Proportional Representation, Political Fragmentation and Political Decision-Making: an Economic Analysis

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“...I am like a piece of land that of itself is dry and barren, but if you scatter manure over it and cultivate it, it will bear good fruit. By this I mean to say that your Grace's conversation is the manure that has been cast upon the barren land of my dry wit; the time I spend in your service (...) does the cultivating; and as a result of it all, I hope to bring forth blessed fruits.” (Don Quichote, part II, Ch. XII)

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GENERAL CONCLUSION

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General Introduction

Elections in different countries take different forms. Besides a number of differences in practical arrangements (e.g. registration formalities), dissimilarities also exist with respect to the more technical elements in the election. Especially with reference to the way in which the seats in parliament are distributed after the election, numerous methods are employed. In fact, the electoral system – i.e. “the means by which votes are translated into seats in the process of electing politicians into office” – is never the same in two countries (Farrell, 2001, 4). Still, given the abundance of different systems that are currently in use, two main categories can be discerned: non-proportional and proportional systems. Non-proportional systems aim to achieve a clear majority for one of the parties. As such, one hopes to create strong and stable government. Proportional systems on the other hand allocate seats more or less in line with the electoral result (in terms of votes) obtained by each party. This has the advantage of lowering voter alienation and politically motivated violence, but the ensuing multiparty systems tend to be less stable (Mueller, 2003).

A key difference between both types of electoral systems is the number of parties they allow to develop and/or sustain. Non-proportional systems tend to support two-party regimes while proportional systems tend to lead to multiparty systems (e.g. Duverger, 1954/1972; Riker, 1982 and Lijphart, 1994). Importantly, the proportionality of the electoral system is a necessary but not a sufficient condition to obtain more fragmented political systems. There should also be sufficient socio-economic diversity within the population (Taagepera and Shugart, 1989). This diversity tends to create opposing views about “optimal” policies, which can give rise to the emergence of (and competition between) various political parties. The electoral system functions as a crucial intermediary factor in the rise (and continuation) of these political parties. In general, it holds that a more proportional electoral system and a more heterogeneous population will tend to be associated with a more fragmented political system (Powell, 1982;
Proportional Representation (PR) is not only conducive to fragmented party systems. Casual observation also shows that the number of candidates that a party proposes to the voter in a given electoral district is larger under PR. For example, no party proposed more than one candidate in any of the 659 constituencies during the 2001 UK general elections, where a non-proportional system (i.e. the plurality rule) is used. Proportional systems on the other hand usually witness more than one candidate per party. An evident reason for this difference is that the number of representatives to be elected in a given district (the so-called “district magnitude”) is generally higher under PR relative to plurality systems (Lijphart, 1994; Farrell, 2001). This district magnitude is most often equal to 1 in plurality systems. There is only one seat to be gained and in such a context it clearly makes little sense for a party to bring forward two, three or more candidates. If the voter is only allowed to cast 1 vote – as is the case in all single-member plurality systems (Farrell, 2001, 22) – each vote gained by a given candidate is a vote lost by all other candidates. Hence, parties presenting more than one candidate split “their” votes over several candidates, which lowers their chance of winning the seat in the given district.\footnote{The same principle holds under limited voting where each voter can cast c votes but where s seats (with s > c) are to be filled. The s candidates receiving most votes obtain a seat (Farrell, 2001). Each party then faces a strategic problem in that it may spread votes too thinly over its candidates to obtain many seats if it proposes s candidates. However, if it proposes “only” c candidates, it a priori declines the chance of obtaining all s seats (Mueller, 2003, 270-271).}

Under (list) PR, a larger number of seats is to be divided among the competing parties in each district. Hence, each party has an incentive to propose more than one candidate to the voter. This incentive is reinforced by the fact that all candidates in list PR-systems obtain votes for the party as well as for themselves.\footnote{Indeed, the distribution of seats in such electoral systems is based on the vote total obtained by the party as a whole (through list votes) and its candidates (through preferential votes). This means that the candidates of the same party can be regarded more as a team than as competitors (as is the case under plurality elections).}

The electoral system thus contributes to the existence and level of political fragmentation in the elections and in parliament and/or government. The effects of this level of fragmentation on decision-making at several stages in the political process are the focal point of this work. More precisely, we analyse the effect of political fragmentation in two phases of the political process: the election and the policy-making of the government.
This consists in particular of analyses of the decisions (a) whether or not to cast a vote and who to vote for and (b) whether or not to implement certain policies. The data for these analyses relate to the local government level in Flanders and the regional government in Brussels (cfr. infra).

The structure of this work is as follows. The first chapter provides the reader with some general information on the basic features of Belgian elections: the electoral system, compulsory and electronic voting, and so on. Because our empirical analyses focus on lower levels of government, specific attention is given to the characteristics of elections at these lower levels, especially where these procedures differ from federal elections. The first chapter also brings forward the central explanatory variable of this work, namely “political fragmentation”. We not only clarify what exactly we mean by this concept, but also present some basic statistics on the level of fragmentation in Belgian municipalities. This serves to illustrate the importance of regarding the effects of such fragmentation in the local political world under investigation as well as acquainting the reader with the data (see also Geys, 2003).

The remaining four chapters present empirical analyses on the effects of political fragmentation on a number of political decisions. These are arranged such as to roughly follow the progress of the political process.

The attention in Chapter 2 is directed at the voter’s decision whether or not to turn out and cast a ballot on Election Day. A considerable literature already exists concerning the elements that influence voter turnout. This literature demonstrates that personal characteristics such as education and wealth are basic components in explaining the voter’s turnout decision. However, it is also shown that the characteristics of the political system, such as for example the level of political fragmentation, matter as well. We reconsider the effect of political fragmentation on electoral turnout using Flemish municipal election data. Voting – or, more accurately, turning out to cast a vote – is compulsory in Belgium. Still, since prosecution is exceptional in practice and turnout varies considerably among the municipalities, studying turnout in Flanders provides valuable and useful information. Our principal results confirm that the municipality’s level of political fragmentation matters for voter turnout. Generally, the more fragmented
the local political landscape, the lower the share of the (registered) population that turns out to cast its vote.

Chapter 3 analyses the voter’s decision process inside the poll booth, viz. which candidate to vote for. It has been frequently shown that presenting long lists of candidates may affect the in-booth voting process. Candidates on the top (or bottom) of the list tend to receive more votes *ceteris paribus*, creating so-called Ballot Position Effects (for a review, see Darcy and McAllister, 1990 and Miller and Krosnick, 1998). In Belgium, long candidate lists have necessitated an important organizational change when computerized voting was introduced. Instead of presenting the voter with one long list of candidates per party, these have to be spread over separate columns in order to fit on the computer screen. Using preferential vote data taken from the 1995 Brussels’ Regional Elections, we show that such differences in layout affect the preferential voting behaviour of the electorate. In fact, we find that candidates on the top (or bottom) of each column tend to obtain more votes, *ceteris paribus*. This finding is not due to the use of computerised voting as the same (layout) effects are observed between different computerised ballots. Important from a normative point of view, we also find that these layout effects are stronger when the level of “cognitive sophistication” of the electorate (proxied by its education level) is lower. The analysis in this chapter is taken from Geys and Heyndels (2003a, b).

Chapters 4 and 5 investigate the effect of political fragmentation on a government’s policy choices. More specifically, we address two issues. The first – brought forward in Chapter 4 – concerns the effect of political fragmentation on the decision of a government to introduce a new tax. Research into this relation has thus far been very limited. Still, a number of studies on the fiscal behaviour of US state governments have shown that “divided” governments (where the governorship and the political majority in the parliament are held by different parties) are slower at introducing new taxes. We take advantage of the substantial fiscal autonomy of local governments in Belgium to re-evaluate these findings in a different context. Specifically, we analyse the introduction of “milieubelastingen” (“green taxes”) in Flemish municipalities as of 1990. It is found that the level of fragmentation of the government affects the timing of introducing this new tax. While coalitions are *an sich* more likely to set the tax than single-party governments,
it is also shown that the greater the fragmentation of the municipal government, the lower the likelihood that a new tax will be set.

The second policy choice – presented in Chapter 5 – refers to the local governments’ level of indebtedness. The analysis here presents a test of the “Weak Government Hypothesis” (Roubini and Sachs, 1989a, b) on local government data. This hypothesis states that weak (or more fragmented) governments tend to have higher budget deficits and debts because of coordination problems within the government. Using data on Flemish municipal long-term local debt over the period 1977-2000, we find evidence in support of the Weak Government Hypothesis. More precisely, the various measures of political fragmentation introduced in the model always have the expected sign and often are statistically significant at conventional levels. They thus indicate that the level of fragmentation indeed affects local indebtedness. Crucially, the effect is non-linear and reveals that two-party coalitions lead to higher increases (or lower decreases) in the municipalities’ indebtedness (compared to other levels of political fragmentation).

The analyses referred to are predominantly empirical in nature. They are performed on an extensive dataset providing a wide range of information on lower levels of government (municipal and regional elections). Many elements in this dataset have been brought together in the course of writing this work and have never been analysed before. One example is the dataset on municipal debts, analysed in Chapter 5. We must also mention that we keep our analyses in Chapters 2, 4 and 5 restricted to the Flemish municipalities and make no attempt to expand the studies to Brussels and Wallonia (Chapter 3 is restricted to Brussels due to the nature of the data). Though this would in itself be an interesting undertaking, two important factors made us refrain from this enterprise in the current work. Firstly, we lack the data on a number of crucial variables for Walloon municipalities, including those relating to the dependent variables of Chapters 4 and 5. Secondly, the intense political differences between Flanders, Brussels and Wallonia would introduce numerous additional complexities to the analyses. Focussing on Flanders avoids these auxiliary issues and allows a clearer analysis and presentation of the main ideas.
PART I

On the Belgian Political System
CHAPTER 1:
Belgian Elections and the
Level of Political Fragmentation

Introduction

The focal point of this work is the effect of political fragmentation on political decision-making by the electorate and the government. However, before one can study this, it is necessary to clarify two important issues. First of all, given that the various rules and procedures that guide the formal organisation of elections constitute the framework in which one examines political decisions, knowledge about the institutional context of the elections is warranted. Secondly, a clear idea about what the term “political fragmentation” entails is indispensable. Both issues are given proper attention in this first chapter.

A number of questions naturally arise concerning the formal organisation of the electoral process. Who is eligible to vote and how does one cast a valid vote? How are votes translated into seats? Is voting compulsory? The first part of this chapter provides an answer to such questions. Hence, the purpose is to familiarize the unacquainted reader with the workings of Belgian elections. We concentrate mainly on those issues that are of immediate relevance for understanding the empirical analyses in this work and do not attempt to give a complete description of the institutional setting of Belgian elections. Obviously, as the empirical analyses deal with the sub-federal political level, most attention is given to the procedures applied in municipal (and regional) elections. We thereby point out if and how these differ from those applied in federal elections.

Whereas the first part of this chapter describes the rules and procedures in Belgian elections, the second part focuses on the Belgian municipal party system. Here we concentrate on the central variable in the remainder of this work, namely “political fragmentation”. We provide a definition of this concept and describe the level of political fragmentation in Belgian municipalities and any trends therein over the period 1982-2000. An explanation of these trends is also provided.
1. **Belgian Elections**

Belgian municipalities are governed by the local council (parliament) and the College of Mayor and Aldermen (government). The number of seats in these bodies depends on the size of the municipality. In Herstappe and Mesen, the smallest Belgian municipalities, the municipal College has 3 members (2 Aldermen and the Mayor) and the local parliament consists of 7 councillors. Antwerp, the largest city, has 10 Aldermen, one Mayor and 55 councillors. For all other municipalities, the number of seats in the local government and parliament lies between these two extremes. The Aldermen are selected from among the councillors, which are themselves nominated through democratic elections. These elections take place once every six years on the second Sunday of October.

The remainder of this section takes a look at the institutional features of Belgian (local) elections. We concentrate on 4 issues that are of immediate relevance for the empirical analyses later in this work. Questions concerning who is allowed to vote, how they can cast a valid vote and other practical issues are considered in section 1.1. The Belgian electoral system – the method used to transform votes into seats – is discussed in detail in section 1.2. Finally, two key characteristics of Belgian elections – compulsory voting and electronic voting – are discussed in sections 1.3 and 1.4 respectively.

We must remark here that the regional governments are currently (2003-2004) deciding upon new institutional rules surrounding the provincial and municipal elections. Formerly the federal government decided upon these rules, but during the latest step in the reform of the Belgian state (the so-called Lambermont-agreements) the authority for the organisation of local elections was transferred from the federal government to the regional governments (Van Grembergen, 2003). Nonetheless, we provide a description of the contemporary electoral procedures. The reason is that our empirical work analyses election and policy outcomes derived under the current rules and procedures. Still, where deemed necessary, reference is made to proposals of the Flemish ministry of internal affairs concerning the impending new legislation.
Belgian citizens become eligible to vote once they reach the age of 18. This age restriction holds for all types of elections: European, federal, regional, provincial and municipal. Recently, proposals have been made by the Flemish government to lower the voting age to 16 as of the municipal elections of 2006 (Van Grembergen, 2003, 4), in line with the age restriction for municipal referenda taken up in the “Nieuwe Gemeentewet” (“New Municipal Law”, art. 322). Note that we have specifically referred to Belgian citizens. Indeed, for most types of elections the Belgian nationality is a prerequisite to be allowed to cast a vote. However, this is not the case for municipal elections and European elections. In these, citizens of other European Union member-states who have their residence in a Belgian municipality also have the right to cast a vote. Still, in order to do so, they need to fill out an application form to be put on the voter lists.

The right to vote is by no means indisputable. Individuals can be (most often temporarily) barred from the official voter lists for several reasons. Most importantly, people that have lost their civic rights due to a criminal conviction lose the right to vote in elections. Persons who suffer from a mental illness may also be denied the right to vote, even though they may be over the legal voting age of 18 years. The same holds for those who are placed in a prolonged state of immaturity by a court of law. Though they may in fact be over 18 years of age, they are not regarded as adults in a legal sense. Consequently, they do not figure on the voter lists and have no right to cast a vote.

It is worth noting that, unlike for example in the United States, voter registration in Belgium is automatic. Moreover, the government assumes the responsibility for compiling the voter lists such that the voter has to make no effort himself to be registered as a (potential) voter. It can thus be assumed that no one is missed out because they dread going through possibly tedious registration procedures. These procedures are often argued to be an important element in America’s low electoral participation rates (Rosenstone and Wolfinger, 1978; Powell, 1980; Piven and Clowart, 1989; Highton, 1997; Brians and Grofman, 1999). Still, even automatic registration as in Belgium does not necessarily mean that the voter lists are 100% accurate. As these lists are brought together some time

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3 This section is predominantly based on information provided on the website of the Belgian government (www.belgium.be).
before the actual election date, it is possible that there are people still on the list at the time of the election where they should have been removed (or vice versa). This implies that the officially reported number of non-voters diverges to some extent from the real number of people not presenting themselves at the polls. Nevertheless, in Belgium, the period between the official make-up of the list and the election is since 1977 limited to only two months. Furthermore, the municipal council is held to keep the voter list updated until the day of the election (VVSG, 2000).

Once in the poll booth, the Belgian voter has two options to cast a legal vote. He can choose to support a party list (by casting a “list vote”) or he can vote for one or more particular candidates from the same list (a “preferential vote”). Panachage, which is the combination of votes for candidates of different party lists, ceased to be a legal way of casting one’s vote as of the municipal elections of 1976 (Dewachter, 1982, 457). It is important to bear in mind that with the advent of computerised voting (cfr. infra), casting invalid votes has become virtually impossible – at least in districts where the computer is used to record votes. More precisely, the voting software renders impossible all ways of making the ballot invalid such as panachage or writing on the ballot form. Blank votes are obviously still possible.

Finally, we note that the type of vote cast (i.e. list or preferential vote) affects the allocation of seats within the party. The reason is that, in Belgian elections, those candidates that achieve a personal vote total above a quota receive a seat. Usually, at most the top candidate manages to reach this quota on the basis of his/her preferential votes alone. To assign the other seats, the party’s list votes are distributed over the various candidates in order of their appearance on the list until all seats are filled. If the party runs out of list votes before all its seats are filled, the remaining representatives for that party are designated according to the amount of preferential votes they obtained. Therefore, by casting preferential votes instead of list votes, the amount of list votes up for

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4 This quota differs for local and federal elections. In municipal and provincial elections, it equals the quotient of (a) the party’s total vote ($V_i$) multiplied by the number of seats it obtained ($S_i$) and (b) the number of seats it obtained plus one (or $V_i * S_i / (S_i + 1)$). For federal and regional elections the quota is equal to the party’s total vote divided by number of seats it obtained plus one (or $V_i / (S_i + 1)$) (see also Janssens and Dewachter, 1995, 18).

5 Because the quota is higher in local elections, the amount of list votes to be distributed over the party’s candidates is also multiplied by the number of seats the party obtains. Note, however, that recent legislation halved the value of the list vote (Law of 27 December 2000). That is, the stock of list votes to be distributed is reduced to 50% of the list votes a party obtains.
distribution reduces and the number of preferential votes obtained by a candidate becomes more important in awarding the party’s seats. As a direct consequence the list order – as presented by the party – is more likely to be overthrown if more preferential votes are cast by the electorate.

This is supported by the data. In the 1995 and 1999 elections at the federal level about 60% of the ballots contained votes for a particular candidate (Smits and Thomas, 1998 and Smits and Wauters, 2000). While no politician managed to get elected outside the list order in the elections for the federal Chamber, 1 Senator achieved this in 1995 and 2 in 1999 (Smits and Thomas, 1998 and Smits and Wauters, 2000). Provincial elections also witness about 60% preferential votes (1994 data) and 22% of the representatives are elected without the use of list votes (Janssens and Dewachter, 1995). Finally, at the municipal level, looking at data from 1988 and 1994, some 80% of the ballots contain preferential votes and approximately 65% of the politicians are elected without the use of list votes (Janssens and Dewachter, 1994, 8; Wauters, 2000).

The large difference between the share of elected politicians overthrowing the list order in federal and local elections has three main explanations.

- **Firstly**, looking at the number of representatives elected without the use of list votes (as in the studies on provincial and municipal elections) is broader than counting the representatives elected outside the list order (as in the studies on federal elections). The former category includes those candidates high upon the list who get elected on the basis of just their preferential votes as well as those candidates lower on the list who obtain seats after all list votes have been distributed. The first are situated within the list order while the second do not necessarily overthrow it.

