Universität Greifswald

Philosophische Fakultät

Institut für Politik- und Kommunikationswissenschaft

The Consequences of Electoral System Change for Voter Turnout

Inauguraldissertation

zur Erlangung des akademischen Grades eines Doktors der Philosophie der Philosophischen Fakultät der Universität Greifswald

vorgelegt von

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Mai 2022

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Acknowledgments

First of all, I would like to thank my supervisor Philipp Harfst. Thank you for having me as a junior scholar at the Greifswald section of the Consequences of Electoral System Change in Modern Democracies (CESC) project and for supervising my dissertation over all these years. From the beginning, Philipp believed in my research project and encouraged me within all the different steps of the processes of research and writing. Furthermore, Philipp was always supportive and available for consultation, even during the years when we worked in quite distant places. At all times he was committed to giving me a good research environment and the necessary freedom to work on the thesis. Finally, Philipp has always promoted my participation in conferences, workshops, and schools to improve my scientific skills, to present my work, and to connect with the scholarly community. I am well aware that this is nothing that can be taken for granted.

I also would like to thank my second supervisor Jessica Fortin-Rittberger, who took this official role rather late in the process but actually played an initial part in enabling me to join the CESC team. Strictly speaking, it was even a seminar held by Jessica during my bachelor's studies at the University of Mannheim that for the first time gave me the idea of comparative electoral systems being an interesting field of research (and see where that led…). Throughout the years as a PhD candidate, Jessica has provided me with guidance and input, on theoretical as well as on methodological aspects, and has invested considerable efforts in giving me detailed feedback on several drafts of the dissertation, especially during the final phase of writing. Beyond that, I am thankful for Jessica enabling my research stay at the University of Salzburg during the winter term 2016/2017. Jessica has always demanded high standards, but this definitely made my work much better.

Moreover, I would like to thank everyone affiliated with the CESC project in Greifswald and Salzburg, especially Sarah Dingler, Sven Kosanke, and Corinna Kröber. It was a pleasure working with all of you, just like having a coffee or a drink outside of office together. My dissertation strongly benefited from the base that was established in the context of the project, what pertains to theory as well as to data. I also would like to thank my former colleague and officemate Stefan Ewert, who was not only an invaluable help for me to get along at the IPK and in Greifswald in general but finally also took the role of a member of the doctoral committee. What is more, I am indebted to all colleagues in Greifswald, Salzburg, Frankfurt and at numerous conferences, workshops, and colloquiums who commented and gave feedback

on different chapters and earlier versions of this dissertation. My work has benefited greatly from these suggestions.

I am indebted as well to many friends outside academia who have accompanied me throughout the time as a PhD candidate (and also in the time before) and thus definitely had an influence on the successful completion of this dissertation by providing the necessary compensation for working on it. This applies to all members of the Team AK, most notably Adrian, Falk, Johannes, Jonas, Kunter, Sandra, and Susi. It is great to know that you have a base at home, even if you are quite far away. And it is even greater to know that when it really matters, there are people who can be counted on.

Finally, my thanks go to my family. To begin with, I would like to thank my brother Tim. I will never forget your visits to Greifswald and Frankfurt and for the latter I will always be aware of your capability when it comes to hauling and assembling furniture… Most importantly, my gratitude goes to my grandparents Johanna, Erich, Theresia, and Günter, of whom unfortunately not all had the opportunity anymore to hold this work in their hands, and – of course – to my parents Christine and Wolfgang who all have supported my academic education since the first day. I am and will always be deeply grateful for this.

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Julian Noseck

May 24, 2022

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1. Introduction

The participation in elections, voter turnout, has received a large amount of scholarly attention. Elections and electoral participation represent major pillars of research on democracy, including theories of democracy (e.g. Dahl 1971; Powell 1982). From a theoretical perspective, turnout rates are often at the center of discussions on their normative function. The debate on the meaning of turnout for democracy mainly revolves around two archetypal points of view: The first point of view basically sees high turnout rates as a sign of democratic stability and legitimacy, while low, respectively shrinking, turnout rates are especially a cause for concern or even problematic for democracy in the long term (Lijphart 1997). By contrast, the opposed second point of view rather sees no cause for concern in comparatively low turnout rates or even perceives high turnout as a symptom of crisis (Lipset 1960).

Independent of any normative judgement, the scientific occupation with voter turnout is highly relevant. First, this is due to the outstanding importance of voting within the possible forms of political participation in democratic countries, where "more people vote than engage in any other type of routinized mass political behavior" (Jackman 1987, 405). Secondly, voting is also the most common form of how *democracy* is finally realized with respect to its etymological meaning. By voting citizens assign temporary political power to a group of persons making binding decisions for society as a whole, i.e. for those citizens who do not participate in an election as well (cf. Cabarello 2014, 437).

With respect to the significance of voting, turnout is a prominent subject in electoral studies assessing it empirically and asking for the factors that may have an impact on the participation in elections. By now, research yielded a series of insights about electoral participation and many different models of explanation were developed. This pertains to individual-level turnout, i.e. individuals' decision to participate in an election or not, as well as to aggregate-level turnout, denoting rates of electoral participation. Scholars identified a plethora of factors influencing turnout, at the individual level (Smets/van Ham 2013) as well as at the aggregate level (Geys 2006; Cancela/Geys 2016; Stockemer 2017). One major factor that has always been discussed with respect to its impact on turnout, especially at the aggregate level, is the electoral system.

In this respect, previous research aimed at identifying the crucial properties of electoral systems being responsible for their potential impact on turnout. Especially the proportionality of the electoral system was regularly found to have a positive effect on aggregate turnout (e.g.

Blais/Carty 1990; Blais/Dobrzynska 1998; Endersby/Krieckhaus 2008; Jackman 1987; Jackman/Miller 1995; Powell 1986), suggesting that proportional representation (PR) is more favorable to increase turnout levels compared to majoritarian electoral systems, which are characterized by higher levels of disproportionality. The argument is hence based on a high number of empirical studies finding aggregate turnout predominantly to be higher in countries using PR compared to countries using a less proportional electoral system, at least from a cross-sectional perspective. This clear relationship between the electoral system and aggregate-level turnout has diminished in more recent studies, though (Cancela/Geys 2016; Stockemer 2017). It is questionable to what extent a more proportional electoral system is still associated with higher turnout at the aggregate level.

Based on the abovementioned cross-sectional studies, one should expect turnout to increase when the electoral system changes towards higher proportionality. However, empirical evidence of the actual lasting impact of changes in electoral institutions on voter turnout is all but conclusive. On the one hand, some previous research found evidence regarding the general impact of electoral institutions, indicating that, for instance, an electoral reform bearing a PR system will lead to higher turnout (cf. Norris 2004, 257-258). On the other hand, more recent research is much more skeptical concerning the promised effects of electoral reform, pertaining to the participation in elections as well (Bowler/Donovan 2013). Bowler and Donovan even state that "for all the discussion of institutional engineering and manipulation and all the effort involved, institutional changes may not actually change very much" (Bowler/Donovan 2013, 5).

This obvious puzzle regarding the actual impact of electoral system change depicts the origin of my research. This dissertation aims to answer the following question: *What are the consequences of electoral system change for voter turnout?* The dissertation argues that a conclusive answer to this question requires examining the relationship between electoral systems and turnout using fine-grained empirics. So far, few existing studies have relied on evidence taking the district level and the temporal dimension of electoral system change into account. It is about going beyond the basic question whether a PR system is more favorable for turnout compared to a majoritarian system. In fact, it is about having a closer look at the variance in turnout *within* countries and how it relates to the local structure of the electoral system, i.e. its structure at the constituency level.

This dissertation more specifically addresses the following questions as well: First, what are the consequences of changes in district magnitude, which is a key property of an electoral

system, for voter turnout? The literature finds district magnitude to have a positive effect on turnout in Western countries, but not in non-Western countries (e.g. Pérez-Liñán 2001; Fornos et al. 2004; Gallego et al. 2012; Stockemer 2015). Explanations for this difference refer to the context that affects the outcomes produced by electoral institutions. This context varies considerably across new and established democracies (Moser/Scheiner 2012; Ferree et al. 2013; 2014). One contextual factor mentioned in this debate is the age of democracy, suggesting that the effects of electoral systems in new democracies gradually converge towards the effects that are observed for electoral systems in established democracies (Gallego et al. 2012). Other research is more cautious in this respect, indicating that the discrepancy between Western and non-Western countries in terms of the effects of district magnitude on turnout is permanent and that especially the cultural contextual factors should be considered (Stockemer 2015). I address the aspect of context as well by controlling for a factor that has probably been underestimated in previous constituency-level research on the consequences of electoral systems: the size of the population.

Secondly, what are the consequences for voter turnout when the number of parties changes? The number of parties ought to be the intervening mechanism that transmits the impact of the electoral system on voter turnout. As PR systems tend to produce a higher number of parties compared to majoritarian systems (Duverger 1954), the higher number of parties should account for higher turnout in countries with a PR system by offering voters more choice in an election and by increasing the level of parties' mobilization efforts. Most studies find the relationship between the number of parties and turnout to be either negative or statistically insignificant, though (summarizing: Blais 2006; Blais/Aarts 2006; Cancela/Geys 2016; Stockemer 2017). Does the number of parties have to be discarded as an important causal mechanism in the context of electoral systems and turnout due to this discrepancy between theoretical expectations and empirical evidence? My analysis should add to answering this question.

Besides the abovementioned puzzle regarding the impact of electoral reform on voter participation, focusing on the consequences of electoral system *change* allows for an invaluable benefit with respect to the examination of the relationship between electoral systems and turnout that I want to leverage: It enhances the determination of the *causal linkages*. This is a difficulty, most hitherto existing research on the relationship between electoral systems and voter turnout has not overcome up to now. Determining the respective causalities has been problematic so far, also pertaining to the endogeneity of electoral institutions, and most

comparative studies on electoral systems and turnout were based only on cross-sectional comparisons which did not account for the aspect of time. Moreover, most studies were performed at the national level without precisely considering the constituency structure – but the constituency level is the actual level where electoral systems finally operate (Cox 1997; 1999a). Apart from that, when studies are performed at the level of electoral districts, they are mostly restricted to the analysis of single cases. Finally, recent studies on the consequences of electoral system change, respectively changes in district magnitude, at the constituency level usually make use of party system size as the dependent variable instead of voter turnout (e.g. Singer 2015; Singer/Gershman 2018).

To address these shortcomings, this dissertation aims at contributing to the research on the relationship between electoral systems and turnout by making use of the following innovations: The examination of the consequences of electoral system change for voter turnout should be carried out within an internationally comparative framework that includes an appropriate group of selected countries. Beyond that, the empirical analysis should be based on data at the district level. Finally, the temporal dimension of the relationship between changes in electoral systems and turnout should be taken into account. In this respect, my analysis adds to the cross-sectional consideration of the relationship between electoral systems and turnout by providing an elaborate account of the short-term consequences of change within a set of first-difference models. In addition, I provide a discussion on two cases of electoral system change that occurred in New Zealand and Italy in 1993 where I will deal with the respective long-term consequences.

Within the scope of this study, I will formulate a set of hypotheses to be tested empirically by analyzing district-level data with a time-sensitive modeling approach. These district-level data, being the basis for my empirical analyses, represent a unique data set covering 9.639 electoral districts from 146 national legislative elections in eleven European countries. I generally find electoral system change to have significant short-term effects on voter turnout. More precisely, while district magnitude and increases in district magnitude in principle have a positive effect on turnout, this influence is reverted when controlling for population size, i.e. the size of the population within a district affects the relationship between district magnitude and turnout. District-level population size hence depicts a contextual factor that has probably been neglected in previous research on the relationship between electoral systems and voter turnout. Moreover, I find the number of parties and increases in the number of parties to have a negative effect on turnout, what confirms earlier findings and provides

additional evidence that the party system is no decisive causal mechanism for the explanation of higher turnout rates in PR systems. Finally, my analysis confirms the positive effect of compulsory voting on turnout. The effect is even stronger when compulsory voting is enforced. Compulsory voting generally has a stronger influence on turnout compared to district magnitude.

This dissertation proceeds as follows: First, I will give a general account of voter turnout, including the discussion of several theoretical aspects of turnout and the provision of an overview of the factors to affect electoral participation, referring to the individual as well as to the aggregate level (chapter 2). Secondly, I will review the previous work on the effects of electoral systems on turnout in particular, going more into detail regarding the causal mechanisms that should influence the relationship between electoral systems and the participation in elections (chapter 3). Thirdly, I will describe the theoretical framework of this study, including the conceptualization of electoral system change, and I will present the addressed hypotheses to be tested empirically (chapter 4). Fourthly, I will provide the discussion of my research design, including the aspect of case selection (chapter 5). Beyond that, chapter 5 describes the data in greater depth as well as the selection and operationalization of the variables. The chapter moreover includes the presentation of the descriptive statistics concerning the data set and the respective variables. Fifthly, I will present the results of the empirical analyses of the consequences of electoral system change for voter turnout and I will interpret the findings (chapter 6). Finally, I will draw a conclusion, give a prospect for future research, and shortly discuss the consequences of my findings with respect to future intentions of electoral reform, respectively electoral engineering (chapter 7). Based on my findings, changes in the electoral system should indeed have short-term consequences for turnout. At the same time, the evidence justifies a more skeptical position when it comes to the long-term impact of electoral system change.

2. On voter turnout

Elections, and the act of voting, are a main pillar of democracy. Despite elections were recently criticized for originally being an aristocratic and elitist procedure, in connection with the proposal to establish a democratic system based on sortition (Van Reybrouck 2016), they are considered as the democratic method *per se*. More precisely, elections are a basic principle of liberal democracy which requires *competitive* elections as the open competition of societal forces and political groups for political power (cf. Nohlen 2014, 27). Moreover, competitive elections are the foundation of the legitimacy of incumbent governments and the political system in general (cf. Nohlen 2014, 28).

The significance of elections for democracy, associated with the existence of universal suffrage, necessarily evokes the question of who participates in an election and who does not, respectively: *Why* do citizens turn out to vote or decide to abstain from voting? In respect thereof, voter turnout – as well as the phenomenon of nonvoters – constitutes a major field of research on voting behavior. The "classical" approaches of electoral research, i.e. the rational choice approach, the social psychological approach and the sociological approaches offer a wide set of explanations for this phenomenon. In the following, I will provide an overview of the factors found to affect turnout at the individual as well as on the aggregate level. I will also describe the role electoral systems play in this context. Before, I briefly discuss the meaning of turnout for democracy to illustrate particular normative considerations that motivate the research question of this dissertation.

2.1. The meaning of turnout for democracy

Besides the explanations for answering the question why people go to the polls or not, turnout is also associated with a normative dimension. Especially, it is to ask: Why is turnout relevant for democracy? And why should low turnout rates be problematic in this respect? First of all, turnout gains its relevance as voting depicts "the most common and important act citizens take in a democracy" (Aldrich 1993, 246). In addition, participation in elections is the only form of political participation, compared to other forms, where a majority or at least a high share of citizens is directly involved in politics (cf. Jackman 1987, 405; Nohlen 2014, 29).

Generally, high rates of voter turnout are widely seen as a sign of democratic stability and legitimacy, even though high turnout was sometimes also interpreted as a symptom of crisis by older studies (cf. Lipset 1960, 189-190). On the contrary, low turnout rates are often seen as more problematic for democracy. On the one hand, low turnout rises concerns about possible lacks of satisfaction with democracy or legitimacy (cf. Franklin 1999, 205). On the other hand, the phenomenon of turnout is also associated with that of social equality, respectively social inequality. This association can be summarized under the following principle: The lower the turnout rate, the more unequal is the participation in elections (cf. Tingsten 1975, 230, cited in Schäfer et al. 2013, 8). Also, Arend Lijphart has drawn a similar conclusion on the connection between turnout and social inequality at the polls by noting that "low voter turnout means unequal and socioeconomically biased turnout" (Lijphart 1997, 2). This relationship is well-known, as already outlined by previous studies and a pattern that is found in all advanced democracies. In addition, it is an enduring pattern: the overall numbers of turnout are still shrinking in recent years in many advanced democracies or remain at considerably lower levels compared to former decades (OECD 2011, 196). Vice versa, higher turnout rates should correspondingly be associated with lower social inequality in respect of voting.

Lower levels of aggregate turnout finally reflect patterns of inequality in electoral participation. This comes along with serious implications. From a normative perspective, unequal participation in elections is considered to be problematic for several reasons. Besides unequal representation in the political sphere, an individual's socioeconomic status is connected to election outcomes and party choice as well. From a traditional cleavage-based position, elections depict "the expression of the democratic class struggle" (Lipset 1960, 220). Also, if class voting has declined, there is also a connection between parties from different ideological camps, i.e. left-wing or right-wing parties, and the policies these parties promote when they are in government (cf. Lijphart 1997, 4). So, many studies found that parties (also in power) promote policies in accordance with their core constituents, i.e. in short, left-wing and right-wing parties are usually "responding to their core supporters, the rich and the poor" (Han 2015, 584). According to this, unequal turnout is linked to policies that especially benefit voters with a higher socioeconomic status.

While some authors opt for the introduction of compulsory voting to reduce inequalities in voter turnout (e.g. Lijphart 1997), others disagree with this view. Amongst other things, Franklin advances the view, "that low turnout is not a disease in its own right but rather a symptom of other features of the electoral context that voters experience in low-turnout

countries" (Franklin 1999, 206). He argues that people go to the polls aiming at influencing the government's policies according to their personal preferences. Hence, low turnout rates express a lack of electoral choices or a lacking noticeable connection between vote choice and policy change – and these difficulties could not be tackled by making voting compulsory (cf. Franklin 1999, 206). According to this, low turnout numbers must not be seen as an original "disease". The claim that low turnout is associated with unequal turnout remains an undeniable empirical finding, however. Taking these normative considerations into account, the phenomenon of voter turnout gains high relevance for further inquiry.

2.2.   What affects voter turnout?

This question was famously asked by Blais (2006) and represents the initial question for the subsequent overview of explanatory factors regarding turnout as well. As stated above, aggregate turnout in many advanced democracies has decreased over the last decades. The temporal development of turnout rates in national parliamentary elections in the EU member states appropriately exemplifies this trend. Figure 1 shows turnout in national legislative elections in these countries, contrasting the level of turnout in the year 2000 with that in 2020. As Figure 1 illustrates, in some countries most recent turnout is actually higher, at least slightly, or quite similar, compared to turnout 20 years ago. For the majority of EU member states, however, the level of turnout in 2020 is lower compared to 2000.

Figure 1: Turnout in National Legislative Elections, EU by country, 2000 versus 2020
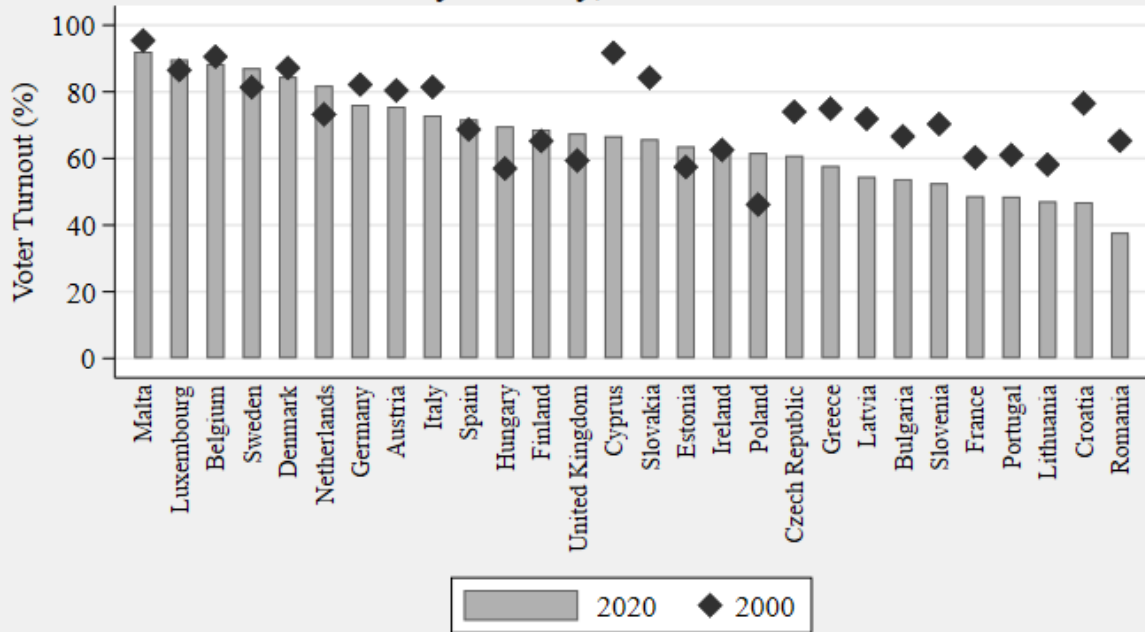
Source: International IDEA Voter Turnout Database. Adapted from Eurostat 2015, 193.
2000 may be 1998, 1999, 2001 or 2002 data; 2020 may be 2016, 2017, 2018 or 2019 data.
Including the United Kingdom.

The long-term trend in turnout decline in Europe becomes even more obvious when considering Figure 2. Figure 2 depicts the 5-year average turnout in national parliamentary elections for a subset of EU member states, covering the period of time from 1945 to 2019. It becomes apparent that mean turnout in European national legislative elections increased by trend until the mid-1970s. Since that period, mean turnout decreased almost constantly. While mean turnout in Europe during the period from 1945 to 1949 was about 85%, it shrinked to about 76% for the period from 2015 to 2019. This makes up a difference of approximately 9% when comparing European mean turnout in the years after World War II with European mean turnout in the most recent years.

Figure 2: Turnout in National Legislative Elections in EU Member States, 1945-2019 (5-year average)
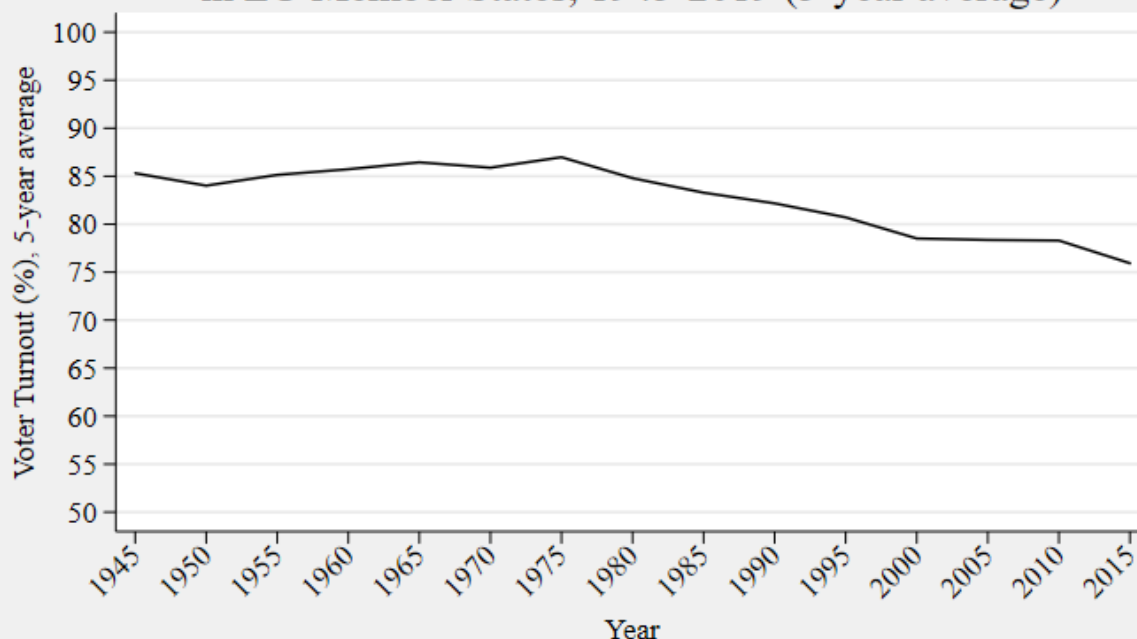
Source: International IDEA Voter Turnout Database.
Countries considered for 5-year average: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Sweden and United Kingdom.

Figure 2 reveals and exemplifies the long-term decline in aggregate voter turnout in many established democracies. Turnout does not decrease uniformly in all these countries, however. For this reason, the question arises: What about differences in voter turnout *within* countries? Which factors are mentioned in the literature to have a positive or negative impact in this respect?

In the following, I provide an overview of the most prominent factors mentioned in the literature to have an impact on turnout. As the decision to turn out or not is, in the first instance, a decision that every voter has to come to individually, I first discuss the factors found to affect *individual-level turnout*, i.e. the variables to influence one's propensity to vote. Subsequently, I discuss the main factors mentioned in the literature to affect *aggregate-level turnout*, i.e. rates of electoral participation. Although voter turnout at the aggregate level is the actual dependent variable of this dissertation, several factors influencing turnout at the individual level are still meaningful for my later theoretical framework on the connection between the micro- and the macro-level.

2.2.1. Turnout at the individual level

As individual-level turnout depicts one facet of voting behavior, it is suitable to group the explanatory factors mentioned in the literature for the individual propensity to turn out into the main theoretical approaches of electoral research. These are the *rational choice* approach, the *social psychological* approach and the *sociological* approaches. The theoretical approaches to individual-level turnout primarily differ in the variables they emphasize as being most important to explain the decision to turn out or not. In this context, though, the following applies as well: "There are multiple ways to group variables into theoretical models and different scholars are likely to have different preferences" (Smets/van Ham 2013, 347). Even if to some extent variables are interpreted differently within the respective approaches, they "are not necessarily mutually exclusive as certain variables can be argued to influence voter turnout through multiple theoretical pathways" (Smets/van Ham 2013, 348). Comprehensive models on voter turnout at the individual level in fact aim at integrating factors proposed from different theoretical perspectives.

The *rational choice* approach describes the decision to turn out as the result of a personal cost-benefit calculation. In this calculus of voting a voter will only decide to participate in an election when the expected benefits of voting will outweigh its costs (Downs 1985). The predictions of the calculus of voting are, however, in sharp contrast with the empirical findings on electoral participation where usually a majority of voters turns out to vote. This should not be the case following the turnout decision calculus, as one's utility from voting is finally only greater zero when the vote is pivotal, what is extremely unlikely in greater electorates. To account for this discrepancy, the calculus of voting is usually extended by the factor of civic duty that should increase the individual propensity to vote in addition to the pure cost-benefit calculation (Riker/Ordeshook 1968).

While the rational choice approach centers on the calculus of voting to explain individual-level turnout, the *social psychological* approach sees individual predispositions, respectively personal attitudes, as determinants for voting behavior. The incorporation of psychological factors to explain voters' decisions in elections dates back to the Michigan model of voting behavior (Campbell et al. 1954; 1960). While the Michigan model especially sees party identification and the perceptions of issues and candidates as the driving forces not only behind the decision to vote for a certain party but also behind the decision to turn out at all, later models of individual-level turnout proposed several additional psychological factors that should influence turnout or made use of alternative measures for the established concepts. These

factors and measures comprise, for instance, political interest, political efficacy, or satisfaction with democracy (for an overview, see Smets/van Ham 2013, 353-355).

In addition to the abovementioned psychological determinants, the Michigan model includes sociological factors as well. Voting behavior finally depicts the end point of a causal funnel that orders the explanatory variables from most distant to most proximate: It is the sociological factors that initially shape the long-term psychological predisposition of party identification, while the attitudes towards issues and candidates represent rather short-term factors within voters' decision-making process (Campbell et al. 1960).

Hence, sociological variables play a role even in social psychological models of voting behavior. Moreover, sociological and socio-demographic variables depict the key explanatory factors within the *sociological* approaches to turnout at the individual level. Beyond that, the sociological approaches emphasize the meaning of an individual's position in the social structure and affiliation with social groups for voting behavior. The macro-sociological approach goes back to the cleavage theory by Lipset & Rokkan (1967). It stresses the role of societal conflict lines for the formation of Western European party systems and also for voting behavior, as voters are expected to quite homogeneously vote for the party that is aligned with the societal group they are affiliated with themselves (Lipset/Rokkan 1967). The micro-sociological approach, in turn, originates from the Columbia model of voting behavior (Lazarsfeld et al. 1948; Berelson et al. 1954) that focusses on voters' socio-structural attributes and social environment, respectively social contacts, to explain electoral behavior.

Besides the two classical sociological approaches, the macro-sociological and the micro-sociological approach, models that refer to the influence of socialization and the formation of voting as a habit on individual-level turnout (Plutzer 2002; Gerber et al. 2003; Franklin 2004; for a critical assessment of the concept of habitual voting, see Blais/Daoust 2020, 71-91) can be subsumed under the sociological approaches as well.

A recent model on turnout at the individual level is provided by Blais & Daoust (2020). The authors lean on the Michigan model of voting behavior (see above) by adopting a funnel of causality approach. Figure 3 shows the funnel of causality that consists of three distinct groups of factors: socio-demographic variables, basic individual predispositions, and election-specific considerations (cf. Blais/Daoust 2020, 20). In the following, I will discuss the factors included in the model by putting the empirical findings of Blais & Daoust – they test their model based on cross-sectional survey data – in the context of previous empirical evidence on these variables with respect to individual-level turnout.

Socio-demographics

Predispositions

Considerations

Sex

Age

Political interest

Care
Ease

TURNOUT

Education

Civic duty
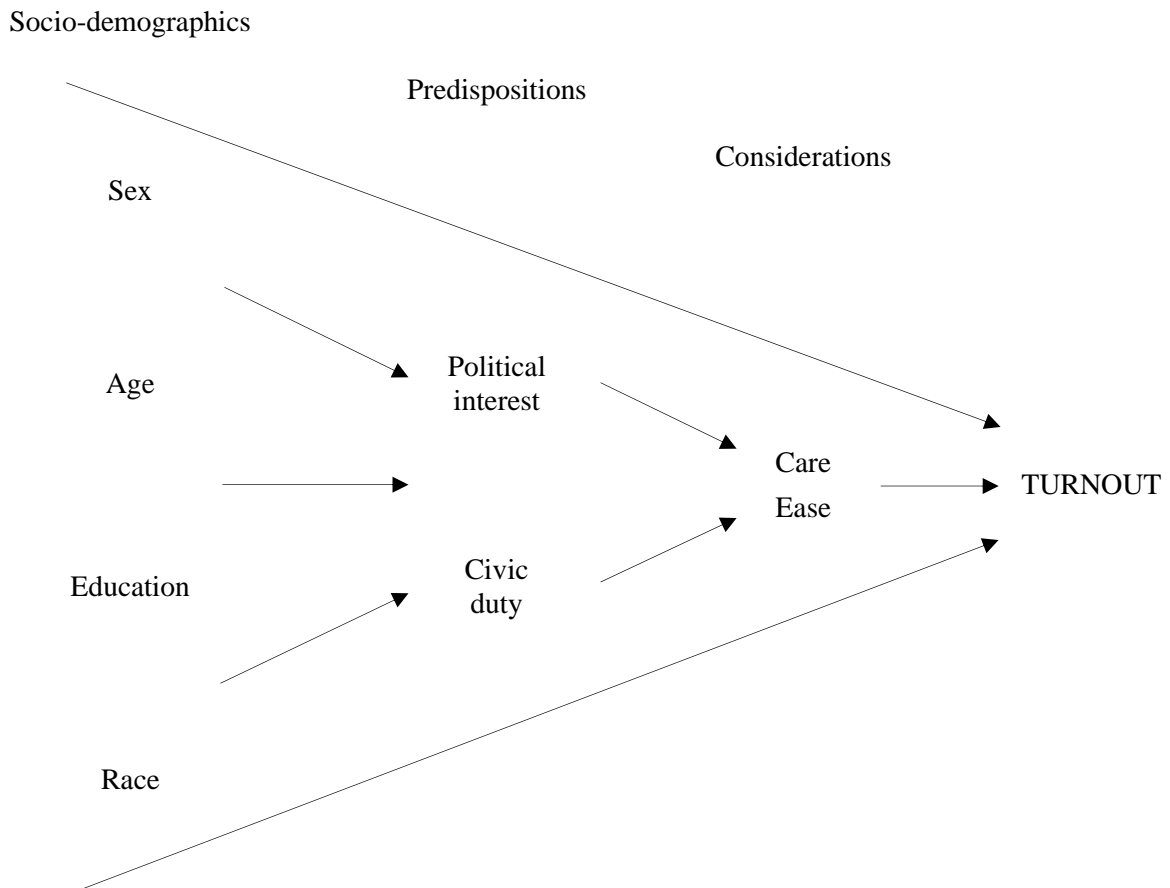
Race

Figure 3: The funnel of causality

Considering first the socio-demographic factors within the funnel of causality that includes the variables sex, age, education, and race. In their empirical analysis, however, Blais & Daoust actually only consider the factors age and education, while in this model sex and race only seem to depict familiar examples of the classical socioeconomic status variables that are frequently used in research on turnout. The decision to only consider age and education in detail is comprehensible, indeed: Sex, respectively gender, and race, including the measures of ethnic identification and even minority community status, do not seem to be meaningful predictors of individual-level turnout, at least not anymore and not cross-nationally (Nevitte et al. 2009; Smets/van Ham 2013).

Age and education, in contrast, still seem to be successful determinants of the individual propensity to turn out: Blais & Daoust find both factors to have a positive effect on turnout (cf. Blais/Daoust 2020, 24-30). This is in line with previous research predominantly finding age to

have a positive effect on individual-level turnout, irrespective of the relationship between age and turnout being rather linear or curvilinear (Smets/van Ham 2013), respectively finding age to have a negative effect on non-voting (Nevitte et al. 2009). The relationship between individual-level turnout and education is similar: A higher level of education predominantly has a positive effect on turnout or negative effect on non-voting (Smets/van Ham 2013; Nevitte et al. 2009). The positive effect of education on turnout does not equally exist in all countries and elections, however. As research on unequal participation finds, the effect is also dependent on contextual factors, especially those contextual factors that may increase the difficulty of voting, for instance the number of parties or the ballot structure (Gallego 2010; 2015).

Two basic individual predispositions that should have a strong impact on a person's turnout propensity form the core of the model: The factor of political interest, representing the intrinsic motivation towards the decision to vote, and the factor of civic duty, tapping the personal internalization of the societal moral norm that there is a duty to vote. Relying on previous empirical evidence, Blais & Daoust perceive both predispositions as long-term and highly stable predictors of individual-level turnout (cf. Blais/Daoust 2020, 42). For instance, previous research based on panel data found political interest to be an attitude with extraordinary stability over the life cycle (Prior 2010). Also for civic duty recent panel studies indicate by now that it is a similarly stable attitude (Blais/Achen 2019; Feitosa/Galais 2020; Galais/Blais 2014; 2016).

Blais & Daoust find both predispositions, political interest as well as civic duty, to have a strong independent positive impact on turnout, even when controlling for the socio-demographic factors age and education (cf. Blais/Daoust 2020, 49-53). In this respect, age and education have a positive effect on political interest and largely also on civic duty. In addition, political interest has a positive effect on civic duty as well. Nonetheless, political interest and the sense of voting as a duty still both have an independent positive effect on turnout. These findings are again in line with previous empirical evidence on the impact of political interest and civic duty on turnout at the individual level: From a meta-analytical perspective, political interest and civic duty have regularly shown to have a positive effect (Smets/van Ham 2013). The results of recent panel studies on the impact of civic duty on turnout support this relationship as well (Blais/Achen 2019; Galais/Blais 2016). As Blais & Daoust note, the positive relationship between civic duty and turnout is well-known: Already the classical Ann Arbor studies on voting behavior (Campbell et al. 1954; 1960) consider the correlation between duty and turnout propensity and also the extended turnout decision calculus by Riker &

Ordeshook (1968) requires a term for civic duty, which even seems to be the most influential factor in their model (cf. Blais/Daoust 2020, 43).

Finally, the funnel of causality incorporates two rather election-specific considerations, representing the proximate short-term factors influencing the individual decision to turn out to vote: How much a person cares about the outcome of the election ("care"), and the perceived ease, respectively difficulty, of voting ("ease"). The factor of care for the election outcome revolves around the questions of how important the election is perceived by a person and "whether, and how much, the person prefers one of the parties" (Blais/Daoust 2020, 10) or, where applicable, candidates. Blais & Daoust expect care about the outcome to be strongly influenced by the personal predispositions, first and foremost political interest, but to a certain degree also by an election's specific context, as not all elections are equally competitive and not all elections are perceived as equally important (cf. Blais/Daoust 2020, 55). The second consideration, ease, refers to how easy or difficult a person perceives the act of voting. Irrespective of the contextual factors that may increase or decrease the ease of voting, for the construction of the variable the authors "rely on citizens' global *subjective* assessment of the ease of voting. We are interested in subjective perceptions because the individual's decision is necessarily based on them" (Blais/Daoust 2020, 66; original emphasis).

Besides the expected strong correlation between political interest and care for the election outcome, Blais & Daoust find care to have a quite strong positive effect on turnout empirically, even when controlling for age, education, political interest, and civic duty and using different indicators of care (cf. Blais/Daoust 2020, 57-63). In line with the results of Blais & Achen (2019), the authors also find support for the hypothesis that the factor of care primarily matters for persons who do not perceive voting as a civic duty, i.e. that the impact of care for the outcome is dependent on duty, allowing for the understanding of care as a compensatory factor for absence of duty (cf. Blais/Daoust 2020, 59). The positive effect of care on the propensity to vote found by Blais & Daoust is again in accordance with the empirical evidence from most of the previous studies analyzing the impact of that factor: From the meta-analytical perspective, caring about who wins the election affects individual-level turnout positively (Smets/van Ham 2013).

