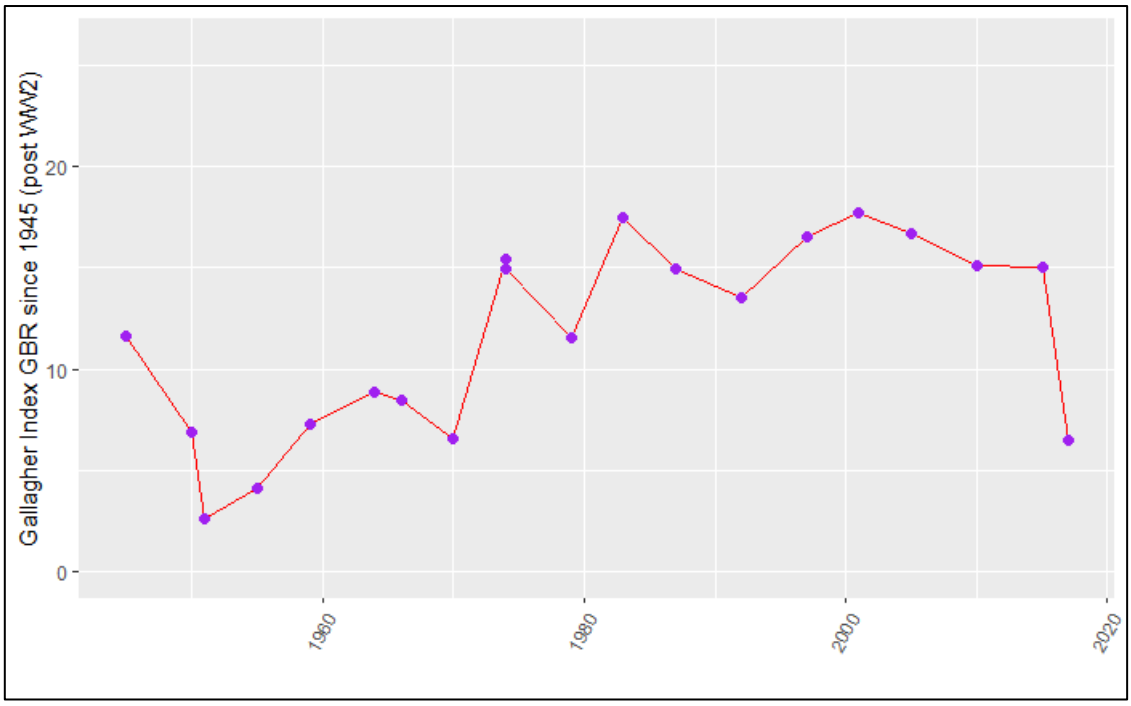



*Figure 7: Gallagher Index for Great Britain since World War II (1945 – 2017).*

The electoral system of Great Britain is not meant to produce proportional outcomes. It is meant to produce systematically disproportional results, so the winning party secures an overall majority in parliament, to build up a government with a strong majority in the legislative power (Curtice, 2015). Therefore, the graph shown in *Figure 7* fits the main aim of the British electoral system. The values of the Gallagher Index have been high, compared to other European Democracies, during all elections held since the end of World War II.

An electoral system like this should, due to its nature, reduce the existence and representation of third parties beside two main parties. In the case of Great Britain, both does not happen in the theoretical expectable amount. First, in case that a smaller party's vote is concentrated constituencies, it will be rewarded by the system with a relative proportional number of seats. In difference, if a party's vote is relatively evenly spread, the system will indeed reward a smaller party with few if any seats. For example, did the SNP get quite a lot of seats, while UKIP did not in several elections. The SNP is only focused on Scottish constituencies, while UKIPs' votes are relatively evenly spread across Great Britain. Nevertheless, UKIP gained many seats in the 2015 elections, which was a surprise to scholars. It was the only time, since the Labor-Conservative duopoly, that was established in 1922, that another party, except of the Liberal Democrats, gained that many seats. The Liberal Democrats have been a third party, always with a small number of seats, compared to Labor and Conservatives, for many decades. Further, a few seats are won by very small parties at each election (Curtice, 2015).

One regional party, the SNP, two parties able to win several constituencies – Liberal Democrats and in the latest past UKIP, as well as the existence of several small parties, that nevertheless always win a very small number of seats, make the British parliament different form e.g. the parliament of the USA (Martin, 2013). Even though the SNP might get a more or less representative number of seats, and therefore not making a big difference on the national Gallagher Index, the mere existence of smaller, evenly spread parties, such as UKIP, Liberal Democrats and so on clearly does.