- **Secondly**, as mentioned in footnote 4, the “quota” is higher for municipal and provincial elections compared to federal elections. Consequently, the stock of list votes is used up faster and more candidates have to rely only on their preferential votes. This increases the possibility that candidates outside the list order are (s)elected in local elections. In line with this argument, Smits and Thomas (1998) calculate that the quota used in local elections would have increased the number of politicians
elected outside the list order in 1995 to 4 for the Chamber of Representatives and 9 for the Senate.

- **Thirdly**, there are more parties obtaining a large number of seats in local elections, compared to federal elections. This is due to a higher average district magnitude in local elections (such that more seats are available) and an electoral system that is more advantageous to large parties than the federal electoral system (cfr. infra). The more seats a party obtains, the higher the chance that the list order will be broken (Wauters, 2003, 420) as there is a higher probability that the stock of list votes will run out before all seats are awarded. Indeed, historically, most politicians elected outside the list order in federal elections are found in large districts (especially Brussels) (Dewachter, 1988). Also, the enlargement of the voting districts in the 2003 federal elections (together with the halving of the stock of list votes to be distributed) led to a sharp increase in the number of representatives elected outside the list order (Wauters, 2003).^6^ 

1.2 The electoral system: From votes to seats

“The means by which votes are translated into seats in the process of electing politicians into office” is known as the electoral system (Farrell, 2001, 4). This allocation of seats can be done in two general ways: non-proportional and proportional.

- **Non-proportional** systems allocate all seats in the district to the party or politician that obtains the highest vote share (or obtains more than 50% of the vote). Such systems are characterised by the aim of securing a strong, stable majority for one party. Most often only one representative is elected per district and, consequently, small political fractions have little chance to obtain representation unless their party base is strongly regionally concentrated.

^6^ Note that this argument also explains why the number of senators elected outside the list order is larger than the number of representatives in the federal Chamber that obtained their seat by breaking the order of their party’s list. Indeed, as seats in senatorial elections are awarded at the Regional level while those for the federal Chamber are awarded (since 2003) at the provincial level, the district magnitude in senatorial elections is (much) larger. More precisely, 25 seats are awarded in the senatorial elections in the Flemish Region. The district magnitude in the elections for the federal Chamber varies between 7 and 24 seats – depending on the size of the province.
Proportional systems allocate seats in proportion to the votes obtained by each party. The idea behind such a system is one of fairness and representation of minority groups. Indeed, small parties have a (much) higher chance of gaining representation in proportional systems compared to non-proportional systems. Obviously, to be able to allocate seats proportionately, more than one seat must be awarded per district. Or, in technical terms, the “district magnitude” in proportional systems is by definition larger than 1.

The Belgian electoral system is part of the latter, proportional tradition. More specifically, Belgium has a so-called List System of Proportional Representation (PR). In such a system, voters vote for party lists of candidates instead of voting for individual candidates – as is the case under, for example, the Single Transferable Vote system of PR (Lijphart, 1994, 153). List Systems of Proportional Representation exist in a variety of forms. These can be divided into two groups according to the way in which the vote-seat translation takes place: by means of division (“highest averages”) or subtraction (“largest remainders”).

The “highest averages”-methods successively divide the vote total of a party by a series of divisors. The party with the “highest average” after each division is awarded a seat. At the same time, its vote total is divided by the next divisor. This continues until all seats are awarded (Lijphart, 1994, 153; Farrell, 2001, 73-74). Methods of this type that are currently made use of include D’Hondt (with divisor series 1, 2, 3, …), Imperiali (2, 3, 4, …) and Sainte Laguë (1, 3, 5, …).

The “largest remainders”-method instead makes use of an electoral quota based on the division of the total number of valid votes cast in the election (V) and the number of seats to be allocated (S). Parties obtaining this quota obtain a seat and the quota is subtracted from their vote total. This continues until no more parties reach the quota. If by then there are still seats to be allocated, these are awarded to the parties with the largest remaining number of votes in order of vote size (Lijphart, 1994, 153; Farrell, 2001, 71-72). Some common rules of this type are Hare (quota = V/S), Hagenbach-

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7 The technicalities of both these types of electoral systems are explained in Appendix A by means of an example.
Bischof (quota = \( V/[S+1] \)), Droop (quota = \([V/[S+1]]+1\)) and Imperiali (quota = \( V/[S+2] \)).

Belgian elections make use of the “highest averages” methods for the allocation of seats. However, at the various levels of government, different divisor series are used. In federal, regional and provincial elections, highest averages D’Hondt is used whereas municipal elections make use of highest averages Imperiali (for a comparison of these electoral systems, see appendix B). Recently, however, the Flemish regional government is considering applying the same rule for allocating seats (namely highest averages D’Hondt) at all levels of government as of the municipal elections in 2006. The intention of this proposition is to increase the transparency and uniformity of Belgian elections (Van Grembergen, 2003, 5).

Hitherto, we have separated electoral systems in 2 groups: proportional and non-proportional. This obviously is a very crude division. Proportionality should rather be seen as a continuum. Indeed, “all electoral systems tend to be at least somewhat disproportional” (Lijphart, 1994, 75). This idea is captured in indices measuring the degree of disproportionality of electoral systems. Such indices are based on the differences between the vote shares (\( v_i \)) and the seat shares (\( s_i \)) of each party that participated in the election. Especially the index proposed by Loosemore and Hanby (1971) has become very widely used (for a review of other indices, see Lijphart, 1994, 58-62). For an election with \( n \) parties, this measure calculates:

\[
\text{Dev} = \frac{1}{2} \sum_{i=1}^{n} |s_i - v_i|
\]

Higher values indicate a less proportional electoral system. By way of example, let us refer back to the example used above to compare highest averages D’Hondt and highest averages Imperiali (see appendix B). The four parties in this example obtain 36.0%, 31.5%, 21.0% and 11.5% of the votes respectively. The seat shares under highest averages D’Hondt are 42.9%, 28.6%, 14.3% and 14.3%. This leads to a degree of disproportionality \( \text{Dev} = 0.096 \). Under highest averages Imperiali the same vote shares translate into the following seat distribution: 42.9%, 42.9%, 14.3% and 0%. With an index value equal to 0.182, this implies that the latter electoral system is less proportional.
than the former – or more beneficial to large parties (see also Ackaert, 1990; Buelens, 1993). Note that under the plurality rule (also known as first-past-the-post or “winner takes all”) one party would acquire all the seats. This would lead to a value of Dev = 0.640, indicating the severe disproportionality of such an electoral system.

Finally, it is important to mention that the (dis)proportionality of electoral systems depends not only on the precise characteristics of the system (as indicated by the example given above) but also on the number of seats that are distributed in the election (cfr. Sartori, 1968; Taagepera and Shugart, 1989; Lijphart, 1994). Indeed, “the decisive point in PR is the size [magnitude] of the constituencies: the larger the constituency, that is, the greater the number of members which it elects, the more closely will the result approximate to proportionality” (Hogan, 1945, as quoted in Lijphart, 1994, 11). Using the same hypothetical election result as before, increasing the number of seats to 55 (the maximum district magnitude in Belgian municipalities) decreases the Loosemore-Hanby disproportionality index to 0.011 for highest averages D’Hondt and 0.015 for highest averages Imperiali.

1.3 Compulsory voting

One of the most characterizing elements of the Belgian electoral system is that voting is compulsory. Despite frequently recurring discussions among politicians and political scientists on the merits and weaknesses of this policy (e.g. Ackaert and De Winter, 1992; Vanmaercke, 1993; Hooghe and Pelleriaux, 1997, 1998; De Winter and Ackaert, 1998; Van Grembergen, 2003; Van Holen, 2004), the Belgian voter is still legally required to present himself/herself at the polling station. Voters that do not turn out and have no acceptable excuse for their absence are subject to prosecution by the justice of the peace and possible monetary fines.8 In most Western countries such a compulsion does not exist or has been abandoned in the past. The Netherlands for example relinquished the obligation to vote in 1970 and Italy has done so in 1993. Though compulsory “voting” is somewhat of a misnomer – it is not the voting itself that is compulsory, but presenting

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8 For the first offence, there is a reprimand or a fine of 25 to 50 euro (plus court-costs). The actual numbers in the law state a fine of 5 to 10 euro, but to this one must add the legal surcharges (“opdeciemen”). A second offence raises the fine to a sum between 50 and 125 euro. Four (or more) unexcused offences within fifteen years cause the non-voter to be disfranchised for a period of ten years. This not only means he is no longer allowed to vote (which would be highly ironic), but also that he is not eligible for any appointment, promotion or distinction awarded by the government.
oneself at the polling station – we continue to use this term to keep in line with the terminology used in the literature.

The knowledge that one is subject to (monetary) fines for not voting causes a significant part of the electorate to present itself at the polling station, even though these voters would not have done so otherwise. This turnout-increasing effect of compulsory voting is well documented in the international literature (e.g. Powell, 1980; Jackman, 1987; Blais and Carty, 1990; Crepaz, 1990; Blais and Dobrzynska, 1998; Pérez-Linàn, 2001). Blais (2000, 21) even argues that it is one of the few robust findings in studies that analyse cross-national variation in voter turnout. The same effect was observed when compulsory voting was introduced in Belgium. Turnout rose from 48% in 1892 to 94.6% in 1894 (Vanmaercke, 1993, 65). Since then, aggregate turnout figures in Belgian elections have consistently been over 90%. This may appear somewhat odd, as the number of non-voters actually prosecuted and fined is extremely small. Of the 100,000 to 200,000 non-voters at each election between 1899 and 1933, about 0.3% was prosecuted. One third of these were acquitted, one third received an admonition and the other third was fined (Tingsten, 1963, 192). Since then, the share of non-voters in the Belgian population has slowly but steadily risen while the percentage of non-voters being prosecuted and/or fined has fallen continually (Ackaert and De Winter, 1992, 15). In 1985, 448,969 voters decided to give the elections a miss. Only 75 were prosecuted and 62 were fined. That leads to a conviction rate of less than 0.015% (Vanmaercke, 1993, 66).

We have gathered more recent data concerning prosecution and conviction of non-voters through a survey among the 27 Belgian judicial areas. The survey asked whether – and if so, to what extent – people were prosecuted for not voting in the judicial area during the previous three municipal elections (1988, 1994 and 2000). We obtained 25 responses (data for Verviers and Dendermonde are missing). All of these provided adequate information about prosecution following the 2000 election, but were generally lacking in similar data with reference to previous elections (given that the survey took place in 2001, this should be hardly surprising).

The responses clearly illustrate that prosecution is still only a marginal phenomenon in Belgium. After the 2000 municipal elections, the only year for which near-complete data were obtained, non-voters were prosecuted in only 2 judicial areas: Turnhout and
Mechelen. In each case, about 1% of the non-voters was prosecuted. Altogether it concerned 391 individuals on a total of 34,260 non-voters in these areas. Almost all were fined (350 individuals). This appears exceptionally high in comparison to the historical figures already mentioned. However, in order to compare these data with those of Vanmaercke (1993), we need to relate the number of convicted individuals to the total number of non-voters in Belgium (equal to 628,957 in 2000). This leads to a conviction rate of 0.06%, which is much more in line with the results mentioned above.

1.4 Electronic voting

Since the first tests with the electronic registration of votes in 1991, the traditional paper ballot sheets and red pencils are gradually substituted for laser pens and touch-screen computers. In the municipal elections of October 1994, 23 of the 208 Belgian cantons introduced electronic voting. These corresponded to 76 of the 589 Belgian municipalities, mainly concentrated in the provinces of Antwerp and Liege. By the 1999 federal elections, this number had increased to 202 of the 589 municipalities (Deschouwer et al., 2000). No enlargement of this group has taken place recently, but debates are held to expand the use of computers to register votes. Especially in Flanders politicians appear to favour the use of computerised vote registration over the traditional paper ballots. In fact, by the 2006 municipal elections, computerised voting is expected to be common practice in Flanders (Decoster and Doesselaere, 2003).

The use of computers to register votes has a number of important advantages over manual voting (Decoster and Doesselaere, 2003). The first is that the organization of the elections becomes easier. More precisely, the number of persons employed at the polling station to monitor the elections can be reduced. Given the frequent problems in finding sufficient people to execute these tasks, this diminishes the organizational difficulties surrounding elections considerably. Secondly, the processing of the votes becomes more efficient as manual counting is no longer necessary. The counting process thus becomes both faster and more accurate such that the results of the election are available sooner. Related to this is a third advantage. As votes are counted faster electronically, polling stations can be kept open for a longer period of time such that the voter has more time to cast his vote.
Still, critics have brought forward a number of arguments against the use of computers to register votes. The most prominent of these are that computers may not always be reliable in registering the voter’s wishes adequately and, related to this, that the voter is unable to check whether the computer has correctly registered his vote (Deschouwer et al., 2000, 1; Duhamel, 2000, 11). Attempts to refute these arguments during the most recent federal elections (in 2003) – through a “ticketing” experiment whereby the voter’s choice was printed out and the results from the computerised vote were compared with the print-outs – proved unsuccessful (possibly because not all voters handed in the print-out of their vote) (Metro, 17/03/2004, 4). Additionally, it has been recurrently argued that computerised voting may be more demanding than voting through the traditional paper ballot sheets (Duhamel, 2000, 11). This may be especially the case for voters who are not used to working with computers (such as elderly and/or less educated people).

Importantly, the transition from manual (i.e. pen and paper) to computerised voting leads to a major difference with respect to the voting procedure. In “manual districts”, voters receive a single form on which all parties and candidates appear. The parties are listed next to one another and for each party the candidates are ranked in one single column. It is clear that, due to high numbers of parties and/or high numbers of politicians per party in an election, all this information often does not fit on a single computer screen. Therefore, in “computerised districts”, the information is presented using a stepwise procedure. More precisely, on entering the ballot box the voter first obtains a screen with the different parties listed upon it. After (s)he has chosen a party, a second screen displays the names of the candidates of that party. Deschouwer et al. (2000) show that this procedural difference may affect the results of the election in that more preferential votes are cast using electronic voting (see also Chapter 3).

2. Political Fragmentation: Definition and Data

From section 1, we have a basic understanding of the practical aspects of Belgian elections. The present section directly builds upon this knowledge and provides a thorough account of the local political reality in Belgium. More precisely, we describe the extent of “political fragmentation” that exists in local politics. To do so, in section 2.1, we start with a definition of the term “political fragmentation” and the diverse indices that
have been employed to measure this concept. Section 2.2 then explains why political fragmentation can arise, what are the elements that influence the level of political fragmentation in a given circumscription. This question has attracted a lot of scholarly attention and the answers provided by this research are briefly summarized in section 2.2. Finally, section 2.3 presents data on the level of political fragmentation in Belgium. These data are central to the empirical analyses later in this work. Though these analyses concentrate on Flemish municipalities and the Brussels Region, all three Belgian regions will be discussed separately in section 2.3 to indicate political differences between Flanders, Brussels and Wallonia. This section also provides an explanation for the observed trends in the level of political fragmentation over the period 1982-2000.

2.1 Definition and measurement

In the Public Choice literature, “political fragmentation” has evolved into a rather comprehensive concept. Ricciuti (2004, 366) argues that four distinct elements can be distinguished. For one, political fragmentation has been taken to refer to the number of parties (or politicians) involved in an election or the government and the size inequalities between them. This is more specifically alluded to as “size fragmentation”. Secondly, “ideological fragmentation” points to the importance of ideological differences among these political actors. A third element, “institutional fragmentation”, focuses on the checks and balances that are imposed on the relation between the various constitutional players. Finally, the concept has been used to refer to changes in size and ideological composition of the political landscape over time. This is generally known as “over time fragmentation”.

In the present work, we concentrate on “size fragmentation”. More precisely, we define “political fragmentation” as the number of parties (or politicians) that are involved in a decision-making process and the size inequalities between these participants.9, 10 Two

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9 From this point onwards, we use the terms “political fragmentation”, “fragmentation” and “size fragmentation” interchangeably.
10 These size inequalities are an indication of the importance of the various “actors” in the decision process. Consider, for example, a constituency where there are five parties each worth 20% of the vote and another constituency where there is one party worth 80% of the vote while the remaining four parties each obtain 5%. Whereas the former constituency can easily be said to have a five-party system, this is not straightforward in the latter one. Even though, objectively, there are still five parties present, one would more comfortably speak of a one-party system. This difference in relative sizes can have important implications for political decision-making – as we will see later.
cases must be distinguished. On the one hand, in elections, the electorate decides which of the various parties or politicians to support. Parties (politicians) then are the subject matter of the decision process and political fragmentation translates into the amount of choice offered to the voter (i.e. the number of options to choose from). The traditional view is that the electorate’s amount of (electoral) choice is represented by the number of parties competing in the election (and their size inequalities). However, not only the number of parties indicates the degree of choice – or political fragmentation – the voter faces. This is also the case for the number of candidates a party proposes (see also Janssens and Dewachter, 1994, 37). This is depicted in figure 1.1. The electorate can choose between options $P_1$ to $P_N$, with $N$ equal to the number of parties in the election or politicians on a given party’s list.\(^{11}\)

On the other hand, fragmentation can be identified at the level of the decision-makers. In that case, fragmentation can be understood as a state of “dispersed political power” (Alesina and Rosenthal, 1995). A number of parties or politicians have to cooperate and come to a common decision concerning the policy issues at hand. Once again, the literature mainly looks at the number of parties. However, recently, a number of scholars

\begin{figure}
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\includegraphics[width=0.5\textwidth]{diagram.png}
\caption{“Political fragmentation” from the voter’s perspective}
\end{figure}

\(^{11}\) Given that a voter is allowed to support only one party during an election, the degree of choice (or fragmentation) within each given party is limited to the number of candidates this party proposes. Since parties are allowed to propose at most a number of candidates equal to the “district magnitude” (i.e. the number of seats in the district), the degree of “candidate choice” is bounded by this district magnitude. In Belgian municipalities, this implies a fragmentation level varying between 7 and 55 candidates (see section 1) – assuming parties to completely fill their candidate list.
such as Kontopoulos and Perotti (1999), Volkerink and de Haan (2001), Perotti and Kontopoulos (2002), Ricciuti (2004) and Schaltegger and Feld (2004) have explicitly regarded the number of spending ministers as a particular dimension of political fragmentation. This situation is shown in figure 1.2. Decision-makers \( P_1 \) to \( P_M \) discuss and evaluate each other’s demands with respect to a certain policy issue and end up taking a common decision.