Considering the factor of ease empirically, Blais & Daoust find the vast majority of respondents to indicate that it is very or somewhat easy to vote and in addition, with the exception of Switzerland, they find only very small differences in means across countries for that variable (cf. Blais/Daoust 2020, 67). With respect to the determinants of ease of voting, the

authors observe a positive relationship between ease and all other factors in the model, which are age, education, political interest, civic duty, and care (cf. Blais/Daoust 2020, 68-69). Most importantly, even when controlling for the other five factors in the model, Blais & Daoust find ease of voting to have a positive effect on turnout, although the impact of ease on turnout is weaker compared to the impact of political interest, civic duty, and care (cf. Blais/Daoust 2020, 69-70).

To what extent does the finding of a positive effect of ease of voting on the propensity to turn out corroborate empirical evidence from previous research? A direct assessment is hardly possible as in the model by Blais & Daoust the ease-variable represents respondents' subjective perceptions of the ease of voting, based on a rather unique survey question. In contrast, models on individual-level turnout usually construe ease or difficulty of voting in conjunction with the costs of voting, where "difficulty refers generically to all contextual costs external to the individual" (Gallego 2015, 39). As already stated above with respect to the effect of education on turnout, this effect especially depends on the contextual factors that increase the difficulty of voting. Particularly with reference to ease or difficulty of voting, the literature mentions plenty of contextual factors that may affect this variable what, in turn, can have a positive or negative effect on turnout.

What role do contextual factors ultimately play within models on turnout? This is an essential question for this dissertation, as it undeniably pertains to electoral systems as well. As will be shown, electoral systems seem to have a stronger impact on aggregate-level turnout compared to turnout at the individual level. I will provide a detailed discussion on the actual impact of contextual factors, especially electoral institutions, on turnout in chapter 3 to elucidate this discrepancy. In the following, I proceed with an overview of several prominent contextual factors that are mentioned in the literature with respect to individual-level turnout, as they should have an impact on the difficulty, respectively costs, of voting. In addition, I refer again to the findings of Blais & Daoust (2020) who examine the meaning of contextual effects for their model on turnout at the individual level as well.

Contextual effects generally describe all effects on individual-level turnout that emanate from factors at the meso- and the macro-level, respectively from environmental conditions in general (cf. Cabarello 2014, 440). The number of environmental factors altering the costs of voting is high, undoubtedly. In the United States, for instance, previous research found a negative effect on the propensity to turn out when voters have to take on long distances to the

polling place or the locations of polling places change (Dyck/Gimpel 2005; Haspel/Knotts 2005; Brady/McNulty 2011).

When considering the effects from the meso-level on individual-level turnout, parties and candidates represent crucial actors in this respect. Provided that there is a positive effect of the closeness of the election on individual-level turnout, this effect may largely be attributed to the influence of intermediary actors: Via the mobilization efforts of parties or candidates that should increase in closer races, these actors aim at reducing the individual costs of voting and increasing the factor of duty to vote for the preferred candidate or party (cf. Aldrich 1993, 267-268). The inspection of meta-analytical evidence concerning the factor of mobilization shows that "[b]oth partisan and non-partisan mobilization efforts are indeed found to positively affect individual turnout in national elections in most instances" (Smets/van Ham 2013, 351).

Despite this finding, the role of parties for turnout is dubious, however. The level of voter mobilization should not only increase with the closeness of the election but also with the number of parties that actually compete in the election. In addition, a higher number of parties gives voters a wider choice of alternatives in the election, what should ease finding a party that reflects the personal preferences. Following these two arguments, a higher number of parties should have a positive effect on turnout. At the same time, a higher number of parties may increase the difficulty of voting due to a more complex ballot and higher information costs, what should have a negative effect on the propensity to turn out. Consequently, the meta-analytical evidence for the impact of the number of parties on individual-level turnout is quite mixed (Smets/van Ham 2013). Based on the contradictory role of party system size for turnout, I will discuss this factor more extensively in chapter 3, considering the relationship between electoral systems and the number of parties as well.

While parties and candidates represent actors at the meso-level, the macro-level contextual factors that should affect the difficulty of voting are mostly institutional and especially electoral institutions are mentioned in this respect. For instance, compulsory voting should have a positive effect on turnout as it increases the costs for abstaining. The positive effect of compulsory voting on individual-level turnout is regularly found in empirical studies (Smets/van Ham 2013; Gallego 2010; Singh 2011a; 2015). In contrast, voter registration requirements, which for example exist in the United States, constitute an institutional factor that should affect individual-level turnout negatively by increasing the costs of voting. The negative effect of voter registration requirements on turnout at the individual level is regularly found as well (Rosenstone/Wolfinger 1978; Mitchell/Wlezien 1995; Gallego 2010).

Electoral systems, finally, represent another widely-used macro-level contextual factor to explain individual-level turnout. On the one hand, majoritarian electoral systems should have a negative effect on turnout as the translation of votes into seats is much more distorted compared to proportional electoral systems. This leads to a higher number of wasted votes, what may disenchant especially supporters of smaller parties as the likelihood of their votes having an impact on the election outcome is significantly reduced (cf. Jackman/Miller 1995, 470). On the other hand, proportional electoral systems could also influence turnout negatively compared to majoritarian systems by being more complex to understand for voters (Pardos-Prado et al. 2014) and by often producing coalition governments, what reduces a voter's likelihood to have an impact on the election outcome (cf. Geys 2006, 651). From the meta-analytical perspective, however, electoral systems do not seem to have significant effects on turnout at the individual level (Smets/van Ham 2013).

To what extent does this finding come as a surprise? Probably it rather reflects the evidence provided by studies on electoral participation that estimate the effect of individual as well as contextual variables within the same model, considering the influence of individual factors as conditional on contextual factors (cf. Blais/Daoust 2020, 14). Following this strand of research, contextual factors generally play a subordinate role in explaining turnout at the individual level compared to individual-level variables. For instance, Nevitte et al. (2009) find, on the one hand, that the contextual factors in their model have a discernible impact on non-voting as the dependent variable, exemplarily a higher district magnitude showing a negative and a higher number of parties revealing a positive effect on the propensity to abstain. On the other hand, though, when testing the impact of the contextual factors on the individual-level determinants of non-voting in their analysis within an interaction model, the authors do not find the contextual factors to affect the relationship between the individual-level factors and the dependent variable, except the wealth of a country having a negative effect on the influence of individual income on non-voting (cf. Nevitte et al. 2009, 104-105).

Blais & Daoust (2020) make use of this approach as well by testing for interaction effects between contextual factors and the four individual-level variables political interest, civic duty, care for the election outcome, and ease of voting. Blais & Daoust generally expect the individual-level determinants of turnout to be similarly effective across different contexts, respectively in different elections, while contextual factors should provide a smaller additive effect that is independent of the individual-level considerations. As their analysis shows, this is indeed the case: Context matters, but the individual-level variables are clearly more important

for the explanation of turnout at the individual level compared to the contextual factors (cf. Blais/Daoust 2020, 93). With respect to the variance in the dependent variable the analysis reveals "that 94% of the variance is due to differences across individuals and 6% is due to macro-level factors" (Blais/Daoust 2020, 93).

To test for the conditional effect of contextual factors on political interest, civic duty, care, and ease, Blais & Daoust model the interaction between these four individual-level variables and two institutional rules, namely the electoral system and the level of government. For the electoral system, the authors differ between PR from non-PR elections, while for the level of government they distinguish between elections at the regional, national, and European level. As the interaction models highlight, altogether, different electoral systems as well as different levels of government have at most a weak impact on the effects of the individual-level variables on turnout (cf. Blais/Daoust 2020, 96-100). Concerning the contextual factor of the electoral system, Blais & Daoust correspondingly state that their model based on individual-level variables "provides a powerful explanation of the turnout decision in both PR and non-PR elections" (Blais/Daoust 2020, 100).

What is the conclusion at the end of the discussion on individual-level turnout? Models that are based on the individuals' predispositions and election-specific considerations generally seem to explain the decision to turn out or not quite well. These factors can hardly explain differences in aggregate-level turnout, though. Even when adding contextual factors to the model, this cannot be achieved. Understandably, however, this is not the aim of models on voter turnout at the individual level. In this context, Blais & Daoust explicitly indicate that their study focusses on the impact of individual-level variables on the propensity to vote (cf. Blais/Daoust 2020, 5). As the authors remark, "[i]ndividual-level variables are much less relevant when it comes to explaining why overall turnout is higher in some elections than in others" (Blais/Daoust 2020, 119).

This is especially true for many socio-demographic variables. For instance, sex, respectively gender, can hardly add to the explanation of cross-national differences in turnout as the sex ratio is more or less the same in all modern democracies and also cross-national cultural differences as a source of differing turnout patterns with respect to sex have surely diminished over the last decades. Even education, representing a highly effective determinant of individual-level turnout, does not seem to be a similarly good predictor for turnout at the aggregate level (Stockemer 2017). Probably, the relationship between education and turnout is rather spurious than causal (cf. Franklin 2004, 18-20). In the end, contextual factors, especially

institutional variables, are much more meaningful for the explanation of aggregate-level turnout. It is to draw on those factors to account for differences and changes in electoral participation rates.

2.2.2. Turnout at the aggregate level

Which explanatory factors are primarily discussed in the literature to affect aggregate-level turnout? As mentioned above, the discussion essentially revolves around macro-level factors. Similar to turnout at the individual level, the total number of variables mentioned with respect to aggregate-level turnout is high. Several factors have emerged as especially prominent, though. These factors are the basis of the following overview and can be classified into three groups of variables: *institutional*, *socioeconomic*, and *election-specific* variables (see Stockemer 2017).

Within with the group of *socioeconomic* variables, development is probably the most prominent factor that is associated with aggregate-level turnout. To operationalize the variable for development, a variety of indicators are used in the literature, though. The most prevalent measures are GDP per capita, education, and literacy rates (cf. Stockemer 2017, 708), i.e. in contrast to models on individual-level turnout where education acts as a direct predictor, aggregate-level studies especially make use of (mean) education as a proxy for economic development.

The relationship between development and turnout at the aggregate level should generally be positive, meaning that "countries with modernized social structures and developed, industrial economies are expected to have higher levels of political participation" (Powell 1982, 34). This relationship between indicators of development and aggregate-level turnout has repeatedly been confirmed empirically in earlier studies (Powell 1982; Blais/Dobrzynska 1998; Fornos et al. 2004; Norris 2004). Recent meta-analytical evidence raises doubts about the strength of this connection, however: Less than half of the evaluated studies found development to have a positive effect on aggregate-level turnout and if there was a positive effect, it was moderate at most (cf. Stockemer 2017, 708). Probably this result reflects the finding by Blais & Dobrzynska (1998) that the relationship between development and turnout is not linear but logarithmic, implying that turnout is especially low in the poorest countries compared to all other countries.

Besides development, several further socioeconomic variables, accounting for structures and trends within populations, were discussed to affect aggregate-level turnout. Especially two factors have repeatedly shown to be linked to turnout: population size and population stability. As the meta-analytical studies on turnout at the aggregate level highlight, there is a quite strong negative relationship between population size and turnout (Geys 2006; Cancela/Geys 2016; Stockemer 2017), while the relationship between measures of population stability and turnout is predominantly positive (Geys 2006; Cancela/Geys 2016).

For other factors concerning the population structure, the relationship to aggregate-level turnout seems to be less clear. This pertains, for instance, to population concentration, income inequality, and ethnic heterogeneity, that all should have a negative impact on turnout. The studies by Geys (2006) and Cancela & Geys (2016) find the relationship between these three factors and turnout at the aggregate level to be rather weak. With respect to ethnic heterogeneity, the negative impact on turnout seems to become more apparent when looking at the proportion of minorities in a population (cf. Cancela/Geys 2016, 267). This finding should be treated with caution, however. As the authors note: "[M]ost of these results derive from US data, and we may have to be careful in generalizing this finding to other settings" (Cancela/Geys 2016, 267). Concerning income inequality, Stockemer (2017) finds this factor to have a negative and statistically significant impact on turnout in slightly more than half of the analyses that he evaluates for his meta-analysis, suggesting "that the effect of income inequality on turnout might be somewhat more complex than most studies indicate" (Stockemer 2017, 709).

The meta-analyses on aggregate-level turnout by Geys (2006) and Cancela & Geys (2016) include previous turnout as another socioeconomic variable. In this respect, past turnout levels should have a positive effect on present turnout rates. Theoretically, this expectation is based on the notion and empirical evidence that the individual propensity to vote is quite stable in the long term (see section 2.2.1.). Such stability might similarly show at the aggregate level. As the meta-studies reveal, there is indeed a strong positive relationship between previous and present turnout (Geys 2006; Cancela/Geys 2016).

Considering now the group of *election-specific* variables that should affect voter turnout at the aggregate level. I focus on two factors that are also linked to each other: electoral closeness and campaign expenditures. Especially the closeness of the election outcome, respectively marginality or competitiveness, represents a factor that is widely-used in the literature on aggregate-level turnout. The idea that the closeness of the election should have a positive effect on turnout follows from the prediction of rational choice theory that a voter will

only participate in an election when there is a positive expected utility from voting (Downs 1985). As stated above, the calculus of voting can actually only become positive when one's vote is decisive. This becomes more likely either when the electorate is smaller or the race is closer. Thereby, closeness should affect turnout positively. The studies by Geys (2006) and Cancela & Geys (2016) generally find empirical support for the positive relationship between closeness and turnout. Stockemer (2017), however, finds in his meta-analysis for the factor of closeness that "less than half of the models that use the variable trigger statistically significant findings in the expected direction. In fact, 56 per cent of the models reject the notion that close elections are beneficial for turnout" (Stockemer 2017, 710). Also for closeness, Stockemer indicates that its impact on turnout might be more complex than stipulated by a simple rational choice model (cf. Stockemer 2017, 710).

The second election-specific variable, campaign expenditures, should have a positive effect on aggregate-level turnout as well. The factor of campaign expenditures can be construed as a proxy for mobilization and may to some extent act as a causal mechanism for the impact of closeness on turnout. As mentioned in the previous section on individual-level turnout, the mobilization efforts of parties or candidates should increase in closer elections. From a rational choice perspective, this should reduce a voter's costs of voting by lowering the information costs and increase her duty to vote for the preferred party or candidate. The expected effect of campaign expenditures on turnout at the aggregate level is confirmed by the respective meta-studies that find a clear positive relationship between these two variables (Geys 2006; Cancela/Geys 2016).

The third group of variables that should be related to aggregate-level turnout, *institutional* variables, comprises several of the most prominent factors in the literature on turnout. Already the classical cross-sectional studies on turnout highlight the role of institutional factors for the explanation of differences in turnout across countries (Powell 1986; Jackman 1987), in which especially Jackman (1987) considers institutions as the most important variables to explain voter turnout at the aggregate level.

Already Jackman (1987) finds compulsory voting to have a strong positive effect on aggregate-level turnout. The positive relationship between compulsory voting and turnout has regularly shown not only at the individual level (see section 2.2.1.), but also at the aggregate level (Blais/Carty 1990; Blais/Dobrzynska 1998; Franklin 2004; Jackman/Miller 1995; for meta-analytical evidence, see Geys 2006; Cancela/Geys 2016; Stockemer 2017). Similarly, the negative effect of voter registration requirements on turnout seems robust not only at the

individual level but at the aggregate level as well (Ansolabehere/Konisky 2006; Burden/Neiheisel 2013; for meta-analytical evidence, see Geys 2006; Cancela/Geys 2016; Stockemer 2017).

Another institutional variable that is at times mentioned to influence aggregate-level turnout is the legal voting age. As explained in the previous section, the individual propensity to vote tends to increase with age. This leads to the expectation that aggregate-level turnout should decrease when the legal voting age is reduced. Indeed, earlier research finds a negative effect of a lower voting age on turnout at the aggregate level (Blais/Dobrzynska 1998; Franklin 2004). From a more recent meta-analytical perspective a strong association between voting age and aggregate-level turnout is questionable, however: Stockemer finds the voting age to have a negative relationship with turnout in only seven of nineteen models that included the variable (cf. Stockemer 2017, 707).

A further factor that may be classified as an institutional variable refers to the importance, or decisiveness, of an election. From a micro-level perspective, the decisiveness of an election should affect the consideration of how much a voter cares for the election outcome (cf. Blais/Daoust 2020, 55; see section 2.2.1.). Consequently, a voter's propensity to turn out should be higher when the election is perceived as more important. This relationship could unfold at the macro-level as well, leading to the expectation that the importance of an election has a positive effect on aggregate-level turnout. The importance of elections is predominantly operationalized by the type of election, for instance first-order versus second-order elections (cf. Stockemer 2017, 706) or based on the level of government. Other widely-used measures that tap the decisiveness of elections and should thus have a positive effect on turnout comprise, for example, concurrent elections, i.e. that more than one election takes place on the same day, or unicameralism, as in bicameral systems "legislation can only be produced by compromise between members of the two houses. This means that elections for the lower house play a less decisive role in the production of legislation where bicameralism is strong" (Jackman 1987, 408). The positive effect of all aforementioned operationalizations and proxy variables related to the importance of elections on aggregate-level turnout is supported by meta-analytical evidence (Stockemer 2017; especially for concurrent elections, see Geys 2006; Cancela/Geys 2016).

Following Stockemer (2017), I classify the number of parties as an institutional variable as well in this overview, even though the number of parties is actually rather "the consequence of the institutional context" (Blais 2006, 112) than an independent institutional factor. The

number of parties, or party system fragmentation, has always been a very prominent factor in research on turnout, starting with the seminal studies by Powell (1982; 1986) that found the linkages between political parties and social groups to be a key aggregate-level predictor for voter turnout. These studies established a strand of research that expects a higher number of parties to have a positive effect on turnout due to increased party mobilization. The impact of mobilization represents one of the two main theoretical arguments why a higher number of parties should lead to higher turnout, the other argument referring to voters' wider choice of options in an election (see section 2.2.1.). As also mentioned in the previous section, there are theoretical arguments as well that suggest a negative effect of a higher number of parties on turnout, though. First, when there are more parties, the political process becomes more complex for voters, what may decrease the propensity to turn out. Secondly, a higher number of parties increases the likelihood for the formation of coalition governments, what may negatively affect the propensity to vote because it "decreases the direct influence of the electorate in the choice of who governs it" (Geys 2006, 650).

The empirical evidence concerning the impact of the number of parties on turnout is similarly contradictory as the theoretical expectations. Already for turnout at the individual level, the meta-analysis by Smets & van Ham (2013) did not find a clear direction of its relationship with the number of parties. This result seems to apply to aggregate-level turnout as well. Earlier studies drawing on Western countries or the common "industrial democracies" found the relationship between the number of parties and turnout at the aggregate level to be negative (Jackman 1987; Blais/Carty 1990; Jackman/Miller 1995; Radcliff/Davis 2000), while studies on Latin American countries did hardly find a statistically significant relationship at all (Pérez-Liñán 2001; Fornos et al. 2004). From an earlier meta-analytical perspective, the results for the effect of party system fragmentation on aggregate-level turnout were clearly inconclusive, about one third of the evaluated statistical models each showing a positive, a negative, or no statistically significant relationship (Geys 2006). More recent meta-analyses even find that there is no statistically significant effect of the number of parties on turnout at the aggregate level in the majority of models, leading to the conclusion that none of the aforementioned theoretical arguments seems to be valid and the number of parties is largely unrelated to aggregate-level turnout (Cancela/Geys 2016; Stockemer 2017).

The electoral system represents the last highly prominent institutional variable that should affect turnout at the aggregate level. On the one hand, theoretical arguments have been provided why majoritarian electoral systems should have a positive effect on turnout. For

instance, PR systems may be more complex to understand for voters and PR systems are favorable for a higher number of parties, making coalition governments more likely, what reduces voters' direct impact on government formation (see section 2.2.1.). On the other hand, several arguments stipulate a positive effect of PR on turnout compared to majoritarian systems. Besides the argument of a higher number of wasted votes in majoritarian systems, PR should also bring higher party mobilization efforts about: "PR, with its multi-member districts, makes it less likely that some districts will be non-competitive, so that parties have more incentive to campaign everywhere and voters more incentive to turn out and vote" (Blais/Carty 1990, 167).

Indeed, earlier cross-sectional studies covering established democracies repeatedly found a positive relationship between the proportionality of the electoral system and aggregate-level turnout (Jackman 1987; Blais/Carty 1990; Jackman/Miller 1995). Earlier meta-analytical evidence confirmed this association as well (Geys 2006).

The universal validity and perdurability of the positive impact of proportionality on turnout is disputed, however. Similar to the relationship between the number of parties and turnout, the findings for the industrial democracies could not be replicated for the emerging democracies in Latin America where virtually no statistically significant effect of electoral disproportionality on aggregate-level turnout was observed (Pérez-Liñán 2001; Fornos et al. 2004). Also Cancela & Geys (2016) suppose that the relationship between PR and turnout may not be meaningful in countries outside of the group of established democracies: Compared to Geys (2006), their recent meta-analysis includes studies that cover a more diverse set of countries, at the same time the more recent studies lead to a decrease in the study success rate from 71% to 53% for the positive effect of PR on aggregate-level turnout and to a lower average effect size (cf. Cancela/Geys 2016, 267-268). With respect to the more recent literature, Stockemer (2017) finds PR being unrelated to aggregate-level turnout in the vast majority of models as well. Even for models that make use of district magnitude as a more precise measure for the electoral system, the success rate for the positive effect of proportionality on turnout is in fact higher, compared to models using a dummy variable for PR, but still slightly below 50% (cf. Stockemer 2017, 704-705). Similar to the number of parties, "it seems that the type of electoral system is no longer […] strongly related to electoral participation" (Stockemer 2017, 705).

How to deal with these results? Is the positive effect of PR on turnout really "an artefact of case selection" (Stockemer 2017, 711)? In any case, this points to a closer examination of the causal effects of electoral systems on voter turnout. In addition, it is to consider the potential

intervening mechanisms more detailed, referring to the question: If PR fosters turnout, how and why is this the case (cf. Blais 2006, 114)? Based on the empirical evidence mentioned above, the role of the number of parties is questionable in this context and awaits further analysis. This finally leads to the question of the microfoundations concerning the impact of electoral systems on turnout. As illustrated in the previous section, it seems that electoral systems do not have a significant direct influence on individual-level turnout. Electoral systems also do not meaningfully affect the explanatory power of individual-level variables with respect to the propensity to vote. To approach the puzzle of the relationship between electoral systems, their adjacent mechanisms, and voter turnout, I will discuss the respective literature more extensively in the next chapter. I will outline feasible methodological pathways for an appropriate assessment of the impact of electoral systems on turnout as well.

2.3. Conclusion

The investigation of voter turnout matters, as voting represents the prevalent form of political participation in democratic countries. Turnout rates vary considerably over time and exhibit considerable differences between countries, though. The explanation of these differences relies on institutional, socioeconomic, and election-specific factors. Especially institutional factors gained high prominence within research on aggregate-level turnout, starting with the classical studies by Powell (1982; 1986) and Jackman (1987). Already these studies highlighted the impact of properties of the electoral system on turnout. The explanatory power of electoral systems with respect to turnout at the aggregate level seems to have diminished within research from the past fifteen years, however.

As shown in this chapter, individual-level variables can hardly contribute to the explanation of turnout at the aggregate level. Research on aggregate-level turnout needs to reflect on individual-level factors, understandably, as they are essential for the underlying microfoundations. Research on individual-level turnout has shown, however, that contextual factors, including the electoral system, are much less influential concerning the propensity to vote compared to individual-level variables and contextual factors also affect the impact of individual-level variables on the propensity to turn out only to a marginal degree.

I examine the impact of electoral systems on turnout from an aggregate-level perspective, being aware of the difference between the individual and the aggregate level of

analysis. This delimitation must clearly be made "because the problem of ecological fallacy implies that we cannot straightforwardly make inferences about individuals' behaviour from an aggregate-level analysis" (Dassonneville et al. 2017, 506). Or as Franklin puts it: "While voting is a matter of individual decisions, turnout is an aggregate-level phenomenon. It is a feature of an electorate not a voter" (Franklin 2004, 16).

This chapter has shown that institutional variables still have a prominent role within models of aggregate-level turnout. While compulsory voting has continuously remained an important factor associated with higher turnout, the electoral system and the number of parties were often found to be unrelated to turnout in more recent research. Hence, with respect to the relationship between electoral systems and voter turnout it is about considering the magnitude of institutional impact and the aspect of causality. Following this general overview of the explanations of electoral participation, I now proceed to a more specific review of the literature concerning the effects of electoral institutions on voter turnout, dealing with the respective causal mechanisms in greater detail as well.

3. The effects of electoral institutions on voter turnout – a review of the literature

As shown in the previous chapter, scholars identified a multitude of factors influencing turnout and a lot of different models to explain turnout were developed. One factor that is generally claimed to affect turnout in elections is the electoral system (cf. Söderlund 2017, 516). Especially the proportionality of an electoral system is often seen as a factor with a positive effect on aggregate turnout. For this reason, many scholars – based on a high number of empirical studies – support the view that electoral systems based on proportional representation are more favorable to increase turnout levels compared to majoritarian electoral systems, which are characterized by higher levels of disproportionality. Besides the electoral formula and potential legal thresholds, the crucial variable determining the proportionality of an electoral system is district magnitude, i.e. a higher district magnitude is related to a higher level of proportionality. While district magnitude in majoritarian systems is one,[1] it is often much higher in PR systems. According to this, it is reasonable to expect that an electoral system change from a majoritarian system to a PR system should have a positive effect on turnout.

Moreover, the previous chapter has already indicated several unresolved questions with respect to the relationship between electoral systems and turnout. While research already made substantial progress in ascertaining "the consequences of electoral laws" (Rae 1971) for voter turnout, the causal mechanisms of how the design of electoral institutions shapes the individual decision to participate in an election are still debated, especially with respect to explaining the variation in aggregate-level turnout between different types of electoral systems. Furthermore, the debate is still going on about how strong the influence of electoral systems on turnout finally is or if they have an effect at all (cf. Dassonneville et al. 2017). As Stockemer (2017) highlights, the relationship between electoral systems and aggregate-level turnout seems to be weaker empirically than indicated by theory. Finally, also the discussion about the most adequate research design to grasp the effects of electoral systems on turnout and the respective causal links has not ended yet. Stockemer proposes three directions for future research on turnout: "(1) studies should be more context specific; (2) they should engage in systematic comparisons; and (3) they should focus on measurement" (Stockemer 2017, 712). In this dissertation, I aim at coming up to all three suggestions.

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[1] District magnitude is usually one in majoritarian systems, but this is no prerequisite. For instance, Mauritius uses a plurality system based on constituencies with a magnitude of two or three (International IDEA 2021).

In the following, I provide a definition of electoral systems and I briefly outline the aspect of their classification. Afterwards, I review the literature on electoral systems and their effects on electoral participation. As this dissertation deals with turnout in national legislative elections, I primarily focus on aggregate-level turnout. With respect to electoral systems, I focus on two of their basic dimensions: *electoral formula* and *constituency structure* (cf. Blais 1988). Besides these basic dimensions, the following facets of electoral institutions, their effects on turnout, and appropriate research strategies are to be discussed below: *compulsory voting*, *proportionality & district magnitude*, *the number of parties & mobilization*, *the magnitude of institutional impact & the role of context*, and *methodological considerations*.

Within the framework of this review, I trace the main lines of debate in that field of research since the last two decades and point out actual gaps and blurs. Taking these into account, I will mark out where I can particularly contribute to the literature on voter turnout with my dissertation. This should finally give an answer to the question about the consequences of electoral system change for the participation in elections.

3.1. Definition and classification of electoral systems

Electoral systems can refer to legislative elections as well as presidential elections. As I deal with legislative elections, I adopt the following definition: "*Electoral systems determine the means by which votes are translated into seats in the process of electing politicians into office*" (Farrell 2011, 4; original emphasis). More precisely, the electoral system is a subset of the electoral law, representing a set of rules which determine the form of voting as well as the translation of valid votes into seats in parliament (cf. Behnke et al. 2017, 57).

This definition allows for distinguishing three basic dimensions of electoral systems, respectively three elements that constitute electoral systems: the ballot structure, the constituency structure, and the electoral formula (Blais 1988; see also Rae 1971). While the dimension of the constituency structure especially addresses the magnitude of electoral districts, the dimension of the ballot structure covers the aspects of how votes are cast as well as how candidacy and the formation of party or candidate lists are regulated. The dimension of the electoral formula, finally, describes the method of how the translation of votes into seats is accomplished. For the electoral formula the fundamental distinction revolves around whether the distribution of seats allocated to a district relies on majority or proportional rule; majority

rule can either require a relative majority (plurality) or absolute majority of votes to win the seats that are distributed within a district and also proportional rule differs in its seat allocation quorum which is affected by the existence or absence of a legal threshold (cf. Behnke et al. 2017, 80).

For the classification of electoral systems three different approaches exist: The classification can either emanate from the *ideal-typical contrast between plurality vote and proportional representation* or it can rest upon *typologies* or *metric concepts* (cf. Behnke et al. 2017, 88). In line with the first approach, the literature distinguishes two different (arche-)types of electoral systems: systems of PR and majoritarian systems (referring to plurality systems, also denominated as first-past-the-post (FPTP) systems). Alternatively, it is possible to differentiate between permissive (PR) and restrictive (FPTP) electoral systems. Mixed electoral systems constitute a further group of systems which unify characteristics of PR and majoritarian electoral rules, although different configurations of mixed electoral systems are used in practice (cf. Farrell 2011, 93-118; Massicotte/Blais 1999). Probably the most prominent example of a mixed system is that of mixed-member proportional representation (MMP) used in national legislative elections in Germany and characterized by combining a majoritarian tier with single-member districts (SMD) and a PR tier.

The electoral formula – and thereby proportionality – is the basic difference between the two types of electoral systems. Proportionality is not only influenced by the formula, however. Especially district magnitude has a strong impact on the proportionality, respectively disproportionality, of an electoral system. District magnitude is often considered as the strongest factor in this respect, even stronger than the factor of the formula (cf. Behnke et al. 2017, 119; see also Taagepera/Shugart 1989, 112-125). Beyond this simplifying typology of electoral system types, it is hence reasonable to understand PR and FPTP systems to be located on two sides of a continuum of district magnitude with mixed systems being located somewhere in the middle. This is where metric concepts must come to the fore.

3.2. The impact of electoral systems on turnout

Research on the effect of the two types of electoral systems on turnout finds that at the aggregate level permissive systems lead to higher turnout compared to restrictive systems, i.e. there is a positive correlation between the permissiveness of an electoral system and the rate of voter

turnout. This result was found in several classical studies (Blais/Carty 1990; Blais/Dobrzynska 1998; Jackman 1987; Jackman/Miller 1995; Powell 1986) as well as in more recent works (Endersby/Krieckhaus 2008; summarizing: Blais 2006; Blais/Aarts 2006; Cancela/Geys 2016; Geys 2006). Previous studies suggested that more proportional systems could be seen as more "friendly" (Lijphart 1999) in terms of their inclusionary function, what should affect turnout positively. Further, recent research corroborates this finding and supports the claim that proportionality is a central feature of electoral systems for the explanation of cross-national differences in turnout (exception: Bowler/Donovan 2013). Eggers finds in a case study on the French municipal elections that PR is associated with an increase of turnout compared to plurality systems and identifies two mechanisms that are responsible for this effect: first, PR encourages turnout in elections with relatively low competition, and secondly, PR leads to an increase in the number of candidates, respectively increases the number of competing lists (Eggers 2015).

While these empirical findings suggest a clear-cut relationship between different types of electoral systems and turnout levels, the scholarly literature strongly disproves this notion. For one, the literature is replete with contradictory findings. Especially regarding the relation between the proportionality of an electoral system and turnout several critical points in the scientific debate on the topic remain open. As outlined in section 2.2.2., the overall relationship between the electoral system and aggregate-level turnout diminishes in more recent studies (Cancela/Geys 2016; Stockemer 2017). This is at least in part due to the difficulties in reproducing the abovementioned empirical findings outside of established democracies (cf. Blais/Aarts 2006, 193). At its core the debate revolves around the causal mechanisms through which electoral institutions should finally affect voter turnout. Beneath, I systematically review the literature on the effects of electoral systems on the participation in elections, focusing on five subject areas which represent the most prominent part in the discussion about the object of research.

The definition of these five subject areas draws on Blais' (2006) review article *What Affects Voter Turnout?* and in the following, I place them in the larger context of the discussion about the relationship between electoral systems and turnout. The first three subject areas represent three institutional factors that should play a role concerning the impact of electoral systems on the participation in elections. Figure 4 illustrates the causal order at the aggregate level with respect to these three factors and turnout. The fourth and the fifth subject area go beyond particular institutional factors, dealing with the impact of institutional variables on voter

turnout in general and how the relationship between electoral systems and turnout can be examined most appropriately.

contextual factor				intervening mechanism		
compulsory voting	$\longrightarrow$	*electoral system*	$\longrightarrow$	*party system*	$\longrightarrow$	*turnout*
$\uparrow$		$\uparrow$		$\uparrow$		
(1)		(2)		(3)		
existing or absent; enforced or not enforced		proportionality & district magnitude		the number of parties & mobilization		
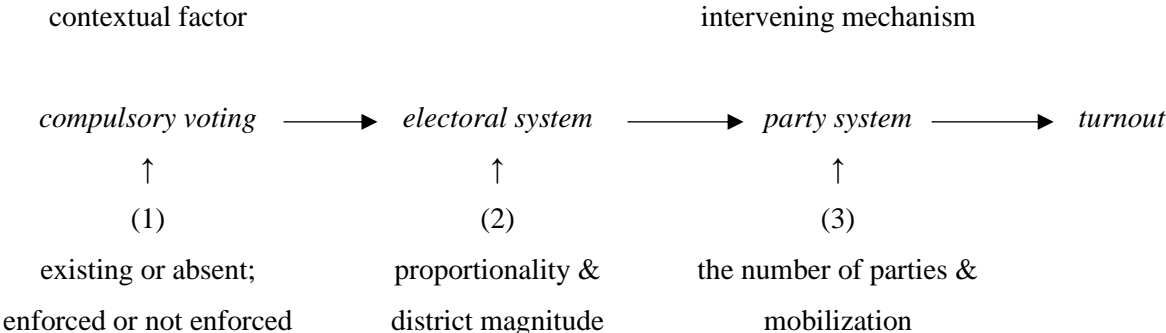
Figure 4: The impact of electoral systems on turnout – an institutional chain of causality

The subsequent discussion pertains to the following five subject areas:

(1) *Compulsory voting:* While there is wide consensus that compulsory voting has a positive effect on turnout, there is still some debate to which extent this effect is dependent on sanctions and, not to forget, their enforcement. With respect to the impact of electoral systems, the existence of compulsory voting represents a preceding factor that might superimpose the potential effect of the electoral system on turnout as mandatory voting increases voters' costs for abstaining in either case. It is hence about determining the additional impact of compulsory voting in comparison with the influence that originates from the electoral system.

(2) *Proportionality & district magnitude:* As stated above, there is quite strong empirical evidence that turnout is higher in PR systems and systems with larger districts. However, "there is no compelling explanation of how and why, and the pattern is ambiguous when the analysis moves beyond well-established democracies" (Blais 2006, 116). The difficulty that many findings concerning the effect of electoral systems on turnout do not seem all too robust remains largely unchanged (cf. Blais/Daoust 2020, 5). I will review several of the theoretical mechanisms that were proposed by now to account for this relationship. Two salient explanations are considered in greater detail within the scope of the fourth and the fifth subject area.

(3) *The number of parties & mobilization:* One main argument in the literature why PR should increase turnout is that proportional systems lead to a higher number of parties. Most

empirical studies report a negative correlation between the number of parties and voter turnout, though. This, certainly, raises the question about the possible contradictory consequences of a higher number of parties (cf. Blais 2006, 118). Accordingly, I will review the disputed role of party system fragmentation as a causal mechanism to convey the impact of the electoral system on voter turnout.

(4) *The magnitude of institutional impact & the role of context:* While earlier studies saw institutional factors as main variables to explain cross-national turnout differences, later research finds only a rather weak impact of (electoral) institutions that is also conditional on the presence of other factors. Consequently, further questions on this topic remain. Especially, "the fact that the influence of many factors […] on turnout is inconclusive demands more contextual analysis" (Stockemer 2017, 712). Recent research emphasizes the mediating impact of context on the incentives for voting behavior originating from electoral rules (Ferree et al. 2014). The respective strand of research especially deals with the size of party systems as the outcome. Within the relationship between electoral systems and turnout party systems are not an outcome but an intervening mechanism, though (see Figure 4). I will discuss the role of context with respect to the influence of electoral systems on turnout but focus hence on the question about the impact of institutions at all regarding electoral participation. In other words: How much do contextual factors ultimately affect voter turnout?

(5) *Methodological considerations:* With respect to the study of electoral systems and their impact on turnout "the analysis should be dynamic" (Blais 2006, 121). Especially the inquiry of electoral reforms can only be accomplished with longitudinal models. While the availability of according data developed strongly during the last twenty years, the further debate shifted towards not merely taking data at the national level into account but increasingly data at the district level. This allows for a direct measurement of district magnitude what is not only a finer grained operationalization of the electoral system type (cf. Stockemer 2017, 705), but it is the electoral districts where the translation of votes into seats actually occurs. I discuss these methodological aspects within the scope of a fifth subject area as they clearly pertain to the question of how to "properly […] [identify] the *causal* effect of electoral systems on voter turnout" (Cancela/Geys 2016, 268; original emphasis).

3.2.1. Compulsory voting

Similar to vote-facilitating rules, which should generally have positive effects on turnout (Smets/van Ham 2013), and voter registration requirements, which were predominantly found to depress turnout (Cancela/Geys 2016; Stockemer 2017), compulsory voting is a legal measure to influence turnout that is exogenous of the electoral rules. For this reason, I do not deal with vote-facilitating rules or voter registration requirements. Compulsory voting, though, necessarily needs to be considered for the study of electoral system effects on voter turnout for two reasons. First, empirically it is more or less the only indicator that unarguably boosts turnout levels when it is in force. Secondly, within the chain of causality pertaining to the impact of electoral systems on turnout, compulsory voting precedes the factor of the electoral system (see Figure 4). Thereby, compulsory voting affects the relationship between the electoral system and turnout by superimposing, respectively dissolving, the effects originating from the electoral system as mandatory voting directly alters the individual calculus of voting.