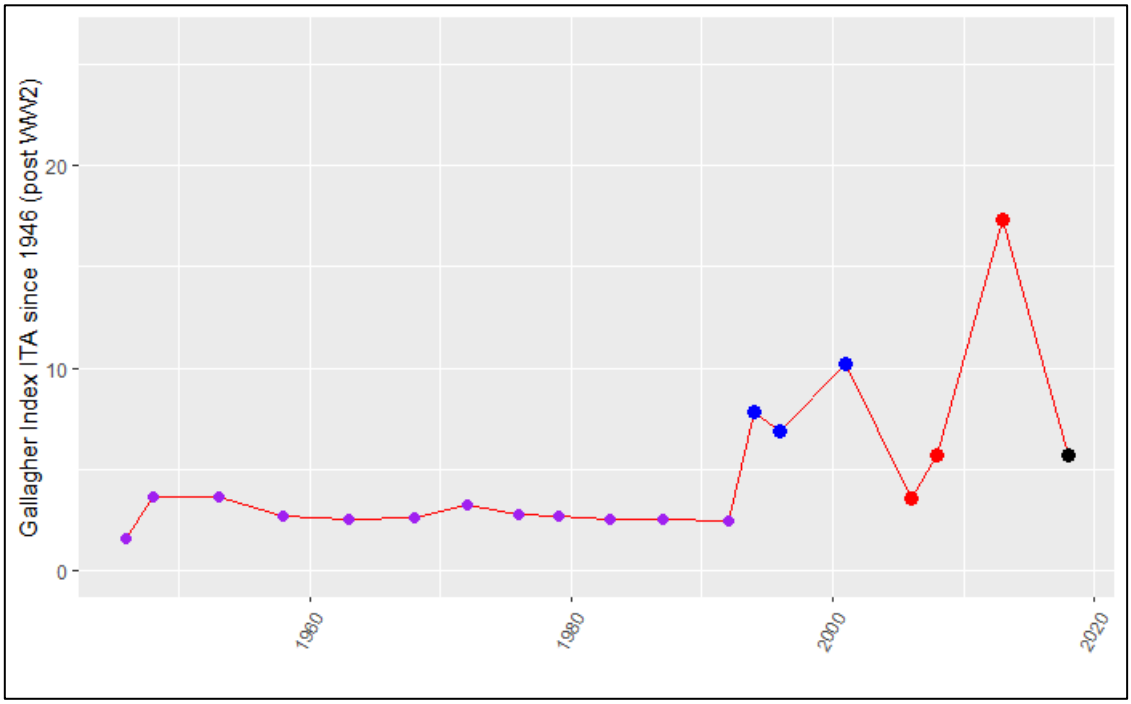



*Figure 8: Gallagher Index for Italy since World War II (1946 – 2018).*

Finally, I want to take a closer look at the case of Italy. Italy shows a quite low value for the Gallagher Index for a long time, which suddenly changed. In *Figure 8*, the timepoints appear in four different colors. Each color stands for elections, that were held under the same electoral rules. As one can see easily, the electoral rules changed during the past 30 years several times (Regalia, 2018). A change in the electoral system can easily lead to a shift in Disproportionality, as we could see in other cases (Gallego et al., 2012; Kovács & Vida, 2015).

In 2005, Berlusconi's government changed the electoral law. The new law was aimed to address the perceived partisan advantages embedded in the previous law. Single-member districts were more favorable to the center-left, and their candidates often were better known, and their electorate was more loyal. In contrast, center-right candidates generally received fewer votes than the sum of the votes of the lists. This law was applied for three consecutive elections (2006,

2008, and 2013) before being declared partially unconstitutional by the Constitutional Court in 2014. So, the electoral System had to be changed again (Regalia, 2018).

What we have seen in *Figure 3* was not a "regular" level of disproportionality in Italy, but a unique peak in the latest Italian history. Since the whole model considers only one election in the latest past per country, it is not that robust against unique outlying events like this. Nevertheless, four outliers were detected and due to separating them, a quite appropriate analysis-model of the mere effect of the Gallagher Index on voter turnout is possible to be computed, done so in the "Reduced model" in *Table 1*.