![Figure 1.2: “Political fragmentation” from the government’s perspective](image)

It is important to note that dispersed political power not only refers to coalition governments, but may also be present across different branches of the government. This is known as *divided government* and exists “when one party controls the executive branch and another controls either one or both chambers of the legislature” (Clarke, 1998, 5). Padovano and Venturi (2001, 17) refer to it as the “American equivalent to a coalition government”. Borrowing the terminology of Bowling and Ferguson (2001), we can discriminate between “simple” and “compound” divided government. Simple divided government exists when “the party in opposition to the governor [or president] controls both chambers of the legislature” (Bowling and Ferguson, 2001, 189). An example is a Republican majority in both the Senate and the House of Representatives while the president/governor is a Democrat. Compound divided government refers to the situation where “control of the two chambers of the legislature is split between the two parties”

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12 See also Alesina and Rosenthal (1995, Ch. 10) for an excellent discussion of the similarities between divided governments in presidential systems and coalition governments in parliamentary democracies.
(Bowling and Ferguson, 2001, 189). This occurs when, for example, the Republican Party controls the Senate while the House of Representatives has a Democratic majority.

The measurement of size fragmentation can and has been done via various operationalizations. The simplest is of course to just count the actual number of participants (i.e. parties or politicians) in the decision-making process. However, several other possibilities have been brought forward. A measure that has received considerable attention in the literature on the size of government debts and deficits is the Roubini and Sachs (1989a, b) Type of Government-index. This index bestows governments with a value between 0 and 3 depending on two elements: whether the government consists of more than one party and whether it has a majority position in parliament. One-party majority governments receive the value 0. Coalition governments receive the value 1 if they consist of two parties and 2 in case of more than two parties. Finally, minority governments get a value of 3.

The measures mentioned above – actual number of parties (or politicians) and Type of Government-index – pay no attention to the relative sizes of the participants in the decision-making process. However, as mentioned, these size inequalities are often argued to be a relevant dimension of fragmentation as well. In such cases, measures of “concentration” taken from industrial economics (that regard both dimensions) may be more adequate. Especially the Herfindahl-Hirschmann concentration index – or, more precisely, its inverse known as the Numbers-Equivalent Herfindahl (Adelman, 1969) or the Effective Number of Parties (ENP, Laakso and Taagepera, 1979) – is often employed in empirical specifications. It is defined as:

$$\text{ENP} = 1 / \sum_{i=1}^{n} p_i^2$$

in which \(n\) stands for the number of parties in the election, parliament or government and \(p_i\) is party \(i\)'s share in the total number of seats (votes). Most generally, \(p_i\) can refer to the share of any group in the total population from which this group is taken. Increases in the value of ENP – or, similarly, decreases in the Herfindahl-Hirschmann concentration index – imply a higher level of political fragmentation.
Two major alternatives for the ENP-measure exist in the literature (though their appearance in empirical work is less common than the ENP-index). On the one hand, Kesselman (1966) and Wildgen (1971) present an index of what they term “hyperfractionalization”. This index attaches more weight to the seat (vote) shares of smaller parties. Using the same notation as before, this is defined as:

\[ H = \text{antilog} \left[ - \sum_{i=1}^{n} p_i \ln p_i \right] \]

The entropy measure used in the turnout-studies of Kirchgässner and Schimmelpfennig (1992) and Kirchgässner and Zu Himmern (1997) is strongly related to this index (cfr. Chapter 2). On the other hand, Molinar (1991) argues that the largest party is “special” and should be treated as such. His index thus attaches more weight to the seat (vote) share of the largest party. With \( p_1 \) equal to the vote share of the largest party and other definitions as before, his index can be written as:

\[ M = 1 + \text{ENP} \frac{\sum_{i=1}^{n} p_i^2 - p_1^2}{\sum_{i=1}^{n} p_i^2} \]

2.2 Explaining political fragmentation

Research into the reason why some countries are confronted with higher levels of political fragmentation than others has received a lot of scholarly attention over the past decades. Most basically, two approaches can be distinguished (Amorim-Neto and Cox, 1997). The institutional approach emphasizes the role of the proportionality of the electoral laws while the sociological approach highlights the effect of social cleavages. Until recently, these elements were considered to be more or less isolated from one another. However, Powell (1982), Ordeshook and Shvetsova (1994), Amorim-Neto and Cox (1997), Cox (1997) and Mozaffar et al. (2003) have brought forward the view that both elements may well interact with one another. The argument is that “a polity will have many parties only if it both has many cleavages and has a permissive enough electoral system” (Amorim-Neto and Cox, 1997, 155, original italics). Empirical evidence based on cross-country
data presented in these studies provides some support for this view. In the remainder of this section, we will explain each approach more carefully and briefly discuss some empirical contributions and results.

Firstly, the institutionalist approach is best addressed by referring to the work of Duverger (1954/1972). Though he was not the first to claim a relation between the number of parties and electoral rules (see Riker, 1982), he was the first to give this relationship a “law-like” status. More precisely, Duverger (1954/1972) stated that political systems based on plurality/majority rule tend to lead to two-party systems (Duverger’s “Law”), while PR tends to maintain multi-party systems (Duverger’s “Hypothesis”). Similar arguments have since then been made by Riker (1982) and Lijphart (1994) among others. The critical determinant brought forward by the institutionalist approach is the “district magnitude” (Rae, 1971; Sartori, 1968; Taagepera and Shugart, 1993). A larger district magnitude, that is, a higher number of legislative seats allocated during the election, is favourable to a higher level of political fragmentation, ceteris paribus. The theoretical explanation is that the district magnitude positively influences the system’s proportionality (Lijphart, 1999; Farrell, 2001, see also section 1.2). In larger districts, at least when a system of Proportional Representation is used, the vote-seat distribution will be more proportional than in smaller districts, giving also smaller parties a fairer chance at gaining representation.

The effect of district magnitude on the number of parties operates through two separate channels (Duverger, 1954/1972). Firstly, there is a purely mechanical effect because the size of the district’s electoral body imposes a limit on the number of parties that can obtain a seat. It is clear that in a district with D seats, there can be at most D parties obtaining a seat. Note that this mechanical factor only affects the number of parties in parliament, and not directly the number of parties participating in the election. The latter is influenced by the psychological effect. Voters as well as party elites foresee the working of the mechanical effect and change their behaviour accordingly. Voters do not want to ‘waste’ their votes on parties that are highly unlikely to obtain a seat and party elites will not want to waste resources on election campaigns if they do not have a reliable chance of gaining

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13 Focus here is on explaining the number of parties in a given area (and their size inequalities). As mentioned earlier, the number of politicians presented by a party is a function of the district magnitude and the number of votes the electorate is allowed to cast.
representation. Both psychological factors will affect the extent of electoral competition at Election Day.

The sociological approach argues that political fragmentation is dependent on the number of socio-economic “cleavages” in the electorate (Lipset and Rokkan, 1967; Karvonen and Kuhnle, 2002). These cleavages refer to criteria by which the population can be divided into separate groups: e.g. religious/secular, rich/poor, conservative/progressive, and so on. More precisely, the more heterogeneous the electorate, the higher the level of political fragmentation will tend to be. In other words: “social segmentation results in multipartism” (Lane and Ersson, 1987, 154). The reason for this relation is that the number of parties required to express all dimensions of political conflict in a society is higher when the amount of conflicting cleavage dimensions increases (Lijphart, 1999, 87).

Interestingly, the relation between the number of issue dimensions and parties appears to relate to a simple mathematical rule. Indeed, Taagepera and Grofman (1985) and Taagepera and Shugart (1989) have shown that the number of parties in the system is roughly equal to the number of (relevant) cleavages plus one.

There thus exist two theoretical explanations for the level of party system fragmentation observed in a given area. And until recently, scholars have looked at both explanations as being of a different order (see Amorim-Neto and Cox, 1997). Empirical studies therefore have focused on either measures for heterogeneity or on the district magnitude to explain the level of political fragmentation (measured by the number of parties participating in elections or obtaining seats in the legislature). For example, empirical research by Rae and Taylor (1970) and Lane and Ersson (1987) on the basis of cross-national data lends support for the hypothesis that socio-economic heterogeneity is conducive to political fragmentation. Studies by Shugart (1985) and Blais and Carty (1991) on the other hand find that the number of parties is lower under plurality/majority voting compared to PR systems and, within the group of PR-systems, when the district magnitude is lower.

However, recently a number of studies have shown that both explanations might not be mutually exclusive and that there may well be an interaction-effect (Powell, 1982; Ordeshook and Shvetsova, 1994; Amorim-Neto and Cox, 1997; Cox, 1997 and Mozaffar et al., 2003). This implies that studies ignoring such interactions are likely to be biased and provide misleading inferences. The theoretical reason to incorporate interaction
effects between electoral laws and population heterogeneity stems from the fact that both elements may well be “necessary” factors for party system fragmentation, but that neither is a “sufficient” one. On the one hand, a very homogeneous society will be unlikely to sustain many parties, even when a PR system is used. On the other hand, in a very heterogeneous society, “multipartyism will be likely unless the electoral and constitutional system encourages consolidation” (Powell, 1982, 84). A permissive electoral system (i.e. high district magnitude) alone will thus not lead to a large number of parties in the absence of a significant level of social diversity (and vice versa).14

Empirical results based on cross-national data support the view that both the permissiveness of the electoral system and the level of social heterogeneity matter for explaining the number of parties in a polity. Powell (1982) explains the effective number of parliamentary parties in 84 elections over the period 1965-76. These data concern 27, mostly European, countries. He includes measures for ethnic, economic and religious heterogeneity and finds that all three encourage fragmentation after controlling for the effect of non-majoritarian electoral laws. Ordeshook and Shvetsova (1994) study a dataset of European elections between 1918 and 1990. They regard 4 dependent variables: the effective number of electoral (legislative) parties and the actual number of parties obtaining at least 1% of the votes (one seat). Measuring social heterogeneity by ethnic diversity and the electoral system by the logarithm of district magnitude, they show that “district magnitude is not merely an important determinant of the number of parties (...), but that it can offset the tendency of parties to multiply in heterogeneous societies” (Ordeshook and Shvetsova, 1994, 100). Amorim-Neto and Cox (1997) and Cox (1997) extend the dataset to include third-world countries, but use only 1 election for each of the 54 countries in the sample (the one closest to 1985). The regression results confirm the conclusions of Ordeshook and Shvetsova (1994) by also finding a strongly significant interaction effect between electoral system variables and ethnic heterogeneity. Finally, Mozaffar et al. (2003) examine data on 62 elections in 34 African emerging democracies. Their results “emphasize the importance of ethnopolitical cleavages in mediating the

14 Apparently, this was also realized by Duverger (1954/1972, 205) since he notes that “the most decisive influences [on the multiplication of parties] are (...) ideologies and particularly the socio-economic structure”. 26
effects of electoral institutions on the structure of party systems” (Mozaffar et al., 2003, 379).  

2.3 The fragmentation-level of the Belgian municipal political system

Coalition formation is common practice in Belgian politics. At the federal level, every government that was formed during the past two decades consisted of at least two political families (Woldendorp et al., 1998). However, also at the local level Belgium witnesses a thriving competition between large numbers of political parties and local governments more often than not consist of coalitions. In the present section we provide more detailed data on the level of political fragmentation in the municipal council and College of Mayor and Alderman (further referred to as the “College”). This serves to describe the state of affairs in Belgian municipalities as well as to illustrate the importance of regarding the effects of such political fragmentation.

Before we describe the data, two remarks are necessary. Firstly, we confine ourselves to providing and describing information about the “actual” number of parties in the councils and Colleges. Including additional data based on the other indices of fragmentation – brought forward and explained in section 2.1 above – or on the number of parties participating in local elections adds little fundamental insights and would only lengthen and obscure the exposition which, after all, should serve as a general introduction. Secondly, as mentioned before, though the empirical analyses later on focus on Flanders and Brussels, all three Regions will be discussed here in order to allow some comparison of the different political situations in each Region.

15 However, a potentially serious problem with each of these studies, as noted by Ordeshook and Shvetsova (1994, 122), is that district magnitude may itself be politically determined in order to produce certain desirable effects with respect to minority representation. In other words, district magnitude is likely to be an endogenous variable. However, it is assumed that the observed values of the district magnitude are equilibrium values and that “changes (…) are due to exogenous factors” (Ordeshook and Shvetsova, 1994, 103). Nonetheless, this possible endogeneity problem creates a serious methodological problem and may lead to biased estimation results.

16 In 1973-74 each political family (Catholics, Socialists, Liberals, ...) split up in a Dutch-speaking and a Francophone party. However, there is an implicit understanding that federal governments should incorporate both branches of a political family. Hence, a federal government created over at least two political families relates to a coalition of at least 4 parties.

17 As mentioned in footnote 11, the level of fragmentation with respect to the number of politicians depends on the number of candidates the voter’s preferred party proposes. This number can be at most equal to the number of seats to be filled in the elections at hand.
a) Flanders

Table 1.1 shows that Flemish councils and Colleges exhibit a considerable degree of fragmentation. Let us first look at the upper part of table 1.1. This represents the number of municipalities where the College consists of 1, 2, 3 or more than 3 parties following the municipal elections of 1982 up to 2000. The average number of parties for each legislative term is also indicated. Looking first at the situation in the current legislative term (2000-2006), 96 – or almost 1 in 3 – municipalities have a one-party majority. In other words, in these municipalities one party can deliver both the Mayor as well as all Aldermen. Little over half of the municipalities (162 out of 308) are governed by a two-party coalition and the remaining 50 local governments (or 16%) are presided by “large coalitions” (containing three or more parties). On average, there are 1.87 parties represented in the Flemish Colleges following the 2000 elections.

From a historical perspective, the average number of parties in Flemish Colleges has witnessed a (modest) rise from 1.78 to 1.87 parties between the elections of 1982 and 2000. However, there is no uniform upward trend over the entire period. The elections of 1988 lead to a decline in the average number of parties in Flemish Colleges, but the following two elections (1994 and 2000) more than made up for this decline. The increase in the average number of parties over the period 1982-2000 is mainly due to the sharp increase in the number of two-party coalitions (+23% over the said period). This contrasts with a strong decrease in the number of municipalities where one party governs on its own (-24% between 1982 and 2000). A closer look at the data shows that only the number of two-party coalitions has been continuously growing from 43% of the Flemish Colleges in 1982 to over 52% in 2000. The other categories present no uniform trend. The number of one-party governments increases in 1988, but steeply declines in 1994 and 2000. The category of “large” coalitions first shrinks in 1988 (from 50 to 32 municipalities) but shows a gradual rise back to the 1982 level during the 1994 and 2000 elections.

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18 The number of parties in the College (or council) can only vary when the composition of the government (or parliament) changes. Unlike at the federal level, this will – under normal circumstances – only happen after new municipal elections or once every six years.

19 Note that a party that obtains a majority of the seats in the council might still form a coalition. Such a strategy may be chosen when the majority position is too tight (e.g. only one seat above simple majority). This explains why the number of one-party Colleges in table 1.1 is different from the number of “absolute majorities” presented in Ackaert (1996).
Table 1.1: Size of College and council in Flanders (Number of municipalities; N=308)

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<td>1 party</td>
<td>126</td>
<td>140</td>
<td>120</td>
<td>96</td>
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<td></td>
<td>40.9%</td>
<td>45.5%</td>
<td>39.9%</td>
<td>31.2%</td>
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<tr>
<td>2 parties</td>
<td>132</td>
<td>136</td>
<td>149</td>
<td>162</td>
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<td></td>
<td>42.9%</td>
<td>44.8%</td>
<td>48.4%</td>
<td>52.6%</td>
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<tr>
<td>3 parties</td>
<td>43</td>
<td>27</td>
<td>31</td>
<td>43</td>
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<td>14.0%</td>
<td>8.8%</td>
<td>10.1%</td>
<td>14.0%</td>
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<td>&gt; 3 parties</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>2.3%</td>
<td>1.6%</td>
<td>2.6%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Average number of parties</td>
<td>1.78</td>
<td>1.67</td>
<td>1.77</td>
<td>1.87</td>
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</table>

<table>
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</thead>
<tbody>
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<td>1 party</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.7%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2 parties</td>
<td>31</td>
<td>39</td>
<td>24</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>10.1%</td>
<td>12.7%</td>
<td>7.8%</td>
<td>12.0%</td>
</tr>
<tr>
<td>3 parties</td>
<td>75</td>
<td>74</td>
<td>60</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>24.4%</td>
<td>24.0%</td>
<td>19.5%</td>
<td>17.5%</td>
</tr>
<tr>
<td>4 parties</td>
<td>122</td>
<td>100</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>39.6%</td>
<td>32.5%</td>
<td>25.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>5 parties</td>
<td>61</td>
<td>65</td>
<td>74</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>19.8%</td>
<td>21.1%</td>
<td>24.0%</td>
<td>24.7%</td>
</tr>
<tr>
<td>6 parties</td>
<td>15</td>
<td>27</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>4.9%</td>
<td>8.8%</td>
<td>15.3%</td>
<td>17.2%</td>
</tr>
<tr>
<td>&gt; 6 parties</td>
<td>2</td>
<td>2</td>
<td>26</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>0.7%</td>
<td>0.7%</td>
<td>8.4%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Average number of parties</td>
<td>3.85</td>
<td>3.90</td>
<td>4.39</td>
<td>4.28</td>
</tr>
</tbody>
</table>

Source: Own calculations

The bottom part of table 1.1 presents similar data for the councils. Again starting from the present situation (2000-2006), we see that 30% of the municipalities have 2 or 3 parties represented in the council, 50% have councillors from 4 to 5 parties and the remaining 20% have elected officials from 6 or more different parties. The average number of parties stood at 4.28 in 2000. This figure has considerably increased between the elections of 1982 and 2000 (from 3.85 to 4.28 parties) and recorded a peak in 1994 (at 4.39 parties on average). This rise can be related to the non-stop fall in the number of municipalities where 3 or 4 parties are elected into the council while those with 5 or 6 parties show an uninterrupted growth. The peak in 1994 and decline in 2000 can be related to the boom-bust sequence in the number of municipalities with more than 6 parties in the council. The number of municipalities in this category surged during the 1994 elections (from 2 to 26 municipalities) and crumpled in the elections of 2000 (to 11 municipalities).
b) Wallonia

The data on the composition of the Walloon Colleges for the years prior to 2000 are not available to us at the time of writing. Hence, the upper part of table 1.2 will only allow us to observe the level of political fragmentation after the most recent municipal elections and does not permit any examination of patterns over time. Looking at these data, we find that almost half of the Walloon municipalities are governed by one single party and another 45% have a coalition of two parties. “Large” coalitions are close to non-existent: less than 6% of the Walloon municipalities can be placed in this category. The average number of parties gaining representation in the Walloon local governments stood at 1.57 after the 2000 municipal elections.