Irrespective of the role of compulsory voting from a normative perspective (see section 2.1.), empirically the findings on the impact of compulsory voting on turnout clearly show a positive effect. The positive effect of mandatory voting on turnout was already found in older studies (e.g. Blais/Carty 1990; Jackman 1987) and also more recent reviews and meta-analyses confirm the finding that turnout at the aggregate level is higher in compulsory systems compared to systems where this measure does not exist (Blais 2006; Cancela/Geys 2016; Geys 2006; Stockemer 2017). Studies which take the individual level of turnout into account find similar effects (Smets/van Ham 2013). Not only are turnout levels raised by compulsory voting but also turnout variability is significantly reduced by making voting mandatory (Selb 2009). Accordingly, compulsory voting is a highly important variable when analyzing the effects of electoral systems on voter turnout.

The literature also found evidence that the size of the effect of compulsory voting on turnout is dependent on respective sanctions and their enforcement (e.g. Norris 2004; Stockemer 2017). As stated above, compulsory voting finally affects the individual calculus of voting as sanctions can significantly increase the personal cost of non-voting. The consequences of different regulations on compulsory voting are illustrated by empirical research. So, voters in systems with compulsory voting abstain least from the polls when sanctions and the likelihood of their enforcement are high and, vice versa, abstain most when both is irrelevant (Panagopoulos 2008). This relationship can be observed at the aggregate level as well as at the individual level. According to this, recent research confirms the aggregate-level findings

concerning the effect of sanctioned mandatory voting and ascertains that individual-level factors are definitely relevant for turnout, but strict compulsory voting still increases electoral participation at any rate (Singh 2011a).

At the same time, parts of the electorate abstain from voting even in countries where voting is compulsory. Two main sources of abstention under mandatory voting exist, even though only the first one has direct consequences for turnout: Either these persons abstain illegally or, especially in countries where compulsory voting is enforced, they resort to invalid voting (Katz/Levin 2018; Singh 2019). With respect to the influence of electoral systems on voter turnout it is hence necessary to determine the additional impact stemming from compulsory voting, but it requires as well to consider enforced and non-enforced mandatory voting separately as enforced compulsory voting is expected to affect turnout more strongly.

3.2.2. <u>Proportionality & district magnitude</u>

Within the scientific debate on the effects of electoral institutions on voter turnout especially two – closely interrelated – properties of electoral systems are at the center of attention: the electoral formula and the magnitude of electoral districts. The formula determines the type of electoral system, although the actual proportionality of an electoral system is especially influenced by district magnitude (see section 3.1.). A significant number of empirical studies, mostly cross-sectional studies including large cross-national comparisons and case studies at different levels, was carried out to examine the impact of the electoral system type on turnout, predominantly finding a positive relationship between PR systems and participation in elections. However, several studies also report contradictory findings concerning the relation between PR and turnout and the results from recent meta-level research on aggregate-level turnout indicate that the link between proportionality and increasing turnout is not that obvious as it often seemed (Cancela/Geys 2016; Stockemer 2017).

Besides the empirical findings, the discussion about the impact of electoral systems on turnout revolves around the causal mechanisms that should account for the relationship between electoral systems and the participation in elections. The crucial question relates to the microfoundations of institutional effects: How exactly do macro-level factors influence decisions at the micro-level, i.e. an individual's decision to vote or to abstain from voting? In other words, pertaining to this dissertation: *Why* do changes of the electoral system affect the participation in elections and which mechanisms of explanation are at work? The critique that

many empirical models in political science lack the respective microfoundations (Achen 2002) often also applied to analyses concerning PR and turnout. Many suggestions to fill this gap were made during the last two decades, however, and the debate is still ongoing. I assess the proposed mechanisms thoroughly in this review and identify the actual critical points where my personal contributions set in. In this section I am going to scrutinize the "proportionality-turnout nexus" (Selb 2009) and the "district magnitude-turnout nexus" (Stockemer 2015, 83). The first part of this section deals with the theoretical arguments concerning these nexuses, while the second part considers the respective empirical evidence.

3.2.2.1. <u>The theoretical arguments</u>

During the last decades, countries using PR consistently showed higher levels of aggregate turnout compared to countries with a majoritarian electoral system: scholars especially sought to explain why PR systems should foster turnout. The literature has put forward some arguments as to why turnout should actually be higher in majoritarian systems (cf. Ladner/Milner 1999, 236). The core argument revolves around higher accountability in majoritarian systems, respectively the attribution of responsibility to the incumbent government. As laid down by Duverger (1954), majoritarian systems tend to produce two-party systems while PR systems are associated with multiparty systems. A higher number of parties increases the likelihood for the formation of coalition governments, though. This, in turn, leads to less decisive election outcomes because the final composition of the government does not follow from voters' direct selection but from the agreements made by the parties in the legislature (cf. Blais 2006, 118; see also Jackman 1987; Downs 1985). In this respect, sometimes an apparent connection between the personal vote choice and the election outcome is lacking in PR systems, what "makes it harder to work out the optimal voting strategy and increases dissatisfaction with the electoral system as such" (Geys 2006, 651). This connection is usually more clear-cut in majoritarian systems where one-party governments are predominant. Also from a more general perspective, proportional systems may be more difficult to understand for the average voter compared to majoritarian systems. Accordingly, higher complexity and difficult accountability of PR systems can have a negative effect on turnout and increase inequalities of electoral participation (Pardos-Prado et al. 2014).

On the flip side, the proposed mechanisms concerning the positive effects of proportional electoral systems on turnout are manifold. Especially three arguments prevail within the literature. The first argument why turnout is expected to be higher in systems of PR

is based on the high disproportionality of majoritarian systems: A plurality system "may lead potential voters to believe that their vote is of no importance (especially supporters of the smaller parties) and will restrain them from going to the poll booth" (Geys 2006, 651; cf. Jackman 1987 and Ladner/Milner 1999). The argument is again based on the classical notion that PR generally should lead to multiparty systems, while majoritarian systems finally induce two-party systems (Duverger 1954). Consequently, as restrictive systems make it quite difficult for smaller parties to gain parliamentary representation, supporters of minor parties could potentially be distracted from participating in an election as they risk "wasting" their vote if they want to vote for their preferred party (cf. Endersby/Krieckhaus 2008, 602).

As PR systems are likely to produce multiparty systems, the second argument adds the notion that if there is a higher number of parties, voters have more choice. In the end, this should make it more likely for them to find a party that fits best to their views and demands. Additionally, more choice concerning political parties should make a smaller number of citizens feel indifferent or alienated from the party system (cf. Blais/Aarts 2006, 184). Another mechanism through which a higher number of parties could positively affect voter turnout is prominently discussed in the literature: mobilization (for a detailed evaluation of the positive and negative effects of the number of parties and mobilization on turnout: see section 3.2.3.). Basically, the argument states that multiparty systems should have a positive effect on turnout by generating a higher overall level of voter mobilization and by strengthening partisan attachments. In this respect, also the process of "subcontracting", as a way of creating strong party-group linkages, and higher efforts of voter mobilization in PR systems in general, amongst other things caused by a higher number of parties competing for votes, may be one reason for higher turnout in proportional systems (Cox 1999b; 2015).

Thirdly, some authors argue that more proportional forms of electoral systems increase voter turnout by raising individual-level political efficacy, especially for supporters of minority candidates (cf. Bowler et al. 2001, 904; Banducci/Karp 2009; Karp/Banducci 2008; Norris 2004). In this respect, *vote efficacy* can be defined as "the feeling that one's vote is potentially decisive" (Banducci/Karp 2009, 110) and the causal link between vote efficacy and proportionality depicts the theoretical counterpart to the argument of "wasted votes" in disproportional systems. As stated in the second argument above, PR systems usually yield a higher number of parties, i.e. multiparty systems, thereby offering voters more choice at the polls and offering political parties more possibilities to draw an ideological distinction with respect to their contenders. So, party system fragmentation is one mentioned factor to create

higher levels of political efficacy. In addition, as in PR systems the number of voters to cast "wasted votes" is usually much smaller compared to voters in majoritarian systems, PR should thereby increase political efficacy, especially among voters of minor parties, as the electoral system is rather perceived as fair (cf. Banducci/Karp 2009). Consequently, this notion emphasizes the "symbolic effects" (Blais/Carty 1990, 179) associated with electoral systems.

Closely linked to the different types of electoral systems is the size of the constituencies as the factor of district magnitude significantly affects the proportionality of a system, i.e. larger districts are generally linked to higher proportionality as votes are translated into parliamentary seats with less systematic distortions (Blais/Carty 1990; Duverger 1954). In line with the aforementioned theoretical arguments why PR should positively affect voter turnout, the literature also suggests a causal link why larger constituencies should have a positive effect on electoral participation. Regarding district magnitude, the competitiveness within districts is seen as a crucial factor in PR systems to boost turnout. So, "many single member districts are noncompetitive, and since the outcome is predetermined citizens have very little incentive to vote" (Endersby/Krieckhaus 2008, 602).

The argument, that lower levels of aggregate turnout in majoritarian electoral systems are caused by different patterns of turnout over constituencies due to variable intensities of local party competition, was finally worked out in greater detail and empirically tested by Selb (2009). Selb's elite mobilization model departs from the assumption that not only voters but also parties behave strategically, what means that "parties mobilize their potential voters if the benefits gained through winning parliamentary seats, weighted by the probability that the mobilization effort will be decisive, exceed their mobilization costs" (Selb 2009, 531). Party mobilization should generally have a positive effect on turnout because it reduces voters' costs of voting, for instance via decreasing information costs or the difficulty of voting, and it can give voters an indication of how close the race will be (cf. Selb 2009, 531). Parties' mobilization efforts are influenced by the electoral system, though. While majoritarian systems are based on SMDs, PR relies on multi-member districts. A party's chance of winning a seat is often higher in multi-member districts, mainly depending on the magnitude of the district, what should affect the mobilization efforts of parties behaving rationally. That means when the threshold of exclusion increases, mobilization efforts and turnout should be more variable over districts as well as over time, the higher inter-district variability in turnout, in turn, inevitably causes lower national-level net turnout (cf. Selb 2009, 532). In addition, while majoritarian systems only operate at the level of the SMDs, upper tiers exist in many other electoral systems. These upper-

tier corrections should lead to higher overall turnout levels, reduce the effects of intra-district competitiveness on turnout, and decrease the variability in electoral participation over districts (cf. Selb 2009, 533).

3.2.2.2.   The empirics

As outlined above, the literature provides compelling arguments as to why one should expect a positive relationship between proportionality and turnout as well as between district magnitude and turnout. What are the findings of empirical studies examining these connections? Starting with the evidence concerning the proportionality-turnout nexus, the picture is quite unclear. While a majority of well-known earlier studies reported a positive effect of PR on voter turnout (see section 3.2.), recent meta-analyses are more cautious with drawing similar conclusions in terms of the impact of different electoral systems. Generally, the majority of studies is still in line with the position that PR systems have a positive effect on turnout. It is remarkable, though, that especially in recent years several studies could not find such an effect (Cancela/Geys 2016). Stockemer (2017) clearly draws a sharper conclusion by assuming that the positive effect of PR in older works was caused by the selection of cases and "PR only has a positive effect on turnout in a minority of cases between 2004 and 2013" (Stockemer 2017, 711). This conclusion is in line with previous comparative research on the proportionality-turnout nexus including cases outside of the developed, respectively established, democracies in Western countries finding only a weaker effect of PR on voter turnout (Blais/Dobrzynska 1998; Endersby/Krieckhaus 2008) or no negative effect of disproportionality on turnout in new democracies (Gallego et al. 2012).

At the same time, there is still a considerable number of cross-national studies (e.g. Endersby/Krieckhaus 2008) or sub-national case studies (e.g. Funk/Gathmann 2013; Eggers 2015) that empirically support the proposed positive relationship between PR and turnout, at least in established democracies. Recent multilevel research also supports the negative impact of disproportionality on micro-level turnout, providing evidence that the individual turnout propensity is lower in plurality systems compared to more proportional systems (Singh 2011b). Finally, empirical studies find evidence for the suggested positive relationship between PR, vote efficacy, and turnout (Banducci/Karp 2009; Karp/Banducci 2008; Norris 2004). In addition, Banducci & Karp (2009) also accomplish to empirically prove several discussed causal mechanisms to be effective. They find evidence that the negative effect of disproportionality in majoritarian systems on efficacy is larger among supporters of small

parties (in PR systems there is no such gap between supporters of small and large parties at all), but when the number of government-forming parties increases efficacy generally declines (cf. Banducci/Karp 2009, 127). According to this, the authors conclude that "PR systems enhance efficacy, most effectively among small party supporters by producing proportional outcomes" (Banducci/Karp 2009, 127).

Which findings are obtained when considering the relationship between district magnitude and voter turnout in particular? In other words: What about the empirical evidence on the district magnitude-turnout nexus? Starting again from the perspective of meta-level research, empirically the proposed causal mechanisms between district magnitude and turnout, i.e. increasing voter mobilization and variations of local competitiveness of parties induced by proportionality, could not be supported empirically in the majority of respective studies (cf. Stockemer 2017, 704-705). The success rate for studies on the electoral system type and turnout is strongly dependent on the operationalization of the variable measuring the type of electoral system, however: When district magnitude is used to operationalize this variable instead of a dummy variable for PR, the success rate increases significantly (cf. Stockemer 2017, 704-705). This finding clearly points out the necessity for a metric measurement of the electoral system type in future analyses instead of relying on a simple typology, as the latter is associated with a great loss of information (see section 3.2.5.).

Recent research also finds evidence that the relationship between district magnitude and turnout is not linear, which is why the author proposes to categorize this variable for its use in empirical models (cf. Stockemer 2015, 97). Accordingly, the appropriate operationalization of district magnitude is a relevant task that analyses dealing with the consequences of electoral systems on voter turnout should cope with. Finally, also with respect to the influence of district magnitude on turnout the literature finds that the relationship between these two factors differs between Western and non-Western countries. While larger constituencies should positively affect electoral participation in Western countries, for non-Western countries this seems not be the case (e.g. Pérez-Liñán 2001; Fornos et al. 2004; Gallego et al. 2012; Stockemer 2015).

Why is this the case? Gallego, Rico & Anduiza (2012) find the age of a democracy to account for this difference: It takes time before the consequences of electoral systems actually manifest, suggesting that the effects of disproportionality and district magnitude in new democracies, which are mostly located outside the Western world, gradually equal the effects in old democracies. Stockemer (2015) takes a more skeptical position: He finds the difference between Western and non-Western countries concerning the impact of district magnitude on

turnout being highly persistent and proposes to pay more attention to cultural factors. This points to the role of context when considering the effects of electoral rules. Moreover, to resolve this question Stockemer suggests to analyze the relationship between district magnitude and turnout at the constituency level, "as the size of districts might vary within one country" (Stockemer 2015, 97).

3.2.3. The number of parties & mobilization

Electoral systems and the number of parties are strongly linked. Classical research outlined a conducive effect of PR on multiparty systems, while majoritarian systems should bring two-party systems about (Duverger 1954). Also, later studies clearly carved out a positive relationship between the proportionality of the electoral system and party system fragmentation, respectively a negative effect of the electoral system's disproportionality on party system size (e.g. Clark/Golder 2006; Lijphart 1999; Neto/Cox 1997; Ordeshook/Shvetsova 1994; Rae 1971). In the previous section the argument has been put forth, owing to this relationship between electoral system proportionality and the fragmentation of the party system, that the number of parties could be the driving force behind differences in turnout levels between PR and majoritarian systems. Especially two mechanisms were emphasized in this respect: A higher number of parties should, first of all, positively affect turnout by giving voters more choice at the polls and, secondly, increase turnout by raising the level of voter mobilization.

Empirical support for the positive effect of a higher number of parties on voter turnout is scarce and inconclusive. Ladner & Milner (1999) find a positive effect of a higher number of parties on electoral participation by mobilizing voters and a strengthening of partisan attachments, but the overwhelming majority of studies finds turnout to decrease with increasing party system fragmentation (e.g. Blais/Carty 1990; Blais/Dobrzynska 1998; Brockington 2004; Jackman 1987; Jackman/Miller 1995; Singh 2011b). Accordingly, Blais concluded "that if PR fosters turnout, it is not because it produces more parties" (Blais 2006, 119). Also the results of recent meta-analyses do not generally change this picture, finding mostly no direct effect of the number of parties on turnout (Cancela/Geys 2016; Stockemer 2017). All these findings suggest that the two main arguments discussed in the literature why a higher number of parties not necessarily increases turnout seem to be justified, i.e. first, that higher party system fragmentation makes coalition governments more likely, what reduces the direct influence of voters on government formation and thereby the likelihood to turn out (Jackman 1987). And secondly, that not the number of parties per se is the decisive factor but the variations in intra-

district party competition in majoritarian systems compared to PR systems showing evenly high levels of local competitiveness (Selb 2009).

With reference to the strand of research focusing on party competition in different electoral systems, the aspect of voter mobilization is still widely discussed in the literature. Here, the majority of studies finds that PR systems increase voter mobilization (exception: Rainey 2015). Cox identifies "subcontracting" as the crucial mechanism behind the higher turnout rates in PR systems compared to plurality systems (Cox 2015). Here, subcontracting is defined as parties' act of paying "affiliated interest groups to mobilize their own members" (Cox 2015, 53). The author explains more subcontracting and, according to this, higher turnout rates in PR systems compared to plurality systems by assuming that "the probability that any given interest group's members will have high loyalty to a particular party is higher under PR than under SMD" (Cox 2015, 53).

Similarly, Cox, Fiva and Smith make use of models of elite mobilization for their case study on the effects of the 1919 electoral reform in Norway where a former plurality system was transformed to a PR system (Cox et al. 2016). In their paper the authors expect that a change from single-member districts (SMD) to multi-member districts does not necessarily increase turnout, as this should depend on the competitiveness of the electoral districts before the reform. So, their elite mobilization models predict a "contraction" of mobilization incentives after the adoption of PR, causing lower turnout in highly competitive districts before the introduction of the reform, but higher turnout in the other districts. The authors find strong support for this prediction of their models when analyzing the Norwegian data empirically. Interestingly, recent empirical research shows that, unlike large parties, small parties do not change their behavior with respect to mobilization when the electoral system, and thereby the number and magnitude of districts, changes (Lago et al. 2019). Accordingly, the impact of district magnitude on party mobilization is also dependent on the size of a party. Altogether, the studies on local competitiveness clearly reveal one thing: For an adequate analysis of electoral system effects on voter turnout it is essential to take the district level into account (see section 3.2.5.).

Turning again to the effects of the number of parties on voter turnout. The aforementioned discussion in the literature that, on the one hand, multiparty systems enable a better matching of voter preferences with a certain party what should increase turnout and, on the other hand, systems with many parties produce too many alternatives what should decrease turnout, is picked up by a recent study on turnout in developing democracies (Boulding/Brown 2015). The authors make use of data from local elections in Brazil and Bolivia and argue that

the relation between turnout and the number of parties is conditional on the electoral system. They find some evidence for their assumptions that under PR systems, large numbers of parties increase turnout, while under FPTP systems, large numbers of parties decrease turnout.

Finally, Taagepera, Selb and Grofman (2014) propose a promising model concerning the discussed positive and negative consequences of multipartyism for turnout. The authors develop a formal "logical model" to examine the relation between N (number of parties) and T (turnout) that is subsequently tested empirically, based on district-level data, confirming their theoretical expectations, also with respect to the older debate on the relationship between the number of parties and voter turnout (cf. Taagepera et al. 2014).

> "We hypothesize that for very low N (however caused), the number of distinct choices are limited and hence, ceteris paribus, the incentive to vote might be slightly depressed; and that for very high N (however caused), the distinction among choices is reduced and the number of choices is high leading to limits on cognitive processing and hence, ceteris paribus, the incentive to vote might again be slightly depressed. This simple model predicts a central hump. The remarkable thing is that for most countries our data analysis (involving 237 national elections in 17 countries, with a total of 23,000 district observations) does find this hump, often in the face of scatter that should make detection impossible" (Taagepera et al. 2014, 410).

Summing up, the implications of the number of parties and voter mobilization as potential causal mechanisms to put forth the effects of the electoral system on turnout have been sketchy for a long time and empirical evidence triggered contradictory evaluations of the causalities. By now, more recent empirical studies allow for a clearer view on the relationships between the contemplated factors, though. New theoretical and empirical models help making progress on these issues, but it remains open to what extent the number of parties actually serves as the decisive intervening mechanism between the electoral system and turnout. Probably the relationship between the party system and turnout is rather spurious or affected by contextual factors. This needs to be considered within a research design.

3.2.4. The magnitude of institutional impact & the role of context

The previous sections of this review illustrate that there is surely convincing evidence that electoral institutions indeed matter for explaining turnout, although in an even complex manner.

Picking up the question addressed at the beginning of this chapter, whether electoral systems have an effect at all, this question must be answered positively: "To some extent voters are influenced by electoral rules, and they adapt their behaviour accordingly" (Dassonneville et al. 2017, 511). The crucial complexity is to finally grasp the extent to which this is the case. With respect to electoral participation, it seems that institutions (especially compulsory voting) are important for increasing turnout but neither a universal remedy nor a guarantee of high turnout (cf. Stockemer 2017, 711). The comparison of studies dealing with the impact of electoral systems on turnout reveals that the size of the observed effects varies considerably, irrespective of the form or level of analysis. Most classical studies arrive at much larger effects compared to more recent analyses. Determining the size of electoral system effects on turnout is definitely a necessary task that needs to be approached. With my dissertation I hope to bring new evidence on this aspect about.

When addressing the question about the size of electoral system effects on turnout, it is essential to take the context in which electoral rules operate into account. Here it is to point out the different meanings of context. I generally refer to the meso- and macro-level factors that should influence turnout as "contextual factors". Regarding the effects of electoral rules, context describes all factors to affect the causal chain linking electoral rules and outcomes that are "external to the electoral rule itself" (Ferree et al. 2014, 423). Both aspects of context are related, though, as the context in which electoral rules operate should finally explain the weakening of their effects in the more recent literature and the differences in the effects of electoral systems between established and new or developing democracies. The irreproducibility of the effects of proportionality and district magnitude on turnout outside of the industrial democracies has led to the conclusion already in earlier works that "[t]he impact of electoral systems on turnout is either contingent on other contextual factors or it is much weaker than the initial pioneer studies had led us to think" (Blais/Aarts 2006, 190).

Context plays a crucial role for the functionality of electoral institutions in general and is especially relevant when considering the variation in the effects of electoral rules across established and new democracies (Moser/Scheiner 2012; Ferree et al. 2013; 2014). Section 3.2.2.2. referred to the puzzle that higher proportionality and higher district magnitude seem to have a positive effect on turnout in Western countries but not in most cases outside of the Western world. This induced the question whether the discrepancy is due to the age of a democracy, suggesting a convergence of the effects of electoral systems in new democracies towards the effects in established democracies over time (Gallego et al. 2012), or to permanent

cultural context (Stockemer 2015). Probably the one explanation does not exclude the other. The age of a democracy is itself rather an important factor within the contextual framework shaping the effects of electoral rules. The extent of democratic experience is at least the most prominent factor in terms of the impact of electoral systems on strategic voting behavior (cf. Ferree et al. 2014, 429-430; see also Tavits/Annus 2006; Lago/Martínez i Coma 2012; Moser/Scheiner 2012). It is hence reasonable to adhere to learning models of the effects of electoral systems and to consider the temporal dimension as well for the impact of electoral systems on voter turnout.

With respect to the effects of electoral rules, Ferree, Powell & Scheiner (2013; 2014) classify context into two categories, namely coercive and noncoercive contextual factors. Coercive contextual factors refer to measures of direct political interference that prevent formal institutions from working as anticipated, for instance election fraud or the use of violence and intimidation to manipulate election outcomes, while noncoercive contextual factors comprise all factors that do not affect the mechanical effects of electoral rules but may have an impact on electoral systems' psychological effects, such as the abovementioned age of a democracy, social diversity, development or other institutions in general (cf. Ferree et al. 2014, 423). The distinction between coercive and noncoercive contextual factors already hints at the varying role of context to shape the effects of electoral systems in new and established democracies: While noncoercive contextual factors exert their influence in a certain manner in all countries, coercive contextual factors are mostly less present in established democracies.

How exactly does context affect the effects of electoral rules? Ferree, Powell & Scheiner (2013; 2014) consider the *length* of the causal chain and the *type* of causal linkages between electoral rules and outcomes to be decisive for the impact of context. The length of the causal chain matters for the role of context as "the longer the causal chain connecting rules to an outcome, the more context should alter the relationship" (Ferree et al. 2013, 811). Concerning the type of causal linkages between electoral rules and outcomes the authors distinguish *mechanical* from *behavioral* causal linkages, following the established distinction between the mechanical and psychological effects of electoral systems (Duverger 1954). The mechanical effects of electoral rules directly stem from the mathematical conversion of votes into seats, being unaffected by the behavior of voters and parties, while the psychological effects of electoral rules refer to voters' or parties' behavioral adaptation to exactly those mechanical effects. That is why contextual factors should have a stronger impact on behavioral causal linkages compared to causal linkages that are mechanical (cf. Ferree et al. 2013, 811). The two

types of causal linkages are not equally affected by coercive and noncoercive contextual factors, though: "Noncoercive contextual factors mediate behavioral mechanisms but not mechanical ones, whereas coercive contextual factors can mediate both kinds of mechanisms" (Ferree et al. 2014, 424).

To what extent is this framework applicable to the effects of electoral systems on voter turnout? Considering the causal chain at the aggregate level (see Figure 4), it is not exceedingly long as I construe compulsory voting to precede the electoral system within the causal order. The party system hence represents the only intervening mechanism within the causal relationship between the electoral system and turnout. The causal chain between electoral rules and turnout still enables context to affect this relationship, though. As will be seen, based on my case selection especially noncoercive contextual factors should play a role. In addition, with respect to the consequences of electoral systems for turnout it is primarily about the behavioral linkages. This leads back to the question of the impact of contextual factors on turnout at all and to what extent contextual factors ultimately affect the decision to turn out or not at the individual level.

The overview of the factors to affect turnout in chapter 2 is based on the distinction between turnout at the individual level and aggregate-level turnout. This subdivision reflects the two traditionally separate streams of research on turnout:

> "One stream is based on aggregate turnout data and focuses on the contextual-level factors (mostly institutional) that are associated with lower or higher participation rates. The second is based on survey data and examines the individual-level factors (mostly attitudinal) that are associated with the propensity to vote" (Blais/Daoust 2020, 14).

As already highlighted in chapter 2, the more recent works that combine these two streams generally find contextual factors, including the electoral system, to have only a weak impact on individual-level turnout, respectively contextual factors do not significantly alter the impact of individual-level variables on the propensity to vote or to abstain (Nevitte et al. 2009; Blais/Daoust 2020). At the same time, some contextual factors may still be relevant in this respect. For instance, the role of context to link the micro-level with the macro-level is substantiated empirically regarding the factor of voter efficacy (Banducci/Karp 2009). What

does this mean for the influence of electoral systems on the individual-level decision to turn out or not in general?

Recent research illustrates the conditional effect of electoral systems on the individual turnout decision calculus as posited by models of rational choice (for a critical experimental assessment of the rational turnout calculus: see Blais et al. 2014). Singh (2011b) formally argues and empirically demonstrates that in PR systems the traditional rational model of micro-level turnout is correct, i.e. there is a positive relationship between the individual expected utility and turning out. In plurality systems, however, the relationship between one's propensity to participate in an election and the expected utility from casting the personal vote for the preferred party is much weaker. In this case, individual decision-making processes are then, amongst others, especially influenced by several election-specific contextual factors (cf. Singh 2011b). These contextual parameters comprise a high number of individual-level factors but also the aforementioned factors of efficacy and compulsory voting. In a nutshell, "participation begins with individually held attributes, but is conditioned by institutional rules" (Singh 2011b, 653). It becomes apparent that the role of context on the micro-level turnout calculus differs between permissive and restrictive electoral systems. I will revert to these aspects in more detail within my theoretical framework that is presented in the next chapter.

3.2.5. Methodological considerations

The review of the literature dealing with the relationship between electoral systems and voter turnout necessitates to finally take a look at the discussions evolving from the aspects of methodology and data. These aspects are also highly relevant in terms of the contributions of this dissertation. First of all, the diagnosis is still correct that, despite several decades of research on the phenomenon, an established "core model" of voter turnout is still lacking (Geys 2006; Smets/van Ham 2013; Stockemer 2017). Nevertheless, the study of the effects of electoral institutions on voter participation made substantial progress until today what is largely due to the developments concerning empirical models and the availability of appropriate data. The review of the respective literature clearly points out two paths for the further analysis of electoral system effects on turnout: the estimation of dynamic models and the use of district-level data.

While earlier research on the relationship between electoral systems and turnout focused on the national level, by now a number of studies has set out to scrutinize the effects of PR and

FPTP systems at the sub-national or at the constituency level. As this review has shown, it is a promising research strategy to analyze the effects of electoral systems on turnout at the district level, so to speak "the roots of an electoral system". First, only analyses at the constituency level are finally able to grasp the district magnitude-turnout nexus (Stockemer 2015). Secondly, also the proportionality-turnout nexus requires to take the district level into account. Based on the argument that the inter-district volatility of party competition should generate the observed differences in aggregate-level turnout between PR and majoritarian systems, only the application of district-level data allows the precise observation of mobilization efforts in each district and the difference in turnout numbers (Selb 2009). A number of recent empirical studies also contends that analyzing the effects of electoral systems on turnout at the most basic level where votes are translated into seats is the most promising further way for this strand of research (e.g. Eggers 2015). Hence, I assent to Selb's point of view: "Many contextual models of voting behavior and party competition naturally operate at the level where votes are transformed into seats and not exclusively at the national level of electoral systems" (Selb 2009, 544).

The necessity for dynamic models stems from the need to improve our understanding of the conditional effects – extensively presented above – of electoral systems on turnout. Dynamic models should permit identifying the respective causal relationships as "the logical way to ascertain the impact of a variable on turnout is to examine whether turnout increases or decreases when that variable changes" (Blais 2006, 121; see also Franklin 2004). That is why it is useful to particularly consider changes in electoral systems. Generally speaking, the analysis should not only be cross-sectional but needs to include the dimension of time as well (the methodological benefits and drawbacks of time-series cross-sectional analyses will be discussed more detailed in the chapters 5 and 6). The dimension of time is important for the realization of the effects of electoral rules even beyond the aspect of causality. Electoral systems, on the one hand, exert mechanical effects in terms of the translation of votes into seats and, on the other hand, psychological effects pertaining to the impact of the electoral system on the strategic behavior of voters and parties (Duverger 1954). The temporal dimension is relevant in this respect as research suggests that – unlike the mechanical effects which should have immediate consequences – the psychological effects emanating from recently established or changing electoral systems unfold over time, what is due to learning processes of voters and parties regarding the adaptation to the incentive structure generated by the new electoral rules (Tavits/Annus 2006; Best 2012; Crisp et al. 2012; Gallego et al. 2012; Harfst 2017).

While the temporal dimension was especially considered in analyses dealing with the impact of generational change on turnout decline (e.g. Blais/Rubenson 2013; Franklin 2004; Franklin et al. 2004; Gallego 2009; Vowles 2010), also some recent studies on electoral system effects accommodate the demand for their dynamic modeling with respect to the number of parties (Best 2012), but also to voter turnout (Gallego et al. 2012). The study by Gallego, Rico and Anduiza (2012) clearly highlights the need for the analysis of preferably long time-series data as they empirically demonstrate that it takes time until the consequences of electoral systems are fully unfolded. This also points out the drawbacks of ignoring the dynamic effects of electoral institutions: "One cannot expect the consequences of electoral systems to be visible immediately after they are adopted" (Gallego et al. 2012, 168). Based on their temporal model the authors find support (in contrast to some other studies) for two theoretical arguments why disproportionality should depress turnout: the argument of "wasted votes" in majoritarian systems and the argument of more competitive districts in PR systems.

These findings advise caution with respect to drawing early conclusions about the consequences of electoral systems on voter turnout without taking the temporal dimension of this relationship into account. Otherwise, the effects of electoral reform may be overstated in the short run (Karp/Banducci 1999) and finally be proven not to persist in the long term (Vowles 2002; 2010), as the prominent 1993 case of electoral system change in New Zealand exemplifies. Finally, the development of dynamic models should also help to cope with the problem of endogeneity in electoral studies (cf. Benoit 2002), what is quite relevant regarding the research question of this dissertation. For instance, due to the problem of endogeneity that is associated with the use of cross-sectional data, Bowler and Donovan advance a critical view on the positive effect of the adoption of a PR system on turnout, especially because many of their own findings even contradict this claim (cf. Bowler/Donovan 2013, 64-79). The adequate determination of the causal impact of electoral systems on voter turnout is thus a crucial task to cope with.

3.3.   Conclusion

What has research been able to tell us about the consequences of electoral systems for turnout? For one, the literature provides no fully consistent picture. While there is convincing empirical evidence supporting a link between proportionality and the participation in elections in earlier

studies, this link has weakened in the more recent literature (Cancela/Geys 2016; Stockemer 2017). Against this background, the key debate centers on the causal links between electoral institutions and voter turnout.

This literature review identified a set of unresolved questions regarding the relationship between electoral systems and turnout. First, while it is undisputed that compulsory voting increases turnout, it is to assess its additional effect within models of the impact of electoral systems on electoral participation and to what extent this effect increases when compulsory voting is enforced. Second, the difference between Western and non-Western countries concerning the effects of district magnitude or electoral institutions in general on turnout points to the more general question: Does it only take time for voters to adapt to the incentives generated by the electoral system in new democracies or does this difference stem from the permanent cultural and country-specific context? Third, to what extent does the number of parties actually have "contradictory consequences" (Blais 2006, 118) for turnout? It is about clarifying the role of the number of parties as a causal mechanism to convey the influence of the electoral system on voter turnout. Fourth, besides the direction of electoral system effects on turnout, the debate on the actual magnitude of the impact of institutions is still ongoing. On these grounds, in this dissertation I target to make a contribution to the strand of research determining the impact of electoral systems on voter turnout with respect to the direction of the effects as well as with respect to their magnitude.

Based on the review of the respective literature, it is apparent that the recent developments in terms of methodological innovations and the availability of better data, i.e. district-level data covering longer periods of time, will definitely help finding answers to the open questions concerning the effects of electoral systems on turnout. Accordingly, I contribute to this research tradition by analyzing the context and the consequences of electoral system change for voter turnout with dynamic models, covering preferably long periods of time, and taking an internationally comparative perspective. Thereby, I challenge and refine previous findings in the literature that posit no substantial positive effect of electoral reforms towards more proportionality on voter turnout (cf. Bowler/Donovan 2013).

4. Theoretical framework and hypotheses

The literature review in the previous chapter indicated a series of unresolved issues pertaining to the relationship between electoral systems and voter turnout. It is to assess the additional impact of different severity levels of compulsory voting on turnout beyond the potential effects of the electoral system. It is to clarify as well the generality of the effects of electoral rules to answer the question to what extent electoral institutions produce similar effects in different countries when sufficient time has passed or whether differences in the effects of electoral systems persist due to the permanent country-specific context. Moreover, the number of parties as the causal link between electoral systems and turnout needs further examination as the theoretical importance of the number of parties disagrees with its actual relation to turnout from an empirical perspective (Stockemer 2017). Finally, the literature review identified the need to determine the magnitude of the impact of electoral institutions on turnout more clearly.

Beyond the number of parties, the literature review discussed several potential factors that should explain how contextual factors shape turnout at the individual level as well. In this context, the conditional effect of electoral systems on the individual turnout decision was mentioned. While the literature review in the first instance provided the causal chain of the impact of electoral systems on turnout at the aggregate level (see Figure 4), within the following theoretical framework I work out the underlying microfoundations of the interrelation between the micro- and the macro-level more precisely. For this purpose, I draw on a rational-choice institutionalist perspective.

Based on this model of the microfoundations of the relationship between electoral systems and turnout, I introduce five hypotheses to be tested empirically in the later chapters. These five hypotheses take up the abovementioned unresolved questions with respect to electoral systems and turnout by systematically addressing *the consequences for turnout when electoral systems change*. Hypothesis 1 describes the consequences of changes in the electoral system type, i.e. in the formula, while Hypothesis 2 more specifically posits the consequences of changes in district magnitude. Hypothesis 3 deals with the measures of compulsory voting, while the causal relationship between electoral system change, the number of parties, and turnout is covered by Hypothesis 4. Hypothesis 5, finally, is concerned with the temporal dimension of the consequences of electoral system change.

The review of the literature has illustrated the analytical leverage gained by focusing on changes in electoral institutions to determine their causal influence on voter turnout. At this

point it is necessary to explain what exactly is meant by electoral system change, though. That is why I first discuss the basic concept of electoral system change as the microfoundations of the impact of electoral system change on turnout and the hypotheses being addressed rely on this concept.

4.1. The concept of electoral system change

For the conceptualization of electoral system change it is necessary to start with some terminological clarifications. First and foremost, it is about discussing the difference between "electoral system change" and "electoral reform." Both terms are found frequently in the literature and many authors understand the terms as synonyms, respectively use "reform" and "change" interchangeably. Accordingly, also an electoral reform may be understood as "any change to status quo electoral arrangements" (Bowler/Donovan 2013, 9). While I adhere to this broad definition of electoral reform, in the subsequent analyses I prefer to use the term "electoral system change" for the same phenomenon. The use of change is more adequate because of two reasons.