The cases of the four detected outliers, Hungary, France, Great Britain, and Italy are important for the main thesis of this paper. As we can see, their relatively high values for the Gallagher Index compared to the rest of the countries of our sample, is logically explainable due to resent research. Even though this would not be the case, the model, the first one in *Table 1*, would show a significant effect of the main independent variable, the Gallagher Index value, on voter turnout. Since especially Hungary and Italy show very high levels of the Gallagher Index compared to the rest of free, democratic elections held in these two countries in the past years, and since Great Britain and France have very volatile and special high Gallagher Values anyway, the Reduced Model in *Table 1* shows the mere effect electoral Disproportionality on voter turnout in the most appropriate way.

# Conclusion

This term paper aims to measure the effect of disproportionality in electoral systems on voter turnouts across Europe. Disproportionality is hereby measured by using the Gallagher Index values for each country in our sample. Some often-regarded variables affecting voter turnouts, namely gender, age, wealth, and education, are taken as control variables. The data analysis is undertaken with individual level data from the ESS, which are further related to the Gallagher values for each country, that has available data in the latest round of the ESS that was available at the time this paper was written. To make sure that the effect of the Gallagher Index values are taken into account correctly, the Gallagher index value of each election that took place before the very election people were asked about if they participated or not, is taken into account instead of simply the latest available ones, since these values could not affect the level of participation on an election that did not took place yet. My results show that the level of disproportionality has a significant reducing effect on voter turnout. The higher the Gallagher

Index value in a country's election is, the lower is the self-reported participation in the next elections of its citizens.

Regarding Europe, we also see that four countries show a very high level for the Gallagher Index, but not similarly low voter turnout. These four cases, Hungary, France, Great Britain, and Italy can be explained by two effects. Hungary (Kovács & Vida, 2015), and Italy (Plescia et al., 2020) faced profound reforms of their electoral systems before the elections considered in this paper. Changes like these can affect the Gallagher Index value, since nor parties nor people are used to the system and its effects on the possibilities of winning and losing in detail yet (Gallego et al., 2012). The other two cases, France (Blais & Loewen, 2009), and Great Britain (Curtice, 2015) have different reasons. In both cases, elections are not meant to be proportional at all. In Great Britain, the single-round majoritarian electoral system has not led to a proper party duopoly. Several evenly spread small parties exist, gaining only very few seats (Curtice, 2015). Therefore, the Gallagher Index is quite high. France, the only established democracy where elections are hold in two rounds, also has single-candidate-constituencies like Great Britain. Due to the two-rounded system, the chances of smaller parties' candidates can be higher than in a single-rounded system. This is one factor that led to non-duopoly party system in France. Therefore, the mathematical level of disproportionality turns out very high (Blais & Loewen, 2009).

Two models show the main findings of my examination. Once including the whole sample and once excluding the four outliers Hungary, France, Great Britain, Italy, we see that the effect of the level of disproportionality on voter turnout is significant in both cases. The second model, excluding the outliers, shows a stronger effect of the Gallagher Index on the amount of voter turnout though. Since there are several reasons stressing the idea of regarding the four outliers separately from the rest, the second model shows best how the level of disproportionality of an electoral system affects the voter turnout.

This papers' findings are based on a sample of 29 European democracies. Therefore, its findings can only be generalized for European democracies. Further research considering a wider sample of democratic elections all around the world could show us even more generalizable findings. Further, this paper only regards elections, voter turnouts and levels of disproportionality in the past few years. Scholars maybe will be willing to make a panel analysis, that also might show us changes over time. Also, when comparing different electoral systems over time regarding their level of disproportionality and their voter turnouts, it might make sense not to group them by states, but by the similarities of their electoral systems, since changes in electoral rules, as

for example in Hungary, once lead to more similarities to the German electoral system and later to less. But a complete panel analysis would have been a too big analysis for this research paper, mostly because of the lack of data we have due to the fact that the ESS does not take place every round in all European countries but only in some of them. Also, several democracies of today are significant younger than others, so for the time before the ESS was established and earlier, before the iron curtain fall, we do not have appropriate data anyway.

Nevertheless, the findings of this paper show, how disproportionality of electoral systems affects voter turnout in Europe. The requirements of electoral systems differ in between countries: some aim to have a high level of participation, leading to a better representation of the peoples wills and needs, other aim to reach stable majorities (Curtice, 2015; Plescia et al., 2020). The effect of disproportionality we observe here might help countries, to optimize their polities, their electoral rules, to better reach their specific aims, maybe to higher voter turnout, or maybe something else. The effect on voter turnout will be there in any case.

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# Tables and Figures

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Effect of disproportionality on voter turnouts across Europe

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