Table 1.2: Size of College and council in Wallonia (Number of municipalities; N=262)

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
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<tr>
<td>1 party</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>48.9%</td>
</tr>
<tr>
<td>2 parties</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>45.4%</td>
</tr>
<tr>
<td>3 parties</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.3%</td>
</tr>
<tr>
<td>&gt; 3 parties</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.4%</td>
</tr>
<tr>
<td>Average number of parties</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.57</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 party</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>2 parties</td>
<td>75</td>
<td>88</td>
<td>70</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>28.6%</td>
<td>33.6%</td>
<td>26.7%</td>
<td>15.7%</td>
</tr>
<tr>
<td>3 parties</td>
<td>127</td>
<td>112</td>
<td>103</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>48.5%</td>
<td>42.8%</td>
<td>39.3%</td>
<td>30.9%</td>
</tr>
<tr>
<td>4 parties</td>
<td>47</td>
<td>52</td>
<td>63</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>17.9%</td>
<td>19.9%</td>
<td>24.1%</td>
<td>42.4%</td>
</tr>
<tr>
<td>5 parties</td>
<td>8</td>
<td>9</td>
<td>17</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>3.1%</td>
<td>3.4%</td>
<td>6.5%</td>
<td>9.9%</td>
</tr>
<tr>
<td>&gt; 5 parties</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1.9%</td>
<td>0.4%</td>
<td>3.1%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Average number of parties</td>
<td>3.02</td>
<td>2.94</td>
<td>3.19</td>
<td>3.48</td>
</tr>
</tbody>
</table>

Source: Own calculations
A comparison with the Flemish data from table 1.1 reveals that the share of one-party majorities is significantly larger in the French-speaking part of Belgium while coalitions of all sizes are (much) more frequent in the Dutch-speaking part of the country. The average number of parties in the College is approximately 20% lower in Wallonia than in Flanders (1.57 versus 1.87 parties). All in all, it is clear that the level of fragmentation of the Colleges in Wallonia is unambiguously lower than in their Flemish counterparts.

The bottom part of table 1.2 shows that after the 2000 elections, nearly 50% of the councils in Wallonia have less than 4 parties occupying seats while little over 10% of the councils hosts representatives of 5 or more parties. Comparing once more to the Flemish data presented in table 1.1, this implies that the number of parties gaining representation in the council in Wallonia is significantly lower than in Flanders. More precisely, the average council consists of 3.48 parties in Wallonia whereas in Flanders this average stands at 4.28 parties.

With respect to changes over time, the data for the Walloon councils show a similar pattern than the Flemish councils. Firstly, the level of fragmentation has undeniably increased. More precisely, the average number of parties in the council rose from 3.02 parties in 1982 to 3.48 parties by the elections of 2000. Secondly, there is a near continuous decline in the number of municipalities with a low number of parties in the council (i.e. 2 or 3 parties) and this decline is mirrored by an unbroken ascent in the number of larger councils (having representatives of 4 or 5 parties). Note, however, that the changes take place at a lower level of political fragmentation in the Walloon data compared to those of the Flemish municipalities.

c) **Brussels**

Finally, in table 1.3, we present data on the fragmentation level in the 19 municipalities of the Brussels Region. These data first of all indicate a much higher level of political fragmentation compared to the figures in tables 1.1 and 1.2. In fact, starting from the most recent observations (2000-2006), the upper half of table 1.3 illustrates that but 2 of the 19 Brussels municipalities are governed by a one-party majority. Coalition governments, and often “large” coalitions, are thus customary in the Brussels Region. The average number of parties in the Brussels Colleges consequently rises far above the averages observed in
the other two Regions and equals 2.63 parties. It is noteworthy that in line with the situation in Flanders, there is an (admittedly modest) development towards more fragmented Colleges over time. More precisely, the average number of parties in the College increases from 2.47 parties in 1982 to 2.63 in 2000.

### Table 1.3: Size of College and council in Brussels (Number of municipalities; N=19)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 party</td>
<td>3 15.8%</td>
<td>4 21.1%</td>
<td>3 15.8%</td>
<td>2 10.8%</td>
</tr>
<tr>
<td>2 parties</td>
<td>7 36.5%</td>
<td>7 36.5%</td>
<td>6 31.6%</td>
<td>7 36.5%</td>
</tr>
<tr>
<td>3 parties</td>
<td>6 31.6%</td>
<td>4 21.1%</td>
<td>4 21.1%</td>
<td>6 31.6%</td>
</tr>
<tr>
<td>&gt; 3 parties</td>
<td>3 15.8%</td>
<td>4 21.1%</td>
<td>6 31.6%</td>
<td>4 21.1%</td>
</tr>
</tbody>
</table>

Average number of parties: 2.47, 2.53, 2.79, 2.63

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 party</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 parties</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3 parties</td>
<td>0 1 5.3%</td>
<td>1 5.3%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 parties</td>
<td>0</td>
<td>1 5.3%</td>
<td>0 21.1%</td>
<td>6 31.6%</td>
</tr>
<tr>
<td>5 parties</td>
<td>4 21.1%</td>
<td>6 31.6%</td>
<td>4 21.1%</td>
<td>6 31.6%</td>
</tr>
<tr>
<td>6 parties</td>
<td>10 52.6%</td>
<td>4 21.1%</td>
<td>6 31.6%</td>
<td>5</td>
</tr>
<tr>
<td>&gt; 6 parties</td>
<td>5 26.3%</td>
<td>7 36.5%</td>
<td>9 47.4%</td>
<td>2 10.5%</td>
</tr>
</tbody>
</table>

Average number of parties: 6.32, 5.79, 6.47, 5.21

Source: Own calculations

Turning our attention to the bottom part of table 1.3, it is clear that the average number of parties finding representation in the council is considerably higher in the Brussels Region than in both other Regions. In point of fact, there is but one observation in Brussels over the entire period where less than 4 parties are represented in the council! However, in sharp contrast to the observations made on the previous two tables, the Brussels councils witness a sharply lower level of fragmentation in 2000 compared to 1982. Whereas the
average number of parties in the council was 6.32 in 1982, this has declined to little over 5 parties in 2000. Obviously, the limited number of observations in this Region leads to sharp fluctuations between the elections. Still, it is evident that – taken over the period 1982-2000 – the number of municipalities with 4-party councils is at its highest level after the most recent elections, while the number of very diverse councils (more than 6 parties) has plummeted to its minimal value.

The level of political fragmentation in the Brussels Region is considerably higher than in the other two Regions. One possible explanation for this finding is that, whereas Flanders and Wallonia are predominantly inhabited by Dutch- and French-speaking residents respectively, the Brussels’ populace is drawn from both major language groups. Indeed, language issues play strongly in the Brussels municipalities (Buelens and Deschouwer, 1997, 95). French- and Dutch-speaking interest groups compete vigorously in the Brussels’ political arena to secure their interests. Moreover, the high population size of Brussels municipalities (and the associated number of seats to be gained in the council) positively affects the number of parties competing in the election (cfr. Sartori, 1968; Lijphart, 1999; Farrell, 2001). This leads to a diffusion of the votes and creates a high level of political fragmentation in the College and council.

d) Explaining the trends in political fragmentation

The foregoing sections have shown that there is a tendency for municipal parliaments to become more fragmented, at least as far as the Flemish and Walloon municipalities are concerned. The municipal parliaments’ level of fragmentation in the Brussels Region is – if anything – declining, though it was (and still is) much more prevalent in that area. It was also illustrated that the level of fragmentation in the Flemish (and Brussels) Colleges is increasing, but that this tendency is much less pronounced than for the local parliaments.

One possible explanation for the upward trend in political fragmentation over the period 1982-2000 is the convergence of popular support for the parties competing in local elections, or, more precisely, the loss of support for the parties traditionally dominating local politics and the gain for smaller parties. Importantly, the fall in the vote share of the leading parties is reinforced by the electoral system when transforming votes into seats.
The reason is that highest averages Imperiali is very beneficial to large parties (Ackaert, 1990; Buelens, 1993). When votes are lost, the reverse effect holds true and the deteriorating electoral performance is fortified when distributing the seats (Buelens, 1993, 57). The largest party loses votes “causing the other parties to gain a more than proportionate increase in seats” (Buelens, 1993, 56, own translation). This increases the level of political fragmentation in the council and College because either (a) more different parties are now able to obtain seats or (b) the existing “small” parties become bigger relative to the dominating party. The former case leads to an increase in the level of fragmentation when measured by the “actual” as well as the “effective” number of parties (different operationalizations of the latter measure are discussed in section 2.1). The latter case leads to an increase in the “effective”, though not the “actual”, number of parties.

Let us clarify this through an example. Suppose there are two parties obtaining 75% and 25% of the votes respectively. The “actual” number of parties obviously equals 2. The “effective” number of parties – using the index presented in Laakso and Taagepera (1979; see section 2.1) – is 1.60. First consider situation (a) in which a third party appears at the next election. Assume this party obtains 10% of the votes at the expense of the largest party. The new vote distribution then is 65%, 25% and 10% respectively. The “actual” number of parties increases to 3 and the “effective” number of parties to 2.02. Now consider situation (b) where instead of a third party arriving on the scene the smallest party captures 10% of the votes of the dominant party, leading to a 65%-35% vote distribution in the next election. The “actual” number of parties than remains fixed at 2 while the “effective” number of parties increases to 1.84.

In figure 1.3, we show the percentage of the vote obtained by “national” parties over the last 4 municipal elections in Flanders and Wallonia.20 The percentages are calculated as the number of votes obtained by party i in all municipalities of a Region divided by the

---

20 As mentioned in footnote 16, each political family (Catholics, Socialists, ...) split up into a Dutch- and a French-speaking party in 1973-74. Each branch restricts its activities to its own Region (Flanders or Wallonia) with the exception of the Brussels Region. “National” thus refers to the fact that a party is active in the entire Region, rather than the entire country. Note moreover that the vote share obtained by “national” party i does not take into account the votes obtained by local divisions of that party when these operate under a different name or when they join forces with other parties for the purpose of the election at hand (forming a “cartel”).
total number of votes cast in that Region. The left-hand side of figure 1.3 presents the results for the Flemish data and the right-hand side displays the Walloon data.

Figure 1.3: “National” parties in local elections (1982-2000)

![Graphs showing voting trends for Flanders and Wallonia](image)

It can be seen that, in both Regions, the traditionally largest parties (CD&V in Flanders and PS in Wallonia) have been witnessing a steadily declining vote share, especially as of 1988. Even though the French-speaking Socialists (PS) managed to strongly increase their vote share in the 1988 elections, they have now also fallen below their 1982 popularity-level. Looking at the data behind the graphs, CD&V and PS respectively obtained 34.18% and 30.96% of the municipal votes in 1982. This had turned to 26.29% and 29.28% respectively in 2000. What is more, the Catholic as well as the Socialist party – who held the first two positions in each Region in 1982 – have been gradually losing vote share in both areas during the period 1982-2000. The loss of these “traditional” dominating parties is translated into an electoral gain for the Liberal, Extreme Right and Green party. Hence, vote shares for the “national” parties appear to be converging over time. Note, finally, that the Flemish nationalist party (VolksUnie) was worth about 10% of the popular vote in 1982 but had fallen below 5% in 2000.

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21 Recently, a number of the “national” parties changed name. Especially in Flanders, this proved a very popular strategy during the last 10 years. Indeed, CVP, SP and Agalev became CD&V, SP.a and Groen! respectively. In Wallonia, PSC turned into CDH and PRL and FDF joined forces in the MR. We refer to the parties’ current names.
The converging levels of electoral support that are indicated in figure 1.3 emerge more clearly in table 1.4. Here we present the average vote share of the “national” parties and the standard deviation between their vote shares. The final row of table 1.4 divides the standard deviation by the mean, leading to the “coefficient of variation”. This index describes how the vote shares are distributed around the mean. The coefficient of variation allows us to compare the vote distribution over time and regions. It shows that for both Regions there is a significant decrease in the distribution of vote shares about the mean value. Hence, the “national” parties are obtaining increasingly similar vote shares in local elections.

### Table 1.4: Converging popularity of “national” parties (1982-2000)

<table>
<thead>
<tr>
<th>Vote Shares</th>
<th>Flanders</th>
<th>Wallonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average (1)</td>
<td>12.65</td>
<td>13.72</td>
</tr>
<tr>
<td>Standard deviation (2)</td>
<td>12.44</td>
<td>11.72</td>
</tr>
<tr>
<td>(2) / (1)</td>
<td>0.98</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Source: own calculations

### 3. Conclusion

This introductory chapter had two specific purposes. The first was to acquaint the unfamiliar reader with the institutional aspects of the Belgian electoral system. Hence, we reviewed the various rules and procedures that guide the formal organisation of elections in Belgium. As the empirical analyses further in this work focus on the sub-federal political level, most attention was given to the procedures applied in municipal (and regional) elections, especially if and where these differ from those applied in federal elections. Important to remember for later chapters is that voting is compulsory. However, we also illustrated that this is to a large extent a theoretical trait as in practice hardly any non-voter is prosecuted (though most of those that are prosecuted are also fined). Also important is the introduction of electronic voting since 1991. This often necessitates a different placement of candidates over the ballot sheet (while preserving
their order!), which could affect the behaviour of the voter inside the poll booth. These two issues will be of crucial importance in the analyses of Chapters 2 and 3 respectively.

The second purpose of this chapter was to present the definition and data concerning the central explanatory variable to be used in the remaining chapters of this work: political fragmentation. “Fragmentation” was defined as the number of parties (or politicians) that compete in local elections or are present in the (local) legislative bodies and the size inequalities between these. It was shown that the lower levels of government in Belgium witness a highly fragmented political landscape. This was most obvious in the 19 municipalities of the Brussels Region though it also held for Flanders and – to a lesser extent – Wallonia. The effects of this fragmented political landscape on political decision-making will be analysed in the next four chapters.
PART II

On Voter Behaviour
CHAPTER 2: Voter Turnout

Introduction

Voters need to make two major decisions at election time. The first is to actually go to the polling station (the “turnout decision”). The second decision concerns the party or candidate to vote for once inside the poll booth. This chapter regards the former decision, while the latter is the subject of the next chapter. At first it would appear somewhat peculiar to study the turnout decision in a country where voting is compulsory, as is the case in Belgium. However, as referred to in Chapter 1, prosecution of non-voters is rare. Only a very small minority of those who do not present themselves at the polls are prosecuted and fined. Moreover, the turnout figures exhibit sufficient variation over the 308 Flemish municipalities to allow for meaningful statistical analysis.

We analyse turnout in the 2000 municipal elections in Flanders to measure the effect of political fragmentation on the electorate’s decision to turn out to cast a vote. Specifically, the key question is whether political fragmentation stimulates or dampens participation in elections. Both hypotheses have some theoretical backing. On the one hand, turnout may well increase due to the higher choice presented to the voter. Such variety of options can be expected to increase the possibility of finding a party one likes. On the other hand, a more fragmented political landscape necessitates the voter to obtain information about more different parties, politicians and policy platforms. These increased information costs may keep the voter away from the polls. Hence, the direction of the effect of fragmentation on turnout is theoretically uncertain and as such comprises the first empirical issue to be solved in this chapter.

The second issue concerns the specific measure to use in estimating the effect of fragmentation. Indeed, when defining political fragmentation in Chapter 1, we argued that it has two separate constituent parts: the number of parties and their size inequalities. Both these dimensions may independently affect the turnout decision. Hence, the logical question is whether a measure for the “actual” number of parties is sufficient or whether we need to take size inequalities between the parties into account as well. Nevertheless, in empirical work it has been common practice to either disregard one of the dimensions (looking only at the number of parties) or to treat both dimensions simultaneously in one
index. The former will lead to misspecification of the model if both dimensions matter and, consequently, to biased estimation results. The latter approach does not allow an assessment of the specific effects of both dimensions on voter turnout. In contrast to previous scholars that have included size inequalities, we not only test for the relevance of this inclusion but also empirically disentangle the size inequalities effect from the number-of-parties effect.

The chapter is structured as follows. In section 1 we provide the general theoretical framework for the analysis of electoral turnout. Section 2 surveys the literature on the relation between turnout and political fragmentation. The empirical analysis is discussed in section 3. The main findings indicate that the effects of both constituent elements of fragmentation – the number of parties and the size-inequalities – run in opposite direction. Turnout falls with the number of parties but rises the more unequal in size the political parties are. The latter effect, however, fails to reach statistical significance. Finally, section 4 presents a summary of the main conclusions.

1. **General framework: voting in a multi-party context**

Almost 50 years ago, Downs (1957) laid out the groundwork for the expected utility model of voter turnout. This model argues that the individual voter is an *homo oeconomicus*, a rational man or woman who assesses the relative size of the costs and benefits of his/her possible actions. In deciding whether to vote or abstain, each voter calculates the expected utility from each possibility action and votes only if the benefits of doing so outweigh the costs. Downs’ (1957) model is – like later extensions to this model – exclusively aimed at two candidate plurality elections. Hence, it does not take into account the effects from coalition formations that frequently arise in non-plurality multi-candidate elections. Extending the model to include such elections, it can be shown that a given individual will vote only if the net benefits of voting are strictly positive, i.e. if:

\[
R = \left[ \sum_{i=1}^{N-1} (p_i^V - p_i^A)(U_i - U_N) \right] - C + D > 0
\]  

22 Moreover, including both dimensions when only one is relevant reduces the efficiency of the model.
The net benefit from voting ($R$) equals the sum of N-1 “instrumental” benefit terms, minus the costs of voting, plus the “expressive” or “consumption” benefits of voting (see also McKelvey and Ordeshook, 1972). Let us now take a closer look at each of these three elements.

- The “instrumental” benefits for each individual voter depend on the future public policy that (s)he expects. This policy is assumed to depend solely on the party or coalition that wins the election. “Winning the election” here means that the party or coalition comes into power.\textsuperscript{23} As can be clearly seen in expression (1), the instrumental benefit term is the product of two components. The first factor gives the probability that one’s vote is decisive, meaning that it leads party/coalition i to victory. This probability of being decisive is given by the difference between the probability that party/coalition i wins if one votes ($p_{i}^v$) and the same probability when one abstains ($p_{i}^a$). Implicit in this modelling is that voters may have an (indirect) influence on the coalition formation process. This will be the case if the votes (seats) obtained by a party determine its power in the coalition negotiations.\textsuperscript{24} The second factor in the instrumental benefit term in expression (1), ($U_i - U_N$), gives the difference between the utility gained from party/coalition i and the party/coalition which is used

\textsuperscript{23} Depending on the electoral context, “winning” may mean that the party obtains most votes or that it is successful in the coalition formation process. Formally, the formation of a political majority (government) may be seen as a two-stage process. First seats are allocated by voters and afterwards – in the second stage – a political majority forms as the outcome of coalition negotiations. The second stage of this process (may) be “empty” only if voters in the first stage provide a single party with a fraction of the votes sufficiently large to secure a parliamentary majority. Given the disproportionality of most electoral systems, this need not be a majority of the votes.