First, while the term "electoral reform" is used widely in the literature, there is not necessarily a consensus about its meaning. Some scholars highlight the normative dimension of reform by hinting at the circumstance that real "reform must promise a progressive component, an advance over some status quo, and a sense of improvement" (Bowler/Donovan 2013, 2). In this respect, reform emphasizes the aspect of improvement and rather corresponds to the term "electoral engineering" (Norris 2004). This understanding also relates to the original meaning of the term, where the Oxford Dictionary provides the following definition of the verb "reform": "Make changes in (something, especially an institution or practice) in order to improve it" (Oxford University Press 2019). In a nutshell, when contrasting change with reform, the latter term emphasizes "a subtle but meaningful distinction that implies not simply alteration but also improvement" (Bowler/Donovan 2013, 2).

This understanding of the phenomenon is quite confining for my analyses. So, "change" is the term that allows for a broader definition that includes all occurrences of alterations of the electoral system, notwithstanding whether one deems the outcomes of these alterations positive or negative, respectively successful or unsuccessful. In addition, "reform" is a too narrow concept for my analyses as it also resonates an a priori political process with the alteration of

the electoral system as the endpoint. Especially with respect to electoral system change such a process is not always preceding. For instance, in many PR systems changes in district magnitude are the consequence of reapportionment, i.e. while the constituencies' geographical boundaries remain similar, district magnitude is regularly adapted to changes of the population. These adjustments are essentially an administrative rather than a political process. The implied a priori political process relating to the term "reform" finally leads to the second reason why the use of change is more adequate for my purpose.

This second reason is that the term "reform" with the aforementioned meaning is inadequate for my analyses as these do not address the processes preceding changes of the electoral system, but the *a posteriori* incidents following these changes. In other words: It is about the *consequences* and not about the causes. That is why referring to "reform" would semantically lead away from the intention of this dissertation. In respect thereof, analyzing the causes for and processes of electoral system change is a totally different story. Furthermore, these causes and processes are manifold. So, alterations of the electoral system may be initiated in the legislative or executive branch of the political system, motivated by strategic concerns or the sincere aim of improving the institutional status quo. Sometimes, alterations are the result of public demand, referendums or other processes of public participation. Finally, alterations of electoral institutions may be the result of judicial review (for an overview of the types of electoral reform and the respective processes, see Renwick 2010, 10-24; also see Benoit 2004, 366-373 and Benoit 2007). Following the two reasons considered above, I make use of the term "electoral system change" in the subsequent analyses.

A more differentiated theoretical conceptualization of electoral system change is needed to adequately assess its impact on turnout empirically. In the literature on electoral reform, there is an established differentiation between two categories concerning the scope of reform: "major changes/reforms" and "minor changes/reforms" (cf. e.g. Lijphart 1994; Katz 2005; Renwick 2010; Roberts et al. 2013). While some authors propose an even more nuanced conceptualization, for instance by adding a third category of "technical reforms" (Jacobs/Leyenaar 2011), I follow the original bipartite differentiation. This is motivated by the fact that there is still disagreement in the literature on which changes to fall in each category. In this regard, a clear dividing line between major and minor reforms is missing (cf. Katz 2005, 69). For instance, Lijphart's classical definition involves the determination of a "quantitative threshold" by considering all reforms as "significant" that concern the electoral formula or changes of at least 20 percent in district magnitude, legal threshold, or size of the legislative

(Lijphart 1994). The most common and established understanding of a major change is the alteration of the electoral system type, though. In other words: The occurrence of a "wholesale replacement of the electoral formula" (Katz 2005, 58) of national electoral systems. As this is a tangible specification, I stick to it within my conceptual framework.

Based on these considerations, I apply an explicitly simple conceptualization of electoral system change with the following two categories: The first category, which is referred to as "major changes" above, comprises all complete changes from one system type to another. The second category, which is referred to as "minor changes" above, comprises the cases where changes of the electoral system take place without changing the electoral formula. As pointed out in the previous chapter, even though I maintain the classification of electoral systems based on a metric measurement, three types of electoral systems, i.e. the two archetypes and a combination of both in different tiers, can be distinguished: PR (permissive) systems, majoritarian (restrictive) systems, and mixed systems. Accordingly, "major changes" refer to electoral alterations changing the system from one of these three types, referring to all respective sub-types, to another, while "minor changes" relate to alterations that do not change the type of an electoral system.

Having specified the two categories of electoral system change, I propose a new terminology that I will subsequently make use of. This is due to the meaning of "major" and "minor" that is not necessarily appropriate with regard to the consequences of electoral system change. The terminology of major and minor changes rather suggests a clear hierarchy concerning their consequences, in that case for voter turnout. But this would give the factor of the electoral system type a significance in affecting turnout that may be overstated. In fact, it is not all about the electoral formula and "major electoral reform *can* have insignificant consequences, while technical reform *can* have substantial consequences" (Jacobs/Leyenaar 2011, 501; original emphases). Therefore, I use the term *inter-systemic changes* instead of major changes and the term *intra-systemic changes* for minor changes.

The terms of inter-systemic and intra-systemic changes reflect that not only alterations of the electoral system type may have a substantial impact on turnout. In this respect, I comply with the suggestion that electoral research should abandon the value-laden categorization of "major" and "other" changes (cf. Leyenaar/Hazan 2011, 447). In fact, I aim at contributing to "a more inclusive definition of electoral reform that will allow a broad range of subjects to be covered by research on electoral change" (Leyenaar/Hazan 2011, 447). Such a definition then explicitly includes phenomena as the introduction or abolition of compulsory voting that

constitute prominent examples for the difficulty that minor changes may have major implications and definitely belong to the scope of research on electoral system change. Additionally, this terminology enables a further semantic shift from the process of electoral system change to its consequences.

4.2.   The microfoundations of the impact of electoral system change on voter turnout

The literature so far makes clear that different types of electoral systems can affect turnout in several ways. After having introduced the concept of electoral system change the question arises, how exactly such macro-level factors and their alteration influence decisions at the micro-level, i.e. an individual's decision to vote or to abstain from the polls. In other words: *Why* do changes of the electoral system affect the participation in elections and which mechanisms of explanation are at work?

When dealing with the microfoundations concerning the positive and negative effects of electoral systems on turnout, the literature has suggested several mechanisms how the electoral system as an institutional factor can shape electoral behavior the individual level. Systematically integrating these in a model illustrating the microfoundations of the impact of electoral system change on voter turnout is important not only for theoretical but also for analytical purposes: Before estimating any statistical model, it is to think about the underlying microfoundation (Achen 2002).

This is especially true for analyzing the impact of electoral institutions on (aggregate) voting behavior. The key analytical task consists of reasonably linking the micro- with the macro-level as the electoral system and aggregate turnout occur at the macro-level, but the decision to turn out (or not) is an act that finally has to be realized by each voter individually. The theoretical link between the individual and the aggregate level can best be conceptualized within the framework of a *rational-choice institutionalist* approach, putting the individual *calculus of voting* at the center of its considerations. As mentioned in the previous chapter, the turnout decision calculus is conditional on electoral rules (Singh 2011b).

The idea that formal rules determine political behavior is essential to this approach, also with respect to the effect of electoral institutions. "The core theoretical claim in rational-choice

institutionalism is that formal electoral rules generate important incentives that are capable of shaping and constraining political behavior" (Norris 2004, 7; cf. Downs 1985). Concerning the phenomenon of turnout, rational choice theory posits the decision to vote to be the result of a personal cost-benefit calculation, the *calculus of voting* or *turnout decision calculus*. Accordingly, a voter will decide to turn out when the expected benefits of voting will at least outweigh its costs (Downs 1985). In a slightly extended model that also includes a term describing a sense of citizen duty, or alternatively civic benefit, that may increase an individual's likelihood of going to the polls, the following formula describes the calculus of voting (Downs 1985; Riker/Ordeshook 1968; Singh 2011b):

$$u_i = p_i b_i - c_i + d_i.$$

Here, i serves to index individuals, b expresses a voter's expected benefit from the election of her preferred party or candidate, c describes the costs of voting, the term d represents intrinsic benefits linked to voting, and p describes the probability that one's vote will be decisive for the election outcome. A voter's expected utility from participating in an election is finally represented by the u term, i.e. a voter will turn out when u_i is greater than zero.

An increase of b denotes that a voter perceives a higher benefit from the election of her preferred party, what should increase the propensity to vote. This emanates from the idea "that voters derive the greatest utility from the candidate or party with the ideal point closest to theirs on an underlying ideological continuum" (Singh 2011b, 647). In turn, as will be outlined in section 4.3.4., with regard to a potential positive effect of a higher number of parties on turnout this means that a wide choice of ideologically distinct parties should increase voters' likelihood to find a party on the ballot that is sufficiently close to their own ideological position to assure their invested costs of voting (Cox 1997; 1999b). These costs of voting, represented by the term c, comprise any cost factors associated with voting, for instance costs of information or costs in decision-making (Downs 1985). As these costs of voting exist, one could expect instrumental voters to abstain if they are not in the highly unlikely situation of having a chance to cast a pivotal vote. So, the term p in the formula above describes this probability that one's vote will alter the outcome of an election. But in reality, most people do not abstain as could be expected from the model but go to the polls, a contradiction that is usually referred to as the "paradox of voting". That is where the d term sets in. As an extension of the original Downsian formulation,

the term represents the potential sense of civic duty that increases individuals' likelihood to turn out (Riker/Ordeshook 1968).

With regards to different electoral systems, Singh (2011b) carves out their conditional effect on the calculus of voting by arguing that in PR systems the rational model of individual-level turnout as delineated above is correct, i.e. for PR there is a positive relation between one's expected utility and participating in an election. In plurality systems, however, the relationship between the individual propensity to turn out and the expected utility from casting one's vote for the preferred party is much weaker. "Thus, in such systems, the decision to vote is driven not by the positions of political parties relative to the individual, but instead by previously identified factors, including income, education, political efficacy, and compulsory voting rules" (Singh 2011b, 653).

This points up the differing role of context for the calculus of voting in permissive and restrictive electoral systems. These considerations raise the question about the role of context in which electoral rules operate. As explicated in the literature review, context indeed plays an important role for the functionality of electoral institutions in general (Moser/Scheiner 2012; Ferree et al. 2013; 2014) but also as a causal link between the micro- and the macro-level, for instance via the mechanism of political efficacy (Banducci/Karp 2009). Individual-level contextual factors are not at the center of my theoretical approach regarding the consequences of electoral system change for turnout, though, but there is good reason to focus on a macro-level institutionalist approach as we have *aggregate* turnout as the dependent variable. Besides the fact that the literature mentions more than 170 individual-level explanatory factors used in studies on voter turnout (Smets/van Ham 2013), an exceeding integration of micro-level contextual factors would finally deprive the actual models of their necessary parsimony. As I will show in the following, the approach set out here has a high explanatory power.

```
                                    6
compulsory voting ------► electoral system ------► party system ------► turnout          macro-level


    1              2           3                                    5


incentives for voters ─────────────4──────────────► calculus of voting          micro-level
```
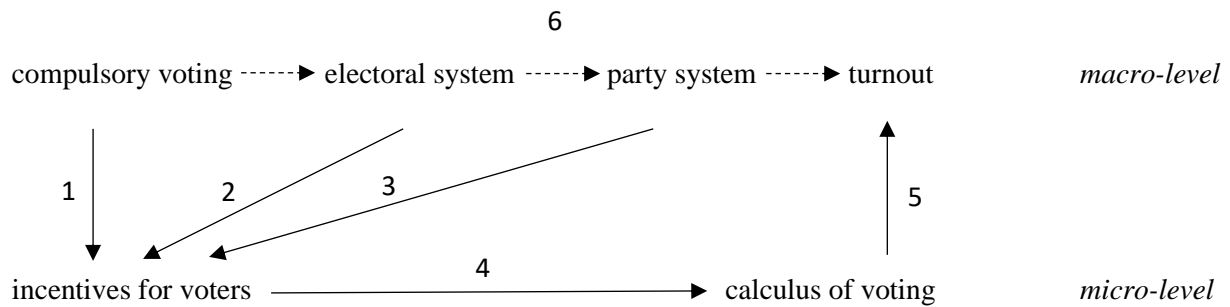
Figure 5: Macro-micro-macro-model on the impact of electoral systems on aggregate-level turnout

Taking all aspects discussed above into account, a schematic representation of the causal chain that links the micro- to the macro-level within a framework of rational choice, illustrating how electoral systems should affect turnout at the aggregate level, shows Figure 5. Figure 5 complements the chain of causality at the aggregate level as presented in Figure 4 in the previous chapter by adding the corresponding microfoundations that should underlie the macro-level relationships.

As Figure 5 highlights, each of the three macro-level factors compulsory voting, the electoral and the party system, directly or indirectly sets incentives for the individual voters. First of all, insofar as compulsory voting exists, it sets a strong incentive for the individual voters by increasing the costs of abstention (1), what might displace the incentives emanating from the other macro-level factors. This should depend on compulsory voting's level of strictness, though. The electoral system as the second macro-level factor in the chain may as well directly affect individual voters by increasing or decreasing their feeling of efficacy (2). Predominantly the electoral system should affect individual voters via the intervening mechanism of the party system which is strongly shaped by the electoral rules: The party system, respectively the number of parties, sets incentives for the individual voters through the level of mobilization efforts and party competition (3). The nature of all these incentives subsequently alters the personal turnout decision calculus (4) and, depending on predominantly vote-encouraging or vote-distracting incentives, a smaller or larger part of the whole electorate will abstain from voting (5). In this way, the electoral system finally affects turnout at the aggregate level (6).

First and foremost, the structure is adaptive to changes of the electoral system, as the causal chain remains the same. When the electoral system changes, the structure of incentives for voters also changes. This may alter the individual calculus of voting what finally changes electoral participation at the macro-level. Yet, the structure of the depicted relationships remains completely stable. In other words: When formal rules change, incentives change as well; when incentives change, also collective behavior changes (cf. Norris 2004, 15). Similarly, for the calculus of voting it is to summarize, that "participation begins with individually held attributes, but is conditioned by institutional rules" (Singh 2011b, 653).

4.3. The hypotheses

After having reviewed the relevant literature in the previous chapter and having introduced the concept of electoral system change as well as the underlying microfoundation of the influence of electoral system change on voter turnout above: Which hypotheses can exactly be specified based on these discussions to be tested empirically in the subsequent chapters? In the following, I present the five hypotheses that are derived from the respective unresolved debates in the literature.

4.3.1. Electoral system type and turnout: The basic hypothesis

In the foregoing chapter, the review of the literature on the relationship between the electoral system type, respectively the proportionality of an electoral system, and turnout revealed several empirical insights. On the one hand, it is a matter of fact that over the last decades countries with a PR system regularly showed higher levels of aggregate turnout compared to countries using a majoritarian system. Accordingly, especially most classical studies on voter turnout but also several newer works report a positive connection between PR and electoral participation (e.g. Blais/Carty 1990; Blais/Dobrzynska 1998; Eggers 2015; Endersby/Krieckhaus 2008; Funk/Gathmann 2013; Jackman 1987; Jackman/Miller 1995; Norris 2004; Powell 1986). On the other hand, several more recent studies cast some doubt on this clear-cut relationship between proportionality and higher turnout rates, finding either no direct causal relation or even presenting contradictory findings (summarizing for turnout at the aggregate level: Cancela/Geys 2016; Stockemer 2017).

In either case, there are comprehensible theoretical arguments why PR should have a positive effect on turnout that are worth following to approximate the "proportionality-turnout nexus" (Selb 2009). With respect to changes of the electoral system type, this is an especially meaningful question as they make up the category of inter-systemic changes, while any other changes of the electoral system belong to the category of intra-systemic changes. Consequently, changes of the type of electoral system have a special bearing. This becomes obvious when dealing with the proposed theoretical arguments on the consequences of the degree of electoral system proportionality on turnout, as it does not only mechanically affect party system fragmentation but also should have an effect on individual-level voting behavior. With respect to the phenomenon of turnout that means a voter's decision to go to the polls or to abstain from voting.

The core argument concerning the hypothesized positive effect of PR systems on voter turnout can soundly be derived from the rational-choice institutionalist theoretical framework described above as it is based on the alteration of the calculus of voting by proportionality, respectively disproportionality. As majoritarian systems, characterized by high disproportionality, should generally produce two-party systems, while PR should bring multiparty systems about (Duverger 1954), these restrictive systems significantly exacerbate parliamentary representation for smaller parties. This could, however, potentially distract small party supporters from voting as they may "waste" their vote when supporting their preferred party that it is potentially chanceless to gain representation in the legislature (cf. Endersby/Krieckhaus 2008, 602). Hence, higher disproportionality can also have a negative effect on individual-level political efficacy and thereby reduce turnout.

By contrast, higher proportionality should affect political efficacy positively, yielding higher turnout (Banducci et al. 1999; Banducci/Karp 2009; Karp/Banducci 2008; Norris 2004). As PR systems allow multiparty systems to form, the number of voters casting "wasted votes" is usually much smaller in countries using PR compared to countries with a majoritarian system. Consequently, PR should have a positive effect on political efficacy, especially among supporters of small parties, as the electoral system is rather perceived as fair (cf. Banducci/Karp 2009). Additionally, a larger party system should increase political efficacy as it generally offers voters more choice in elections, making it likelier for them to find a party that fits best to their personal opinions and demands. A multiparty system allows more possibilities for political parties to distinguish themselves ideologically from their competitors as well (cf. Downs 1985, 126). This should positively affect party competition what, in turn, may have a positive effect

on turnout (Cox 1999b; see also section 4.3.4.). Accordingly, more choice with respect to political parties should make less voters feel indifferent or alienated from the party system (cf. Blais/Aarts 2006, 184), what may have positive consequences for turnout.

Finally, the described arguments provide high eligibility for "incentive-based explanations [that] focus on the differential rewards facing citizens under alternative electoral arrangements" (Norris 2004, 162). Especially, when recent research finds much empirical support for the propositions laid down above and the hypothesized negative influence of disproportionality on turnout at the individual level, i.e. that there is a lower individual propensity to turn out in plurality systems compared to systems with higher proportionality (Singh 2011b). In the end, it should be noted that the manifestation of substantive effects of most measures of electoral reform may take some time (see section 4.3.5.).

Taking the theoretical arguments discussed above into account, the basic hypothesis, specifying the relationship between changes of the electoral system type and voter turnout, is the following:

Hypothesis 1: As a consequence of an electoral system change towards a more permissive electoral system, turnout will increase. Inversely, the introduction of a more restrictive electoral system leads to a decrease of turnout.

4.3.2. The impact of district magnitude on turnout

As described in the previous section, the proportionality of an electoral system should be a crucial property to affect turnout positively or negatively, i.e. higher proportionality should have a positive effect on turnout while higher disproportionality should influence turnout negatively. For the proportionality of an electoral system, besides the formula, "magnitude is the decisive factor: the number of seats allocated in an electoral district has a stronger impact on proportionality than almost any other factor" (Taagepera/Shugart 1989, 112).[2] There is a positive relationship between larger constituencies and higher proportionality due to less systematic distortions concerning the translation of votes into seats in parliament (Blais/Carty 1990; Duverger 1954).

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[2] In fact, the proportionality of an electoral system (if not FPTP) is additionally determined by further parameters besides the formula and district magnitude, for instance the seat allocation method, legal thresholds or upper tiers (see Taagepera/Shugart 1989).

Since both the formula and district magnitude account for the proportionality of an electoral system, the hypothesized impact of both factors follows a similar causal logic. The formula and district magnitude belong to different categories of electoral system change based on the aforementioned concept, though: The electoral system type, considered in the first hypothesis, indicates the formula and refers to incidents of inter-systemic change, while changes in district magnitude belong to the category of intra-systemic changes. Moreover, district magnitude represents a more precise measurement of the proportionality of an electoral system compared to the electoral system type and should be tested independent of the latter. That is why I address a separate hypothesis on the relationship between changes in district magnitude and voter turnout.

As a key determinant of the proportionality of an electoral system, district magnitude is a decisive factor for party system size (the mechanism of the number of parties is discussed in greater detail in section 4.3.4.), so higher district magnitude is associated with a higher number of parties (see e.g. Benoit 2001; Clark/Golder 2006; Duverger 1954). Moreover, district magnitude is a fundamental property of an electoral system as these processes unfold at the level of individual constituencies (Cox 1997; 1999a). For these reasons the examination of the "district magnitude-turnout nexus" (Stockemer 2015, 83) is an important venture, especially as changes in district magnitude indeed fall in the category of intra-systemic changes but they depict a phenomenon that occurs quite often, especially compared to any inter-systemic changes in electoral institutions.

While there is some support for the positive effect of higher district magnitude on turnout, at least in Western countries (Stockemer 2015), in consideration of the description in the previous chapter the relation between district magnitude and electoral participation is still vague empirically (cf. Stockemer 2017, 705). Yet, there are good reasons to maintain the proposed theoretical mechanisms that should find empirical support by means of an adequate research design. These theoretical mechanisms between district magnitude and turnout revolve around an increased voter mobilization in larger constituencies and less variation in inter-district turnout caused by more even intra-district competitiveness in PR systems compared to majoritarian systems.

The argument of the positive effect of increased voter mobilization in larger districts is obvious, as there is a positive relationship between district magnitude and the number of parties. But the argument of higher intra-district competitiveness in larger constituencies corresponds to the former. So, the lack of competition in many single member districts, where the election

outcome is already predetermined, surely lower voters' incentives to go to the polls (cf. Endersby/Krieckhaus 2008, 602). The competitiveness within districts hence alters the individual calculus of voting. And accordingly, lower levels of aggregate turnout in restrictive electoral systems are due to differences in turnout over districts that are finally evoked by varying intensities of intra-district party competition (Selb 2009).

The aforementioned arguments lead to the following formulation of the second hypothesis, which describes the impact of changes in district magnitude on voter turnout:

Hypothesis 2: As a consequence of an electoral system change inducing larger districts, turnout will increase. Inversely, an electoral system change inducing smaller districts leads to a decrease of turnout.

4.3.3. The impact of compulsory voting on turnout

As already mentioned in the previous chapter, I deal with the impact of compulsory voting – a factor that is actually exogenous of the electoral rules – on voter turnout for two reasons. First, because of the undoubtedly positive effect of its introduction and application on turnout rates. And secondly, because the measure of compulsory voting finally dissolves the effects on electoral participation emanating from the electoral system by altering the individual calculus of voting, namely by increasing the costs of abstaining from the polls. Compulsory voting hence depicts an informative example of a macro-level factor affecting political behavior at the micro-level and perfectly fits to the theoretical framework laid down above.

Generally, from the empirical perspective there is no doubt that compulsory voting has a positive effect on aggregate-level turnout. This finding was already reported in several studies during the last decades (e.g. Blais/Carty 1990; Blais/Dobrzynska 1998; Jackman 1987; Jackman/Miller 1995) and also confirmed by more recent meta-analyses and review studies examining the aggregate level (Blais 2006; Cancela/Geys 2016; Geys 2006; Stockemer 2017) and the individual level (Smets/van Ham 2013). In addition, besides increasing turnout levels mandatory voting also strongly reduces inter-district turnout variability (Selb 2009), clearly pointing to the dissolving impact of compulsory voting on the relationship between electoral rules and turnout.

However, the literature also provides empirical evidence that the magnitude of the positive effect of compulsory voting on electoral participation is dependent on its enforcement,

primarily through sanctions (e.g. Norris 2004; Stockemer 2017). This is based on the intervention of compulsory voting in the calculus of voting, as sanctions considerably increase the individual cost of abstaining from voting. Already without formal sanctions compulsory voting should set an incentive to outweigh the individual cost of voting (Lijphart 1997), not to forget "social pressure to vote intensifies if voting is an obligation" (Gallego 2015, 51). But empirical research analyzing the calculus of voting in different systems with compulsory voting clearly shows that voters abstain least when sanctions and the probability of their enforcement are high and abstain most when both conditions are lacking (Panagopoulos 2008). These findings were corroborated by recent research, providing evidence that individual-level factors are still crucial for the personal turnout decision calculus, but the application of mandatory voting and the strictness of its enforcement positively affect turnout in either case (Singh 2011a).

Taking the empirical literature and the given rational choice theoretical arguments into account, I formulate the following hypothesis on the relationship between compulsory voting and voter turnout:

Hypothesis 3: The introduction of compulsory voting leads to an increase of turnout, size of increase depending on the existence of respective sanctions and their enforcement. Inversely, the abolition of compulsory voting leads to a decrease of turnout. In addition, compulsory voting has a stronger impact on turnout than the electoral system.

4.3.4. Electoral systems and turnout: The mechanism of the number of parties

As already shortly marked in section 4.3.1., there is a close connection between the electoral system and party system size. The positive relationship between the proportionality of an electoral system and the number of parties was already illustrated by Duverger (1954) in his classical notion that PR systems lead to the generation of multiparty systems and majoritarian systems tend to produce two-party systems. This relationship is correspondingly found in later studies on the effect of electoral systems on party system fragmentation (e.g. Clark/Golder 2006; Lijphart 1999; Neto/Cox 1997; Ordeshook/Shvetsova 1994; Rae 1971). Based on this connection, it was widely discussed whether the number of parties was the decisive factor in explaining the differences in aggregate turnout rates between PR and majoritarian systems.

In this respect, especially two arguments were put forth. The first argument pleads that a higher number of parties should have a positive effect on turnout as thereby voters have more

choice. On the one hand, the development of partisan attachments due to ideological proximity should positively affect electoral participation (Crepaz 1990). On the other hand, from a rational choice perspective a broader choice of ideologically distinct parties should increase the likelihood for voters to find an ideologically close enough option to assure their invested costs of voting (Cox 1997; 1999b). Similarly, the second argument emphasizes a potential positive effect of a higher number of parties on turnout by increasing the overall level of voter mobilization. In this connection, the electoral system plays a key role in structuring parties' strategic incentives to mobilize voters (Cox 1997). So, multiparty systems should generate a higher level of voter mobilization as, amongst other things, a higher number of parties in PR systems generally leads to higher mobilization efforts, but also by strengthening partisan attachments and creating strong linkages between parties and supporting groups (Cox 1999a; 2015). In these ways a higher number of parties should positively affect turnout.

The empirical literature highlights the question about the possible contradictory consequences of a higher number of parties, though (cf. Blais 2006, 118): The vast majority of studies finds no or often even a negative effect of party system size on voter turnout (e.g. Blais/Aarts 2006; Blais/Carty 1990; Blais/Dobrzynska 1998; Brockington 2004; Jackman 1987; Jackman/Miller 1995; Singh 2011b; summarizing: Cancela/Geys 2016; Stockemer 2017). While most studies examine turnout at the national level, potential approaches to address this puzzle focus on the constituency level. So, not the number of parties per se may be the crucial factor for voter turnout but the variations in intra-district party competition in majoritarian systems compared to PR systems that show more even levels of local competitiveness (Selb 2009). With respect to electoral system change, focusing on the level of electoral districts seems the most promising path, as also recent elite mobilization models show (e.g. Cox et al. 2016).

Recent research illustrates that the scrutiny of the district level may be able to solve the striking puzzle that PR systems with a higher number of parties show higher levels of aggregate turnout compared to majoritarian systems with a lower number of parties, although turnout at the national level does not rise when the number of parties increases. Following Grofman & Selb (2011) who analyze constituency-level data from Switzerland and Spain, this puzzle is first and foremost an ecological artefact. The authors controvert the two most prominent arguments in the literature for why an increasing number of parties should have a positive effect on turnout incentives in PR systems: First, that proportionality necessarily rises with district magnitude and, secondly, that party competition necessarily rises with district magnitude. They finally find no link at the district level between the effective number of parties and political

competition in both analyzed countries, at least for constituencies with more than two effective parties or constituencies with a magnitude greater than 1 (cf. Grofman/Selb 2011, 109). So, the puzzle brought up seems to be an ecological artefact insofar as "the MMD districts found in PR systems, on average, do exhibit higher turnout than SMDs, but turnout does not necessarily rise with m [district magnitude, J.N.], once we move beyond the contrast between $m = 1$ and $m > 1$" (Grofman/Selb 2011, 109; original emphases).

Building up on these insights, Taagepera, Selb and Grofman (2014) provide a suitable formal "logical model" to analyze the relationship between N (number of parties) and T (turnout). The central characteristics of the model can be summarized as follows:

"We hypothesize that for very low N (however caused), the number of distinct choices are limited and hence, ceteris paribus, the incentive to vote might be slightly depressed; and that for very high N (however caused), the distinction among choices is reduced and the number of choices is high leading to limits on cognitive processing and hence, ceteris paribus, the incentive to vote might again be slightly depressed. This simple model predicts a central hump. The remarkable thing is that for most countries our data analysis (involving 237 national elections in 17 countries, with a total of 23,000 district observations) does find this hump, often in the face of scatter that should make detection impossible" (Taagepera et al. 2014, 410).

The presumed curvilinearity of the relationship between the number of parties and voter turnout offers an explanation that comes up to the several conflicting theoretical considerations and empirical findings. That is why the connection between N and T as illustrated above, which is also able to cope with changes of the electoral system, should find its way into the respective hypothesis. This connection motivates as well the formulation of a separate hypothesis for the intervening mechanism of the number of parties at all: If Hypothesis 1 and Hypothesis 2 were true, the number of parties should be the linkage between the characteristics of the electoral system and voter turnout. At the same time, it is in question to what extent this is the case as the relationship between the number of parties and turnout does not seem to be linear.

According to this, on the basis of the literature discussed above and the corresponding theoretical argumentation, the fourth hypothesis, illustrating the role of the number of parties as a causal mechanism between electoral system change and turnout, reads as follows:

Hypothesis 4: As a consequence of an electoral system change inducing a higher number of parties, turnout will increase to a certain peak and decrease afterwards.

4.3.5. <u>Consequences of electoral system change for turnout: The temporal dimension</u>

This dissertation is grounded on the basic prerequisite that electoral systems have an effect on voting behavior, particularly on voter turnout. Recent contributions reassure that also in a cross-national context "electoral rules do have an impact on some element of the vote decision process" (Dassonneville et al. 2017, 512). In this respect, one should not neglect the significant variation in the size of electoral system effects on turnout found in the empirical literature. While earlier studies usually tend to find quite large institutional effects, the impact of electoral systems on turnout is comparatively small in most recent works. Hence, it is a central task of the subsequent empirical analysis to scrutinize the size of the impact of electoral institutions on the participation in elections.

Provided that electoral institutions and their alteration generally affect turnout as hypothesized above, the question arises: What about the temporal aspect concerning the impact of electoral system change on turnout, i.e. *when* will the consequences of electoral reforms manifest themselves? This question is difficult to answer in general – but especially interesting for being analyzed empirically. Difficulties for answering the question about the temporal dimension of the consequences of electoral system change for turnout arise as the manifestation of the effects is surely dependent on the respective kind of reform that is enacted. For instance, it is reasonable that there is an immediate effect of compulsory voting on turnout after being introduced, as mandatory voting alters the individual calculus of voting quite considerably, also depending on how consequent compulsory voting is enforced. In contrast, other electoral reforms may not change the turnout decision calculus to such an extent, what will finally result in a later manifestation of the effects of these changes.

This is not the whole story. In the first instance, it is to differentiate between *short-term* and *long-term effects* of electoral system change. As stated above, there are theoretical reasons why compulsory voting should have a short-term effect on turnout rates – and these theoretical considerations also find broad empirical support, including the perdurability of the effect of compulsory voting. Similar empirical support is not regularly found for other facets of electoral reform. When, for instance, considering examples of inter-systemic changes in the newer past, it is difficult to empirically prove the sustainability of the reforms' short-term effects on turnout. One prominent case of an inter-systemic change depicts the 1993 electoral reform in New Zealand where the hitherto existing FPTP system was replaced by a more permissive MMP system. While turnout increased for the first election under the new system and this rise in electoral participation was attributed to the effect of PR (Karp/Banducci 1999), turnout for the

subsequent elections rather shows a declining trend from 88.3% in the first post-reform election 1996 to 77.9% in the 2014 general elections (Stats NZ 2017). Amongst other factors, for instance party mobilization, the decline of voter turnout is ascribed to long-term generational effects (Vowles 2002; 2010).

The example of the 1993 electoral reform in New Zealand clearly illustrates that while there may be apparent short-term effects of electoral system change, really profound effects only manifest themselves in the long term. Thus, recent works dealing with the effects of electoral system change on the number of parties show that only a small part of these effects can be observed in the first post-reform election, but in large part the effects are distributed over subsequent elections (Best 2012). The temporal dimension of the effects of electoral system change is mainly due to the psychological effects of electoral systems as stated by Duverger (1954), i.e. the adaptation of voters' and parties', respectively party elites', electoral behavior to the new electoral system. In contrast to the mechanical effects of electoral systems, this process should not be finished immediately, rather "the full psychological effects may unfold gradually over subsequent elections" (Fiva/Folke 2016, 277).

This process at the individual level to adapt to the new rules given by the electoral system is not only present with respect to the decision of which party to vote for at the polls but also for the decision to turn out at all. Consequently, for the phenomenon of voter turnout it takes a longer period of time as well until the effects of the electoral system are completely unfolded (Gallego et al. 2012). In their study, the authors focus on new democracies and propose a learning model of electoral system effects providing evidence that voters and parties adapt to the electoral system after its establishment over subsequent elections. So, electoral systems' disproportionality finally affected turnout negatively because of the corresponding greater variation in intra-district competitiveness and the lower propensity to vote of supporters of small parties who feared that their vote could be wasted (cf. Gallego et al. 2012, 168).

These considerations lead to the fifth hypothesis, describing the temporal dimension of the consequences of electoral system change for turnout, which is the following:

Hypothesis 5: With exception of the measure of compulsory voting, having an immediate positive effect on turnout, the substantive effects of electoral system change on turnout will fully unfold not until several subsequent elections after the adoption of the reform.

4.4. Conclusion

How do these five hypotheses contribute to our understanding of the relationship between electoral systems and voter turnout? The linkage between differences in the type and district magnitude of an electoral system and turnout has diminished in the more recent literature (Cancela/Geys 2016; Stockemer 2017). By systematically referring to changes in electoral institutions, this set of hypotheses should add to the identification of the causal influence of institutions on turnout. In this context, the role of the number of parties awaits clarification. Is the number of parties the actual intervening mechanism between the electoral system and turnout or does it need to be discarded as a causal link? Beyond the causality of institutional effects, the hypotheses should help clarifying the magnitude of these effects as well. Particularly the question of the impact on turnout emanating from different severity levels of compulsory voting in comparison with the influence originating from the electoral system should be resolved. Finally, the hypotheses address the temporal dimension of the consequences of changes in the electoral system for voter turnout. This adds to our understanding of the actual short- and long-term consequences of these changes.

How to most adequately test these hypothesized relationships empirically? How to analyze the consequences of electoral system change? In the following chapter, I provide the underlying research design of this dissertation. As outlined in the literature review, time-series analysis and the use of constituency-level data are key in this respect. Beyond the research design, the next chapter informs about the aspects of data and variables and presents the corresponding descriptive statistics.

5. Analyzing the consequences of electoral system change – research design, data, variables, and descriptive statistics

Based on the theoretical framework of this dissertation and the respective hypotheses to be tested empirically which were presented in the previous chapter, this chapter outlines the chosen research design more detailed. In this context, I expound the followed methodological approach. As discussed above, the estimation of time-series cross-sectional models at the district level should be a promising strategy to analyze the consequences of electoral system change for turnout. There are several potential pitfalls and complexities that accompany cross-sectional research, though. Regarding the analysis of electoral system change especially four methodological problems arise: the difficulty to control for all relevant factors, omitted variable bias, the lack of consideration of temporal patterns, and the endogeneity problem. I discuss these four pitfalls as well as how they can be confronted in the context of a time-series cross-sectional modeling strategy. In the last sub-section on research design, I consider the criteria for case selection.

Subsequently, I describe the data set that is the basis of my empirical analyses, including the description of the applied variables. To get a closer impression, I will provide a set of descriptive statistics on the data set and the respective variables. The chapter closes with the presentation of several supplementary correlations of the variables that are characterized by being time-variant. This provides the basis for the estimation of the empirical models, what chapter 6 will deal with.

5.1. Research design

Analyzing the consequences of electoral system change – this is the critical endeavor of this dissertation. In doing so, I aim at determining the causal relationships between the properties of an electoral system, respectively the intermediary mechanism of the number of parties, and voter turnout. An adequate research design is necessary to accomplish this task, especially because the analysis of electoral system change is afflicted with several difficulties. In the following, I first discuss the potential pitfalls of analyzing electoral system change. Thereafter, I present my approach regarding the research design that I want to follow to overcome these difficulties. Section 5.1. closes with the description of the criteria applied for case selection.

5.1.1. The pitfalls of analyzing electoral system change

For the discussion about the adequate research design, it is necessary to give attention to the respective complexities that go along with the analysis of electoral institutions and that a research design needs to confront as best as possible. In this context, four main methodological problems of electoral research that are partially coherent, respectively evoke each other, need to be addressed: The difficulty to control for all relevant factors of influence, a potential omitted variable bias, the lack of consideration of temporal patterns and trends, and the problem of endogeneity.

The first problem concerns the *difficulty to control for all relevant factors of influence*. This relates to the circumstance that in cross-national comparative cross-sectional and longitudinal research it is nearly impossible to control for all influences on the observed outcomes (Lijphart 1971). So, following a Y-centered approach to explain the dependent variable "voter turnout" as entirely as possible must fail. The macro-level factor of the electoral system is finally only one factor that should affect electoral participation. For turnout as an individual-level phenomenon research actually discussed the impact of more than 170 independent variables (Smets/van Ham 2013). Besides the amount of potentially influencing factors, pooled but also longitudinal cross-sectional studies need to take to heart that correlation is not causation. Especially for cross-national studies it may be problematic to solely examine the effects of electoral institutions by correlational analyses. As Bowler and Donovan put it: "Given multiple surveys, large sample sizes, and the fact that there are so many tests for so many potential relationships between various attitudes, behaviours, and electoral rules, something will be statistically significant" (Bowler/Donovan 2013, 131).