\textsuperscript{24} However, the need to form a coalition to obtain a political majority likely weakens the voter’s influence on the eventual outcome. The reason is that given distributions of seats (power) among parties may allow multiple possible coalitions. As such, the second stage in the process of forming a political
as a reference point in the analysis, viz. party/coalition N. The larger this difference, the higher are the potential gains from casting a vote to the voter. Hence, the “instrumental” benefit for the voter in a multi-candidate context “therefore is a series of terms in which each term represents a paired comparison” between party/coalition N and any other party/coalition (McKelvey and Ordeshook, 1972, 52).

- The costs of voting (C) comprise two different elements. Firstly, there are the costs one incurs by getting informed about the candidates and parties in the election. These are borne before Election Day and are relatively minor in size. Indeed, it is often argued that a lot of information is accessed without real effort by the potential voter through news broadcasts and/or overhearing discussions in public areas (Downs, 1957; Aldrich, 1993, 262). Secondly, the voter suffers opportunity costs during the act of voting. The argument here is that while an individual is in (or even on the way to or from) the polling station, (s)he cannot perform another activity. Still, since the act of voting usually does not take that long to complete, this also is only a minor cost to the voter.

- Downs’ (1957) original model was restricted to the “instrumental” benefits of voting. This restriction led to the “paradox of voting”. One single vote has practically no influence on the election outcome (whenever the electorate reaches a certain size) such that the “instrumental” benefits are close to zero. Given the existence of positive – though admittedly small – costs attached to this action, no individual would rationally vote for instrumental reasons. Still, in reality, significant turnout rates are observed even when voting is not compulsory (Geys, 2002a, 24). To overcome this paradox, several solutions have been proposed (for a review, see Dhillon and Peralta, 2002; Mueller, 2003, Ch. 14). The most common approach is to include “expressive” or “consumption” benefits of voting to the model (e.g. Riker and Ordeshook, 1968). These expressive benefits (D) entail the satisfaction from compliance with the ethics of voting (“civic duty”), from affirming allegiance to the political system or a political majority may be a black box to the voter, introducing uncertainty and lowering his influence on the outcome.\footnote{Stigler (1972, 102-104) and Filer (1977, 14-15), however, argue that the probability of casting a vote that determines the “winner” in the election is not the only relevant one. Voters may also turn out to increase the vote percentage for their party as higher support turns a political party more influential (even as opposition party). Still, they agree that the effect of any single vote(r) remains marginal in most situations such that “this restatement does not in turn magically dispose of the paradox” (Stigler, 1972, 104).}

42
party, from deciding who to vote for and going to the polls (“entertainment value”) and from the affirmation of one’s efficacy in the political system (Riker and Ordeshook, 1968, 28).

Two further remarks are necessary. Firstly, it is clear from the formulation of Downs’ (1957) model that a given individual will only turn out to vote if the benefits outweigh the costs. In the notation of equation (1) this holds when $R$ is strictly positive. Secondly, it should be noted that expression (1) applies to all potential voters, irrespective of their favourite party. This can be seen most clearly if we regard the simpler case where two parties compete under plurality rule. Then, $N=2$ and the possible “winners” are parties 1 and 2. Using party 2 as the point of reference in the analysis, the above expression reduces to:

$$R = (p_1^v - p_1^d)(U_1 - U_2) - C + D > 0$$

Rewriting $(p_1^v - p_1^d)$ as $p$ and $(U_1 - U_2)$ as $B$, we get:

$$R = pB - C + D > 0$$

This is the common formulation of the Calculus-of-Voting model by Riker and Ordeshook (1968) where $p$ is the probability that a voter is decisive in bringing about his favourite party’s victory. For a voter favouring party 1 (2), the $p$-term as well as the $B$-term in the above expression will be positive (negative) (for a generalization of this argument, see appendix C).

2. Literature Review

2.1 Theory

When we defined the concept of fragmentation, we argued that there are two relevant dimensions to take into account: the number of parties and the size inequalities between them (see Chapter 1, section 2.1). Both these elements may have a (separate) effect on
electoral turnout. In this section, we present theoretical arguments about the likely influence of the number of parties as well as their size inequalities.

a) The number of parties

There is no consensus in the vast literature on voter turnout whether – from a theoretical point of view – the number of parties in the election can be expected to increase or decrease turnout. Each point of view is supported by several arguments.

A **positive** effect can be expected on the basis of two arguments. **Firstly**, a larger number of parties enriches the choice offered to the electorate. This is likely to lower possible alienation feelings within the electorate by increasing the probability that voters can identify with some party (Seidle and Miller, 1976; Blais and Carty, 1990, 173 and Hansen, 1994, 19). This closer identification can be expected to enlarge the benefits of voting to the individual. **Secondly**, Dittrich and Johansen (1983) argue that the existence of more parties increases the competitiveness of the party system and thus the potential “instrumental” benefits from selecting “good policy”. However, this argument may be flawed as one could expect that in a more competitive system the quality of any proposed policy will be higher. Indeed, there is no reason to believe that this general increase in the quality of policies proposed also increases the expected “instrumental” benefit of the voter. And, following Downs (1957), turnout depends on the difference in utilities between policy platforms, not the level of the preferred platform. A positive effect on turnout may, however, still be expected if “higher quality politics in general” allows the voter to identify himself more easily with the respective political platforms (creating “expressive” benefits to casting a ballot).

A **negative** effect can be expected as an increase in the number of parties is likely to enlarge the need for coalition formation under given electoral rules (Jackman, 1987, 408; Blais and Carty, 1990 and De Winter et al., 1991, 44-48). As mentioned in section 1, this decreases the influence of the electorate in the choice of who governs it, and thus is likely to decrease its willingness to vote. Blais and Dobrzynska (1998, 249) contend also that more parties might increase the complexity of the political system. This increased complexity not only makes it harder for the voter to make up his mind, but also increases
his (information) costs in general. Facing higher costs reduces the voter’s likelihood of heading to the polls (Hoffman-Martinot, 1994).

b) Size inequalities between the parties

Size inequalities between the parties are an important element of political fragmentation and constitute a potentially relevant influence on voter turnout. In fact, when discussing the empirical literature later on, it will become clear that many authors analysing the effect of size fragmentation on turnout implicitly take this influence into account. They do this via the use of concentration indices borrowed from industrial economics. Such indices, for instance the Herfindahl-Hirschmann index, regard the effect of the number of participants as well as their relative sizes (see Chapter 1). Unfortunately, hitherto there is little formal theoretical argument given as to why size inequalities influence the level of voter turnout. We bring two reasons to the reader’s attention: the expected closeness of the election and the incidence of dominant parties.

First of all, size inequalities may be an important measure for the expected closeness of the election. This closeness positively affects the probability for a single voter to be decisive and thus affects turnout. Actually, in two-party contests the expected equality – formally: the difference in expected vote shares between both candidates (or parties) – is the standard way to measure closeness (e.g. Barzel and Silberberg, 1973; Lutz, 1991; Filer et al., 1993 and Hogan, 1999). The general intuition there is clear. A marginal voter is more likely to be decisive if both parties have an expected vote share of 50% than if the expectations are such that one party has, say, an 85% expected vote share. However, a generalisation of this argument to situations where more than two parties compete under plurality rule or to alternative electoral rules is not straightforward.

Secondly, size inequalities between parties may be of relevance irrespective of the fact that they proxy closeness. Where the coalition formation process is not exogenous, the second stage of government formation is a “black box” to the voters. In such case, size inequalities may reflect power inequalities in the coalition negotiations and, importantly, in the government (cfr. Stigler, 1972). Large size inequalities could refer to the presence of powerful political parties that dominate politics. Obviously, this “domination” could refer to either of two separate elements. Firstly, parties may become so big that they are
expected to have a majority of the votes. In that case, the individual voter will play no role and might as well stay home. Hence, domination in this sense will lead to lower turnout. Secondly, dominance may refer to playing a dominant role in coalition negotiations. The presence of a large party in such negotiations reduces the number of possible coalitions that can be formed (given the formation of majority coalitions). In fact, the number of majority coalitions that can be formed is at a maximum when the votes/seats are distributed perfectly equal and at a minimum when one party holds all the votes/seats. Increasing the level of inequality in the votes/seats distribution between these two extremes always leads to a non-increasing number of coalition possibilities. Hence, the formation process becomes “easier” (i.e. more transparent and predictable) when there is a large party and dominance can then be expected to increase turnout. In other words, the size inequalities may make the second stage in the process of forming a political majority less of a black box.

2.2 Empirical literature

The vast majority of the empirical work on voter turnout can be categorized in one of two types: individual-level and aggregate-level analyses. Whereas the former take the individual voter as the focus of the analysis, the latter regard turnout rates in municipalities, states or countries as the central element of analysis. However, the effect of fragmentation on turnout has been most often studied using aggregate data. The discussion of the empirical results of these analyses – with respect to fragmentation – is summarised in table 2.1. The table is structured as follows. Of each study (mentioned in column 1), we first give the exact definition of the fragmentation variable(s) used and the sample studied in columns 2 and 3 respectively. Column 4 presents whether or not fragmentation has a turnout-increasing effect and the last column testifies of the statistical significance of the fragmentation effect. Each “Yes” indicates statistical significance at least at the 95 percent confidence level.

The studies in table 2.1 have been subdivided into three groups.

- Firstly, there are ten studies that use a fragmentation measure that only taps into the first dimension of fragmentation, the number of parties in the election. Seidle and Miller (1976) and Settle and Abrams (1976) do so by introducing a dummy variable. They come to opposite conclusions. Seidle and Miller (1976) find that the competition
of three candidates for one seat significantly *increases* turnout compared to a two-
candidate contest in a cross-section of 144 UK counties (1964 and 1966). Analysing a
time-series of 26 US presidential elections Settle and Abrams (1976) find that a third
candidate significantly *reduces* turnout.

Six other studies in this category introduce the actual number of parties that contest the
election as their measure of fragmentation (Crepaz, 1990; De Winter *et al.*, 1991;
Kaempfer and Lowenberg, 1993; Hoffman-Martinot, 1994; Hansen, 1994 and
Hoffman-Martinot *et al.*, 1996).26 Once again, the conclusions contradict each other.
Both studies on municipal elections in France find that a larger number of parties
significantly reduces turnout (Hoffman-Martinot, 1994 and Hoffman-Martinot *et al*.,
1996) while the opposite is true for municipal elections in Norway (Hansen, 1994). A
possible explanation lies in the difference in the electoral rules that are used in both
countries. France elects its municipal councillors via a two-ballot majority system,
while Norway has a system of proportional representation. Whereas votes for smaller
parties may easily be considered “wasted votes” in the French system, this is not so in
the Norwegian system. Individuals who want to vote for small parties thus have less
reason to turn out in France than in Norway.27 The same contradictive signs are found
in cross-country studies. A positive effect is found in the analysis of 19 countries of
Crepaz (1990), while Kaempfer and Lowenberg (1993) find a negative effect in their
analysis of 59 countries. De Winter *et al.* (1991) show the effect of the number of
parties to be non-linear when they regard all Belgian municipalities in the 1988
municipal elections. Turnout marginally increases with the number of parties until
four parties and sharply decreases afterwards. However, this result seems to be mainly
driven by the Flemish municipalities.

Finally, the last two studies in this category (Franklin and Hirczy, 1998 and Franklin,
1999) employ the number of years of “divided” government in the US as their measure
of political fragmentation. Both papers find that turnout levels decrease significantly
with the number of years of divided government.

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26 Crepaz (1990) uses the number of parties in the legislation and Kaempfer and Lowenberg (1993) use the
number of “major” political parties in the election.

27 The reason why potential supporters of smaller parties may feel they waste their vote in non-proportional
systems (a “psychological effect”) is that small parties face a much higher hurdle to obtain representation
in such systems (a “mechanical effect”) (see Duverger, 1954/1972). Indeed, the “effective threshold of
representation” – which is “the minimum percentage of the vote that can earn a party a seat under the
most favourable circumstances” – is generally much higher in non-proportional systems (Lijphart, 1994,
Ch. 2). This higher threshold is likely to discourage voters of the smaller parties in the election.
Table 2.1: Voter turnout studies incorporating political fragmentation

<table>
<thead>
<tr>
<th>Study</th>
<th>Measure</th>
<th>Sample</th>
<th>Effect</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One dimension</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seidle and Miller (1976)</td>
<td>Dummy equal to 1 in 2-candidate contest and 0 in 3-candidate contest</td>
<td>U.K. county seats in general elections</td>
<td>Increase</td>
<td>Yes</td>
</tr>
<tr>
<td>Settle and Abrams (1976)</td>
<td>Dummy equal to 0 in 2-candidate contest and 1 in 3-candidate contest</td>
<td>U.S. presidential</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Cepaz (1990)</td>
<td>NoP in legislature</td>
<td>16 countries</td>
<td>Increase</td>
<td>No</td>
</tr>
<tr>
<td>De Winter et al. (1991)</td>
<td>Number of party lists in election</td>
<td>Belgian municipalities</td>
<td>Non-linear</td>
<td>Yes</td>
</tr>
<tr>
<td>Kaempfer and Lowenberg (1993)</td>
<td>Number of “major” parties in election</td>
<td>59 countries</td>
<td>Decrease</td>
<td>No</td>
</tr>
<tr>
<td>Hoffman-Martinot (1994)</td>
<td>NoP in election</td>
<td>French municipalities</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Hansen (1994)</td>
<td>NoP in election</td>
<td>Norwegian municipalities</td>
<td>Increase</td>
<td>Yes</td>
</tr>
<tr>
<td>Hoffman-Martinot et al. (1996)</td>
<td>NoP in election</td>
<td>French municipalities</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Franklin and Hirczy (1998)</td>
<td>Number of years of “divided” government</td>
<td>39 presidential elections (US)</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Franklin (1999)</td>
<td>Number of years of “divided” government</td>
<td>39 presidential elections (US)</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Both dimensions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jackman (1987)</td>
<td>ENP in legislature</td>
<td>19 countries</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Kirchgässner and Schimmelpfennig (1992)</td>
<td>Entropy measure</td>
<td>German and UK General Elections</td>
<td>Increase</td>
<td>Yes</td>
</tr>
<tr>
<td>Jackman and Miller (1995)</td>
<td>ENP in legislature Molinar-index</td>
<td>22 democratic countries</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Kirchgässner and Zu Himmern (1997)</td>
<td>Entropy measure</td>
<td>German Bundestag</td>
<td>Increase</td>
<td>Yes</td>
</tr>
<tr>
<td>Pérez-Linán (2001)</td>
<td>ENP in legislature</td>
<td>17 countries</td>
<td>Increase</td>
<td>No</td>
</tr>
<tr>
<td><strong>Several indices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blais and Carty (1990)</td>
<td>ENP in legislature</td>
<td>ENP in election</td>
<td>NoP in election</td>
<td>NoP in legislature</td>
</tr>
<tr>
<td>Blais and Dobrzynska (1998)</td>
<td>NoP in election</td>
<td>91 democratic countries</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
<tr>
<td>Blais (2000)</td>
<td>NoP in election</td>
<td>91 democratic countries</td>
<td>Decrease</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Notes:  
* NoP stand for the actual number of parties, ENP stands for the “effective” number of parties.  
** The number of lists has a slight positive effect up to 4 lists and affects turnout negatively afterwards.  
* The variable is significant at the 10%-level.  
* All mentioned measures were tried, but only one was reported in the final regression equation.  No indication of the results using the other definitions is given.
A second group of five studies employs a fragmentation variable that considers both
the number of parties and the size inequalities between them. All five studies look at
the number of legislative parties as a proxy for the choice offered to the voter.
Jackman (1987) and Pérez-Linán (2001) consider the “effective” number of parties
(ENP, see Chapter 1). Jackman (1987) finds that turnout significantly decreases with
the number of effective parties in the legislature of 19 industrial democracies. Pérez-
Linán (2001) estimates the same model using data on 17 Latin American countries.
She finds an (insignificant) positive effect of fragmentation.
Jackman and Miller (1995) use the inverse of the ENP-index as well as a related index
presented by Molinar (1991) (see Chapter 1). Both operationalizations provide a
significant negative coefficient, indicating turnout to decline with the (“effective”) number of parties.
Kirchgässner and Schimmelpfennig (1992) and Kirchgässner and Zu Himmern (1997)
analyse turnout in elections for the German Bundestag where a hybrid electoral system
is used, combining elements of both plurality and PR. They focus on the effect of
(expected) closeness. The latter is measured by the expected difference in votes
between the two major candidates. As an alternative, and to capture effects from three
or four party contests, they use an “entropy” measure \( E = -\sum_{i=1}^{n} p_i \ln(p_i) \). This
measure, in general, leads to more significant results. To our opinion, and as discussed
above, this can be interpreted as evidence for the existence of a number-of-parties
effect over and above the closeness effect that the authors concentrate on (and which,
in our terminology is a size-inequalities effect). Indeed, entropy, like the ENP or any
other concentration index depends on both the size-inequalities between parties and
the number of parties.\(^{28}\)

Finally, three studies explore both types of fragmentation variables; using the “actual”
as well as the “effective” number of parties (Blais and Carty, 1990; Blais and
Dobrzynska, 1998 and Blais, 2000). We must note, however, that the final regression
equation in each study includes only the fragmentation variable that gave the best
results (see table 2.1). All three studies analyse data on more than 300 elections and
find that turnout is significantly depressed at higher levels of political fragmentation.

\(^{28}\) We find it hard, however, to grasp the intuition of a closeness definition that considers a three-party-
contest with expected votes (0.48; 0.48; 0.04) much closer than a two-party contest with (0.50; 0.50)
expected votes (as indeed the entropy measure takes the value 0.83 and 0.69 respectively).
Interestingly, Blais and Dobrzynska (1998) and Blais (2000) find that the number of parties best explains the observed variation in turnout, whereas Blais and Carty (1990) report a preferred regression result with the effective number of parties as the indicator of political fragmentation (thus referring to a separate effect from size inequalities).

3. **Empirical analysis**

As we have seen in the presentation of the fragmentation data in Chapter 1 (section 2.2), Flanders (and Belgium) displays a highly fragmented political landscape in most jurisdictions. In the present chapter, we analyse how this fragmentation affects electoral turnout. Our analysis explains voter turnout rates in the most recent municipal election (October 2000) for 307 of the 308 Flemish municipalities.29 Though turnout is theoretically compulsory, prosecution of non-voters in practice is close to non-existent (see Chapter 1, section 1.3). There is also significant inter-municipal variation in the percentage of non-voters, and as such also in turnout rates. This variation justifies – and necessitates – a thorough analysis of turnout in Flemish municipalities. Nonetheless, given the compulsory character of voting, it is important to take this issue into account in our estimations. Indeed, lack of data on prosecution of non-voters for elections prior to 2000 is the main reason why we concentrate on one sole election (see Chapter 1, section 1.3).

As an introduction to the empirical work, we provide some summary statistics and background information on voter turnout in the Flemish municipalities in section 3.1. Section 3.2 presents the empirical model and section 3.3 discusses the main results.

3.1 *Turnout rates in the Flemish municipalities*

The dependent variable for our empirical work is the level of turnout in the municipality, defined as the number of votes cast (valid as well as invalid) divided by the number of registered voters. The variation in turnout rates among the 307 Flemish municipalities in this study is depicted in figure 2.1. Turnout rates are given on the X-axis, while the number of municipalities with a given level of turnout is read from the Y-axis. It can be
seen that turnout is generally very high. In fact, the average turnout rate during the 2000 elections for the 307 municipalities considered in the analysis was 94.11%. Still, it is clear that there is a reasonable amount of variation between the turnout rates of the Flemish municipalities – even though voting is (theoretically) compulsory. More precisely, turnout rates varied between 98.46% in Mesen and 87.95% in Drogenbos and displayed a standard deviation of 2.00%.

![Figure 2.1: Distribution of municipal turnout rates for 307 Flemish municipalities](image)

3.2 Empirical model

From our review of the turnout literature in section 2, it is clear that a vast majority of the studies to date have either used the “actual” number of parties or the inverse of the Herfindahl-Hirschmann concentration measure (i.e. the “effective” number of parties, see Chapter 1) to measure political fragmentation. However, when regarding the actual number of parties, one implicitly assumes that the size inequalities between the parties do not matter. To the extent that size inequalities do matter, this leads to misspecification and biased estimation results. If, on the other hand, one uses the “effective” number of parties, one imposes that both elements of fragmentation affect turnout. When this (implicit) assumption is not met by the data, this leads to a reduction in the efficiency of the model’s parameter estimates. More importantly, combining the number of parties and size

Herstappe was removed from the dataset.
inequalities in one index precludes the analysis of both elements’ separate effects on voter turnout.

Both these issues can be easily resolved. In the remainder of this empirical section, we first investigate whether a specification taking only the number of parties into account is superior to one using the “effective” number of parties (hence including size inequalities) or vice versa. This entails testing both specifications against one another using a Davidson and MacKinnon (1993) J-test and allows us to judge whether or not size inequalities affect the level of turnout in Flemish municipal elections. As a second step, we decompose the “effective” number of parties into two separate measures for the number of parties and size inequalities respectively (cfr. Davies, 1980). This allows us to analyse the size, significance and direction of the effects of both elements separately.

To gauge the effect of the number of parties and their size inequalities on voter turnout, we relate electoral turnout to indicators of political fragmentation while controlling for other “typical” determinants of voting behaviour. These controls where derived from a thorough reading of the relevant literature (Geys, 2002b). More precisely, building on this previous literature, we estimate the following model using data on the municipal elections of 2000 for 307 Flemish municipalities:

$$T_i = \gamma + \beta_1 X_i + \beta_2 \text{FRAG}_i + \epsilon_i$$

where $i$ (= 1 to 307) is an index for municipality $i$ and where $T_i$ is a logistic transformation of turnout ($T_i = \ln \left(\frac{\text{Turnout}_i}{1-\text{Turnout}_i}\right)$). Such a transformation is necessary as the range of turnout is limited to the 0 to 100 percent interval. If we would simply use a linear estimation method, the estimated turnout numbers are not constrained to lie within this interval. After transformation, the dependent variable ranges from negative infinity to positive infinity, eliminating predictions outside the allowable range (Thomas, 1997).

30 The Davidson and MacKinnon (1993) J-test is preferred over a non-nested F-test as the former is more parsimonious.
The effect of fragmentation is measured via two approaches: the number of parties (NoP) and the “effective” number of parties in the election (ENP). Finally, the \( X_i \)-vector is composed of the following eight control variables: number of registered voters (REG); population density (per m²; DENS); (out- and inward) migration as % of population (MIGR); population over 65 as % of population (AGE); unemployed as % of population (UNEM); per capita taxable income (in 1000 Euro; Y); income inequality (ratio of interquartile difference in income to the median value; INCDIV) and, finally, a dummy that equals 1 for municipalities in those judicial areas where non-voters are prosecuted (0 for all other municipalities; PROSEC). As mentioned in Chapter 1 (section 1.3), there are only two judicial areas that prosecuted non-voters after the 2000 municipal elections: Turnhout and Mechelen. They cover 40 of the 307 municipalities in our population.

### 3.3 Empirical results

At the outset of our empirical analysis, we first wish to infer whether there may be problems of multicollinearity in our dataset. The presence of this would be a violation of the standard assumptions of OLS estimation and would seriously inhibit analysis. In fact, linearly related variables may spuriously appear non-significant as their t-ratio’s will be biased towards zero (Thomas, 1997). Our test is simply to look at the bivariate coefficients between the various explanatory variables. Following Davis (1991), we employed a cut-off point of 0.80 to eliminate variables from the model. None of the variables needs to be rejected on the basis of severe multicollinearity.

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31 Although some of the lists that are presented to the voter are actually cartels of a number of parties or political groups, we refer to these lists as being a “party” because they present one common alternative to the voter.

32 Using data on prosecution of non-voters after the 2000 municipal election to explain turnout in that same election is obviously not ideal. It (implicitly) assumes that the policy towards prosecution of non-voters has not changed from previous elections such that the electorate can perfectly foresee whether or not prosecution will take place in its judicial area. This may be a rather strong assumption. However, as mentioned in Chapter 1 (section 1.3), we lack data on prosecution in earlier elections for a significant number of Flemish judicial areas. Importantly, however, the limited data that are available give some backing to the assumption made in that they show prosecution of non-voters in the same two judicial areas after the 1994 municipal elections.

33 Data on prosecution in the judicial area of Dendermonde are missing. We assume that this implies that no prosecution took place in the 32 municipalities in this area. Hence, these municipalities obtain the value 0 in our prosecution dummy. To see whether this affects our results, we re-estimate our model dropping these municipalities. No significant changes in the estimated coefficients occur (see Appendix D, columns (1) and (2)).
Initially, we concentrate on two important econometric issues of our estimation. We therefore present the results with respect to the central variable of our analysis (taken from the full multivariate estimation results) and those for the various diagnostic tests performed in table 2.2. We extensively discuss these findings before we turn to the full estimation results, which are presented in table 2.3. The first issue discussed in table 2.2 concerns the functional form of the specification. Columns (1) and (2) in table 2.2 present the results of a linear model for each of the fragmentation measures, that is, NoP and ENP. Columns (3) and (4) show the findings of a loglinear specification (where we take the natural logarithm of all explanatory variables). We perform Ramsey’s (1969) Regression Equation Specification Error Test (RESET). This test involves adding powers of the fitted values of the original model into the equation (squared for RESET² and squared and cubed for RESET³) and F-testing the statistical significance of these “variables”. If there is no misspecification (of the functional form), these should not have any explanatory value. The results – presented at the bottom of table 2.2 – indicate that the test statistics for RESET² as well as RESET³ are statistically significant at least at the 5% level in a linear specification, but not in a loglinear specification. As a consequence, we can be fairly sure that the loglinear model is correctly specified. Further estimations and interpretations will thus centre on the loglinear specification.

Secondly, we test for the optimal operationalization of the fragmentation variable. This involves an empirical test to ascertain whether a measure taking only the number of parties into account (NoP) is sufficient or whether an index including both the number of parties and size inequalities (ENP) is to be preferred. We do this via the Davidson and MacKinnon (1993) J-test. This test consists of introducing the fitted values from one model into the equation of the rival model and see whether the coefficient of this “variable” is significantly different from zero (using a standard t-test). Given the functional form misspecification in the linear model we just ascertained, we concentrate on the results of the preferred loglinear model, given in columns (3) and (4).

Adding the fitted values from specification (3) – where log (NoP) is the measure for fragmentation – to model (4) leads to a t-statistic of 0.94. Hence, the fitted values of this model add little to the model where log (ENP) is used as the measure of fragmentation. Adding the fitted values from specification (4) to model (3) approaches statistical significance at the 10% level (t-statistic equal to 1.52). This would indicate the absence of
an important size inequalities effect on voter turnout over and above the number-of-parties effect. Note that this is in contrast to the findings of Kirchgässner and Schimmelpfennig (1992), Kirchgässner and Zu Himmern (1997) and Blais and Carty (1990). These papers find that the use of an index including both elements performs better than an index that only regards one element of political fragmentation. It is, however, in line with Blais and Dobrzynska (1998) and Blais (2000) who find that the number of parties best explains the observed variation in turnout (compared to the “effective” number of parties). This suggests that the “optimal” measure of political fragmentation is likely to be context-dependent such that testing for the “optimal” measure is essential in order to avoid misspecification.34

Table 2.2: The optimal “index” of fragmentation

<table>
<thead>
<tr>
<th>Variable</th>
<th>NoP (1)</th>
<th>ENP (2)</th>
<th>Log (NoP) (3)</th>
<th>Log (ENP) (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRAG</td>
<td>-0.070 ***</td>
<td>-0.099 ***</td>
<td>-0.168 ***</td>
<td>-0.189 ***</td>
</tr>
<tr>
<td></td>
<td>(-6.56)</td>
<td>(-6.09)</td>
<td>(-3.91)</td>
<td>(-3.48)</td>
</tr>
<tr>
<td>adj R²</td>
<td>55.21</td>
<td>54.41</td>
<td>59.27</td>
<td>59.46</td>
</tr>
<tr>
<td>J-test (1) – (2)</td>
<td>1.90 *</td>
<td>2.99 ***</td>
<td>1.52</td>
<td>0.94</td>
</tr>
<tr>
<td>J-test (3) – (4)</td>
<td></td>
<td></td>
<td>0.60</td>
<td>0.13</td>
</tr>
<tr>
<td>RESET²</td>
<td>5.47 **</td>
<td>10.93 ***</td>
<td>1.90</td>
<td>1.37</td>
</tr>
<tr>
<td>RESET³</td>
<td>9.21 ***</td>
<td>11.70 ***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 307 for each regression; t-statistics between brackets
*** Significant at 1 % level; ** at 5 % level; * at 10% level

Table 2.2 shows that the fit of our model is very good. Almost 60% of the variation in turnout between the Flemish municipalities can be explained by the variables in our model. The parameter estimate of the political fragmentation variable shows a negative sign. The interpretation of this is straightforward in column (3), where we use the (natural logarithm of the) number of parties in the election as our indicator of fragmentation. Municipalities where more parties compete in the election are characterised by a lower level of electoral turnout. However, in column (4) the interpretation is more intricate as the index includes both the number of parties and size inequalities. This inhibits an

34 Note that using the “effective” number of parties in itself introduces a restriction into the model as one assumes a very specific relation between the number of parties and size inequalities. In fact, it implies that the α in the more general Hannah and Kay (1977) concentration index, \( \left( \sum_{i=1}^{n} \left( \frac{Vote_i}{\text{Total Vote}} \right)^{1/(1-\alpha)} \right)^{1/(1-\alpha)} \), is set to 2. Testing this restriction shows that there is no significant difference between the results using the optimal α (equal to 0.9) and α = 2. Hence, we follow the main strand of the literature in employing the “effective” number of parties.
assessment of the relative effects of both these elements. This can be achieved by untangling the ENP-index into its composing parts.

Davies (1979) suggested that a concentration index could be written as a function of the number of parties (NoP) and a measure of size inequality (I). Following this suggestion, Davies (1980, 307), Davies et al. (1988, 82) and Chakravarty (1995, 20) indicate that the “effective” number of parties can be written as:

$$ENP = \frac{\text{NoP}}{1 + \text{cv}^2}$$

with

$$\text{cv} = \sqrt{\frac{1}{\text{NoP}} \sum_{i=1}^{\text{NoP}} (s_i - \bar{s})^2}$$

where $s_i$ represents share of votes party $i$ in the election, $\bar{s}$ the average vote share over all parties and NoP equals the number of parties in the election. The coefficient of variation (cv) is a well-known and “popular index of inequality” (Chakravarty, 1995, 20, see also Chapter 1, section 2.2). Taking logarithms at both ends we obtain:

$$\log ENP = \log \text{NoP} - \log (1 + \text{cv}^2)$$

Importantly, this allows us to assess the direction of the effect of both elements of fragmentation separately. The results are presented in columns (1) and (2) of table 2.3 (column (2) removes non-significant variables).

As already observed in table 2.2, the number of parties negatively affects electoral turnout. Hence, the possible positive effects associated with multi-party systems (through lower alienation and a more competitive political system) seem to be dominated by the negative effects (higher need for coalition formation and higher informational costs). De Winter et al. (1991, 44) observed a similar negative effect in the 1988 municipal elections in Flanders (and in Belgium as a whole). The coefficient for size-inequalities in table 2.3

---

35 Note that including log NoP and log ($1 + \text{cv}^2$) is only perfectly equivalent to including log (ENP) if we restrict the sum of the coefficients of both these variables to be equal to that of log (ENP). The results presented in table 2.3 are obtained without imposing this restriction (creating a more general model to the one in which the restriction would be imposed). Still, an F-test shows that we cannot reject that the restriction holds ($F(1, 296) = 2.02; p > 0.1$). Moreover, imposing the restriction does not materially change the results presented (see appendix D, column (5)).

36 We tested for a non-linear effect of the number of parties – as found by De Winter et al. (1991) – by adding a quadratic term of the number of parties. However, since this was not significant, it was dropped
shows that electoral turnout is higher the more unequal in size are the political parties. However, the parameter estimate only approaches statistical significance at the 10% level. A possible explanation for this positive sign is that the presence of parties that dominate the political landscape increase the representative voter’s incentives to turn out. We have already indicated at the outset of the present chapter that this is most likely due to the increased transparency and predictability of the coalition formation process. This may strengthen the (perceived) link between the individual voter’s vote and the political outcome of the elections – thus leading to an increased voter turnout.

As a more direct test of this dominant-party-interpretation, we re-estimated our regressions replacing the size inequality measure by dummy variables indicating the size of the largest party in the municipality. Size is thereby defined in terms of the share of seats obtained in the 2000 municipal election. This dominance-dummy approach allows us to discriminate between two different dominance-effects. Indeed, our basic argument to explain the positive size inequality effect is that size inequalities reflect the presence of parties that dominate coalition negotiations, thereby making these more transparent and strengthening the link between the individual vote and the government that is ultimately formed. Still, extreme inequalities will reduce the number of possible coalitions to one. This will be the case when a single party dominates politics so much that it has a majority of the seats. Then, changes in this dominance will have no marginal transparency-effect that induces voters to turn out. In fact, the situation will show similarities with a two-party contest, meaning that the closeness argument is likely to apply (i.e. the more dominant the party becomes, the lower we expect turnout to be). All this suggests a non-linear relation between party dominance (size inequalities) and electoral turnout. For lower values of dominance (inequality) we expect turnout to increase with dominance (as an indicator of transparency of coalition processes). For higher values of dominance – reflecting the presence of a single party with a majority of the seats – turnout can be expected to decrease with dominance (as larger dominance means lower “closeness”).

from the final results shown in table 2.3. The estimated coefficients and significance levels of the other variables were not influenced by the inclusion of this variable (see Appendix D, columns (3) and (4)).
Table 2.3: Determinants of electoral turnout in Flemish municipalities (2000)

<table>
<thead>
<tr>
<th>Variable (in logs)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>8.275 *** (9.71)</td>
<td>7.804 *** (10.65)</td>
<td>8.163 *** (9.56)</td>
<td>7.822 *** (10.74)</td>
</tr>
<tr>
<td>REG</td>
<td>-0.154 *** (-5.14)</td>
<td>-0.151 *** (-5.28)</td>
<td>-0.149 *** (-4.99)</td>
<td>-0.152 *** (-5.35)</td>
</tr>
<tr>
<td>DENS</td>
<td>-0.136 *** (-4.86)</td>
<td>-0.130 *** (-5.11)</td>
<td>-0.130 *** (-5.11)</td>
<td>-0.127 *** (-5.01)</td>
</tr>
<tr>
<td>MIGR</td>
<td>-0.357 *** (-4.68)</td>
<td>-0.364 *** (-5.13)</td>
<td>-0.366 *** (-4.78)</td>
<td>-0.370 *** (-5.24)</td>
</tr>
<tr>
<td>AGE</td>
<td>-0.271 *** (-3.42)</td>
<td>-0.260 *** (-3.35)</td>
<td>-0.272 *** (-3.39)</td>
<td>-0.261 *** (-3.39)</td>
</tr>
<tr>
<td>Y</td>
<td>0.157 (0.79)</td>
<td>-</td>
<td>0.148 (0.74)</td>
<td>-</td>
</tr>
<tr>
<td>INCDIV</td>
<td>-1.052 *** (-4.47)</td>
<td>-0.860 *** (-6.08)</td>
<td>-1.052 *** (-4.42)</td>
<td>-0.868 *** (-6.17)</td>
</tr>
<tr>
<td>UNEM</td>
<td>-0.027 (-0.55)</td>
<td>-</td>
<td>-0.018 (-0.37)</td>
<td>-</td>
</tr>
<tr>
<td>PROSEC</td>
<td>-0.111 *** (-2.66)</td>
<td>-0.111 *** (-2.72)</td>
<td>-0.112 *** (-2.67)</td>
<td>-0.111 *** (-2.74)</td>
</tr>
<tr>
<td>NoP (election)</td>
<td>-0.203 *** (-3.61)</td>
<td>-0.162 *** (-3.20)</td>
<td>-0.160 *** (-2.87)</td>
<td>-0.177 *** (-3.48)</td>
</tr>
<tr>
<td>I</td>
<td>0.128 (1.52)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>35-40% dummy</td>
<td>-</td>
<td>-</td>
<td>-0.011 (-0.20)</td>
<td>-</td>
</tr>
<tr>
<td>40-45% dummy</td>
<td>-</td>
<td>-</td>
<td>0.094 ** (2.13)</td>
<td>0.069 ** (2.13)</td>
</tr>
<tr>
<td>45-50% dummy</td>
<td>-</td>
<td>-</td>
<td>0.048 (0.85)</td>
<td>-</td>
</tr>
<tr>
<td>50-55% dummy</td>
<td>-</td>
<td>-</td>
<td>0.058 (1.08)</td>
<td>-</td>
</tr>
<tr>
<td>55-60% dummy</td>
<td>-</td>
<td>-</td>
<td>0.032 (0.56)</td>
<td>-</td>
</tr>
<tr>
<td>Above 60% dummy</td>
<td>-</td>
<td>-</td>
<td>0.056 (1.06)</td>
<td>-</td>
</tr>
<tr>
<td>R² (adj.)</td>
<td>59.44</td>
<td>59.44</td>
<td>59.36</td>
<td>59.91</td>
</tr>
</tbody>
</table>

N = 307 for each regression; t-statistics between brackets
*** Significant at 1% level; ** at 5% level; * at 10% level

To test for this dominance effect, we follow an empirical approach. More precisely, we introduce six dummy variables that equal 1 in those municipalities where the largest party had between 35-40% of the seats, between 40-45% of the seats, …, above 60% of the seats. Obviously, the reference category then consists of those municipalities where the largest party controls less than 35% of the seats. This categorisation is chosen as it leaves us with at least 30 observations in each group. The results are in table 2.3, columns (3)
and (4). It can be observed that the last five dummies all have positive signs. This indicates that turnout is in general higher in municipalities where the largest party has 40% or more of the seats. Still, the only coefficient that is significantly different from zero at a reasonable level of statistical significance is associated with those municipalities where the largest party possesses 40-45% of the seats in the council. This result is in line with our earlier interpretation that turnout is increased by the presence of parties that dominate coalition negotiations. Nonetheless, from the same perspective, it is puzzling that the dummy 45-50% is insignificant, especially as we would expect the transparency-effect to be augmented by a closeness-effect in this specific category. For the present, we have no ready explanation for this observation. On the other hand, the fact that dummies for the largest party-dominance (dummy 55-60%; above 60%) are insignificant can be explained by the fact that the de facto two-party situation they create implies that the dummies actually measure a closeness-effect.