The possibility of *omitted variable bias* depicts the second problem. It is a complexity that often emanates from pooled cross-sectional analyses, respectively from studies comparing different countries at a single point in time, turning country-specific or more universal trends over time into potentially omitted variables (cf. Roberts et al. 2013, 1556). This claim is surely also appropriate regarding the impact of electoral institutions on voter turnout. Besides the temporal aspect, it is to take into consideration potential contextual factors influencing turnout, especially factors that are most likely correlated with the electoral system or any other properties of the electoral institutional framework like the constituency structure. In this respect, the (socio-)economic context could be considered. Below I will explain and argue why in particular the inclusion of (socio-)economic contextual factors in my empirical analyses is not

necessary or helpful, though. In this connection, I will describe my approach to the selection of adequate control variables in detail.

As just already mentioned, the *lack of consideration of temporal patterns and trends* constitutes the third problem. Besides being a possible source for omitted variable bias, simple cross-sectional models cannot account for any conditional effects of electoral systems on voter turnout. When considering the effects of electoral systems, the mechanical effects set in immediately when votes are translated into seats in parliament. Regarding electoral systems' psychological effects on voters, this is not necessarily the case, also with respect to the decision to participate in an election or not. This should be true more than ever when the electoral system changes. It would be erroneous to expect that the consequences of electoral systems will manifest themselves directly after they are adopted (cf. Gallego et al. 2012, 168). Accordingly, analyzing the consequences of electoral system change for turnout can hardly be accomplished without taking the dimension of time into account. Otherwise, the consequences of changes will most likely be over- or underestimated.

The fourth problem directly relates to the aforementioned issue, i.e. when temporal patterns and trends are not sufficiently considered, namely the *problem of endogeneity*. The phenomenon that is referred to as "endogeneity problem" (Benoit 2002; 2007) describes the instance that the causal direction between electoral systems and their effects is still an unsettled question for research. While the role of electoral systems as endogenous institutions was mostly debated concerning the relationship between electoral systems and party systems, the respective difficulties surely apply to the effects of electoral systems on turnout as well. So, many classical studies on the effects of electoral systems on turnout find turnout to be higher in countries with PR systems. However, such cross-sectional and cross-country studies clearly illustrate the endogeneity problem: "[D]id nations with traditions of greater civic engagement or more participatory cultures end up adopting PR, or does the adoption of PR have a predictable *causal* effect on engagement and participation, independent of the forces that led to its adoption" (Bowler/Donovan 2013, 66; original emphasis)?

How to design a research project that can handle the four aforementioned problems as good as possible? In the following, I describe the approach I want to follow to analyze the relationship between electoral system change and voter turnout. This pertains to the research design in general as well as the respective modeling strategy.

5.1.2. The chosen approach

The basic idea behind the approach to solve the four pitfalls is to not analyze the effects of electoral systems but the consequences of their *changes*. Finally, I aim at analyzing the consequences of electoral system change for the phenomenon of voter turnout in a systematic, quantitative, and comparative framework. As I am interested in the consequences of a special factor (the electoral system), respectively the consequences of a set of factors that belong together, for the phenomenon of turnout, I am following an X-centered research design (cf. Ganghof 2005). Bearing these considerations in mind, the research design must not lead to an all-encompassing explanation of turnout, but should enable to corroborate the hypothesized impact of the electoral system factors on the dependent variable and the respective causal linkage as well as to estimate the magnitude of this impact. This is surely a relevant point against the background of the first pitfall, namely the difficulty to control for all relevant factors of influence.

To confront this problem of classical cross-sectional research, it is necessary to bring in the dimension of time and to estimate a longitudinal model, i.e. to carry out a time-series cross-sectional analysis (TSCS). Analyses on electoral systems using TSCS data are still comparatively rare, but for the whole field of comparative politics TSCS data is probably the most commonly used data (Beck 2001; Beck/Katz 1995; 2011; Wilson/Butler 2007). For the analysis of the TSCS data, in addition to a basic fixed-effects model, a model based on the differenced time-series seems to be the most suited approach for my intent as it would allow to investigate changes over a series of elections. At most, such models could help to control for excluded, but constant, factors of influence, helping to trace the impact of the independent variables, respectively of changes in the independent variables, on the dependent variable, respectively on changes in the dependent variable. This course of action should mitigate the first problem.

This modeling approach could also mitigate the second problem, namely omitted variable bias. Certainly, such a time-sensitive and dynamic approach does not make the specification of adequate control variables unnecessary. However, as many country-specific factors of influence, especially the socio-structural factors, remain stable over time while the electoral system changes and being independent from the incidents of electoral system change, they do not need to be specifically controlled for (cf. Roberts et al. 2013, 1563). Concerning the third problem addressed, the lack of consideration of temporal patterns and trends, it should be clear that the dynamic modeling approach should explicitly account for this pitfall. As the

application of dynamic models regarding changes in electoral systems already has led to promising results (e.g. Best 2012; Gallego et al. 2012; Roberts et al. 2013), I will follow this practice as well. I will first perform cross-national analyses based on TSCS data, estimating dynamic models. This will be followed by two supplementary case studies of particularly relevant cases of electoral system change.

Finally, the estimation of dynamic models should also be one remedy for the fourth problem addressed, which is the problem of endogeneity. Generally, it is difficult to provide rock-solid evidence on causal relationships outside of experimental research. However, the temporal structure of observations can be an indication of causal linkages. In contrast to cross-sectional analyses, the time-sensitive approach enables the exact identification of the point in time when a treatment, i.e. a change of the electoral system, occurs. In addition, the time-sensitive approach allows for the exact identification of the point in time when the outcome is measured. This enables to trace the logical and temporal order of dependent and independent variables. Against the background of electoral systems being endogenous, it is unrealistic to expect a unidirectional causal relationship between the dependent and the independent variables (although the problem is surely not as significant for turnout as, for instance, the number of parties). Though, the dynamic modeling approach should enable to provide evidence for *one* of both possible causal directions. In a nutshell, the design permits to classify my addressed hypotheses on the consequences of electoral system change for voter turnout into a chronological order, hereby allowing for the provision of evidence concerning causality by means of temporal patterns.

The performance of district-level analyses, i.e. the use of data at the constituency level, depicts a second remedy for the endogeneity problem. The performance of a cross-national TSCS analysis at the district level constitutes a meaningful innovation in my dissertation. It is also a necessary one as "we need to focus on cases where explicit endogeneity issues are less likely to exist. One solution to this problem may be to move beyond national-level dynamics to focus on subnational ones" (Singer 2015, 119). With respect to the endogeneity problem, the analysis of the constituency level brings the advantage about that electoral districts are usually not constant over time. The variation in district magnitude within and across districts over time stems from the characteristic in many PR systems that, while the constituencies' geographical boundaries remain similar, district magnitude is regularly adapted to changes of the population. Accordingly, district magnitude in these systems varies across districts and over time. These adjustments, often referred to as "reapportionment", are essentially an administrative rather

than a political process (cf. Singer 2015, 119). This enables to circumvent potential endogeneity problems that may arise in comparable research designs.

5.1.3. <u>Case selection</u>

After having laid down that I aim to perform an analysis that is cross-national, I want to discuss my basic criteria for case selection. From the perspective of an ideal conception, the TSCS analysis would include as many cases as possible and cover the longest possible period of time to have a most reliable data base. Irrespective of such an ideal conception, I want to select a group of countries that shows sufficient variation in the permissiveness, respectively restrictiveness, of the electoral system. The group of selected cases would at best comprise countries with PR, majoritarian, and mixed electoral systems. For two reasons I will not include countries with a majoritarian system in the TSCS analyses, though. First, the majoritarian systems show absolutely no variation in district magnitude, what finally makes them useless for this kind of longitudinal examination. Secondly, there are virtually no incidents of inter-systemic change in the respective countries where the majoritarian system became a more permissive one. The only remarkable case of inter-systemic change among these countries depicts the 1993 electoral reform in New Zealand. That is why I discuss this event separately from the TSCS analyses within the scope of an additional case study on the consequences of inter-systemic change for voter turnout. The group of selected cases will hence only include countries with either PR or a mixed system. I am confident that this decision will help to obtain convincing results for the TSCS analyses.

Apart from that, in my judgment, it is reasonable to choose a group of cases based on similarity. The following only includes elections that are generally regarded as free and meeting common democratic standards. Accordingly, elections in non-democratic systems are excluded and the basic comparability of cases is warranted. The decision to focus on democracies is also based on the suggestion of former research that the effects of formal rules in general and electoral systems in particular tend to be weaker in non-democracies (Mylonas/Roussias 2008). At the same time, I do not want to restrict the group of selected cases to countries that are usually considered as "established democracies." On the one hand, it is necessarily debated which countries exactly belong to that group. When referring to common definitions, the countries of Eastern Europe would usually fall out of the group of selected cases, confining it exorbitantly. On the other hand, regarding the effects of electoral systems on turnout, the

distinction between OECD member states and non-OECD countries has proven more revealing for analytical purposes (cf. Endersby/Krieckhaus 2008, 608).

I will not use OECD membership as criterion for case selection as well. I rather restrict my selection to cases that are referred to as "Western," but complemented by the countries of historical "Eastern Europe." Following the concept of "first nations," the Western countries comprise the states of Western Europe, the United States, Australia, New Zealand, and Israel (cf. Stockemer 2015, 88). I will draw on a subset out of these countries as former research found evidence that the hypothesized relationship between district magnitude and turnout a priori significantly differs between Western and non-Western countries. While larger constituencies should positively affect electoral participation in Western countries, for non-Western countries this seems not be the case (e.g. Pérez-Liñán 2001; Fornos et al. 2004; Gallego et al. 2012; Stockemer 2015). As discussed in chapter 3 (see especially section 3.2.4.), this discrepancy is especially attributed to the varying context in Western and non-Western countries that influences the effects produced by the electoral system.

For the historical Eastern, respectively post-Communist, European countries in particular, the relationship between the electoral system and turnout a priori seems to resemble the relationship found in Western countries (Kostadinova 2003). That is why Eastern European cases can complement the selection of Western countries without the group of selected cases becoming too dissimilar. At the same time, drawing on a group of countries that comprises cases from the Western as well as from the post-Communist European democracies should add to the scope and validity of the analysis and allow for a higher generalizability of the findings. In the following section, I provide a more detailed overview of the countries and elections that finally constitute the group of selected cases.

5.2. The data

The analyses necessitate data that fulfill two requirements: First, the data should be longitudinal to allow for the scrutiny of the consequences of electoral system change on voter turnout over time, i.e. to investigate the respective temporal dynamics and time patterns. Secondly, the data needs to be at the district level to fully grasp the impact of the electoral system factors on the dependent variable and to employ key independent variables as district magnitude with its

specific values – without the need to make use of an imprecise measure as national-level average district magnitude.

The core data set that I apply for my analyses stems from the *Constituency-Level Elections Archive (CLEA)* (Kollman et al. 2019). In this respect, as I am dealing with elections to national lower chambers, I resort to the CLEA Lower Chamber Elections Archive. This data set is qualified for my empirical analyses precisely because it contains information at the level of electoral districts and covers preferably long periods of time that allow for time-series analyses. Hence, it allows using electoral districts as units of analysis. In addition, the data set covers a comprehensive number of countries, providing a group of cases that includes different electoral system types. Finally, the CLEA not only provides information on election results but also on turnout, electoral system properties, and further variables that are necessary for my empirical models.

As already pointed out, the use of data at the district level is a key aspect of the following empirical analyses. While earlier research on the relationship between electoral systems and turnout focused on the national level, by now a number of studies has set out to scrutinize the effects of PR and majoritarian systems at the sub-national or at the constituency level. Also this dissertation follows that strand of research by analyzing the effects of electoral systems on turnout at the district level, so to speak "the roots of an electoral system". So, the effects of electoral systems finally operate in each district individually (Cox 1997; 1999a). And, understandably, only analyses at the constituency level are able to finally grasp the district magnitude-turnout nexus (Stockemer 2015).

Table 1: Overview of countries and national legislative elections included in the TSCS-analyses

Country	Elections	Covered period of time	Number of covered elections
Austria	1949, 1953, 1956, 1959, 1962, 1966, 1970, 1971, 1975, 1979, 1983, 1986, 1990, 1994, 1995, 1999, 2002, 2006, 2008	1949-2008	19
Belgium	1946, 1949, 1950, 1954, 1958, 1961, 1965, 1968, 1971, 1974, 1977, 1978, 1981, 1985, 1987, 1991, 1995	1946-1995	17
Bulgaria	1991, 1994, 1997, 2001, 2005, 2009	1991-2009	6
Czech Republic	1990, 1992, 1996, 1998, 2002, 2006	1990-2006	6
Denmark	1945, 1947, 1950, 1953 (I), 1953 (II), 1957, 1960, 1964, 1966, 1968, 1971, 1973, 1975, 1977, 1979, 1981, 1984, 1987, 1988, 1990, 1994, 1998, 2001, 2005, 2007, 2011	1945-2011	26
Estonia	1992, 1995, 1999, 2003	1992-2003	4
Finland	1948, 1951, 1954, 1958, 1962, 1966, 1970, 1972, 1975, 1979, 1983, 1987, 1991, 1995, 1999, 2003, 2007	1948-2007	17
Germany (until 1990: West Germany)	1949, 1953, 1957, 1961, 1965, 1969, 1972, 1976, 1980, 1983, 1987, 1990, 1994, 1998, 2002, 2005, 2009	1949-2009	17
Hungary	1990, 1994, 1998, 2002, 2006, 2010	1990-2010	6
Italy	1946, 1948, 1953, 1958, 1963, 1968, 1972, 1976, 1979, 1983, 1987, 1992, 1994, 1996	1946-1996	14
Portugal	1975, 1976, 1979, 1980, 1983, 1985, 1987, 1991, 1995, 1999, 2002, 2005, 2009, 2011	1975-2011	14
Total number of countries: 11			*Total number of covered elections: 146*

Based on the criteria for the selection of cases described above, Table 1 shows the cases that I will finally analyze in the following and the periods of time that are covered. The data base includes information from individual constituencies in eleven Western and Eastern European democracies (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Italy, Portugal) and covers up to 26 national lower chamber legislative elections going back until 1945 in the case of Denmark. The 2011 legislative elections in Denmark and Portugal depict the most recent electoral events that are comprised by the data. Finally, district-level information on turnout and electoral systems from a total of 146 lower chamber legislative elections makes up the basis for my analyses.

5.3. The variables

This section provides an overview of the variables I will apply in my empirical models and describe how these variables are operationalized. Starting with the description of the dependent variable, I subsequently also discuss the selected independent and control variables. In this regard, I justify as well why some variables are not considered for the analyses.

5.3.1. The dependent variable

The dependent variable is *Voter Turnout*. More precisely, it measures voter turnout at the district level. Information on turnout is included in the CLEA data set. Concerning the operationalization of district-level turnout, the variable depicts the fraction of eligible voters who vote in a given constituency. In this regard, it is necessary to note that the variable does not report turnout rates to be found in official election reports. In fact, it is an original measure based on the CLEA data. "Because countries use a variety of methods to calculate turnout, we do not report the turnout rates listed in official election reports as these are not consistent across countries" (CLEA 2019). The use of a standardized calculation of turnout numbers is surely a substantial argument to rely on that measure when analyzing electoral participation in a comparative framework.

The variable is calculated by dividing the total number of votes cast in a constituency by the number of eligible voters in that constituency. So, theoretically, the values of the variable could range from a minimum of 0 (nobody voted) to a maximum of 1 (everybody voted).

However, the CLEA data set also contains some district-level cases where the variable is greater than 1. This is to occur when the official election results report more votes cast than eligible votes. For theoretical reasons and for reasons of comparability, I focus on turnout in the first round, i.e. in cases of runoff elections (as, for instance, used in France) I use the information on turnout in the first ballot for my analyses. Finally, the group of selected cases contains only one country where instances of turnout in the second round even exist, which is Hungary.

After having described the operationalization of the dependent variable, I shortly want to address the discussion about how to measure voter turnout adequately more generally. This is due to the varying measures used in the literature and their respective benefits and drawbacks. Additionally, these remarks should further explain why the calculation of turnout as included in the CLEA data – besides the aforementioned aspect of comparability over countries – is an adequate measure when analyzing the impact of electoral systems on the aggregate participation in elections.

Most previous studies on the relationship between institutional and socioeconomic factors and voter turnout made use of either one of two different measures of turnout: The share of registered voters that votes or the share of the voting age population that turns out to vote (for the following discussion cf. Endersby/Krieckhaus 2008, 602-603). Several authors argue for the use of the percentage of registered voters who cast a vote as the most adequate measure of aggregate turnout by pointing out several shortcomings of the measure based on the voting age population (e.g. Blais/Aarts 2006; Blais/Dobrzynska 1998; Franklin 2004). For instance, the voting age population as the denominator of turnout also includes people without the right to vote, for instance foreigners or – in many countries – prisoners, what might distort turnout statistics. Moreover, as the voting age population is calculated based on census data, there is the risk of relying on data that may be out of date or in other respects inaccurate.

However, the approach of measuring turnout based on the percentage of registered voters that goes to the polls is confronted with a cardinal problem as well. In this respect, the whole process of voting requires two separate acts: The registration to vote and finally the act of voting by itself. Obviously, these two acts correlate strongly as citizens who decide to register for an election will also be more inclined to vote. "If registration and voting are correlated, however, then the ratio of voters to registered voters is a biased measure of citizen's motivation to vote. […] Put differently, using registered voters in the denominator is controlling for the very outcome we are trying to explain" (Endersby/Krieckhaus 2008, 602). This measure hence causes severe problems for the analysis of turnout, especially when aiming at examining the

impact of factors like the electoral system on the decision to turn out or not. As both established measures of macro-level turnout are confronted with severe issues, I am quite confident that the CLEA-based measure of voter turnout, using the number of eligible voters as denominator, depicts the most applicable indicator for my analyses.

5.3.2. The independent variables

The variables describing the various properties of electoral systems make up the main part of independent variables for the subsequent empirical analyses. To account for inter-systemic changes and to test the relationship between the type of electoral system and turnout (Hypothesis 1), I include the independent variable *Electoral System Type*. The information about the type of electoral system stems from version 3.0 of the *Democratic Electoral Systems (DES)* data set (Bormann/Golder 2013), which covers all legislative and presidential elections in democratic countries within the period of time from 1946 to 2016. The original variable in the DES data set by Bormann and Golder is categorical and reflects the three basic types of electoral systems. More precisely, it contains the information whether the respective electoral system belongs to the majoritarian (coded "1"), proportional (coded "2"), or mixed (coded "3") type. I adopt this coding for the cases of mixed electoral systems. As my group of selected cases does not include majoritarian systems, I assign the value "1" to the PR cases in my data set instead of being coded as "2".

I am aware that with respect to the proportionality of an electoral system this operationalization of the electoral system type is quite coarse-grained. As mentioned above, the proportionality of an electoral system is determined by several of its characteristics and proportionality may indeed vary within the different electoral system types. For instance, the existence of upper tiers increases proportionality, respectively serves as a correction for the disproportionality in the lower tier (Selb 2009; see also Taagepera/Shugart 1989, 126-132). This does not only pertain to mixed electoral systems. Several countries in the group of selected cases make use of PR systems that have more than one tier as well, for example Austria or Denmark. I nonetheless do not consider upper tiers in the context of the operationalization of the electoral system type. On the one hand, the variable specifically accounts for the electoral formula and serves as an indicator for inter-systemic changes. On the other hand, I include district magnitude as an independent variable as well, which is a more adequate proxy for proportionality in any case. I revisit this latter aspect below.

A further key independent variable for the empirical models, and the factor to especially test the impact of the constituency structure on turnout (Hypothesis 2), is *District Magnitude*. The information on district magnitude is included in the CLEA data and describes the number of seats in the legislature allocated in a given constituency. Supplementary information on district magnitude is obtained from the data set that was compiled within the scope of the research project *Consequences of Electoral System Change in Modern Democracies* (Harfst et al. 2018). Some authors argue not to use the variable in its "raw form" but rather to create a categorical variable of varying constituency sizes to account for a potential non-linear relationship between district magnitude and turnout (Stockemer 2015, who performed the respective analyses at the national level). I see the detailed available information as a valuable help, though, to examine the hypothesized effects of that factor on voter turnout which here is measured at the same level. In the empirical models, however, I use the natural logarithm of district magnitude to take into consideration that the psychological effects of constituency size tend to fade out at higher levels (cf. Cox 1997, 122). As outlined in the previous chapters, the psychological effects of electoral rules should not only refer to voting behavior in terms of vote choice but also to citizens' preceding decision whether to turn out or not.

The use of the variables "Electoral System Type" and "District Magnitude" in the empirical models should allow for the non-inclusion of a separate variable measuring the disproportionality of an electoral system, customarily the disproportionality index. "The reason is simply that the relative disparity between seat and vote shares is to a large extent the product of the electoral system and that we should not control for that outcome if we wish to estimate the total effect of the electoral system" (Blais/Aarts 2006, 186). Hence, disproportionality may be treated as an alternative measure of the electoral system but not as an additional variable within the same model: "Unfortunately, it is often included together with the electoral formula or district magnitude. The consequence is that the effect of one or the other variable may be weakened" (Blais/Aarts 2006, 189). With respect to the inclusion of district magnitude, one should bear in mind that the disproportionality of an electoral system is mainly determined by constituency size. In fact, district magnitude even constitutes the most crucial factor that may have a (negative) effect on the proportionality of an electoral system (cf. Taagepera/Shugart 1989, 133-135). For this reason, the two factors are highly correlated, which is why either district magnitude or disproportionality should be included in the empirical models. As district magnitude is an essential variable for my analyses and disproportionality has even been assessed as conceptually redundant (cf. Radcliff/Davis 2000, 134) when provided that there is

information on the constituency structure instead, I will not make use of the factor of disproportionality.

To account for the impact of mandatory voting on turnout (Hypothesis 3), I include two further independent variables. The first variable *Compulsory Voting* is operationalized as a dummy variable and contains the information whether voting is officially, respectively legally, compulsory in a given election. Additionally, to test whether the size of the hypothesized positive effect of compulsory voting on turnout depends on the enforcement of existing mandatory voting laws, I include the second variable *Enforcement*, which is a dummy variable as well. The variable gives the information if compulsory voting laws are enforced in practice, for instance by means of sanctions. The data for the two variables "Compulsory Voting" and "Enforcement" stems from the International IDEA Voter Turnout Database (International IDEA 2019) that also contains information on compulsory voting around the globe.

Finally, to test the mechanism of the number of parties that might link the electoral system as an explanatory factor to the phenomenon of voter turnout (Hypothesis 4), the *Effective Number of Parties (ENP)* (Laakso/Taagepera 1979) depicts the independent variable measuring party system size. The ENP suits for my analyses as, on the one hand, it is an established index that is still a standard measure in the respective literature and, on the other hand, the measure allows for cross-country comparability, also over time, what is indeed relevant with regards to my time-series cross-sectional approach. As the authors note: "Such a number is [...] needed if one wants to detect trends toward fewer or more numerous parties over time, or the effects of a proposed change in electoral rules" (Laakso/Taagepera 1979, 3). Information on the ENP at the district level is included in the CLEA Party Nationalization Datasets. The variable describes the effective number of electoral parties, i.e. the measure is based on party vote shares, in a country's party system at the level of electoral districts for the respective election year. The ENP is calculated at the district level following the specification by Laakso & Taagepera:

$$ENP_{district} = \frac{1}{\sum_1^n p_i^2}$$

In the above-mentioned formula, *n* describes the number of parties in a district and p_i represents the party's share of the constituency vote. Following the standard operationalization practice in

the respective literature, I will use the natural logarithm of the ENP in my empirical models. This is based on the theoretical reason that, for instance, a shift from two to three parties will likely have a stronger effect than an increase from seven to eight parties (cf. Singh 2011b, 649).

Having information on the ENP at the district level is quite essential. Besides the necessity to make use of data below the national level to grasp the relationship between voter turnout and the number of parties, this is also due reasons of modeling: "When we study the relationship between (effective) number of parties and turnout at the national level, making cross-national comparisons, we risk committing ecological fallacies" (Taagepera et al. 2014, 396; cf. Grofman/Selb 2011). With respect to the modeling strategy, similar to the (not included) factor of disproportionality, Blais & Aarts point out that "[w]hen we wish to ascertain the impact of the electoral formula, we should not control for the number of parties because that number is posterior in the causal sequence" (Blais/Aarts 2006, 186). That is why the authors suggest sequential modeling where party system variables are included only in the last stage (cf. Blais/Aarts 2006, 195). Even though the ENP should have the function of an independent variable and not that of a control variable in my analyses, this is a recommendation worth considering.

5.3.3. The control variables

What about the inclusion of additional control variables in the empirical models? Are there further factors that need to be controlled for when it comes to analyzing the impact of electoral system change on voter turnout? As pointed out in the first section of this chapter, although making use of an X-centered research design, omitted variable bias could be a potential problem. Especially, when factors are somehow correlated with electoral institutions. In this respect, the (socio-)economic context was mentioned. Which socioeconomic factors are most meaningful in this respect and are there further key variables in the literature that have regularly proven their influence on turnout and therefore need to be incorporated into this analysis (see section 2.2.2.)?

It is again to point out that I am analyzing voter turnout at the aggregate level. Indeed, the analysis is based on data at the level of electoral constituencies. However, this constituency-level data is finally macro-level data as well. That is why only variables that have shown influential on aggregate-level turnout could actually be potential control variables in my models. To find out these potentially relevant variables, I draw upon the respective available

meta-analyses on aggregate-level turnout. Which variables do they find to affect voter turnout at the meta-level, that is to say repeatedly influential in a majority of studies?

Besides the level of turnout in previous elections, i.e. lagged turnout, what I will incorporate in my analysis in either case, Geys (2006) and Cancela and Geys (2016) repeatedly find the following variables to persistently have an effect on electoral participation: Population size (smaller countries tend to have higher turnout rates), population stability, competitiveness of elections, campaign expenditures, concurrent elections, and voter registration requirements (stricter rules lead to lower turnout rates). Further variables shown "successful", for instance the electoral system and compulsory voting, are already part of my analysis in form of independent variables. From these variables Stockemer (2017) finds consistent impact on turnout only for compulsory voting and population size. His meta-analysis also confirms the influence of voter registration requirements, but this result is based on a relatively small number of studies. Another variable Stockemer finds to consistently affect turnout is the importance of an election. Stockemer's meta-study hence provides more cautious results and clearly points out that the empirical evidence for the impact on turnout with respect to variables like competitiveness or polarization is far from convincing.

I will restrict the control variables to those found to be influential in all of the aforementioned meta-analyses. As stated above, I will generally control for *Lagged Turnout* in my time-series models. In addition, I will include *Population Size* as a control variable in several model specifications. One might argue that population size usually refers to countries as the geographical unit and that the variable is not applicable for electoral districts due to the regular processes of reapportionment or redistricting, precisely because to adapt to changes in population size within the districts. However, especially in countries where the district level is the decisive or only tier of the electoral system, it seems quite reasonable to take population size within districts into account. As Geys remarks: "If constituencies are small, the voter may be influential at this level even though this constituency is nested within a much larger population" (Geys 2006, 642).

Regarding the operationalization of the variable, in most studies population size is measured as the natural logarithm of the population of the respective geographical entity (cf. Stockemer 2017, 708; Geys 2006, 643). In principle, this operationalization could also be applied to electoral districts. This information cannot be obtained for all district cases in the data set, however. To correct for this, I follow the approach by Singer and Gershman who use the number of valid votes cast in a district as a proxy for the size of the electorate in the

respective election (Singer/Gershman 2018). They also use the log of the variable and, correspondingly, I will adhere to this established operationalization as well. In other words, I will use the logged number of valid votes in each constituency for the elections under scrutiny to measure population size. Beyond that, I will set additional control variables aside in my analyses.

Other influential variables discussed above cannot be included in the analysis at all. This refers to the importance of an election and rules of voter registration. Including a variable to control for the decisiveness of an election is not viable a priori as I examine only one type of elections. Moreover, I examine exclusively national legislative elections that can generally be seen as first-order elections. That is why there would be no variation in that variable for the whole data set. The same is true for voter registration requirements. While the exact rules for voting eligibility might differ slightly between the countries in the group of selected cases, for instance with respect to the requirement of permanent residence in the country or the disenfranchisement of people because of mental illness or being prison inmates etc., being on the voting register is compulsory in all analyzed countries with Austria as the only exception (ACE Electoral Knowledge Network 2020). Voter registration is hence an automatic process where a personal registration in the run-up to an election is not necessary. The special case of Austria can be neglected, as a registration requirement only pertains to citizens living outside the country (Bundesministerium für Inneres 2020). Consequently, voter registration requirements cannot be used as a control variable as well.

Finally, as outlined in the first section of this chapter, the choice of an adequate model is key to control for excluded, but constant, factors that may have an impact on the dependent variable. The time-sensitive model should diminish the complexity of potential omitted variable bias. When coming back to the demand of including socioeconomic or other country-specific factors as controls to the analysis, the argument still holds that there is no additional usefulness in this measure as these factors remain constant over time within the electoral districts. The electoral system and its respective properties might change, but the socioeconomic factors are independent from these changes and do not need to be especially controlled for.

5.4.   Descriptive statistics

After having introduced and described the dependent variable, the independent variables, and the control variables, I proceed to the descriptive statistics now. All the numbers presented in

this section are based on the original values of the variables, i.e. on the variables without the logarithm being taken.

First of all, I want to give an overview of the data structure. As stated above, the employed data set includes data from individual constituencies in eleven Western and Eastern European countries. Altogether, the analysis extends to 9.639 constituencies. Table 2 shows the distribution of the individual district level cases over the eleven countries that are included in the analysis. As the table illustrates, the number of districts that enter the analyses is quite diverse. Especially Germany stands out with 4.790 constituencies, but also the Italian and Hungarian districts account for a considerable share of the total number of cases, each with more than 1.000 observations. The comparatively high number of constituencies from particularly Germany, Italy, and Hungary is driven by the numerous SMDs in the first tier (the majoritarian tier) of these countries' electoral systems.

Table 2: Distribution of district level cases

	Freq.	Percent	Cum.
Austria	453	4.699658	4.699658
Belgium	500	5.18726	9.886918
Bulgaria	186	1.929661	11.81658
Czech Republic	60	.6224712	12.43905
Denmark	508	5.270256	17.70931
Estonia	46	.4772279	18.18653
Finland	257	2.666252	20.85279
Germany	4790	49.69395	70.54674
Hungary	1176	12.20044	82.74717
Italy	1383	14.34796	97.09513
Portugal	280	2.904866	100
Total	9639	100	

Having considered the distribution of constituency cases over the eleven countries included in the analyses, what impression can we get when we look closer at the information provided by the individual variables? When first looking at the dependent variable *Voter Turnout*, Table 3 shows the basic descriptive statistics on the variable for the whole sample.[3]

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[3] Technically, the data do not represent a sample but a group of selected cases. Notwithstanding, I subsequently make use of the term "sample" for reasons of clarity.

Table 3: Descriptive statistics on Voter Turnout, pooled total sample

Variable	N	Mean	Std. Dev.	Min	Max
Voter Turnout	9365	.8145967	.102413	.2590846	.9878308

As the table shows, the range of values for the variable Voter Turnout is quite large. The sample includes districts with a minimum value of 0.259, what describes an extremely low electoral participation for the respective case, and a maximum value of 0.987, what describes a case of nearly total participation in an election. Mean turnout for the total sample is about 0.814. On its own, this mean value does not reveal too much, though. To get more detailed information on the distribution of the values and the various levels of district-level turnout over the countries in the sample, Table 4 shows the descriptive statistics on Voter Turnout disaggregated over the eleven countries.

Table 4: Descriptive statistics on Voter Turnout, by country

Country	N	Mean	Std. Dev.	Min	Max
Austria	453	.8774138	.0792341	.6698123	.98377
Belgium	500	.9299379	.0217978	.8284194	.9797546
Bulgaria	93	.6091452	.0612473	.4494645	.7347041
Czech Republic	60	.727083	.1340771	.5016511	.9770495
Denmark	416	.8464372	.0417968	.5751765	.9112598
Estonia	46	.6330966	.0656664	.5227809	.7504851
Finland	248	.754416	.087382	.3312192	.8819798
Germany	4,790	.832395	.0659124	.4944212	.9878308
Hungary	1,156	.6519962	.0731572	.3873551	.8477148
Italy	1,383	.8640108	.0769811	.4876177	.9877508
Portugal	220	.7356486	.1220538	.2590846	.9443904

When comparing the mean turnout (for the whole given period of time as shown in Table 1) in the table above between countries, the numbers reflect the well-known phenomenon that many Western European countries exhibit higher mean turnout rates compared to most Eastern

European countries. With the exception of Portugal, that might be treated as a special case because it became a democracy not until the middle of the 1970s in the course of the Carnation Revolution, all Western European countries in the sample show a mean turnout of 0.754 (Finland) and higher. Within the group of the Eastern European countries, Czech Republic shows the highest mean turnout with 0.727 and Bulgaria the lowest with 0.609. In contrast to that, Belgium reports the highest number of mean turnout from the whole sample with a value of 0.929. This might be due to the fact that Belgium belongs to the group of countries where voting is compulsory and compulsory voting is actually enforced (see below).

Turning to the descriptive statistics on the independent variable *Electoral System Type,* Table 5 displays the distribution of country-cases in the sample over the two considered types of electoral systems. Furthermore, the overview shows whether and when an inter-systemic change occurred in a country. As Table 5 illustrates, eight out of eleven countries used a PR system for the whole covered period of time. Two countries, Germany and Hungary, continuously used a mixed electoral system. While it is sometimes debated whether, for instance, the German mixed-member proportional system belongs to the group of mixed systems or whether it should better be classified as a PR system (see Nohlen 2014, 396-398), I classify the German system as mixed based on a definition that takes the mechanics of the electoral formula into account. According to this, an electoral system can be considered as "mixed if its mechanics involves *the combination of different electoral formulas (plurality or PR; majority or PR) for an election to a single body*" (Massicotte/Blais 1999, 345; original emphasis). The unique case in the sample where a change of the electoral system type occurred is Italy. Italy used a PR system for the whole period after World War II until the 1992 election. In 1993 the electoral system was changed and since the 1994 election Italy used a mixed electoral system as well (further changes of the electoral system in Italy occurred again from 2005 on) (cf. Renwick 2010, 111-112).

Table 5: Overview of Electoral System Type and inter-systemic changes

Country	Electoral System Type	Inter-systemic changes
Austria	PR	
Belgium	PR	
Bulgaria	PR	
Czech Republic	PR	
Denmark	PR	
Estonia	PR	
Finland	PR	
Germany	Mixed	
Hungary	Mixed	
Italy	PR (1946-1992) Mixed (since 1994)	Change from PR to mixed in 1993.
Portugal	PR	

Table 6 provides a summary over countries of the descriptive statistics for the independent variable *District Magnitude*. As the table illustrates, with respect to constituency size there is significant variation in the data set: District magnitude ranges from SMDs to large constituencies with a maximum of 89 members of parliament that were elected in this district. Most cases of extremely high district magnitude can be attributed to the incidents of mixed electoral systems in Germany and Italy where a considerable share of seats is distributed in large constituencies in the second tier (the PR tier). At the same time, the mixed electoral systems are also causing the very low numbers of mean district magnitude in Germany and Hungary. More precisely, the many SMD cases originating from the majoritarian tier of the German and Hungarian electoral system finally confound, respectively lower, mean district magnitude to numbers smaller than two for both countries. Interestingly, four countries exhibit a mean district magnitude between 7 and 8. Mean district magnitude is highest for the case of Czech Republic with a number of 19.55, followed by Finland with 13.229 and Portugal with 11.846.

Table 6: Descriptive statistics on District Magnitude, by country

Country	N	Mean	Std. Dev.	Min	Max
Austria	453	7.412804	7.352654	1	42
Belgium	500	7.05	5.93143	2	33
Bulgaria	186	7.198925	3.212846	1	14
Czech Republic	60	19.55	9.033694	5	41
Denmark	508	7.066929	3.765756	1	21
Estonia	46	8.782609	2.384329	2	15
Finland	257	13.22957	6.134385	1	34
Germany	4,790	1.885804	5.960063	1	89
Hungary	1,176	1.623299	2.487436	1	28
Italy	1,383	6.230658	9.957414	1	55
Portugal	280	11.84643	12.11214	2	58

An overview of the regulations on *Compulsory Voting* and *Enforcement* is provided in Table 7. As shown, at least three countries in the sample have or had laws on mandatory voting, namely Belgium, Bulgaria, and Italy. While in Italy voting was compulsory during the years from 1945 to 1993 (compulsory voting was abolished in the context of the 1993 electoral reform), Bulgaria introduced it as recently as 2016. As for Bulgaria the data set covers the period of time from 1991 to 2009, this case enters the empirical analysis as a country *without* compulsory voting, though. Only in Belgium voting is compulsory for the whole period of time in the analysis. Beyond that, Belgium represents an outstanding case because it is the only country in the sample that actively enforces its compulsory voting regulations. Non-voters in Belgium have to provide a legitimate reason for abstaining or otherwise face fine sanctions or even a potential disenfranchisement if abstaining for at least four elections within 15 years (cf. International IDEA 2019).

Table 7: Overview of Compulsory Voting (national level) and Enforcement

Country	Compulsory voting	Enforced	Year introduced
Austria	No		
Belgium	Yes	Yes	1892 (men); for women in 1949
Bulgaria	Yes	No	2016
Czech Republic	No		
Denmark	No		
Estonia	No		
Finland	No		
Germany	No		
Hungary	No		
Italy	Yes	No	Practiced from 1945 to 1993
Portugal	No		

Hereinafter, I want to provide the descriptive statistics on the *Effective Number of Parties*. The information is shown in Table 8 and depicts the summary statistics on the ENP at the constituency level, as described above, for each country in the sample. It is again to point out that the variable depicts the effective number of *electoral* parties. This means that the variable is not calculated based on seats in parliament but on the votes in the respective districts.

When considering the mean ENP, there is quite variation in that number between the different countries. Germany exhibits the lowest mean district-level ENP with about 2.7, what might reflect that the German party system, at least for the Bundestag, was rather small for decades with two major parties (CDU/CSU, SPD) and one minor party (FDP) and was therefore usually referred to as a "two-and-a-half-party system" (Blondel 1968). The German party system increased not until the emergence of the Greens in the 1980s and the PDS (today Die Linke) after German reunification. Mean constituency-level ENP is highest for Estonia with about 5.8, followed by the Czech Republic with about 4.7. It is noteworthy, that the Czech Republic does not only show a comparatively high mean ENP at the constituency level but that it is also characterized by the highest mean district magnitude of all countries in the sample. In addition, the numbers in Table 8 generally show that, on average, the Eastern European countries exhibit slightly higher values for the mean ENP compared to the Western European

countries. This might refer to the comparatively higher volatility of Eastern European party systems over the last decades (see e.g. Powell/Tucker 2014). In the end, it is to point out the apparent range of the district-level ENP within the countries. In this respect, one may assume that district magnitude plays a decisive role here.

Table 8: Descriptive statistics on district-level ENP, by country

Country	N	Mean	Std. Dev.	Min	Max
Austria	453	2.986185	.7855441	1.767333	6.000826
Belgium	500	3.421307	.9354709	1.470955	10.53134
Bulgaria	186	3.8828	.9195455	1.934442	6.169515
Czech Republic	60	4.652171	1.152308	2.31203	7.69031
Denmark	508	4.405966	.9351207	2.601089	7.559988
Estonia	46	5.780565	1.129877	3.647903	7.998496
Finland	217	4.569187	.9315102	1.07633	6.224793
Germany	4,790	2.708234	.5837899	1.457133	5.922253
Hungary	1,176	4.122938	1.650363	1.788587	10.52944
Italy	1,383	3.162414	1.041234	1.348756	8.436139
Portugal	280	3.06373	.6039942	1.882865	4.853352

Finally, after having considered the descriptive statistics on the dependent variable and the independent variables, Table 9 presents the respective information also for the control variable *Population Size*. The comparison of the mean district-level population size between countries has only limited informative value as these numbers are finally dependent on the national population as a whole and the constituency structure, i.e. the allocation, respectively apportionment, of the districts. At least, Table 9 reveals that several countries show a mean district-level population size between 100.000 and 200.000. It is striking that the highest mean for population size pertains to the Czech Republic. As the Czech Republic also exhibits the highest mean district magnitude (see Table 6), these numbers provide an indication of the two factors being associated with each other.

Moreover, Table 9 illustrates the large range of values regarding constituency-level population size within the individual countries. Also with respect to population size the

consequences of the mixed electoral systems in Germany, Hungary, and Italy need to be considered, though: The – geographically as well as in terms of the population – smaller SMDs pertaining to the first tier finally decrease mean district-level population size for these countries. As the case of Germany exemplifies, mean size of the population is only about 266.136. In the second tier, however, population size can become as high as the total maximum value in the data set for this variable, displaying the constituency of North Rhine-Westphalia in the 1983 German national legislative election with more than 11 million valid votes cast.

Table 9: Descriptive statistics on district-level Population Size, by country

Country	N	Mean	Std. Dev.	Min	Max
Austria	453	193744.8	183819.8	27521	1078471
Belgium	500	181094	155567.1	28175	854248
Bulgaria	186	146108.6	60358.03	52556	287604
Czech Republic	60	597439.5	323067.2	121140	1430000
Denmark	508	176523.4	191236.6	20674	1594330
Estonia	46	39690.26	12794.4	5053	63486
Finland	217	165963.5	79443.31	4656	465734
Germany	4,790	266135.9	825992.8	54423	11176337
Hungary	1,176	52518.44	93550.51	14895	1113865
Italy	1,383	391809	592497.2	41806	3523119
Portugal	280	274173.4	282042.6	59258	1297695

Having set out all variables in the analysis and the respective descriptive statistics, what can be recorded so far? The presented descriptive statistics on the distribution of constituency cases over the eleven European democracies in the data set and the descriptive statistics on the individual variables provide a more profound insight into the data structure. The information about the essential descriptive properties of the variables is crucial for the subsequent inferential statistics. The hitherto provided numbers allow for some preliminary consideration of the relationships between the variables, especially with respect to the variables that vary over time. I complement the previous descriptive information about the variables with the examination of the correlations between the time-variant factors in the data set. This is the last preparatory step

before analyzing the consequences of electoral system change for voter turnout by means of statistical models.

5.5. Correlates of the variables

In the following discussion, I provide the abovementioned supplementary correlations of the at most time-variant factors mentioned. These are the independent variables District Magnitude and Effective Numbers of Parties, as well as the control variable Population Size that is operationalized as the number of valid votes in a constituency. This is to address the issue of potential multicollinearity between the variables, leaving aside the inherently (almost) time-invariant independent variables, i.e. the variables should not be too strongly correlated in regression models. Informed by theory and empirical knowledge it is to expect district magnitude and the effective number of parties to be correlated to a certain extent, however. More precisely, one would expect a positive relationship between these variables, higher district magnitude inducing a higher effective number of parties. Table 10 presents the correlation matrix for the three time-variant variables in their unlogged form, displaying the pairwise correlation coefficients between the variables.

Table 10: Correlations of District Magnitude, Effective Number of Parties, and Population Size

Variables	District Magnitude	ENP	Population Size
District Magnitude	1.000		
ENP	0.316 0.000	1.000	
Population Size	0.647 0.000	0.056 0.000	1.000

As the table shows, all correlations are statistically highly significant. As expected, there is a positive relationship between district magnitude and the effective number of parties. With an r-

value of 0.316 there is only a moderate correlation between these two variables, however. This relationship should hence not be problematic for the models to be run. Furthermore, the table shows that there is nearly no correlation between the ENP and population size. Finally, it also becomes apparent that population size and district magnitude are quite highly correlated. The correlation coefficient of 0.647 indicates a strong positive relationship. This is not necessarily surprising as in districts with a higher magnitude the absolute number of voters might also be higher. Also this correlation should not be problematic, though. It is still far away from collinearity and it is again to point out that population size only acts as a control variable. In the following chapter, I will specify several models where the control variable is included as well as models where it is omitted. Then it will turn out whether the inclusion of population size also has an effect on the coefficient for district magnitude in these models.

In addition, Table 11 shows the correlation coefficient for the dependent variable Voter Turnout and the control variable Population Size, again in its unlogged form. That is to additionally rule out the possibility that the two variables are finally different measures for the same phenomenon, as population size is operationalized as the total number of valid votes in a constituency. If turnout and the number of valid votes would describe a similar phenomenon, the two variables should be strongly correlated. Generally, from a theoretical point of view and also regarding the operationalization of the variables, using population size as a control variable should not be problematic. While the total number of valid votes to a certain extent reflects the number of voters in a district in *absolute* terms, turnout is a *relative* measure and depicts the fraction of eligible voters in a district who go to the polls. In the CLEA data set, the variable is calculated from dividing the total number of votes cast by the number of eligible voters, each in a given constituency (for a more detailed description of the calculations for the respective variables, see codebook from Kollman et al. 2019). Consequently, the number of valid votes in a constituency that makes up the variable Population Size is, moreover, not included in the calculation for the variable Voter Turnout. This should also preclude any a priori interference between the two variables Voter Turnout and Population Size.

Table 11: Correlation of Voter Turnout and Population Size

Variables	Voter Turnout	Population Size
Voter Turnout	1.000	
Population Size	0.118 0.000	1.000

The correlation analysis shown in Table 11 ultimately dispels potential doubts regarding the dissimilarity of the two variables Voter Turnout and Population Size. The correlation coefficient is indeed highly significant, but with a Pearson's r of 0.118 there is only a quite weak positive relationship between the two variables. This should proof that the variables are sufficiently different from each other and not measuring the same phenomenon. According to this, there is no problem of using the control variable Population Size, operationalized as the number of valid votes cast in a district, with respect to the dependent variable Voter Turnout. As stated above, I will additionally account for the possible impact of that control variable by including it only in some model specifications.

Based on the outlined general framework in terms of the research design and the data base and the provided descriptive statistics and correlations of the time-variant variables, the next chapter proceeds to the inferential analyses regarding the relationship between electoral system change and voter turnout. Chapter 6 informs about the details concerning model specification, presents the findings of the empirical analyses, and contextualizes these findings. The chapter closes with two case studies considering incidents of inter-systemic change in New Zealand and Italy.

6. Empirical analysis of the impact of electoral system change on turnout – results and interpretation

The previous chapter closed with an analysis of the correlations between the time-variant variables as well as between the dependent variable Voter Turnout and the control variable Population Size. Herewith, problems caused by collinearity or an inadequate operationalization of the control variable were precluded. Based on the considerations in chapter 5, this chapter presents and interprets the findings from the empirical analysis of the relationship between electoral systems, their changes, and voter turnout.

As outlined in chapter 5, TSCS models play an important role within my research design as they should add to coping with the pitfalls of analyzing electoral system change. TSCS models allow for analyzing the spatial as well as the temporal dimension, thereby increasing the number of available observations and degrees of freedom, and reduces the problem of multicollinearity (cf. Fortin-Rittberger 2014, 389-390). At the same time, the estimation of TSCS models is itself associated with several complexities. That is why I first discuss the estimation of TSCS models more generally and how to deal with these complexities. In this context, I will provide additional details on the performed statistical models and procedures as well as on their respective specifications.

Subsequently, I will proceed to the findings of my statistical analyses on the consequences of electoral system change for turnout. I will first present the results for the whole group of cases included in the TSCS-analyses, providing a wide range of different model specifications. Each set of model specifications fulfills a particular task within the analysis, resulting in three analytical stages: The TSCS models in the first stage act as baseline models to assess the (temporal) relationships between the time-variant independent variables and turnout, while the purely cross-sectional models in the second stage give a more detailed account of the effects and the hypotheses that involve time-invariant variables. The first-difference models in the third stage finally take on the (short-term) consequences of change. These three analytical stages are followed by two additional case studies on New Zealand and Italy to especially discuss the consequences of inter-systemic changes and their potential long-term consequences. Within the scope of the presentation of results, I will interpret the findings in greater depth and discuss whether the addressed hypotheses, respectively which of the hypotheses, are corroborated or do not find empirical confirmation.

6.1. Additional information on the statistical models and diagnostics

As mentioned above, before presenting the results I first provide further details on the models' specifications. Moreover, I describe the respective diagnostics and statistical tests performed in the context of specifying the models (for the detailed results of statistical test, see Appendix A).

Concerning the data structure, the data comes in a longitudinal shape to enable running time-series cross-sectional models. As the variable identifying the panels, I created a variable that assigns a unique identification code to every constituency for each country in the data set. The election dates act as the variable identifying the time units for the time-series structure. Accordingly, delta, the period of the time variable, is the time between two elections. As the variable finally counts the number of legislative periods covered in this analysis for each country separately, this should perfectly deal with the circumstance that electoral periods might differ in length and that, additionally, the number of elections differs between countries. What should also be mentioned is the multilevel structure of the data. Generally, the individual constituencies depict the cases in this data set. These electoral districts (level 1) are eventually nested in elections (level 2), which are again nested in countries (level 3).

In terms of model specification and the circumvention of potential complexities, I generally follow the strategies that Fortin-Rittberger (2014) suggests for the estimation of time-series cross-sectional models. After having presented the main descriptive statistics for the data set, the dependent variable and the independent and control variables in the previous chapter, I now turn to the essential statistical tests of the data regarding the specification of TSCS-models. The first issue to address is autocorrelation, respectively serial correlation, which is quite likely to exist in my data. In fact, it is unlikely and theoretically misleading that the observations in my data are independent on the temporal dimension. The characteristics of electoral districts in past elections might still be present in an election at $t = 0$. My models are based on an OLS estimator, though, and the temporal dependence of errors is not unproblematic in respect of the estimates. According to this, autocorrelation needs to be removed. To test for serial correlation, I perform Woolridge's test for autocorrelation. As supposed, the test shows a statistically significant result at the 0.0-level, indicating the null hypothesis of no autocorrelation needs to be rejected. Consequently, there is indeed serial correlation in the data.

As a remedy for autocorrelation, I will include a lagged dependent variable (LDV) among the independent variables in the time-series models. While this practice is not completely undisputed, it is an established approach and many scholars see it as a reliable

solution to removing serial correlation (e.g. Beck 2001; Beck/Katz 1995; 2011). Recent research demonstrates as well that the inclusion of LDVs leads to less biased coefficient estimates for independent variables compared to specifications without LDVs (Wilkins 2018). According to this, LDVs should certainly be included in time-series regression models, as long as autocorrelation in the error term is avoided. Finally, the decision to add an LDV is theoretically justified, too. As stated above, one can assume that turnout in a constituency is quite dependent on the turnout level in prior elections in that constituency. I decided to include lagged turnout – what would be an LDV – as a control variable either way. As Fortin-Rittberger states: "If the researcher knows that successive values of a dependent variable are theoretically dependent on previous values […], or that the past matters to explain current values of a variable, the LDV should probably be included" (Fortin-Rittberger 2014, 393).

In addition, I test for non-stationarity in the data. This is relevant because TSCS models are based on the assumption that data are stationary, i.e. the statistical properties of a time-series process are constant over the defined time periods (cf. Fortin-Rittberger 2014, 393). To test for non-stationarity, I perform several augmented Dickey-Fuller tests (Fisher type unit root tests for panel data) at different lags. The tests reveal that for some variables the panels contain unit roots. This indicates that there is only limited stationarity in the data. How can stationarity be achieved? Two possible courses of action come into consideration to make the data stationary: One solution would be the inclusion of a time index component as an independent variable in the analyses to model the non-stationarity, the other solution would be the estimation of first-difference models (cf. Fortin-Rittberger 2014, 394). Also Beck and Katz (2011) refer to differencing as means to obtain stationary data. I follow the second suggestion to estimate first-difference models as well, respectively a special series of model specifications within the whole analysis will be first differenced time-series models.

This decision is not only based on the ability of these models to deal with non-stationarity in the data, but first differencing also reduces autocorrelation. Consequently, this procedure depicts an additional approach to cope with autoregressive processes, besides the inclusion of a LDV as described above, especially with respect to first-order autocorrelation. First-difference models are also associated with one drawback, though: While first differencing, that means replacing the raw data (x_t) by the first differenced series ($x_t - x_{t-1}$), effectively removes first-order serial correlation, the procedure finally eliminates information on long-term trends (cf. Fortin-Rittberger 2014, 393; see also Beck/Katz 2011, 343). More precisely, that means "when using differenced data, analysts can only interpret the short-term effects of

variables since long-term effects are effectively differenced out" (Fortin-Rittberger 2014, 393). Nevertheless, the advantages clearly outweigh potential disadvantages regarding the estimation of first-difference models. Within the scope of the two case studies at the end of this chapter, I will discuss the potential long-term impact of electoral system change as well. Hereby, I finally aim to account for the short-term as well as the long-term consequences of changes in the independent variables for the dependent variable.

Is finally a random-effects (RE) or a fixed-effects (FE) model the most appropriate solution to model my data? There is quite some difficulty with FE models when some of the independent variables are stable or nearly unchanging (cf. Fortin-Rittberger 2014, 396), what would apply to the variables Electoral System Type, Compulsory Voting and Enforcement. Generally, the FE model has drawn certain criticism in recent research (Plümper/Troeger 2019). Rarely changing independent variables cause large standard errors (Plümper/Troeger 2007) what possibly could lead to Type II errors, that is to say the false estimation that a variable has no effect although actually being statistically significant (cf. Fortin-Rittberger 2014, 398). For completely time-invariant variables the use of FE models is not possible at all to investigate their effects on the dependent variable: When applying dummy variables for countries in the models, these dummies are perfectly collinear with the countries' time-invariant characteristics (cf. Fortin-Rittberger 2014, 398; see also Kohler/Kreuter 2016, 346). In contrast, only RE models would allow the modeling of time-invariant variables.

The FE model is still the most adequate choice to investigate my research question and the most appropriate model from a theoretical perspective. Using FE is adequate when one is essentially interested in analyzing the influence of variables that vary over time. This is the case for my quite variant key variables like District Magnitude or the Effective Number of Parties. Generally, FE models are designed to analyze the causes of changes within an entity, respectively an electoral district in my case, and a time-invariant characteristic cannot cause such a change as it is constant for each entity (cf. Kohler/Kreuter 2016, 346). In respect of the underlying research question, the temporal dynamics are much more relevant than the cross-sectional differences. Additionally, the FE model allows controlling for unmeasured explanatory variables. It hence enables to assess the consequences of change and this is what I am finally investigating.[4]

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[4] To statistically verify the appropriateness of a FE model, I perform a Hausman test to compare the FE to a RE specification. The test shows a p-value at the 0.0-level, so the null hypothesis that the difference between coefficients is not systematic can clearly be rejected. Thus, a FE model is the more suitable choice compared to a RE model.

As it is to run FE models, I additionally perform Pesaran's CD test to examine the data for contemporaneously correlated errors, i.e. for cross-sectional dependence. Here, for some variables the test displays statistically significant p-values. This indicates that the null hypothesis of no cross-sectional dependence cannot always be rejected, pointing out to cross-sectional dependence in the data. This is hardly surprising as, for instance, cross-sectional dependence of constituencies within one national election can be expected. Finally, I also test for panel heteroscedasticity applying a modified Wald test for groupwise heteroscedasticity in FE models. As the test is highly significant, the null hypothesis of panel homoscedasticity needs to be rejected. The existence of cross-sectional dependence as well as groupwise heteroscedasticity suggest the use of robust standard errors, respectively panel corrected standard errors (PCSEs) as proposed by Beck and Katz (1995), in the models (cf. Fortin-Rittberger 2014, 399-400). Finally, I opt for using Huber-White standard errors to facilitate obtaining robust variance estimates.

6.2.   Results and interpretation

After having discussed the main issues regarding the methodological approaches, specificities of the data and the respective diagnostics, I now turn to the presentation and interpretation of the results. In this respect, I also especially want to illustrate the substantive effects of district magnitude and the effective number of parties. As the previous section has shown, the consequences of electoral system change for turnout cannot be determined within a single type of model. In fact, the addressed hypotheses require a wide range of model specifications to finally grasp the diverse aspects subsumed as "electoral system change". That is why my superordinate modelling strategy aims at providing a comprehensive overall picture to ascertain the consequences of electoral system change for voter turnout empirically.

Subsequently, I present the results of the following model types, each covering different aspects and all drawing on the whole group of selected cases of the district-level data set: fixed-effects models (first analytical stage), cross-sectional models (second analytical stage), and first-difference models (third analytical stage). This is followed by the two additional case studies analyzing inter-systemic changes in greater depth, based on data at the national level. The first analytical stage comprises five model specifications, the second analytical stage comprises six model specifications, while four models are specified within the third stage of

the analysis. This adds up to a total of fifteen models to test the relationship between the independent variables and turnout empirically.

It should be noted that the first two stages of the analytical process rely on models on absolute levels of turnout. In this respect, these stages should give an impression of the basic relationships between the independent variables and voter turnout, while the aspect of change is considered in the third stage. The first-difference models in particular deal with the short-term consequences of change, while the long-term consequences of change are considered within the scope of the two case studies on inter-systemic changes in New Zealand and Italy.

6.2.1. Fixed-effects models

Below, I present the results of my basic TSCS-analyses, namely from the fixed-effects regression models.[5] Table 12 shows the coefficients for the different model specifications. The estimations are based on the procedures as described above. The first five models, shown in Table 12, depict the regular FE models with robust standard errors. These models aim at giving a first impression of the temporal relationship between turnout and the time-variant independent variables, which are District Magnitude and the Effective Number of Parties. The fixed-effects models hence give a first account of the impact of the factors that pertain to Hypothesis 2 and Hypothesis 4. The findings are subsequently contextualized within the second and third stage of the analysis.

The number of observations, i.e. individual constituency-cases, that finally makes up the data basis for the analyses ranges from 8.014 to 8.055. This difference is caused by particular missing information for some variables and the models are only estimated on the basis of complete data. In the end, the difference in the number of observations is neglectable for the analytical purposes and do not affect the results. Interestingly, although the fixed effects models are rather reduced and my X-centered approach does not aim at a maximum explanation of the dependent variable, R^2 is over 0.3 in all specified FE models. Thus, the independent and control variables included notwithstanding explain a proportion of the variance in the dependent variable that is not inconsiderable.

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[5] Appendix B provides a series of robustness checks for the fixed-effects models. First, I run the FE models based on a data set without the SMD cases from mixed electoral systems. Secondly, I replicate the TSCS models within a multilevel mixed-effects estimation instead of the original FE specification. The results of these tests to a large extent prove the robustness of the estimates presented in section 6.2.1.

Table 12: Time-Series Cross-Sectional Models on Voter Turnout with Fixed Effects

	(1)	(2)	(3)	(4)	(5)
	Voter Turnout	Voter Turnout	Voter Turnout	Voter Turnout	Voter Turnout
L.Voter Turnout	0.584***	0.650***	0.581***	0.642***	0.578***
	(0.0205)	(0.0199)	(0.0233)	(0.0224)	(0.0234)
L.District Magnitude (log)	0.0133***	0.0947***	0.0134***	0.0953***	
	(0.00241)	(0.00454)	(0.00247)	(0.00463)	
District Magnitude (log)					-0.0208***
					(0.00475)
L.Population Size (log)		-0.0910***		-0.0912***	
		(0.00396)		(0.00402)	
Population Size (log)					0.0373***
					(0.00459)
L.Effective Number of Parties (log)			-0.00166	-0.00503	0.00122
			(0.00340)	(0.00338)	(0.00340)
Constant	0.327***	1.295***	0.332***	1.309***	-0.0887
	(0.0166)	(0.0451)	(0.0213)	(0.0487)	(0.0476)
R^2	0.307	0.385	0.306	0.386	0.319
Observations	8055	8025	8025	8025	8014

Note: Fixed effects at constituency level. Robust standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Model 1 depicts a reduced "baseline" model that only contains the LDV and lagged district magnitude, as all independent variables, respectively control variables, are lagged in these models. The only exception is Model 5 where I use the unlagged form of the variables District Magnitude and Population Size. Besides the fifth model I entirely make use of lagged variables in this first analytical stage to reflect the dynamic component that I theoretically expect regarding the impact of institutions, or rather macro-level factors, on the behavior of voters. For instance, information on party system size in a district for a current election is not an information that voters have at hand in the polling booth. It is in fact an information that follows up the election and can be calculated not until the respective election results exist. Consequently, it is rather the case that voters rely on retrospective information and form their preferences to turn out or not based on their experiences from previous elections. That is why

it might indeed be reasonable to use the ENP in its lagged form. Similarly, the argument also holds for the factor of district magnitude. As the information on district magnitude in principle in the majority of cases precedes the act of voting, i.e. voters are not only dependent on retrospective information, and the abovementioned temporal relationship is not that clear-cut for the impact of population size, I include these variables also in their unlagged form in Model 5 to inspect whether this makes a difference.

When comparing the models shown in Table 12, it becomes apparent that past turnout has a positive impact on turnout, showing a highly significant coefficient in all specifications. The same is true for lagged district magnitude that is included in the first four models. Its coefficients are continuously positive and highly significant as well. So far, these results do clearly fit the theoretical expectations.

Model 2 adds lagged population size as a control to the reduced first model. In fact, it is only a control variable. Nevertheless, it may be interpreted. The coefficient for lagged population size shows high statistical significance and an increasing population size within a district between two electoral periods seems to negatively impact voter turnout. Notwithstanding population size is measured as the number of valid votes within a district in an election, the result confirms the expectation that a smaller population in any geographical entity brings higher turnout about.

For the effective number of parties as an independent variable, I follow the suggestion by Blais and Aarts to include any party system variables only in the last stage in the models (cf. Blais/Aarts 2006, 195). This variable is finally added in Model 3, Model 4, and Model 5 in its lagged form. Model 3 and Model 4 differ with respect to the inclusion of lagged population size as a control variable only in the fourth model. As in the previous two models, the coefficient for lagged turnout remains constantly positive and highly significant. The coefficient for the lagged ENP is negative in Model 3 as well as in Model 4, but turns positive in Model 5. It is noticeable that the coefficient fails to reach statistical significance in all three models. Regarding the additional control variable in Model 4 it becomes apparent that, similar to Model 2, also in the fourth model lagged population size is negative and highly significant.

How to interpret the findings for the lagged ENP? Even though the models only describe the temporal effects for one time period, the negative influence of an increasing ENP on turnout would generally not contradict the theoretical expectations but again confirm the empirical findings of a negative relationship between electoral participation and party system size. The instability of the coefficients' direction might also be due to a lack of applicability concerning

the specification of Model 5. With regards to the direction of the impact of party system fragmentation on turnout it is to point out that I finally hypothesize the relationship to be curvilinear. This relationship cannot be examined within the scope of the FE models, though. The substantial effect of the ENP on voter turnout will be further investigated in a special follow-up analysis. In addition, I will inquire whether the coefficients for the ENP remain insignificant in other model types as well, what would corroborate the findings of the FE models.

Proceeding now to the discussion of the further results of Model 5, which is characterized by the inclusion of unlagged district magnitude and unlagged population size, besides the changing sign of the coefficient for the lagged ENP. While lagged turnout is stable in the fifth model as well, i.e. positive and highly significant, the coefficients for unlagged district magnitude and unlagged population size come as a surprise. Indeed, the coefficients remain highly significant but both change their sign in each case in the opposite direction compared to their lagged versions included in the other models. More precisely, district magnitude, on the one hand, turns negative and population size, on the other hand, turns positive. These results not only contradict the first four model specifications but also dissent with theoretical expectations. Especially, as the coefficient for lagged district magnitude proves stable over all models where it is included, the results of Model 5 need a closer inspection. The upcoming further analyses will reveal if one needs to attach any importance to these results.

Besides the (missing) lag structure for these variables in the context of this model type as a cause, the direct relationship between district magnitude and population size could potentially drive these results. The correlation analysis of these two variables, which was performed above, did not indicate too severe collinearity issues, though. Nonetheless, a strong relationship between district magnitude and population size cannot be dismissed. This further proves the decision to control for population size in the models as being essential and justified.

In a nutshell, the comparison of all five models highlights lagged turnout to be the most stable predictor. The coefficient for the LDV is throughout positive and highly significant. Besides the methodological reasons to include the LDV in the models, controlling for lagged turnout also confirms the meta-level evidence (Geys 2006; Cancela/Geys 2016) that the level of turnout in past elections is a reliable predictor for the level of turnout in future elections. Lagged district magnitude shows a significant positive effect on the dependent variable as well. Lagged population size, in turn, displays a significant negative effect on voter turnout in the

models where this control variable is included. Finally, there is no statistically significant effect of the lagged ENP on turnout in any of the FE models.

6.2.2. <u>Cross-sectional models</u>

In this second analytical stage, I specify a series of cross-sectional models, based on OLS regression. This is to especially account for the (nearly) time-invariant variables Electoral System Type, Compulsory Voting, and Enforcement. Nonetheless, I will include and further test the other independent and control variables in these cross-sectional models as well. Beyond a closer examination of the influences on turnout emanating from the variables especially pertaining to Hypothesis 2 and Hypothesis 4, which are District Magnitude and the ENP, the cross-sectional models should allow for testing Hypothesis 1 and Hypothesis 3 as far as possible.

Only the control variable for lagged turnout cannot be used in this analytical stage as the models do and should not cover the aspect of time. Nevertheless, by analyzing the pooled data, the results from the cross-sectional analyses will as well bring consolidated findings about. These models should definitely allow for recognizing the underlying relationships between the dependent variable and the included independent variables, what pertains to the directions as well as to the magnitudes of these relationships. Generally, the number of observations is constant over all models. With 9.334 constituency-cases the number of observations is higher compared to the time-series cross-sectional models because no cases were "lagged out". Table 13 shows the results for the pooled cross-sectional models.

Table 13: Pooled Cross-Sectional Models on Voter Turnout

	(6) Voter Turnout	(7) Voter Turnout	(8) Voter Turnout	(9) Voter Turnout	(10) Voter Turnout
Electoral System Type	-0.0325***	-0.0306***	-0.0178***	-0.0152***	-0.0125***
	(0.00114)	(0.00108)	(0.00122)	(0.00114)	(0.00114)
District Magnitude (log)	0.0226***	0.00744***	0.00141	-0.0151***	-0.0162***
	(0.000987)	(0.00103)	(0.00122)	(0.00123)	(0.00122)
Effective Number of Parties (log)	-0.138***	-0.135***	-0.116***	-0.112***	-0.109***
	(0.00327)	(0.00308)	(0.00324)	(0.00303)	(0.00301)
Compulsory Voting		0.112***		0.115***	
		(0.00331)		(0.00315)	
Population Size (log)			0.0400***	0.0417***	0.0477***
			(0.00144)	(0.00135)	(0.00135)
Compulsory Voting Enforcement Index					0.0716***
					(0.00184)
Constant	1.001***	0.994***	0.497***	0.468***	0.392***
	(0.00352)	(0.00333)	(0.0185)	(0.0173)	(0.0173)
R^2	0.290	0.368	0.344	0.427	0.436
Observations	9334	9334	9334	9334	9334

Note: Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Turning to the coefficients in Table 13 for the independent variable Electoral System Type, it shows that these are negative and highly significant in all model specifications. The negative coefficients are due to the coding of the variable where PR is coded with the smaller value (see section 5.3.2.). Accordingly, a more restrictive electoral system – a mixed electoral system in this respect – has a negative effect on voter turnout. Vice versa, PR should have a positive effect on turnout compared to more restrictive electoral systems. Consequently, this finding generally confirms the theoretical expectations and provides first evidence that the hypothesized relationship between the type of electoral system and voter turnout, as formulated in Hypothesis 1, is correct. Indeed, the models in Table 13 only cover the cross-sectional dimension but are nonetheless meaningful and confirm previous cross-sectional research that finds PR to positively affect turnout. Understandably, the results from the cross-sectional models do not provide information on the effect of *change* especially. That is why the two closing case studies

on inter-systemic change will further cover this aspect to also address the temporal dimension and the respective question of causality that is included in Hypothesis 1.

Regarding the effect of the logged ENP in the models presented in Table 13, its coefficients constantly show a negative sign and are always statistically highly significant. In other words, from a cross-sectional perspective a higher number of parties has a negative effect on electoral participation. In respect thereof, these results at the district level, comparable with the abovementioned relationship between the type of electoral system and turnout, confirm previous findings from cross-sectional aggregate research on the effect of the ENP on turnout rates. The findings on the negative effect of party system size on turnout from the pooled cross-sectional models are also in line with most of the respective results of the FE specifications (Model 3 and Model 4) presented in Table 12. Even though the FE models included the lagged ENP and the coefficients did not reach statistical significance, the numbers of the cross-sectional models make the found direction of the ENP-effects in Model 3 and Model 4 more compelling. As the cross-sectional models do not allow for the assessment of the consequences of *change* in the ENP on voter turnout, this variable will be further investigated in the upcoming analytical stage. Then it will show whether the relationship between the number of parties and turnout is finally positive, negative, or, as hypothesized, curvilinear. Hereby, Hypothesis 4 should eventually be fully addressed and the causality between the mechanism of the number of parties and turnout should be clarified.

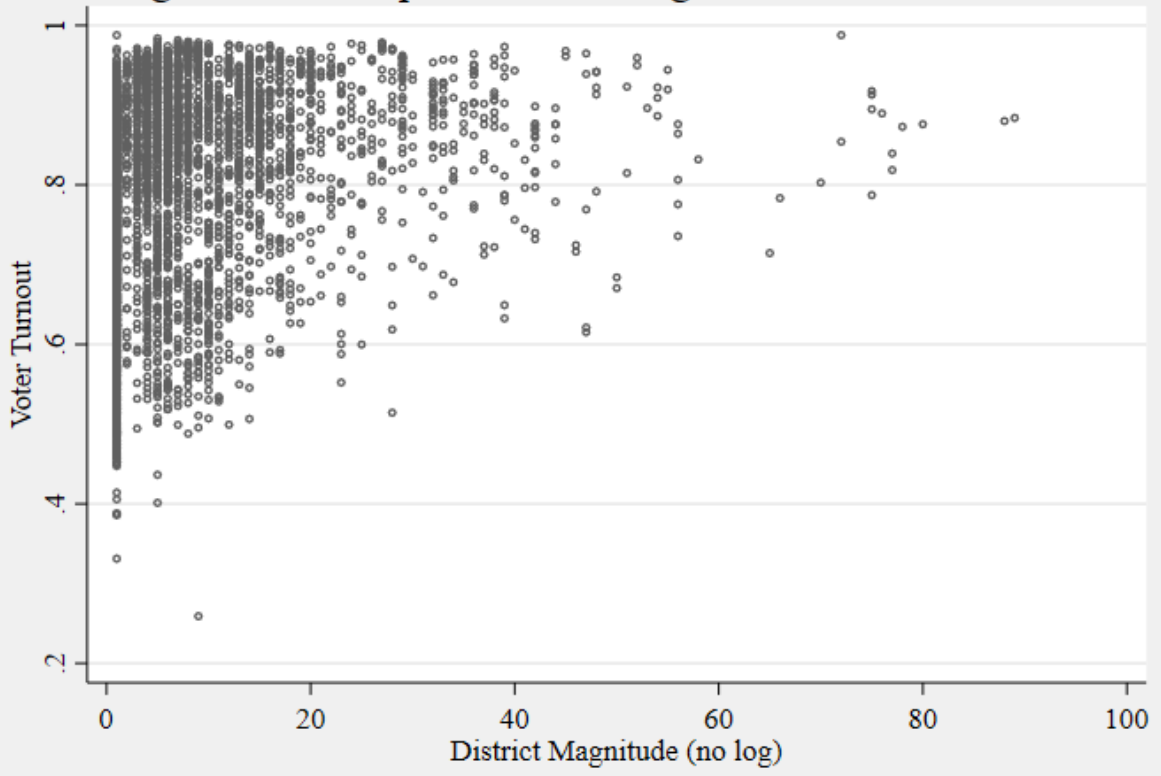Figure 6: Scatterplot District Magnitude and Voter Turnout

Figure 7: Scatterplot District Magnitude and Voter Turnout
by country

In accordance with theoretical expectations, the coefficients for logged District Magnitude are positive and highly significant in the first two cross-sectional models in Table 13 (Model 6 and Model 7). In this respect, a higher district magnitude should have a positive effect on turnout. As this is also in accordance with the vast majority of findings for district magnitude in the FE models where the lagged variable was used, the cross-sectional findings further substantiate the positive effect of district magnitude on voter turnout and add some additional confirmation to the relationship as stated in Hypothesis 2. To illustrate this generally positive relationship between district magnitude and the dependent variable, Figure 6 shows how the whole sample of constituency-cases is distributed on the dimensions of unlogged district magnitude and turnout. Figure 6 clearly points out that a voter turnout of 70% and lower mostly occurs in constituencies with a district magnitude smaller than 25. Put differently, the graph exhibits the general trend that higher turnout is predominantly found in constituencies with a higher magnitude.

This still holds when the distribution is graphed separately for each country in the data set, what is depicted in Figure 7. The positive effect of district magnitude on voter turnout becomes even more apparent when the relationship between the two variables is considered separately in each particular country in the sample. Understandably, the distribution of district magnitudes varies considerably over the eleven countries under study, showing diverse patterns. Nonetheless, the positive relationship between the two variables is evident in nearly all of these countries even though their electoral systems differ from each other in several other details. The case of Belgium seems to deviate in this respect. This exceptional relationship between turnout and district magnitude gives a first impression of the influence of another factor coming into play: compulsory voting. As it turns out, the cases of Italy and especially Belgium display comparably high levels of turnout for most constituencies. The particular consequences of enforced compulsory voting for turnout, what applies to the Belgian case, already become apparent in Figure 7 but will be analyzed in greater detail below.

Table 14: Pooled Cross-Sectional Model on Voter Turnout with interaction of District Magnitude and Population Size

	(11) Voter Turnout
Effective Number of Parties (log)	-0.109***
	(0.00290)
Compulsory Voting	0.118***
	(0.00303)
District Magnitude (log)	0.233***
	(0.00816)
Population Size (log)	0.0775***
	(0.00148)
District Magnitude (log) # Population Size (log)	-0.0202***
	(0.000654)
Constant	0.0273
	(0.0182)
R^2	0.470
Observations	9334

Note: Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When considering the models 8 to 10 in Table 13, the effect of logged district magnitude first becomes insignificant in Model 8 and turns negative then in the models 9 and 10, again with a statistical significance at the 0.001-level. How can that be? Are there any intervening factors regarding the district magnitude-turnout nexus? The reason is that the effect of district magnitude is dependent on the control variable Population Size, i.e. the impact of district magnitude on turnout diminishes when one controls for the districts' population. This is not completely unreasonably as these variables are closely connected. It rather makes sense when one has the logic of reapportionment, especially in PR systems and upper-level districts in mixed systems, in mind. Hence, district magnitude will be higher in constituencies where the number of inhabitants is higher to account for the principle of equal value of votes in a democratic electoral system. This close connection is also reflected by the relatively strong correlation of district magnitude and population size as shown in Table 10.

To address this issue, Model 11 in Table 14 shows a slim additional specification of the pooled cross-sectional models, but including the interaction term of district magnitude and

population size.[6] As the table shows, the joint effect of these two variables is negative, while the main effect of district magnitude itself is positive again. To further illustrate the interaction between district magnitude and population size, I calculated the average marginal effects of logged district magnitude on turnout, conditional on logged population size (see Figure 8). As Figure 8 highlights, the positive effect of district magnitude decreases and finally becomes negative with increasing population size. When adding the factor of compulsory voting to the cross-sectional models, a negative effect of district magnitude finally emerges.