Having discussed the fragmentation variables in detail in the previous paragraphs, we now turn to a discussion of the other variables included in the model. From table 2.3 we see that all but two of the control variables included in the model have a significant effect on electoral turnout in Flanders. First, the number of registered voters (REG) significantly reduces turnout. This is in line with the Downsian argument that a larger voting population decreases the probability that one vote will make a difference (Downs, 1957). Secondly, higher migration levels (MIGR) depress turnout. This may suggest that municipalities with a highly stable population have a tighter social network and community life with higher “social pressure” (Karnig and Walter, 1974 and Hoffman-Martinot, 1994). Also, Hoffman-Martinot (1994) argues that stable, self-centred communities might grow stronger feelings of identification, also increasing social pressure to turn out the vote. An alternative explanation for the negative migration-effect may be that voters who have resided in the same community for a longer period are more aware of local issues and candidates (Filer et al., 1993). This implies that they face lower information costs. Finally, higher (out)-migration may indicate that people do not vote as, actually, they might live elsewhere in the near future and will thus be unaffected by local policy.

Population density (DENS) is negatively correlated with turnout. This may indicate that residents of more densely populated areas are less well integrated in the community as
urbanisation leads to “a weakening of interpersonal bonds” (Hoffman-Martinot, 1994, 14; see also Wirth, 1938 and Weber, 1947, 514-601). As a consequence, the social pressure to vote will be weaker, depressing turnout. The coefficient on the dummy variable for the municipalities in judicial areas where non-voters were prosecuted (PROSEC) shows a significant negative sign. This is somewhat counterintuitive: it indicates that the municipalities in jurisdictions where non-voting is in practice penalised are actually confronted with lower turnout. Two explanations are possible: the higher prosecution level reflects the response to a “structural” lower turnout level or higher prosecution levels crowd-out the intrinsic motivation of the Flemish voter to participate in the electoral process (Frey, 1997).37 The latter argument refers to the possibility that feelings of civic duty among the population are diluted by a government that – by prosecuting – reveals a lack of trust in its citizens.

While a larger proportion of elderly in the population (AGE) also tends to depress turnout at the polls, unemployment (UNEM) and average income (Y) do not reach generally accepted levels of significance.38 Finally, income diversity (INCDIV) has a significantly negative effect on turnout. As a measure for the socio-economic heterogeneity of the population, income diversity may weaken social pressure within the community to turn out to vote. It has been argued that “planners who are concerned with building communities (...) have accepted the fact that social homogeneity is a necessary prerequisite of community cohesion” (Cohen, 1982, 259). More cohesion can be expected to increase group solidarity (Ashworth, Heyndels and Smolders, 2002) and thus social pressure towards electoral turnout.

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37 A simultaneous estimation technique and/or a panel analysis that takes into account variation of turnout over time is needed to discriminate between the different explanations. Unfortunately, data on prosecution of non-voting is not available for longer time periods.

38 In interpreting the parameter estimates of these three variables, we need to be aware of the so-called “ ecological fallacy”. This refers to the bias that may occur because an association observed between variables at an aggregate level does not necessarily represent an association that exists at an individual level (see e.g. Robinson, 1950; Kramer, 1983). For example, the negative sign for the share of elderly in the municipal population indicates that a larger share of people over the age of 65 is related with lower electoral turnout. This should not be taken to imply that people over the age of 65 are more likely to stay home on Election Day. Such a relation should be tested at the individual level.
4. Conclusion

This chapter analysed whether the level of political fragmentation in Flemish municipalities affects the first step of the electoral process, viz. the decision of the voter whether or not to turn out. In previous work, this has been recognised as an important determinant of voter turnout. However, no agreement has been reached on the direction of the effect, theoretically nor empirically. Hence, the first aim of this chapter was to estimate whether turnout *de facto* increases or decreases with the level of fragmentation in Flemish municipalities. A second aim was to estimate the direction of the effects of the two constituent elements of political fragmentation: number of parties and size inequalities. Indeed, by using one indicator that subsumes both these elements – such as the “effective” number of parties (ENP) – it is impossible to gauge the separate effects of both elements. By decomposing the ENP-index, we empirically disentangled both effects in our empirical model.

Using data on the most recent municipal elections in Flanders (held in the year 2000) we find that only the number of parties significantly affects electoral turnout. The effect of size inequalities merely approaches statistical significance at the 10% level. Importantly, we observe that both dimensions of fragmentation have opposite effects on the level of turnout. The number of parties in the election negatively affects turnout, in line with the findings of De Winter *et al.* (1991). Possible positive effects of multi-party systems on turnout (through lower alienation and a more competitive political system) are dominated by negative effects (higher need for coalition formation and higher informational costs). Size equalities strengthen this effect: for a given number of political parties, electoral turnout is lower in municipalities where the parties are more equal in size. This may be taken to indicate that the absence of parties that dominate the political landscape lower the representative voter’s incentives to turn out as it makes the coalition formation process (and therefore the voter’s ideal voting strategy) more uncertain. A more direct test of this reveals that turnout is significantly higher in those municipalities where the largest party holds between 40 and 45 % of the seats.

Interestingly, our results contradict the results in Hansen (1994) where a positive effect of the number of parties on turnout was found in a context of a system of proportional representation. A possible explanation for this difference may be the fact that Flemish
municipalities – unlike their Norwegian counterparts – have a parliamentary system. In Norwegian municipalities executive boards are established in which all parties have members according to their share of seats in the council (Tovmo, 2001, 4). Our result may be taken to suggest that in Flemish municipalities the increased probability for coalition formation in municipalities with more parties actually discourages the electorate because its direct influence in choosing their government decreases.
CHAPTER 3: Ballot Layout Effects

Introduction

In the previous chapter we have analysed the decision of the voter to head to the poll booth on Election Day. As mentioned there, this decision represents only the first step in the electoral process. The present chapter focuses on the next step in this process, namely the decision what party (parties) and/or candidate(s) to vote for. More precisely, we point our attention to the effect of long candidate lists – and consequent layout differences on the ballot paper – on the voter’s decision inside the poll booth. This implies that in the present chapter the number of candidates on the list constitutes our indicator of political fragmentation. Just as the number of parties in the election, this is representative of the extent of choice offered to the voter.

The effects of long candidate lists on in-booth voting behaviour have frequently been studied in the literature on Ballot Position Effects (for a review, see Darcy and McAllister, 1990 and Miller and Krosnick, 1998). These effects refer to the fact that politicians whose names appear in given positions (1st, 2nd, 3rd, …) obtain more (less) votes, ceteris paribus. Such Ballot Position Effects can be seen as the political version of response-order and framing effects that are commonly observed in survey measurements.

Though the effect of long lists on voting behaviour has often been analysed, the effects of layout differences have received considerably less attention. Nonetheless, the 2000 US presidential elections have illustrated how details in the formal organisation of democratic elections may have far-reaching political consequences. The specific layout of the “butterfly ballot” in Palm Beach County, Florida and how this (may have) misled voters was a hotly debated issue in the world press and the political world. It goes without saying that the idea that the identity of the US president may depend on the layout of a voting bulletin does not fit easily into most people’s normative conception of a democratic

39 Though voting for (candidates of) different parties on one and the same ballot is prohibited (see Chapter 1, section 1.1), the voter can – and often does – vote for different parties on various ballots during one election. For example, elections for the Senate and Chamber of Representatives in Belgium take place concurrently. Nothing prevents the voter from voting for, say, a Catholic party/candidate on the Senatorial ballot while supporting a Socialist party/candidate in the elections for the Chamber of Representatives.
state. Ideally, election results should not depend on the layout of the ballot form. And, certainly, such forms should not be misleading.

The US case is an extreme one. Still, a layout-neutral election result may be unrealistic. Layout matters. Any newspaper editor will tell you. And, like newspapers, ballot forms have a specific layout. If the newspaper editor is right, then it is possible that the layout of a ballot form affects electoral outcomes. In reference to this idea, it is interesting to see that the length of the candidate lists in Belgium has necessitated an important organizational change when computerized voting was introduced as of 1991. Instead of presenting the voter with one long column of candidates per party, these have to be spread over separate columns in order to fit the computer screen. Whether the ensuing layout differences affect the in-booth voting behaviour of the electorate is the central question of this chapter.

We study this question using data on the 1995 Brussels’ Regional Elections. These elections offer an interesting natural experiment as the parties presented identical lists of candidates (in the same order) to the electorate in three different layouts. This allows comparing the election results of 897 candidates in this election in three different “treatments”. Using preferential vote data, we show that differences in layout do indeed affect the preferential voting behaviour of the electorate. In fact, we find that candidates on the top or bottom of each column tend to obtain more votes, ceteris paribus. Moreover, we find that the level of “cognitive sophistication” of the electorate (measured by its education level) has a strong attenuating effect on these Ballot Layout Effects. These findings are in line with the results produced in the literature on Ballot Position Effects and psychological research with respect to question and response order and framing effects.

The remainder of the chapter is structured as follows. Section 1 reviews the literature on Ballot Position and Ballot Layout Effects. Section 2 gives information on the institutional context of the 1995 elections of the Brussels Regional Government and, especially, on the different layouts that were used. Our empirical analysis is in section 3. We find clear empirical evidence for the presence of Ballot Layout Effects and the attenuating influence thereon of “cognitive sophistication”. Section 4 discusses both the political consequences
of the observed Ballot Layout Effects and the way in which the presence of such effects may yield insights into the motivations of individual voters. Section 5 concludes.

1. **Ballot Layout Effects and Ballot Position Effects: literature**

1.1 **Theory**

Ballot Position Effects – i.e. the finding that certain options are more frequently selected due to their position in the order of the list – have attracted a lot of scholarly attention. Most of these studies, however, strictly focus on empirical analyses into the existence of Ballot Position Effects, while the theoretical arguments to explain these effects have been much less looked into. Still, two theoretical explanations have been provided. The first explanation is anchored in modern psychological theories of choice, while the latter takes rational choice theory as a starting point.  

Krosnick and Alwin (1987) and Miller and Krosnick (1998) look at modern psychological theory to explain the existence of “primacy effects” (giving advantage to the candidates at top positions). The reasoning presented in these papers has two elements: limited cognitive capacity and confirmatory bias. The former states that people by definition have a limited capacity to process information. Hence, names (or items) that are read first are subject to deeper cognitive processing (Krosnick and Alwin, 1987, 203). The reason is that, when assessing items that one perceives later, one’s mind becomes increasingly clogged with thoughts about the previous alternatives. This process limits one’s power to generate adequate argumentation concerning later items. However, early perception and the associated deeper processing do not necessarily imply that the item (or candidate) will be chosen. Obviously, it will have to be preferred to other items (which are perceived later). This is where the second element (“confirmatory bias”) plays its role. Indeed, psychological research has shown that early processing is likely to be dominated by the generation of cognitions that justify the selection of an item. People tend to “begin a search of memory for information about an object by looking for reasons to select (…)  

40 The question why people would bother to cast preferential votes, is disregarded in both models. Given that it takes a certain effort and thus entails costs to the individual, this is nonetheless a relevant question. However, as we will argue later (section 4.2), preference voting may be an act of “consumption”. That is, in the words of Chapter 2, people may simply derive an “expressive” benefit from the action itself.
rather than reasons not to select them” (Miller and Krosnick, 1998, 294). As a result, if people move top to bottom through a candidate list, limited cognitive capacity and confirmatory bias will lead to a “primacy effect”.

A “recency effect” (or bottom candidate advantage) occurs, according to Miller and Krosnick (1998, 294), when the attempt “to retrieve reasons to vote for a candidate fails completely, retrieving instead only reasons to vote against him or her”. If the voter then advances through the candidate list and grows tired, he will find fewer elements to vote against the later candidates. This will bias him towards candidates that are placed at or near the end of the list.

The explanations for primacy and recency effects based on this psychological theory appear to be mutually exclusive. We have either a primacy effect or a recency effect. However, this reasoning holds only at the level of the individual voter. It does not necessarily imply that we cannot observe both effects concurrently in an election result (a “J-curve pattern”, cfr. infra). The reason is that election results refer to a large group of voters. Some of these may be looking for supportive arguments while others may be inclined to search for reasons not to support a given candidate. Consequently, the overall election result may well show both primacy and recency effects at the same time.

A second explanation of Ballot Position Effects is based on rational choice theory. In the turnout literature, the decision to vote is often considered in terms of a cost-benefit analysis (see Chapter 2, section 1). Bowler et al. (1992) and Hamilton and Ladd (1996) extend this analysis into the poll booth. Central to their argument are the costs of voting once the voter has entered the poll booth. These are costs of determining how the voting technology works, of deciding in which races and for which of the parties or candidates to vote and so on (Hamilton and Ladd, 1996, 262). The cost of finding the desired party or candidate on the ballot form is also highly relevant in this process. Voters without sufficient information about parties and candidates or without clear convictions about who to vote for may aim to minimise these in-booth voting costs. This could lead to Ballot Position Effects for two reasons. Firstly, voters may resort to simple voting rules such as the “donkey vote”. In this case, one votes for the first available alternative(s) on the ballot form (Darcy and Marsh, 1994, 44). Secondly, voters may act according to Simon’s satisficing principle (Simon, 1957). This implies that voters stop searching the ballot form
upon discovering an acceptable candidate. Such decision rules are likely in a context where the costs of making a mistake are small. As Downs (1957) pointed out, this is likely to be so in most elections as the probability of any single vote having an effect on post-electoral politics is very small.

Based on these theories, some hypotheses can be advanced concerning the possible occurrence of Ballot Position Effects. For one, longer ballots (as is often the case under PR) and ballot forms without specific information such as party labels increase the demands on the voters’ time, information and cognitive capacity. This makes it more likely that position effects will occur. Secondly, position effects are also more likely to occur under compulsory voting. The reason is that compelling people to turn out brings a lot of voters to the polls that are indifferent or ignorant to the choice of candidates (see Darcy and McAllister, 1990). As information and interest are critical elements in voting behaviour, this would lead to the expectation of more important position effects in countries with compulsory voting, such as Australia, Belgium and Greece.

1.2 Empirical literature

The existence of Ballot Position Effects has long been known (and exploited) in the political world. The prototype situation is one where a number of candidates running for a single office are ranked alphabetically in a single column on a ballot form, independent of their party affiliation. Those candidates who are ranked high – early in the alphabet – are found to obtain more votes *ceteris paribus*. Such a primacy effect creates obvious possibilities for strategic behaviour (Hamilton and Ladd, 1996). To illustrate this, Darcy and McAllister (1990, 12) refer to the example of the Australian 1937 Senate elections in New South Wales. The Labour Party nominated four candidates whose surnames started with A, thus being placed at the top of the ballot form. All four were elected! To prevent this type of strategic behaviour, ballot positions have been determined by lot from 1940 onwards. Also some US states and several countries assign candidates’ places on the ballot by drawing lots or by using name rotation (Taebel, 1975, 519n and Darcy, 1986, 648). The latter involves the concurrent use of several ballot sheets where the candidates are presented in various orders. However, these precautions, especially name rotation, can be very costly in terms of ballot printing, administrative burden, increased possibility of counting errors and so on (Darcy, 1986, 648-649). That they are nonetheless taken shows
the existence of a general belief in Ballot Position Effects among politicians. Thus the question whether this general belief is justified clearly warrants scientific attention.