Figure 8: Average Marginal Effects of District Magnitude (log) with 95% CIs

Note: Based on Model 11 in Table 14.
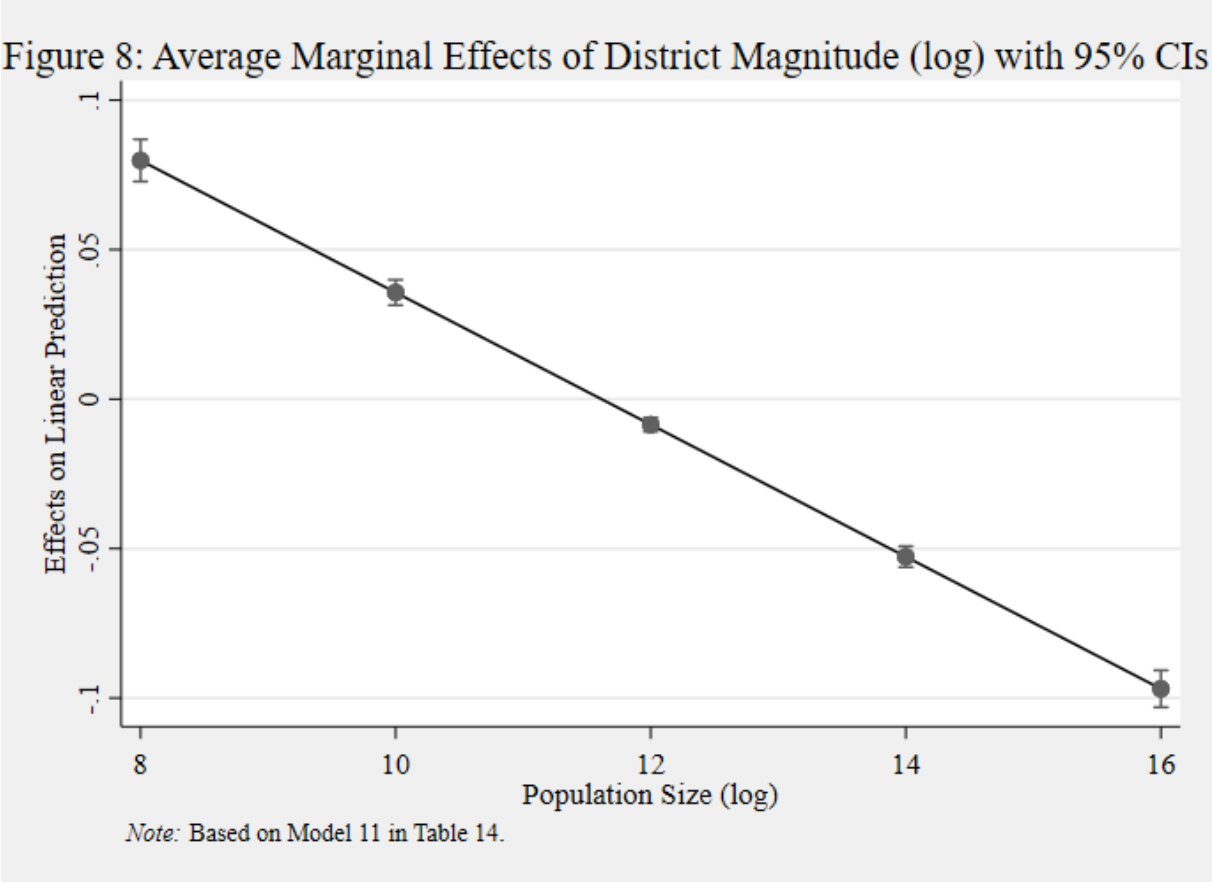
When considering the coefficients for the control variable Population Size itself, the cross-sectional models show the impact of population size to be positive and highly significant. As the foregoing FE models constantly report a negative effect of lagged population size that is statistically highly significant, while the coefficient for unlagged population size in Model 5 resembles the coefficients for this variable within the pooled cross-sectional models, it seems

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[6] Model 11 leaves the Electoral System Type aside, although the inclusion of that variable does not drastically alter the coefficients in the model (see Table B6 in Appendix B).

that without the temporal dimension the coefficients for population size reflect in fact a positive effect of a higher population in a district on electoral participation.

Finally, it is to discuss the impact of the factor of compulsory voting. As expected, there is quite a strong positive effect of compulsory voting on turnout that is also highly significant (see Table 13 and Table 14). According to this, the results clearly confirm Hypothesis 3. The hypothesis also expects the effect to be stronger when there is not only compulsory voting by law but if it is also enforced in practice. I account for that by the independent variable Enforcement. In Appendix B (see Table B5), I provide another pooled cross-sectional model that is specified with Enforcement instead of Compulsory Voting. Certainly, the coefficients of these two variables do not considerably differ. This was expectable as the cases coded "1" for the dummy variable Enforcement are finally only a sub-sample of the positive cases for the dummy variable Compulsory Voting. Consequently, the additional effect of enforcement cannot be demonstrated by the independent variable Enforcement alone.

To substantiate the additional effect of enforcement I created the "Compulsory Voting Enforcement Index (CVEI)" that depicts an additive index of the variables Compulsory Voting and Enforcement. The index is "0" when voting is not compulsory, "1" when there are legal rules of compulsory voting, and "2" when the compulsory voting rules are actually enforced. The CVEI is finally included as an independent variable in Model 10 (see Table 13). Here it is included as a continuous variable that displays a highly significant positive coefficient as well but the variable cannot capture the varying size of effects at different levels of compulsory voting severity yet. For this reason, by treating the CVEI as a categorical variable and calculating its predicted probabilities, evidence of the additional positive effect of enforcement can be provided. Figure 9 depicts the graphical representation of the effect of different levels of compulsory voting enforcement on voter turnout.

Figure 9: Effect of Different Levels of
Compulsory Voting Enforcement on Turnout

Note: Based on Model 10 in Table 13.
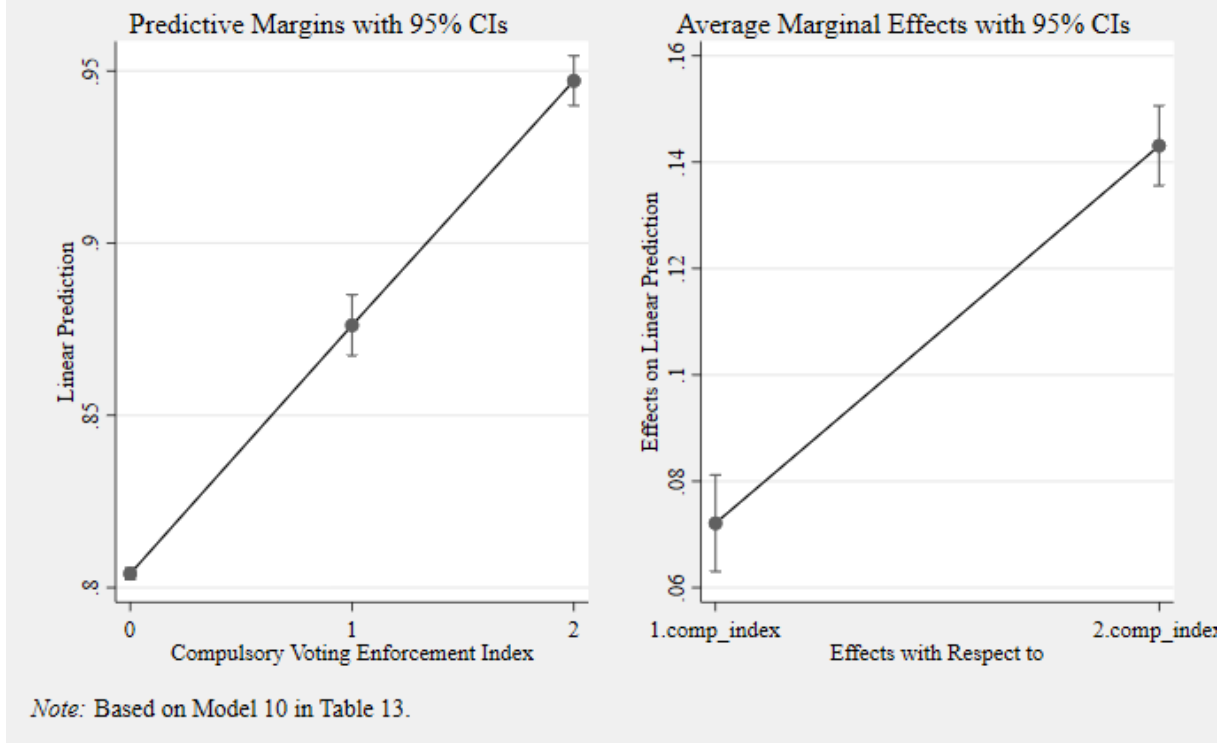
The left plot in Figure 9 shows the predicted values of the dependent variable for the different categories of the CVEI. As the plot clearly illustrates, predicted voter turnout significantly increases with each increase in compulsory voting enforcement. According to this, average turnout is about 80% for constituencies where voting is voluntary and is about 87% for constituencies with compulsory voting. For constituencies where compulsory voting is enforced, mean predicted turnout even rises to nearly 95%. In addition, to illustrate the magnitude of effects by compulsory voting and enforcement, the right plot shows their average marginal effects on turnout. As the plot reveals, both factors exert a positive effect on the dependent variable but the actual effect of enforced compulsory voting is considerably stronger than the effect of compulsory voting that is not enforced.

As a final illustration of the impact of the different levels of the CVEI on voter turnout, Appendix A contains a kernel-density plot that shows a comparative distribution of turnout, based on the respective density of constituency-cases, for the very levels of compulsory voting enforcement. The kernel-density plot clearly highlights that the lower levels of turnout are quite only found in districts without compulsory voting. In contrast, the highest turnout levels are more or less exclusively found in districts with either unforced or enforced compulsory voting

while the share of districts without compulsory voting strongly decreases for turnout levels over about 90%. In this respect, the plot once again visualizes the effect of compulsory voting and enforcement on the dependent variable and thereby also confirms the impressions of that relationship already insinuated by Figure 7. In conclusion, the preceding analyses of the influence of compulsory voting, respectively enforced compulsory voting, empirically confirm Hypothesis 3 as best as possible.

Finally, the pooled cross-sectional models should allow for a direct comparison of the magnitude of the effects of the different institutional factors on voter turnout. These models can include the time-variant factors as well as the constant ones, for instance Compulsory Voting. Estimating these factors within the same model enables determining their substantive effects. That is why I estimate two cross-sectional models that include the key independent variables District Magnitude, ENP, and Compulsory Voting. The second of these two models additionally includes the control variable Population Size. The estimation is based on standardized variables, though. Estimating the regressions based on the beta weights should add to the comparability of the coefficients. The coefficients shown in Table 13 and Table 14 can hardly be compared directly because the variables vary in their types of units. The standardization of the variables depicts a remedy for this problem as thereby all variables are based on the same scale, having a mean of 0 and a standard deviation of 1. Figure 10 illustrates the effects on voter turnout emanating from the variables included in the two aforementioned models, reporting the standardized coefficients.

Figure 10: Substantive Effects of the Predictors on Turnout

Note: Standardized regression coefficients displayed.
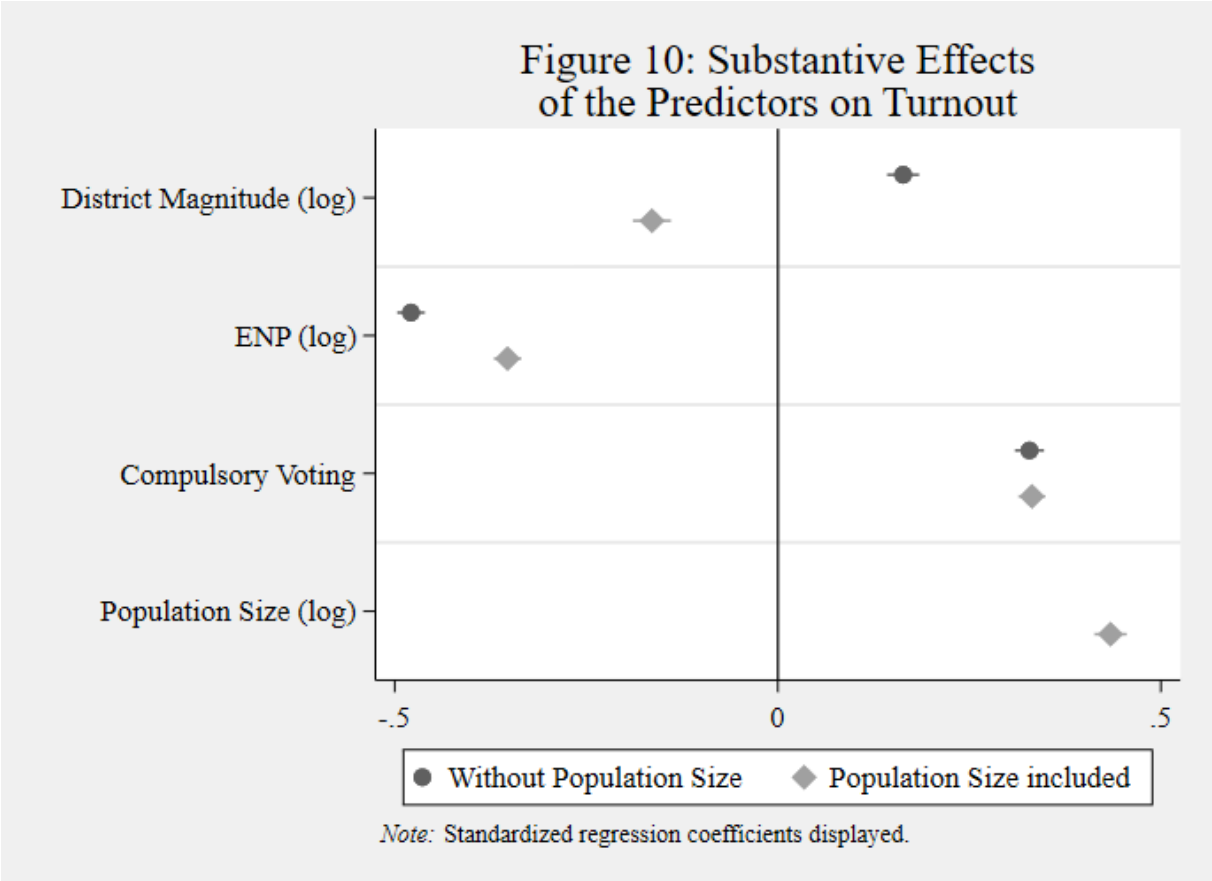
The direction of the effects of these variables on turnout was already widely discussed above and is reflected by Figure 10 as well, but what does the figure tell about the size of the effects? As it turns out, the electoral system, represented by logged District Magnitude, has the weakest effect on turnout compared to all other included factors. The logged ENP as well as Compulsory Voting in general have a stronger impact in that respect. Interestingly, the control variable, which is logged Population Size, has the strongest positive effect with one standard deviation increase in logged Population Size leading to an increase in voter turnout of about 0.43 standard deviations. When considering the standardized coefficients of the model that includes the control variable, Figure 10 once more highlights the relationship between District Magnitude and Population Size with District Magnitude becoming negative. Beyond that, the effect of the ENP on turnout slightly decreases when the control variable is added, while the effect of Compulsory Voting is similar in both models. Altogether, Figure 10 reveals that the magnitude of institutional impact is smallest for the factor of District Magnitude and highlights, as expected, that the impact of Compulsory Voting surpasses the influence originating from the electoral system, respectively, as in these models, in particular from District Magnitude. This confirms the last part of Hypothesis 3.

Sure, all the pooled cross-sectional analyses discussed in this section do not cover the temporal aspect of the hypothesized relationships between the independent variables and voter turnout. This should be accomplished in the next analytical stage: By estimating a set of first-difference models I aim at finally grasping the effects of *change*.

6.2.3. First-difference models

The first-difference models represent the third stage of the analysis and account for the component of change in the hypotheses, especially with respect to Hypothesis 2 and Hypothesis 4. Basically, the first difference of a time series depicts the series of changes from one period to the next. Therefore, the first-difference models allow for grasping the impact of changes in the independent and control variables on changes in the dependent variable, as the latter is differenced as well. More precisely, I estimate a series of first differenced pooled time-series models to analyze the relationship between changes in the independent and control variables and changes in voter turnout. In addition, modeling the first differences of the variables is also the most adequate solution to scrutinize the consequences of changes as the first differencing brings stationary data about and reduces autocorrelation in the models.

By describing the changes in variables from one election to the next, the first-difference models are perfectly suitable to ascertain the short-term effects of change. This is quite relevant from a theoretical perspective, as the first-difference specifications enable the modeling of whether changes in the independent and control variables have an immediate effect on changes in turnout. However, the models cannot account for potential long-term effects of change, i.e. changes that might manifest themselves over a period of time that exceeds one legislative period. This means that the first-difference models do not consider the long-term effects of changes on voter turnout and rather "potentially understate the importance of electoral system reforms by looking only at their immediate impact" (Singer/Gershman 2018, 176).

Turning to the exact specification of the first differenced pooled models, as the models account for the *changes* in variables, the time-invariant variables are not included. The variable Electoral System Type is not included as well because the single case of inter-systemic change in Italy 1993 would not yield meaningful results and is left for the closing case studies for further discussion. In fact, the first-difference models account for the consequences of the intra-systemic changes for changes in voter turnout, especially the impact of changes in district magnitude on changes in turnout should be emphasized in this respect. Hence, the models

include the two time-variant independent variables District Magnitude (log) and Effective Number of Parties (log), as well as the two time-variant control variables lagged Voter Turnout and Population Size (log). For the interpretation of the coefficients, it is to note that the first differencing of a logged variable means modeling the logged growth rate of this variable (cf. Singer/Gershman 2018, 176). With the exception of lagged Voter Turnout all other three first differenced variables are logged, "making them growth rates whose coefficients describe how logged percentage changes in X are translated into logged percentage changes in Y" (Singer/Gershman 2018, 176). Table 15 presents the correlates of changes in voter turnout in a constituency compared to the previous election.

Table 15: First-Difference Models on Changes in Voter Turnout

	(12)	(13)	(14)	(15)
	D.Voter Turnout	D.Voter Turnout	D.Voter Turnout	D.Voter Turnout
D.District Magnitude (log)	0.0159***	0.0202***	-0.0764***	-0.0682***
	(0.00245)	(0.00233)	(0.00322)	(0.00357)
D.Effective Number of Parties (log)	-0.0866***	-0.0956***	-0.0816***	-0.0802***
	(0.00267)	(0.00305)	(0.00277)	(0.00277)
LD.Voter Turnout		-0.213***	-0.170***	-0.169***
		(0.0107)	(0.00972)	(0.00970)
D.Population Size (log)			0.121***	0.125***
			(0.00306)	(0.00315)
D.District Magnitude (log) # D.Population Size (log)				0.00673***
				(0.00127)
Observations	8014	6727	6727	6727

Note: Models based on pooled OLS regression, constant term not specified. Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The total number of observations for the first-difference models is again lower compared to the pooled cross-sectional models as one period of time is differenced out. While the first model can draw on a sample of 8.014 district-cases, the other models rely on 6.727 observations. The first model in Table 15, Model 12, depicts a baseline model that only includes the two

independent variables logged District Magnitude and logged ENP. As Model 12 shows, changes in district magnitude are associated with increasing turnout, while changes in the ENP in a positive direction have a negative effect on changes in electoral participation. This is quite in line with theoretical expectations and also widely agrees with the findings of the previous analytical stages, although the impact of changes is modeled here especially. Also when adding the LDV as a control in Model 13, the coefficients for district magnitude and the ENP remain stable. The coefficient for the LDV itself is negative. This might reflect an average trend that when turnout has increased in a preceding election, it might often be lower again in a subsequent election.

However, while the coefficients for the ENP and lagged turnout still remain widely stable in Model 14 where the second control variable Population Size is added, the coefficient for district magnitude turns its sign and becomes negative. This clearly parallels the relationship between district magnitude and population size within the pooled cross-sectional models discussed in section 6.2.2. That is why I specify a further first-difference model that also includes the interaction of the two variables to account for this linkage (Model 15). The coefficient, respectively main effect, for population size itself is positive in Model 14 and Model 15. Against the background of the operationalization of population size as the total number of valid votes in a district, this allows for the interpretation that a positive change in the number of valid votes in a constituency is related to a positive change in voter turnout in that district. A relationship that theoretically *must not* exist but empirically finds support when analyzing the pooled data.

When further considering Model 15, besides the already discussed stable coefficient for population size, also the stability of the coefficients for the ENP and lagged voter turnout manifests again. The coefficients for both variables constantly point in a negative direction in all models where the variables are included, also being a sign of the robustness of the first-difference estimator. What concerns the interaction of district magnitude and population size in Model 15, it shows that the main effects of the two variables quasi remain unchanged, i.e. while the coefficient for population size remains positive, the coefficient of district magnitude remains negative. As their joint effect is positive, illustrated by the interaction term in the model, I assume that the positive effect of changes in district magnitude as found in Model 12 and Model 13 is nevertheless substantial. I maintain that it is still informative to examine the isolated effect of changing district magnitude in greater detail, leaving potential intervening factors aside.

In this respect, to determine the substantive impact of changes in the two independent variables in the models – district magnitude and ENP – on changes in the dependent variable voter turnout, Figure 11 and Figure 12 illustrate their respective estimated effects on predicted change in electoral participation. In this respect, I aim at accounting for the hypothesized consequences of changes in district magnitude and the number of parties as formulated in Hypothesis 2, respectively, Hypothesis 4.

Figure 11: The Estimated Effect of Changing District Magnitude (log) on Changes in Voter Turnout

Note: Based on Model 13 in Table 15.
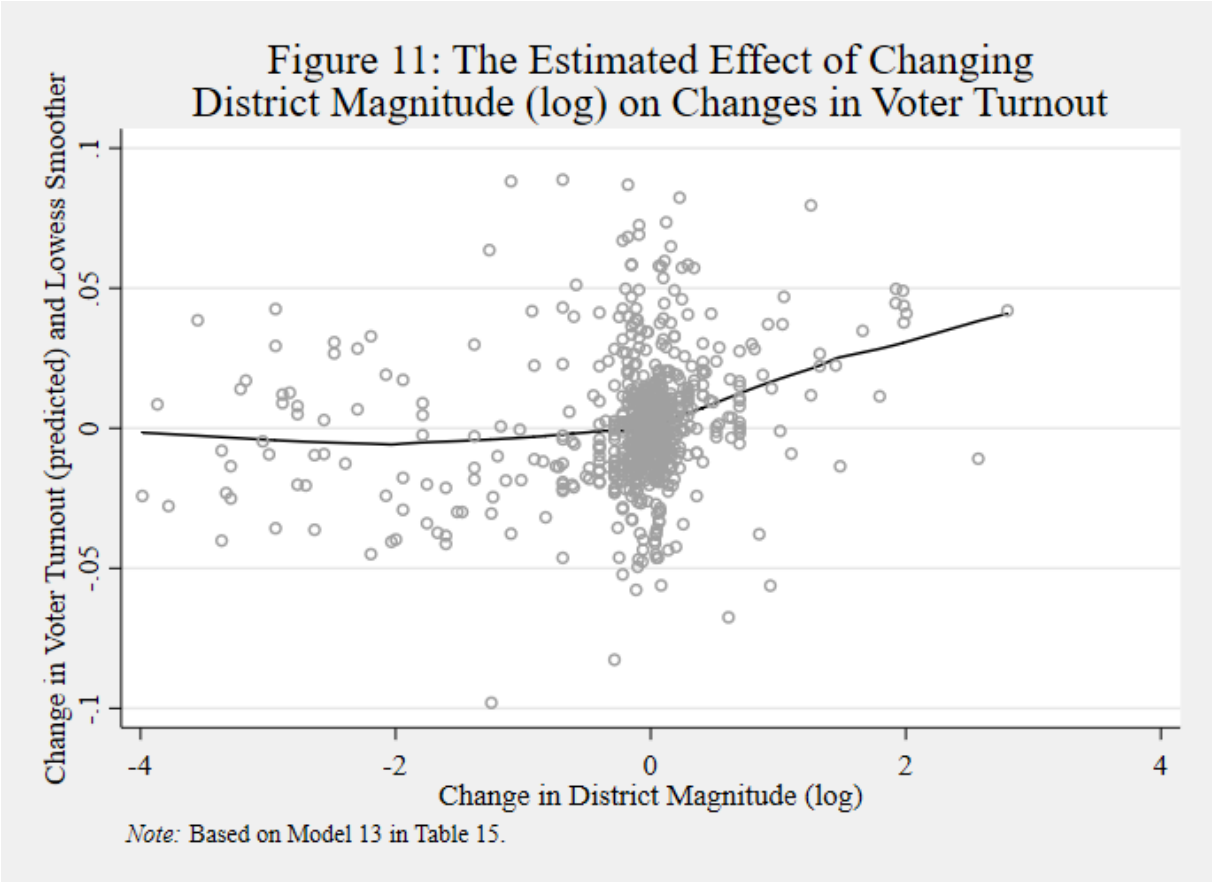
Figure 11 as well as Figure 12 make use of the logged form of district magnitude, respectively, the ENP. Figure 11 displays the estimated effect of changes in district magnitude on changes in predicted voter turnout. Understandably, the graph includes only the cases where district magnitude actually changes, i.e. the cases where no change in district magnitude occurred were excluded. As the predictions of changes in turnout are based on a linear model, the fitted lines generally reflect the results shown in Table 15. By applying a lowess smoother, a more precise impression of the relationship between the variables can be won. Figure 11 shows that most changes in district magnitude are rather small, clustering around zero. It shows as well that the

negative impact of district magnitude which decreases from one election to the next is rather small with respect to changes in voter turnout. Nonetheless, a positive change in district magnitude is clearly associated with a change towards increase in turnout. The greater the positive change in district magnitude, the greater the effect on changes in turnout. From this perspective, Hypothesis 2 is clearly corroborated empirically. Admittedly, this exclusively pertains to the short-term consequences of changes in district magnitude. Furthermore, the direct influence of changing district magnitude on change in voter turnout may be weakened when controlling for population size.

Figure 12: The Estimated Effect of Changing Effective Number of Parties (log) on Changes in Voter Turnout

Note: Based on Model 12 in Table 15.
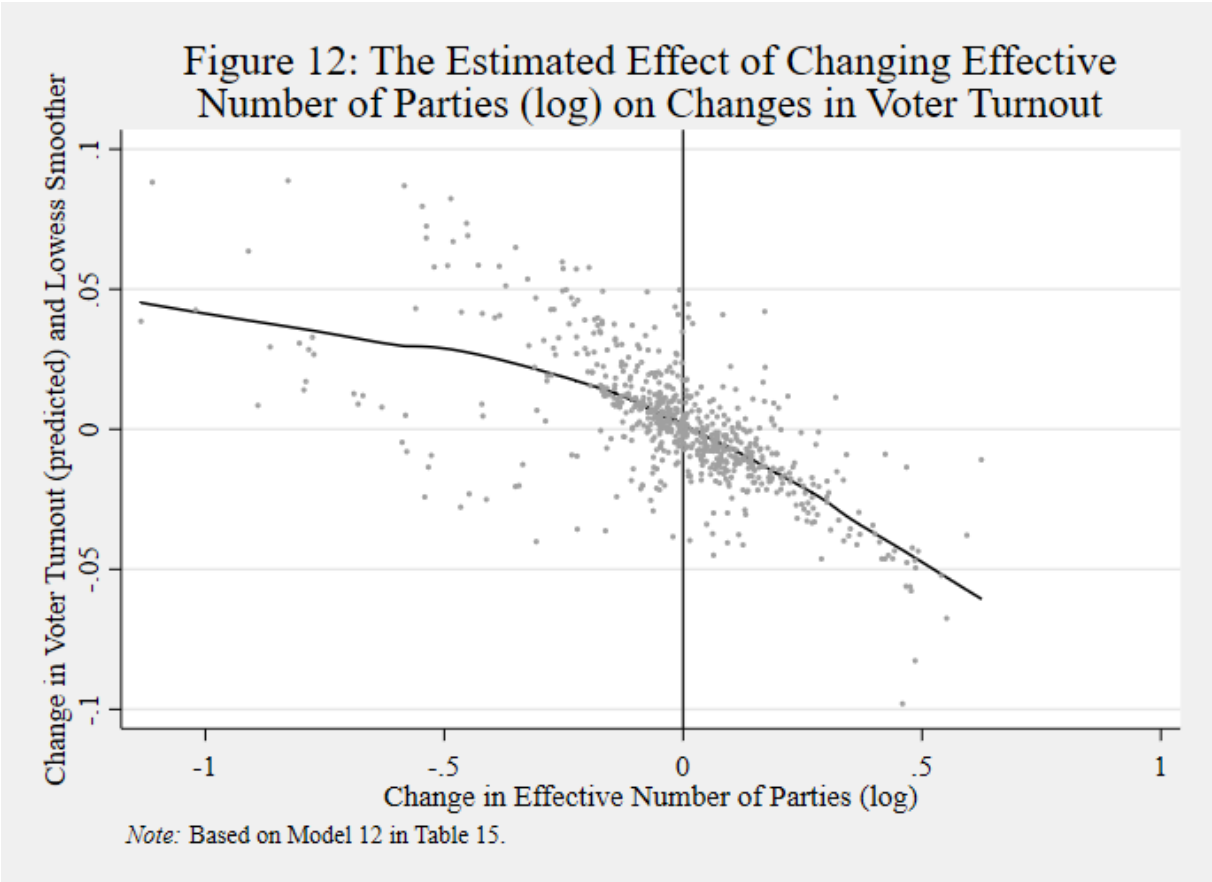
Figure 12 shows the estimated effect on changes in predicted voter turnout by changes in the ENP to account for the impact of party system size. The graph is based on the same sample as Figure 11, i.e. it only includes the cases where a change in district magnitude actually occurred. This follows from the formulation of Hypothesis 4 to finally look at the cases where changes in the number of parties are induced by changes in the electoral systemic properties. As Figure 12 shows, the negative effect of changes in the ENP seems quite substantial and in line with the

findings on the ENP in the previous sections. The number of cases where a positive change in the ENP is associated with a positive change in turnout is extremely limited. Therefore, the hypothesized direction of the effect, i.e. that there is a positive effect of the number of parties to a certain peak is not supported. In fact, Figure 12 displays a quite continuously increasing positive effect on changing turnout when negative changes in the ENP increase. Similarly, the stronger the positive changes in the ENP from one election to another, the stronger is the negative impact on changes in turnout.

What do these results mean for the addressed hypothesis, namely Hypothesis 4? The theoretical reasoning behind the formulation of the hypothesis in large part is grounded on the works of Grofman and Selb (2011) and especially Taagepera et al. (2014), suggesting a model that finds a rather curvilinear relationship between the number of parties and turnout. Interestingly, Figure 12 reproduces this relationship to a certain extent. However, finally the information in the different models are not comparable with each other. Taagepera et al. (2014) estimate a nonlinear model with the absolute numbers of the variables, while I emanate from a linear model, use the logged ENP, and draw upon first differenced data. In a nutshell, the findings for changes in the ENP first and foremost again corroborate the classical paradox that, on the one hand, turnout is higher in PR systems but, on the other hand, it does not increase with party system size. Or as Blais puts it: "[I]f PR fosters turnout, it is not because it produces more parties" (Blais 2006, 119). My findings at the district level finally confirm previous (aggregate level) research providing evidence that the effect of the number of parties on voter turnout is not existing or even negative (for the meta-level summaries, see Cancela/Geys 2016; Stockemer 2017).

6.2.4. Consequences of inter-systemic change? The cases of New Zealand and Italy

In the end, it is to give a final assessment of the impact of inter-systemic-change on voter turnout. In this respect, I aim finally accounting for Hypothesis 1. This basic hypothesis on the relationship between electoral system type and turnout stated that, on the one hand, as a consequence of a change towards a more permissive electoral system turnout will increase. Vice versa, on the other hand, a change towards a more restrictive electoral system will cause turnout to decrease.

Especially the cross-sectional models discussed in section 6.2.2. provide first – respectively confirm established – evidence on the basic impact of the electoral system type on

the participation in elections: PR has a positive influence on turnout compared to the more restrictive mixed electoral systems. However, it is exceedingly difficult to realistically ascertain the consequences of inter-systemic *change*, accounting for the temporal dimension of this causality, within the framework of quantitative analyses. Particularly, it is virtually impossible to identify the actual long-term consequences of inter-systemic changes, as the number of potential micro- and macro-level factors affecting turnout is that tremendous (for the meta-level evidence, see Geys 2006; Cancela/Geys 2016; Stockemer 2017; Smets/van Ham 2013). In the following, I discuss two exemplary cases of inter-systemic change and I review the development of national level turnout in the respective countries over time. These two countries are New Zealand and Italy.

The choice of the two case studies on the consequences of inter-systemic change for turnout is motivated by New Zealand and Italy being prominent examples, as the two countries "changed their electoral system type in the mid-1990s when both switched to mixed-member proportional systems" (Best 2012, 147). Coincidentally, both inter-systemic changes, in New Zealand and Italy, were even enacted in the same year, to wit in 1993. Though, the two cases differ with respect to the electoral system applied before the change took place: New Zealand used a FPTP system until 1993, while the Italian system was PR until the change was passed. Hence, in New Zealand the electoral system became more permissive and in Italy it became more restrictive following the change. In this respect, these antipodal reforms allow to account for both hypothesized directions of inter-systemic change, New Zealand exemplifying a change towards a more permissive and Italy exemplifying a change towards a more restrictive electoral system. While the previous analyses examined turnout at the district level, the following discussion is based on turnout at the national level. The data on aggregate-level voter turnout in national parliamentary elections stems from the International IDEA Voter Turnout Database (International IDEA 2020).

Figure 13: Aggregate Turnout in National Legislative Elections, New Zealand (1946-2017)

Source: International IDEA Voter Turnout Database.
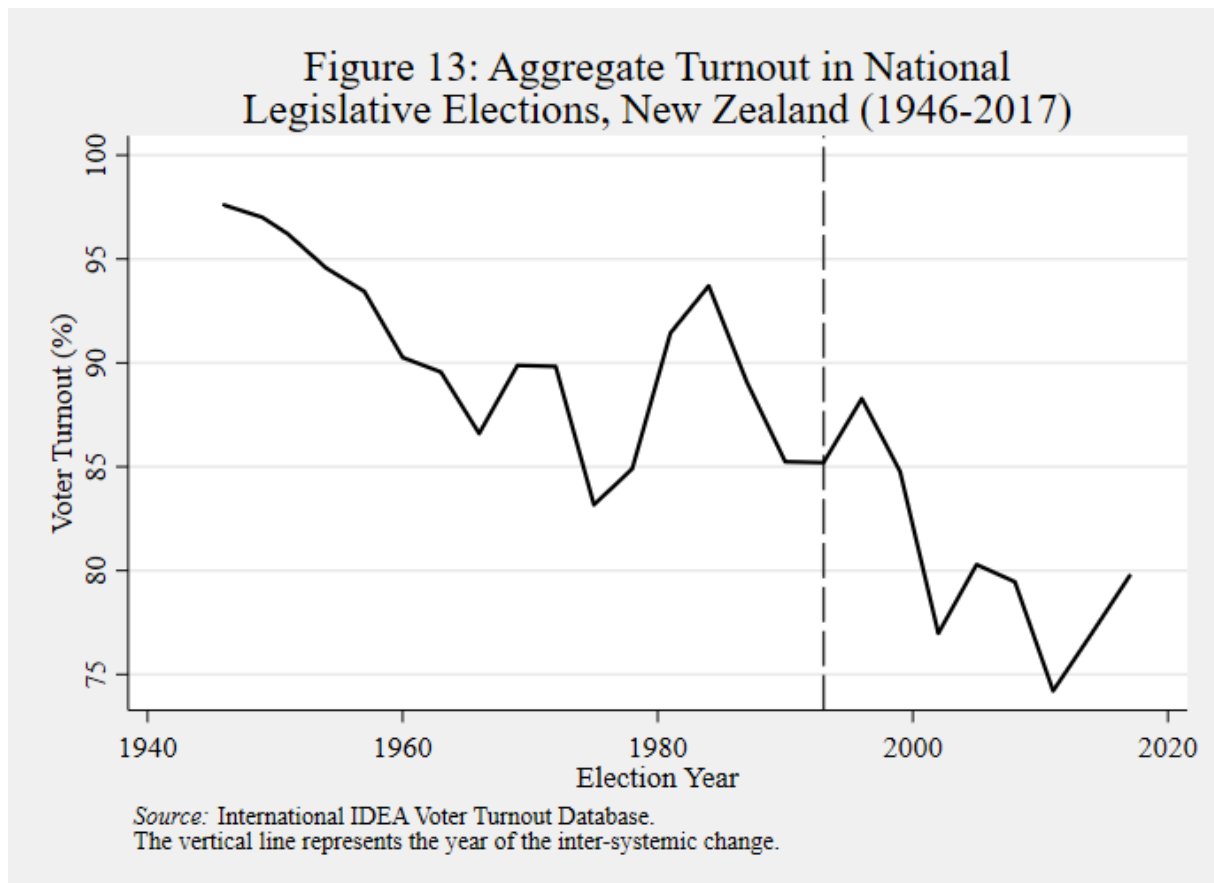The vertical line represents the year of the inter-systemic change.

Figure 13 illustrates the development of aggregate voter turnout in national legislative elections over time for the first case of inter-systemic change, which is New Zealand. The graph covers the period of time from 1946 to 2017. Generally, New Zealand emanates from comparably high turnout rates of over 90% until the 1960s. Afterwards, turnout over 90% was reached not before the 1980s again, with a peak for the 1984 election where turnout increased to 93.7%. However, considering the whole period of time, turnout levels in New Zealand decreased over the decades. For the 2017 election voter turnout was 79.8%.

What about the potential impact of the inter-systemic change? As stated above, New Zealand changed its electoral system from FPTP to MMP in 1993. The change was the result of a decisive referendum that was held aside from the 1993 election. Accordingly, the election from 1993 was the last under the majoritarian system and the first election under the MMP system took place in 1996. Concerning the consequences of that change for turnout it shows that voter participation indeed increased for the first election under the new system, from 85.2% in 1993 to 88.3% in 1996. This increase in voter turnout was then confidently attributed to the effect of PR (Karp/Banducci 1999). However, for the subsequent elections turnout again declined by trend, reaching its lowest point at 74.2% for the 2011 general elections.

What does the case of New Zealand reveal regarding Hypothesis 1 that expects an increase in voter turnout following an inter-systemic change towards a more permissive system? The case of New Zealand corroborates the hypothesis to the extent that there might indeed be a short-term positive effect on turnout following the change. At the same time, the case study demonstrates as well that there are rather no long-term effects, which would, moreover, be difficult to prove. All in all, the 1993 inter-systemic change could not lastingly impact the long-term trend of declining turnout rates in national legislative elections in New Zealand.

Figure 14: Aggregate Turnout in National Legislative Elections, Italy (1946-2001)

Source: International IDEA Voter Turnout Database.
The vertical line represents the year of the inter-systemic change.
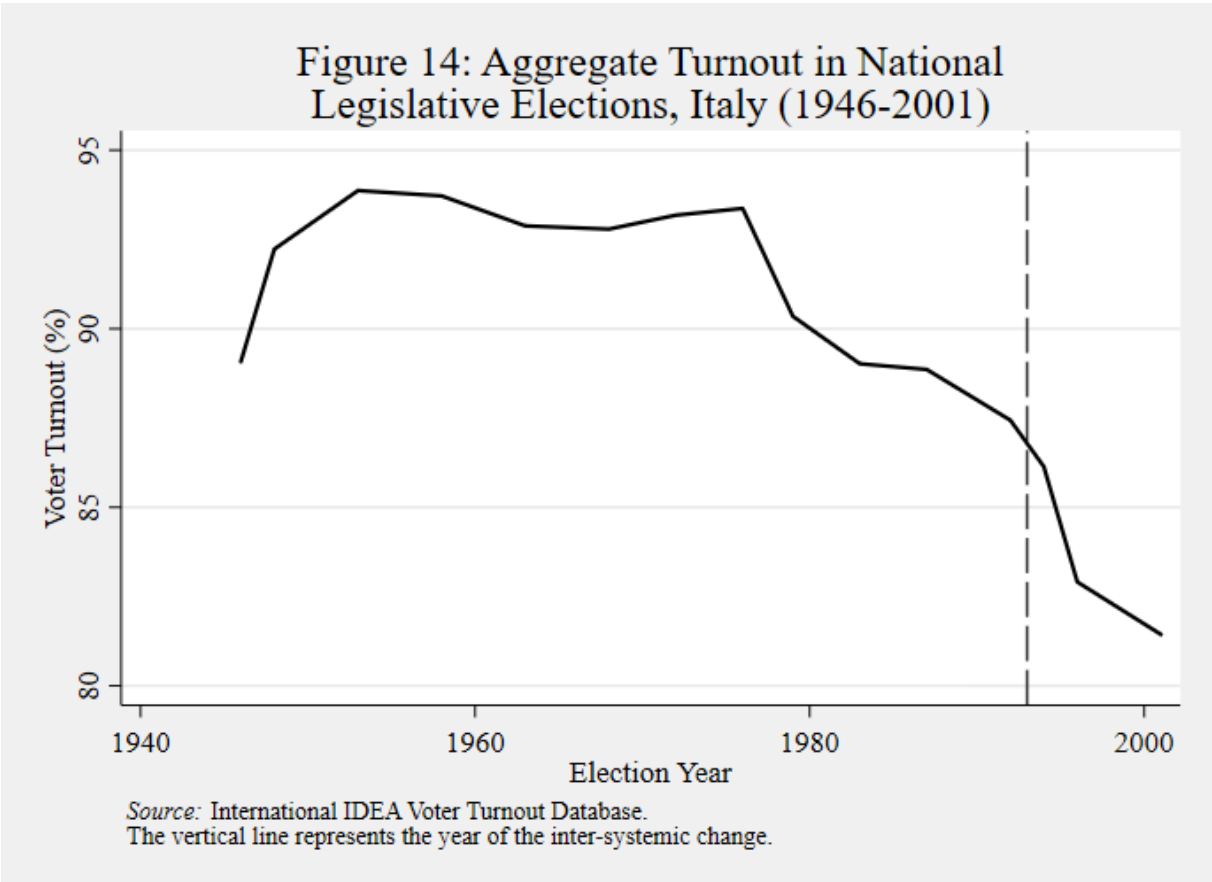
Turning to the second case study on inter-systemic change, which is the 1993 electoral reform in Italy. Since the foundation of the Italian Republic after World War II, Italy used a PR system until the 1992 election. In 1993 a mixed electoral system was introduced, which was used the first time in the 1994 election. In this respect, the 1993 Italian electoral reform depicts an instance of an inter-systemic change towards a more restrictive electoral system.

What about the consequences of this change for voter turnout? Figure 14 shows the development of aggregate turnout in national legislative elections over time for the case of Italy.
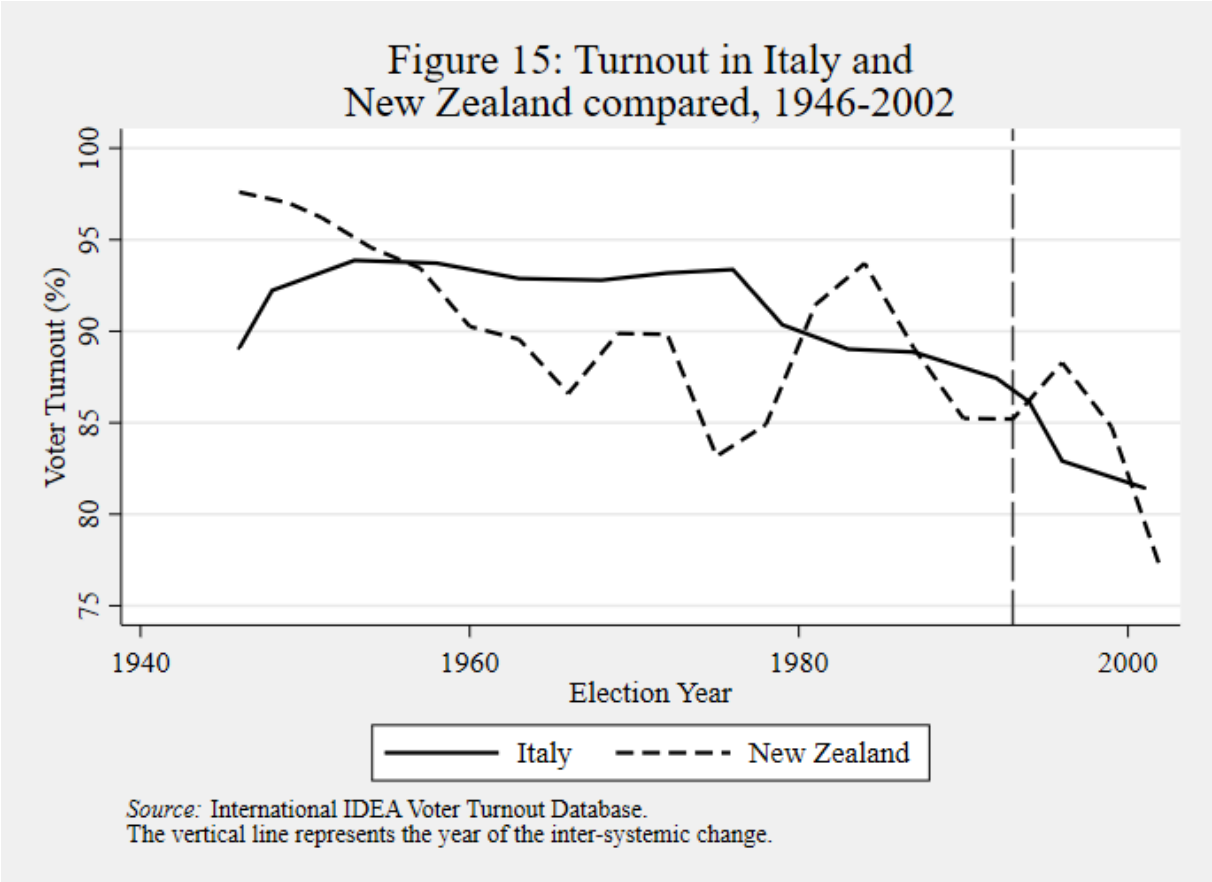
The graph comprises the period of time from 1946 to 2001. The period of time under scrutiny already ends with the 2001 election because of the next major alteration of the Italian electoral system that already occurred in 2005 and was in use from the 2006 election on (cf. Renwick 2011, 467), which was the election following the 2001 ballot. As the change in 2005 would in all likelihood terminate the potential impact of the previous change in 1993, I restrict the observed period of time for Italy to the 2001 election and focus on the consequences of the 1993 inter-systemic change for turnout.

In contrast to New Zealand, the case of Italy was already included in the previous district-level analyses (covering the period of time from 1946 to 1996), accordingly the information in Figure 14 reflect the already gained insights from the Italian constituencies. The statistical models could only hardly account for the 1993 case of inter-systemic change, though. This would presumably also have been true if further cases of inter-systemic change would have been part of the analyzed data set. As already observable in the previous district-level analyses (see Figure 7), Figure 14 illustrates the comparably high turnout rates in Italy as well. Figure 14 reveals that aggregate turnout was constantly over 90% for the period of time from 1948 to 1979. However, since the 1976 election aggregate turnout quite steadily declines in Italy, decreasing to a minimum of 81.4% for the 2001 election.

Are there any remarkable consequences of the inter-systemic change for voter turnout? As Figure 14 shows, turnout slightly declined in the first election after the change, the 1994 election, compared to the last election under PR in 1992. The decline is even stronger with respect to the 1996 election, i.e. the second election after the change. In consideration of Hypothesis 1, which posits turnout to decrease following an inter-systemic change towards a more restrictive electoral system, the case study of Italy would generally confirm the hypothesis. As it turns out, voter turnout is constantly declining after the change, without any election showing an increase again. However, as described above, the observable period of time after the inter-systemic change is relatively short and only allows for evidence on the short-term effects of change on turnout. Furthermore, it is hardly to resolve if the decline in turnout after the 1993 change can essentially be attributed to that electoral reform or rather just continues a steady trend which already initiated in the 1970s. If the latter was true, Figure 14 is rather suggestive of the interpretation that the inter-systemic change did not significantly affect the already existing trend.

Finally, one special characteristic of the case of Italy should additionally be remarked at this point, as it might play the role of a confounding factor: This special characteristic is the

existence of compulsory voting. Voting has always been compulsory but was effectively abolished in 1993. That is why the decline in turnout after 1993 might, at least to some extent, be an effect of the repeal of mandatory voting as well. The existence of compulsory voting surely also substantially accounts for the comparably high turnout rates over decades in Italy. As compulsory voting was not enforced, at least not by fines, turnout decreased nonetheless since 1976.

Figure 15: Turnout in Italy and New Zealand compared, 1946-2002

Source: International IDEA Voter Turnout Database.
The vertical line represents the year of the inter-systemic change.

As the observed period of time begins in the same year for both case studies and also the inter-systemic change in New Zealand and Italy occurs in the same year, this provides an excellent opportunity to illustrate the development of aggregate voter turnout in national legislative elections over time comparatively, showing both countries together in Figure 15. The period of time displayed in Figure 15 ends with the 2002 election in New Zealand to allow for comparable time periods for both countries.

Figure 15 again illustrates the long-term trend of turnout decline that is quite similar in both countries. While the short-term positive effect of the 1993 change on turnout in New

Zealand is definitely noticeable, the unaffectedness of the long-term trend is obvious as well. For the case of New Zealand, the decline of turnout since the 1996 election is, on the one hand, mainly attributed to factors like "weaker party identifications and reduced party campaign contact" (Vowles 2002, 599). On the other hand, declining turnout in New Zealand over a long period is also ascribed to long-term generational effects (Vowles 2010). In respect of the latter explanation, it seems that both countries, New Zealand and Italy, reflect the general long-term trend of declining turnout rates in most Western countries.

As stated above, the number of factors to potentially affect voter turnout is vast and the electoral system type is only one of the many factors. As this dissertation shows, changes in the properties of electoral institutions definitely have consequences for turnout, especially with respect to intra-systemic changes. Changing the type of electoral system is no panacea for decreasing turnout, though. Such a notion clearly overestimates the impact of electoral institutions. Even if the effect of the electoral system type on turnout shows in a cross-sectional perspective, without much doubt the effect will shrink when considering inter-systemic changes over time.

6.3.   Conclusion

The analyses presented in chapter 6 show that district magnitude is in principle positively related to turnout and changes towards higher district magnitude should result in higher turnout as well. Controlling for population size at the district level reveals, however, that this factor significantly affects the relationship between district magnitude and turnout and the impact of district magnitude is finally reverted. Nearly no constituency-level study on the effects of electoral systems so far controlled for population size, which was operationalized by the number of valid votes cast in a district (but see Singer/Gershman 2018). In respect thereof, the results of this analysis dissent from research that finds the positive relationship between district magnitude and turnout being clear-cut in Western countries (Stockemer 2015). The finding on the interaction between district magnitude and district-level population size adds a new facet to the district magnitude-turnout nexus that future studies should consider.

Moreover, the analysis finds the Effective Number of Parties in all specifications to virtually always have a negative effect on voter turnout: Beyond the underlying negative relationship between the ENP and turnout, changes towards a higher ENP lead to lower turnout.

The relationship between the lagged ENP and turnout is mostly negative as well and, in addition, statistically insignificant. The results for the impact of the ENP are in line with previous research finding negative or no significant effects of the number of parties on the participation in elections (summarizing: Blais 2006; Blais/Aarts 2006; Cancela/Geys 2016; Stockemer 2017). This analysis at the district level provides further evidence that the number of parties can be discarded as the decisive causal mechanism that conveys the positive influence of a more permissive electoral system on voter turnout.

Finally, the analysis confirms that compulsory voting generally has positive consequences for turnout and that the magnitude of the effect of compulsory voting depends on its severity. In other words: The positive effect of mandatory voting increases when it is enforced. Beyond that, compulsory voting has a stronger impact on turnout than district magnitude. This indicates that the influence of compulsory voting outplays the impact emanating from the electoral system.

This empirical analysis offers a dynamic perspective on the relationship between electoral systems and voter turnout that goes beyond a purely cross-sectional examination as in many previous works (e.g. Blais/Carty 1990; Blais/Dobrzynska 1998; Jackman 1987; Jackman/Miller 1995; Endersby/Krieckhaus 2008). As highlighted by the first-difference models, changes in the electoral system, expressed by changes in district magnitude and the ENP, definitely *do* have short-term consequences for turnout. At the same time, with reference to the case studies on inter-systemic changes in New Zealand and Italy, the long-term consequences of electoral system change are rather questionable.

7. Conclusion and outlook

This dissertation investigated the consequences of electoral system change for voter turnout. What are the respective insights of this study and which answers are provided for the addressed research question? First of all, it shows that electoral institutions basically *do* have an effect on voter turnout. This is the first fundamental conclusion to make based on my findings. In this respect, my analysis disagrees with recent research finding the electoral system to be only weakly related to turnout (Stockemer 2017). At the same time, the effects emanating from the electoral system are more subtle than suggested by previous research (e.g. Norris 2004; Endersby/Krieckhaus 2008). My findings suggest that with respect to electoral systems it is important for cross-national comparisons of turnout to take the district level into account to determine the actual institutional impact. The same is true for the determination of the consequences of electoral system change in general. Insofar, this dissertation pursues the promising line of research to examine the consequences of electoral systems at the district level (e.g. Singer 2015; Singer/Gershman 2018).

While this pertains to the short-term consequences of change, the two case studies on inter-systemic change in New Zealand and Italy have shown that it is unlikely that an electoral system change in either direction has a long-term effect on voter turnout. A short-term positive effect of change towards a more permissive system is expectable, though. Nonetheless, as the analysis has demonstrated, the consequences of electoral system change for voter turnout especially unfold at the constituency level. In a nutshell, it is the intra-systemic changes that matter.

According to this, my analysis in principle finds an increasing district magnitude to affect turnout positively, while a decreasing magnitude has negative consequences for electoral participation. When controlling for population size, the positive effect of district magnitude on turnout is reversed, however. This points to a potential underestimation of the role of population size as a contextual factor in earlier district-level analyses on the effects of electoral systems. While Singer & Gershman (2018) control for constituency-level population size in their analysis of the impact of changes in district magnitude on party system fragmentation, with respect to district-level turnout as the dependent variable this control variable seems quite new. Probably the factor of population size needs to receive more attention when considering the context that influences the relationship between the electoral system and voter turnout.

My analyses suggest that there must be further relevant contextual factors in larger constituencies to affect turnout. This is due to the fact that the findings also preclude the number of parties in a district to be the causal mechanism linking the proportionality of an electoral system to a higher turnout rate. More precisely, a higher number of parties in a district, respectively an increase in the number of parties in a district, has a negative impact on district-level turnout. In this respect, my results confirm the paradox raised by Blais (2006) that turnout is higher in PR systems but not increasing with party system size. This necessitates further inquiries about alternative causal mechanisms. Probably the conducive effect of PR on turnout stems from the electoral system more directly, where voter efficacy could indeed be one mechanism (e.g. Banducci/Karp 2009; Karp/Banducci 2008; Norris 2004).

Finally, my analyses empirically confirm the positive effect of compulsory voting on turnout. This is in line with previous evidence on this factor (for the meta-level, see Cancela/Geys 2016; Stockemer 2017). As hypothesized, the impact of compulsory voting is even stronger when it is actually enforced. Beyond that, I find compulsory voting to have a stronger impact on voter turnout compared to the key electoral systemic factor of district magnitude.

This dissertation aims at contributing to the strand of research on the relationship between electoral systems and voter turnout by focusing on the consequences of changes in electoral systems. Thereby, this dissertation should help to improve our knowledge of the *causalities* between electoral system design and the participation in elections. In this respect, my analyses could surely add to determining these causalities empirically.

As a potential direction for future research, studies on the consequences of electoral system change for turnout could include further countries in their groups of selected cases. While this dissertation focused on a subset of Western and post-Communist European countries, the democracies that do not belong to this group of countries should be addressed as well in future analyses. This is especially relevant as the consequences of electoral systems, respectively the specific characteristics of electoral systems like district magnitude, might be different in these countries compared to the Western countries (Pérez-Liñán 2001; Fornos et al. 2004; Gallego et al. 2012; Stockemer 2015). This should particularly be due to the varying context in new and established democracies that shapes the relationship between the electoral system and the outcomes (Moser/Scheiner 2012; Ferree et al. 2013; 2014).

What do the findings of this dissertation mean in the wider context of the debate around the possibilities and limits of electoral reform and electoral engineering? More recent works

find the impact of the reform of electoral rules on the behavior of voters to be rather limited (e.g. Bowler/Donovan 2013). When dealing with turnout in particular, my findings suggest a precise consideration of the consequences of electoral system change. I find electoral system change to have an – at least short-term – effect on turnout when it is intra-systemic. In this respect, the findings disagree with the position that electoral behavior is largely unaffected by institutional factors. At the same time, my results are in line with a rather skeptical position regarding the influence of electoral reform when it comes to the long-term consequences of inter-systemic change for turnout. Especially the discussion of the case of inter-systemic change in New Zealand rather arrives at the conclusion that the promise of long-term positive consequences for voter turnout following from the adoption of a more permissive electoral system (see e.g. Norris 2004) might be overstated.

To sum up, my findings indicate a certain degree of caution when it comes to the expected impact of electoral reforms on voter turnout. On the one hand, an electoral reform towards a more proportional system might have short-term positive consequences. On the other hand, expecting a large-scale and long-lasting effect of such a reform will presumably lead to disappointment. Generally, the expected increase in turnout following from the reform will mostly be rather minor. In contrast to the proportionality of the electoral system, compulsory voting has constantly proven to increase turnout. As this dissertation has shown, compulsory voting in addition has a stronger impact on electoral participation than district magnitude. That means when higher voter turnout is the actual aim of electoral engineering, making voting compulsory depicts a more effective measure in comparison to changing the electoral system. In any case, besides the possibly desirable goal of having as high turnout rates as possible, reformers should always endeavor to create an electoral system that the majority of citizens considers as effective, legitimate, and fair.

Appendix A: Results of statistical tests

Woolridge test for autocorrelation

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F( 1,    579) =   171.848
           Prob > F =     0.0000
```

Augmented Dickey-Fuller test (Fisher unit root test for panel data), 1 lag

Variable	p
Voter Turnout	0.0000
Electoral System Type	1.0000
District Magnitude (log)	1.0000
Compulsory Voting	1.0000
Enforcement	1.0000
ENP (log)	0.0000

Augmented Dickey-Fuller test (Fisher unit root test for panel data), 2 lags

Variable	p
Voter Turnout	1.0000
Electoral System Type	1.0000
District Magnitude (log)	1.0000
Compulsory Voting	1.0000
Enforcement	1.0000
ENP (log)	1.0000

Hausman test

	(b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
to1				
L1.	.6247574	.7009896	-.0762323	.006625
mag_log				
L1.	.1081209	-.0209841	.129105	.0134674
vv1_log				
L1.	-.1094363	-.039645	-.0697912	.0029682

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 792.33
Prob>chi2 = 0.0000

Pesaran's CD test

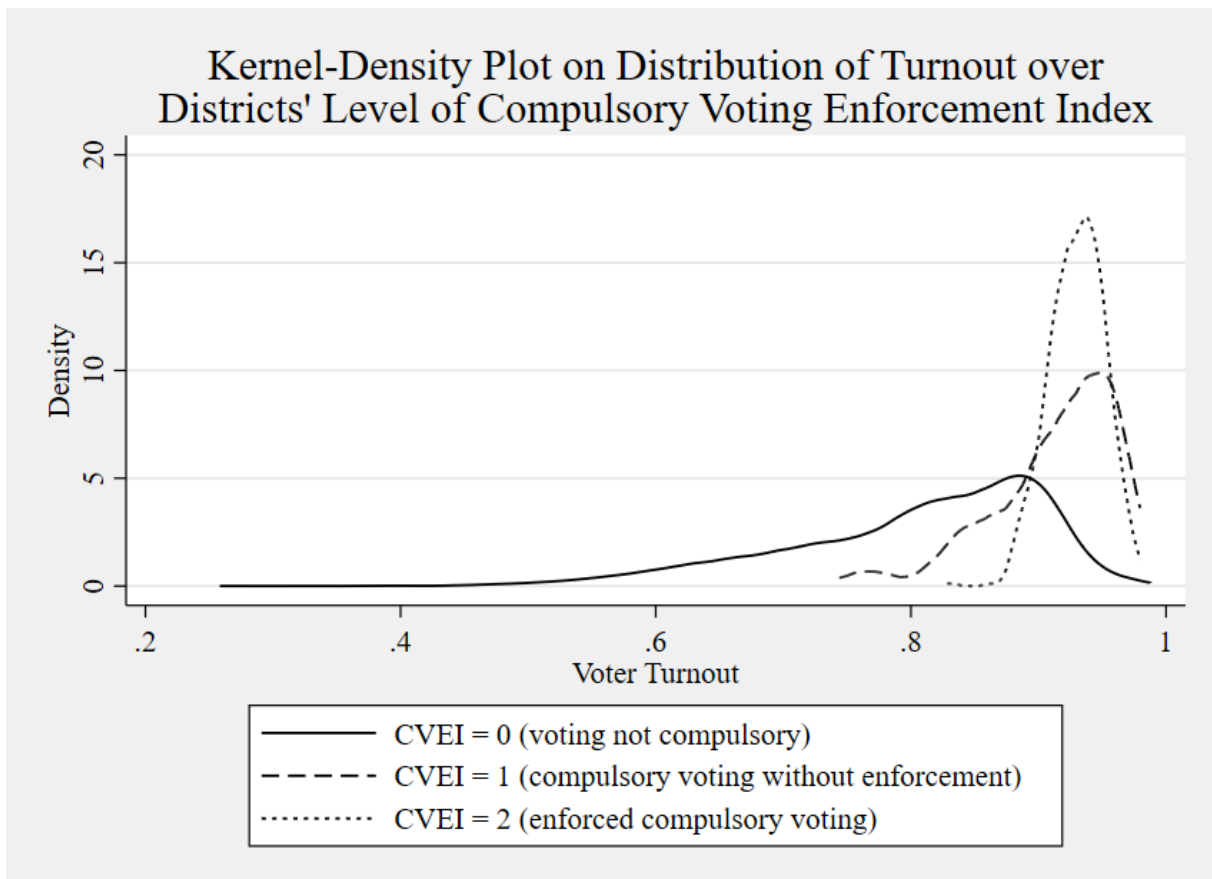| Variable	p
Voter Turnout	0.000
Electoral System Type	0.000
District Magnitude	0.153
Compulsory Voting	0.000
Enforcement	1.000
ENP	0.000
Population Size	0.000

Modified Wald test

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (593)  =   3065.53
Prob>chi2 =      0.0000
```

Kernel-Density Plot on Distribution of Turnout over Districts' Level of Compulsory Voting Enforcement Index

Appendix B: Robustness checks and alternative model specifications

Fixed-effects models without the SMDs from the majoritarian tier of mixed electoral systems

As Table 2 in chapter 5 shows, three countries exhibit a much higher number of respective constituency cases compared to the other countries in the data base. These countries are Germany, Hungary, and Italy, with Germany as the most outstanding country that accounts for 4.790 districts. The higher number of observations from these three countries is due to the SMDs from the majoritarian tier of their mixed electoral systems. This leads to the question whether these SMDs should be included in the analysis at all, since they refer to the same ballots as the cases from the multi-member districts in the PR tier of these mixed electoral systems. From the perspective of the robustness of the estimates, the additional question arises: To what extent do the three countries that account for a considerably higher number of observations affect the results?

To address these issues, i.e. to verify that the inclusion of the SMDs from the majoritarian tier of mixed electoral systems does not significantly alter the results, I re-estimate the fixed-effects models presented in section 6.2.1. (see Table 12) based on the data set without the respective SMD cases. Table B1 presents the distribution of district level cases over countries with the SMDs in mixed electoral systems being excluded and Table B2 provides the estimates of the specified models.

Table B1: Distribution of district level cases, SMDs in mixed electoral systems excluded

	Freq.	Percent	Cum.
Austria	453	14.99007	14.99007
Belgium	500	16.54533	31.53541
Bulgaria	186	6.154864	37.69027
Czech Republic	60	1.98544	39.67571
Denmark	508	16.81006	56.48577
Estonia	46	1.522171	58.00794
Finland	257	8.504302	66.51224
Germany	193	6.386499	72.89874
Hungary	120	3.97088	76.86962
Italy	419	13.86499	90.73461
Portugal	280	9.265387	100
Total	3022	100	

As Table B1 illustrates, the total number of constituency cases reduces to 3.022 when the SMDs from mixed electoral systems are excluded from the data base (from 9.639 cases when these constituencies from the majoritarian tier are included). At the same time, Table B2 clearly reveals that the exclusion of these cases does not significantly change the results of the fixed-effects models. The estimates for lagged district magnitude in Model 1 and 3 are marginally less significant in comparison with the original models, but still statistically significant at the 0.01-level. Only the signs of the coefficients for the lagged ENP switch in comparison with the original models and the coefficient for the lagged ENP even becomes significant at the 0.05-level in Model 4, while it was insignificant in all original models where the variable was included. As the coefficients for the lagged ENP are still insignificant in two of the specifications without the SMDs from mixed electoral systems, this primarily confirms the weak relationship between this factor and voter turnout which was found in the original models as well.

Table B2: Time-Series Cross-Sectional Models on Voter Turnout with Fixed Effects, SMDs in mixed electoral systems excluded

	(1) Voter Turnout	(2) Voter Turnout	(3) Voter Turnout	(4) Voter Turnout	(5) Voter Turnout
L.Voter Turnout	0.667***	0.691***	0.670***	0.708***	0.658***
	(0.0536)	(0.0550)	(0.0562)	(0.0586)	(0.0573)
L.District Magnitude (log)	0.0107**	0.0583***	0.0106**	0.0616***	
	(0.00364)	(0.00725)	(0.00369)	(0.00790)	
District Magnitude (log)					-0.0278***
					(0.00816)
L.Population Size (log)		-0.0503***		-0.0542***	
		(0.00671)		(0.00762)	
Population Size (log)					0.0390***
					(0.00771)
L.Effective Number of Parties (log)			0.00489	0.0178*	-0.00571
			(0.00599)	(0.00718)	(0.00653)
Constant	0.251***	0.753***	0.243***	0.758***	-0.136
	(0.0423)	(0.0739)	(0.0484)	(0.0754)	(0.0786)
R^2	0.474	0.504	0.474	0.507	0.488
Observations	2384	2354	2354	2354	2343

Note: Fixed effects at constituency level. Robust standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To sum up, the differences between the estimates from the original models and the models presented in Table B2 are largely negligible and nearly all coefficients remain similar with respect to the direction and the statistical significance of the effects. The results shown in Table B2 provide confidence that the original estimations are quite robust and confirm the decision to include the SMDs from mixed electoral systems in the original model specifications and all other models that are presented in chapter 6.

Multilevel mixed-effects models

As a further robustness check, I replicate the original time-series cross-sectional models that are presented in Table 12 by means of another model type (with the SMDs from mixed electoral systems being included again). This is to control to what extent the coefficients remain stable when another estimation technique is used. While the original TSCS models are estimated with FE, the replication models in Table B3 are estimated with multilevel mixed-effects linear regression. These replication models bring one benefit about that adds to the basic TSCS-analyses with fixed effects as shown in section 6.2.1.: The multilevel time-series models account for the data structure described in section 6.1., i.e. that constituencies are nested in election dates, which are again nested in countries. As the models in Table B3 depict exact re-specifications of the models in Table 12, only estimated with multilevel mixed-effects regression, the number of observations for the multilevel models is the same as for the original FE models.

Table B3: Multilevel Mixed-Effects Models on Voter Turnout

	(1) Voter Turnout	(2) Voter Turnout	(3) Voter Turnout	(4) Voter Turnout	(5) Voter Turnout
L.Voter Turnout	0.727***	0.726***	0.729***	0.729***	0.683***
	(0.00771)	(0.00822)	(0.00780)	(0.00835)	(0.00779)
L.District Magnitude (log)	0.000732	0.000125	0.000406	0.000277	
	(0.000583)	(0.00197)	(0.000604)	(0.00197)	
District Magnitude (log)					-0.0392***
					(0.00177)
L.Population Size (log)		0.000585		0.000128	
		(0.00185)		(0.00186)	
Population Size (log)					0.0400***
					(0.00167)
L.Effective Number of Parties (log)			0.00416*	0.00414*	-0.00150
			(0.00205)	(0.00207)	(0.00199)
Constant	0.199***	0.194***	0.193***	0.191***	-0.171***
	(0.0135)	(0.0212)	(0.0140)	(0.0214)	(0.0207)
lns1_1_1					
Constant	-3.295***	-3.299***	-3.284***	-3.285***	-3.276***
	(0.259)	(0.260)	(0.258)	(0.259)	(0.249)
lns2_1_1					
Constant	-3.279***	-3.277***	-3.278***	-3.278***	-3.275***
	(0.0688)	(0.0690)	(0.0689)	(0.0690)	(0.0686)
lnsig_e					
Constant	-3.547***	-3.546***	-3.546***	-3.546***	-3.580***
	(0.00794)	(0.00795)	(0.00795)	(0.00795)	(0.00796)
Observations	8055	8025	8025	8025	8014

Note: Standard errors in parentheses.
$^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

When comparing the models in Table B3 with the models in Table 12, it is obvious that the LDV remains positive and highly significant in all specifications, further corroborating the stability of its impact. Similarly to the FE estimations, the coefficient for lagged district magnitude is in the expected direction, although losing statistical significance in all models in Table B3, irrespective of the in- or exclusion of the independent variable ENP or the control

variable Population Size. The coefficients for lagged population size, in contrast, change more considerably: While they are negative and highly significant in the FE specifications, they are positive and insignificant in the multilevel models. When considering Model 5 in Table B3 in particular, the coefficients for the LDV, District Magnitude, and Population Size resemble those from the fifth model in Table 12.

Apart from that it stands out that the coefficients for the lagged ENP differ in certain respects between the types of models being estimated. The coefficients for the lagged ENP had a negative sign in the FE models, with the exception of Model 5 in Table 12, and were insignificant in all FE models where the variable was included. In contrast, in the third and the fourth model presented in Table B3 the coefficient for the lagged ENP is in a positive direction now and statistically significant at the 0.05-level. Only the respective coefficient in the fifth model in Table B3 remains insignificant, although becoming negative. These diverging results for the ENP, Population Size and, at least with respect to statistical significance, District Magnitude in the FE models and the multilevel mixed-effects models justify my superordinate modelling strategy to follow an analytical process that comprises multiple stages. Accordingly, the subsequent stages can add to a more profound examination of the substantive effects of these variables. This pertains especially to a closer scrutiny of the impact of the ENP on turnout. At the same time, several coefficients remained stable in both model types, what clearly increases the confidence in their impact being substantive.

Beyond the benefit of the multilevel mixed-effects models to particularly account for the underlying structure of my data, these estimations can contain the independent variable Electoral System Type as well. This variable could not be included in the original FE models due to its nearly time-invariant properties. That is why I specify two additional multilevel mixed-effects models which, besides the LDV and the lagged variables District Magnitude, ENP, and Population Size, also include the variable Electoral System Type. One model includes the variable in its lagged form while the other model is specified with unlagged Electoral System Type. Table B4 provides the results from these two models.

Table B4: Multilevel Mixed-Effects Models on Voter Turnout with lagged and unlagged variable Electoral System Type

	(1) Voter Turnout	(2) Voter Turnout
L.Voter Turnout	0.729***	0.729***
	(0.00836)	(0.00836)
L.Electoral System Type	-0.00609	
	(0.0124)	
Electoral System Type		-0.00820
		(0.0108)
L.District Magnitude (log)	0.000199	0.000172
	(0.00198)	(0.00198)
L.Effective Number of Parties (log)	0.00413*	0.00414*
	(0.00207)	(0.00207)
L.Population Size (log)	0.000191	0.000213
	(0.00187)	(0.00187)
Constant	0.199***	0.202***
	(0.0268)	(0.0257)
lns1_1_1		
Constant	-3.270***	-3.257***
	(0.263)	(0.264)
lns2_1_1		
Constant	-3.280***	-3.283***
	(0.0691)	(0.0692)
lnsig_e		
Constant	-3.546***	-3.546***
	(0.00795)	(0.00795)
Observations	8025	8025

Note: Standard errors in parentheses.
$^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

The coefficients in the models shown in Table B4 generally resemble those from the other multilevel mixed-effects models depicted in Table B3. The consideration of the electoral system type reveals that the results for the lagged as well as the unlagged form of the variable are quite similar. Both coefficients have the expected direction, which is negative due to the coding of the variable and what would indicate the positive effect of PR on turnout. The coefficients are statistically insignificant, though. That may not be surprising either. Regarding the variable on the electoral system type, it should be remarked that the variable in the end accounts for only one case of inter-systemic change of the electoral system, that is to say the case of Italy where the electoral system changed from PR to mixed in 1993. As this is the only variation in this

variable for the whole group of countries included in the analysis, the potential impact of this change can easily disappear within the scope of such TSCS and multilevel models. That is why the respective case of change in the electoral system type in Italy is further examined separately in the latest stage of analysis. Italy hence depicts one of the two case studies where the consequences of inter-systemic change for voter turnout are discussed more detailed.

To sum up the results from the multilevel mixed-effects regression models, after the coefficients for lagged district magnitude remain constantly positive in all model specifications, in the original FE models as well as in the multilevel models, there is some additional empirical support for the second hypothesis that expects a positive influence on turnout by increasing district magnitude. However, this is only partial evidence so far. The lack of statistical significance with respect to lagged district magnitude in the multilevel models as well as the results of the fifth model in Table B3, including unlagged district magnitude, tell that the findings for the impact of district magnitude on voter turnout need a more detailed verification. The same is true for the other independent variables in the models. That is why further stages of the analytical process are taken in chapter 6.

Table B5: Pooled Cross-Sectional Model on Voter Turnout with independent variable Enforcement

	Voter Turnout
Electoral System Type	-0.0108^{***}
	(0.00116)
District Magnitude (log)	-0.0124^{***}
	(0.00121)
Effective Number of Parties (log)	-0.108^{***}
	(0.00305)
Enforcement	0.136^{***}
	(0.00385)
Population Size (log)	0.0525^{***}
	(0.00140)
Constant	0.332^{***}
	(0.0180)
R^2	0.422
Observations	9334

Note: Standard errors in parentheses.
$^{*} p < 0.05,$ $^{**} p < 0.01,$ $^{***} p < 0.001$

Table B6: Pooled Cross-Sectional Model on Voter Turnout with interaction of District Magnitude and Population Size, Electoral System Type included

	Voter Turnout
Electoral System Type	-0.0575***
	(0.00260)
Effective Number of Parties (log)	-0.103***
	(0.00284)
Compulsory Voting	0.0832***
	(0.00334)
District Magnitude (log)	0.0252*
	(0.0123)
Population Size (log)	0.0832***
	(0.00146)
District Magnitude (log) # Population Size (log)	-0.00727***
	(0.000865)
Constant	0.126***
	(0.0183)
R^2	0.496
Observations	9334

Note: Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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