From their overview of the empirical literature on Ballot Position Effects, Miller and Krosnick (1998, 296) conclude that “most of these studies found that candidates did better when listed early”. In their own work on the 1992 elections in Ohio, they find evidence of statistically significant position effects in almost half of the races under study. A very large majority of these involves the first candidate getting more votes than the second (“primacy effect”). There thus appears to be compelling evidence on the existence of primacy effects. Nonetheless, the literature also shows that the conclusion slightly alters where voters have to elect various candidates to a single office and thus are allowed to cast more than one vote. The main finding then seems to be that the position within the party is more important than the actual position on the ballot form. In other words, it is more important to be the first-listed candidate of your party than to be the first-listed candidate as such (Robson and Walsh, 1974; Darcy, 1986; Darcy and McAllister, 1990; Darcy and McKerras, 1993; Darcy and Marsh, 1994 and Rallings et al., 1998). The studies of Robson and Walsh (1974) and Rallings et al., (1998) even find this within-party position effect after controlling for incumbency status.41

Not only the top position in a list of candidates may bring electoral advantage. Several studies find that candidates listed near or at the end of the ballot receive more votes than we would expect if no positional effects were present. Byrne and Pueschel (1974, 781-782), for example, show in their analysis of 3600 candidates in 500 California central committee elections between 1948 and 1970 that there is an increasing advantage of being on lower places on the candidate list. Other studies, considering elections with “longer ballots”, find that the lowest as well as the highest ballot positions are advantaged (Bain and Hecock, 1957, 72-75 and Robson and Walsh, 1974, 200). This is referred to as the “J-curve pattern” (Mueller, 1970, 399 and Darcy and McAllister, 1990, 8). The combination of first and last position effects has been interpreted as an indication of a voter’s tendency to skip the middle positions when faced with long candidate lists (Robson and Walsh,

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41 Remarkably, this within-party position effect is not found in the few multimember district elections in the US (Darcy, 1998) although it appears to be a general phenomenon in non-US elections. The reason, Darcy (1998, 694-695) argues, is that voters outside the US are party oriented rather than candidate oriented. A similar idea was already proposed by Robson and Walsh (1974, 192-193) who find strong support for the hypothesis that Irish voters have “strong preferences between parties” but tend to be “undecided between the candidates put forward by each party”.
1974; Bowler et al., 1992, 564). Still, as mentioned before, a “J-curve pattern” may also arise because some voters are looking for arguments to support a candidate while others look for reasons not to support a given candidate. The primacy and recency effects at the level of the individual voter then translate into a J-curve pattern in the overall election result (cfr. supra).

Position effects are not only present in the political context. Each “closed” survey question is likely to be confronted with the same issue. “Closed” questions present two or more alternatives to the respondent from which (s)he has to choose. The influence the order of the alternatives has on the individual’s choice is generally known as a Response-Order Effect (Schuman and Presser, 1981, 56). Survey research in various contexts has abundantly shown such effects to exist. An important finding in this literature is that not only the characteristics of the study matter (such as the order of the responses), but also the characteristics of the individuals answering the survey questions. In fact, it has been recurrently argued that the education level of the respondents can be expected to have an important tempering influence on the appearance and strength of biases due to question wording, tone or order and response order (Hyman et al., 1975; Schuman and Presser, 1981). Empirical analyses using indirect measures of “cognitive sophistication” – such as the level of formal education or student grade point averages – have been generally supportive of this hypothesis (e.g. Krosnick and Alwin, 1987; Narayan and Krosnick, 1996; Johnson et al., 1999). Furthermore, Smith and Levin (1996) find that people with a higher natural tendency to engage in and enjoy thought are hardly affected by “framing effects” (cfr. Tversky and Kahneman, 1981). Finally, Stanovich and West (1998) find that subjects with higher “cognitive capacity” are less prone to a number of widespread choice biases such as outcome bias, if-only thinking, overconfidence bias and hindsight bias.

Ballot Layout Effects are closely related to Ballot Position Effects. Indeed, a list of candidates can be presented on the ballot in different ways while still preserving their order. The possibility that this presentation might affect electoral outcomes has received only minor attention. Mueller (1970) treats it as a case of Ballot Position Effects when examining the 1969 LA Junior College Board primary election, in which 133 candidates ran for office. These could not be matched on one single page and were distributed over as much as 7 ballot pages. Mueller (1970, 399, italics added) found that “the candidates listed last on each page received some 5000 votes more than one would expect on the
basis of other considerations”. Although this result failed to reach statistical significance, we feel it has received too little attention in the literature where it has not been formally distinguished from other Position Effects (cfr. Darcy and McAllister, 1990, 8). However, the candidates listed last on page 1 to 6 in this primary cannot be considered as candidates in the last place on a ballot. Rather, they are presented on the last place of a part of the ballot due to its layout. If the candidates had been placed in a single column it is unlikely that the same candidates (being no longer listed at the bottom of the page) would have received as many votes as they have now.

After Mueller’s (1970) publication, interest in the subject remained low to non-existent. Nonetheless, since the 2000 US presidential elections, a number of studies have been performed that estimate the effect of the “butterfly” ballot in Palm Beach County, Florida on the election result. Wand et al. (2001), for example, find that the ballot may have misled voters into voting for another than their preferred candidate. They show that the butterfly ballot may have decided the elections to the advantage of President Bush Jr. The analysis of Adams and Fastnow (2002) confirms this result.

It is important to realise that both cases of Ballot Layout Effects described here are still substantially different from one another. The layout effects in the 2000 US presidential elections are mainly due to the misleading character of the ballot paper. This is not the case for the elections considered in Mueller (1970), nor in the present analysis (cfr. infra). In these, the length of the candidate list played a crucial role as this necessitated a different placement of the candidates over the ballot paper, while preserving a given order. This was also the case in the Dutch provincial elections of 1999 in the province of Noord-Holland. There the long list of VVD-candidates (the Dutch liberal party) had to be split over two columns on the ballot sheet. As several ballot forms were used, (two) different candidates at times appeared on top of this second column. It was argued in a newspaper article that “the layout of the ballot probably strongly increased the preferential votes obtained by these candidates” (NRC Handelsblad, 10/03/1999, own translation). However, no test of the statistical significance of these effects – to the best of our knowledge – was endeavoured.
2. **The Brussels Elections of 1995**

The Brussels’ Regional Parliament has 75 seats. The representatives to fill these are elected every 5 years by means of elections organised in 8 districts (“cantons”). These districts are purely administrative entities. From this it follows that the parties and the lists of candidates are identical across districts. Moreover, the order in which the (maximum of 75) candidates appear on the voting bulletin is also identical across districts. The election outcome is obtained by the simple aggregation of the results in the 8 districts.

Concerning the 1995 elections, one major organisational difference could be observed among the districts: four districts used the computer to register votes, whereas the other four districts retained the traditional manual (“pencil and paper”) voting. Importantly, this entailed a major organisational difference with respect to the voting procedure. In the “manual districts”, voters received a single form on which all parties and candidates appeared. For each party, candidates were ranked in one column. The number of columns on the form (no less than 23!) thus corresponded with the number of parties that participated in the election. Columns contained up to 75 names of candidates though smaller parties typically had fewer candidates. This situation is represented in figure 3.1.

![Figure 3.1: Manual voting ballot](image)

<table>
<thead>
<tr>
<th>Party 1</th>
<th>Party 2</th>
<th>Party 3</th>
<th>...</th>
<th>Party 23</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
<td>1.</td>
<td>1.</td>
<td>1.</td>
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<td>2.</td>
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<tr>
<td>75.</td>
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<td>75.</td>
<td>75.</td>
<td>75.</td>
</tr>
</tbody>
</table>

It is clear that, because of the size of a computer screen, all this information could not be given on a single computer screen. Therefore, in “computerised districts”, the information is presented using a stepwise procedure in which the voter first chooses a party. Then, a second screen displays the names of the candidates of the preferred party. Moreover, each
party’s list of candidates was distributed over different columns. This had obvious layout implications as can be seen from figures 3.2 and 3.3.

Figure 3.2 gives the layout as used in three of the four computerised districts (Brussels, Sint-Jans Molenbeek and Sint-Gillis): the candidates were ordered in 3 columns of 22 and 1 column of 9 politicians. Figure 3.3 presents the situation as observed in the fourth computerised district (Sint-Joost-ten-Node): candidates were ordered in 5 columns of 15 politicians. In what follows, we denote these formats as LO-22 and LO-15 respectively. The “manual” format is denoted as LO-75. This format was used in four districts (Anderlecht, Elsene, Schaarbeek and Ukkel).

Note that the situation in Brussels was significantly different from the setting of Mueller (1970). In fact, the 133 candidates that Mueller (1970) analyses were presented to the
voter on 7 separate sheets, while the candidates in the Brussels elections were shown to
the voter in separate columns on one single “sheet” (per party). It is unclear how this
difference affects the results of the analyses. This would involve an investigation of the
individual voters’ eye movements and ballot scanning methods in the different contexts.
Although this surely is an interesting topic in itself, it lies outside the scope of the present
chapter.

3. Empirical analysis

3.1 Empirical model

As far as we know, the present analysis is the only study of layout effects that deals with
elections outside the United States. More precisely, it focuses on the 1995 elections for
the Brussels Regional Government. As mentioned, this election provides us with a quasi-
experiment. Though the voters in each of the 8 voting districts were invited to choose
among the same set of candidates, three different ballot layouts were used (cfr. supra).
Individual politicians had a different place on the ballot paper in the various layouts, even
though their place in the party’s candidate list was the same across all districts. We
investigate how this difference in position on the ballot form affects the individual
candidate’s electoral success. We do so by testing a simple model of the politicians’
preferential votes:

\[ PV_{ij} = \beta \cdot \text{POPi}_{ij} + \mu_{ij} \] (1)

where \( PV_{ij} \) is the number of preferential votes obtained by politician \( i \) in district \( j \). The
underlying idea of the equation above is that preferential votes are essentially an estimate
of politician’s (latent) popularity \( \text{POPi}_{ij} \) and that this estimate has an error term \( \mu_{ij} \). This
error term is composed of a systematic – layout related – and an unsystematic part. The
presence of Ballot Layout Effects refers to the fact that preferential votes are a biased
estimate of a candidate’s popularity. More specifically:

\[ \mu_{ij} = \gamma \cdot C_{ij} + \delta \cdot \text{ELECj} \cdot C_{ij} + \epsilon_{ij} \] (2)
Ci,j is a dummy variable, indicating whether or not a candidate’s name appeared in a “critical” position in that particular district j. If this is the case, then Ci,j = 1. In all other cases, Ci,j = 0. Critical positions are, following the literature on Ballot Position Effects, identified as those positions at the top or the bottom of a column. However, candidates ranked 1st (75th) are at the top (bottom) in any of the layouts. Moreover, these positions are “special” in themselves as they are typically reserved for highly popular politicians. Therefore, these politicians will be treated separately in the empirical work (see further).

This implies that there are no critical positions for layout LO-75; for LO-22 these critical positions are 22, 23, 44, 45, 66 and 67; for LO-15 these are positions 15, 16, 30, 31, 45, 46, 60 and 61.

The expected bias in the model corresponds with the existence of Ballot Layout Effects: politicians whose name appears in a “critical” position are expected to have a significant benefit from this. Moreover, such a benefit may be stronger (or weaker) depending on the composition of the electorate. In our analysis, this notion is captured through ELECj. To be more precise, ELECj corresponds with the share of the population (above 20 years of age) holding a college or university degree. εi,j is a random error term.

The idea is simple: if preferential votes are an unbiased measure of politicians’ popularity, then β equals 1 while γ and δ are zero. Then, the only divergence between “actual” and “measured” popularity is random (reflected by εi,j). If Ballot Layout Effects occur, then γ and/or δ differ from zero. Having defined critical positions as those where we expect politicians to obtain a systematic advantage, we expect γ > 0. If a higher educational level of the electorate weakens layout effects (see section 1.2.), then δ < 0.

It should be observed that the specification above assumes that the increase in votes from a critical position is constant among candidates. Each candidate in a critical position gains a certain number of votes. This is probably unrealistic. We may rather expect not the absolute but the relative number of votes gained to be constant, such that a candidate in a critical position increases his/her vote total with a given percentage. For example,

42 Position 75 is typically reserved for a popular politician who has no ambition to win a seat in the election under consideration, but who wants to support his/her party.

43 This may capture the fact that politician i obtains fewer votes than his popularity would suggest, for example because a relatively large number of “his/her” voters did not turn out to vote, … Even in the system of mandatory voting, turnout in Brussels hardly ever reaches 90 %. 
candidates from large political parties (large in terms of votes obtained) can be expected to win more votes in absolute terms. Also candidates in positions that *ceteris paribus* are expected to receive more votes (in general: candidates who rank higher in the list of a party’s candidates, see further) may have a larger absolute advantage. To neutralise both these “scale-of-party” and “position-in-list” effects, it is necessary to re-specify the model. Following the literature on Ballot Position Effects, this is done by redefining the dependent variable as the relative share of preferential votes, $\text{RPV}_{i,j}$. The latter corresponds with the vote-share that candidate $i$ obtains in the total of the preferential votes for his/her party in district $j$. This can be written as:

$$\text{RPV}_{i,j} = \frac{\text{PV}_{i,j}}{\sum_{i=1}^{75} \text{PV}_{i,j}}$$

with $\sum_{i=1}^{75} \text{RPV}_{i,j} = 1$

Of course, popularity has to be redefined in a similar way into $\text{RPOP}_{i,j}$, which is the candidate’s “relative popularity”.

$$\text{RPOP}_{i,j} = \frac{\text{POP}_{i,j}}{\sum_{i=1}^{75} \text{POP}_{i,j}}$$

with $\sum_{i=1}^{75} \text{RPOP}_{i,j} = 1$

The estimation equation then becomes:

$$\text{RPV}_{i,j} = \beta \cdot \text{RPOP}_{i,j} + \gamma \cdot \text{Ci}_{i,j} + \delta \cdot \text{ELECj}^\ast \text{Ci}_{i,j} + \varepsilon_{i,j}$$

It is important to note at this point that we assume strategic use of (possible) layout effects by the political parties to be absent. In the 2000 municipal elections and 2003 federal elections, casual evidence exists that such strategic behaviour has become a realistic element in Belgian politics. For example, in the province of Antwerp during the 2003 federal elections a CD&V candidate preferred to be on position 13 instead of position 6. The reason she gave to explain her choice was that the list of candidates for her party was split over two columns and position 13 would bring her at the top of the second column (Renson, 2003). Previous to 2000, however, no such evidence exists.\(^{44}\) Moreover, in the

\(^{44}\) An interesting case supporting the assumption of “no strategic positioning” is found in the make-up of the candidate list of the VLD (Flemish liberal party). This party classified its candidates from position 21 to 73 in alphabetical order.
Brussels 1995 setting, strategic use of layout effects would have been complicated by the organisational characteristics of computerised voting. Indeed, for one and the same election different layouts were used in parallel. The evident consequence of this is that the same candidate may have been positioned at the top/bottom of a column in one layout (e.g. candidate 15 in LO15) while this was not necessarily so in the other layouts (e.g. candidate 15 in LO22 and LO75).

We cannot estimate equation (3) directly as we do not have data on the elusive “popularity”, $\text{POP}_{i,j}$ (or $\text{RPOP}_{i,j}$). A route around this obstacle is to estimate this popularity as a function of determining or correlating factors. We identify four such factors: Position, Use of Computerised Voting, Incumbency and Gender.\textsuperscript{45}

- Position

Political parties present their respective candidates in a given order to the voter. As a general rule, positions higher in the list are reserved for more popular (influential) politicians. The reason is that list votes play a crucial role in assigning mandates in Belgian elections. Indeed, only those candidates that reach a quota (defined as the party’s total vote over the number of seats it obtained plus one; see also Chapter 1, section 1.1) are elected. In most cases no other than the top candidate manages to reach this quota. To select the other candidates, the party’s list votes are distributed over the candidates in order of their appearance on the list until all seats are filled. As such, the candidates higher upon the list are (much) more likely to be elected. Given this importance of “list votes”, voters in practice only decide on the number of seats that a party obtains and not directly on who will end up filling these seats (De Winter, 1988, 20). Hence, in the Belgian context, the ordering of candidates is extremely important.

It is common practice for the Belgian political parties to take popularity into account when designing their list of candidates. As a general rule, more popular politicians are ranked higher (Marsh, 1985). In a survey among Belgian politicians active at the municipal level of government, Meier (2001, 57) finds that they regard the potential to attract votes as the

\textsuperscript{45} As argued in Marsh (1985) and illustrated by use of Belgian election results in Wauters (1999) and Wauters et al. (2003), candidates may attract more votes in the electoral district where they live. This may derive from the fact that candidates are simply better known in their own district or because voters may be subject to “home-bias”. However, due to lack of data on the place of residence of the candidates in the election under investigation, we were not able to control for this in our analysis.
single most important criterion for designing the party’s candidate list.\footnote{This motivation of ordering candidates may be limited to those positions where it could reasonably be expected that politicians can actually be sent to office. The example already given of the VLD (where candidates from position 21 to 73 were listed alphabetically) may reflect this.} For empirical purposes it is important to observe that when political parties “translate” popularity into a rank, they transform popularity into an ordinal variable. This implies that extreme differences between candidates are levelled out. As a result, the relation between position and popularity is likely to be non-linear (the difference in popularity between the candidate ranked 74th and the one ranked 73rd is likely to be much smaller than the difference in popularity between candidates 2 and 1).\footnote{Only when latent popularity is uniformly distributed within each party (that is, when within each party there are as many candidates of each popularity level) the translation into an ordinal scale is linear. Whether this is actually the case is an empirical matter. Actually, non-linearities may be taken to reflect a “scarcity” of political talent (read: scarcity of highly popular politicians), i.e. an underrepresentation of politicians with high popularity.}

- Use of computerised voting

A second possible determinant of the (relative) preferential vote shares – \( \text{RPV}_{i,j} \) – is the use of computerised voting. Deschouwer \textit{et al.} (2000) show that the introduction of computerised voting in Belgium led to an increase in the number of preferential votes cast from an average of 0.87 when voting manually to 1.28 preferential votes on average when voting by computer. This means that the “measured (absolute) popularity” of politicians is higher in districts using computerised voting than in those districts were voting was manual. More important is the observation that the additional votes were not uniformly distributed among candidates. Politicians in lower ranks benefited more from the increase in preferential votes than politicians in higher ranks. As a general rule, computerised voting appears to have been to the benefit of those candidates in lower positions.\footnote{In a recent article, Holcombe and Kenny (2004) analyse voting behaviour in Florida’s property tax rate referenda between 1947 and 1968. Towards the end of this period, there was a change from paper ballots to voting machines. The results show that preferences expressed by voters in these referenda are affected by this transition. Specifically, the use of voting machines resulted in a significant increase in the number of rejections of the school board’s recommended property tax rate.}

- Incumbency and Gender

Finally, two easily observable characteristics of the individual candidates may explain their vote shares. First, we expect candidates presently serving in the Brussels’ parliament (“incumbents”) to have a higher popularity than their rank suggests. This is the case as incumbency may in itself reflect that the politician has been popular (for whatever reason) and/or because incumbent politicians typically have higher media exposure and
political visibility (see Gelman and King, 1990; King and Gelman, 1991). Second, gender may be a relevant determinant of individual popularity. It has often been argued that women are systematically discriminated against. This would mean that they are ranked lower in the list than one would expect on the basis of their popularity alone.49

All these arguments lead to the following empirical model:

$$RPV_{i,j} = \alpha + \beta_1(1/POS_i) + \beta_2.COM_j(1/POS_i) + \beta_3.INCUM_j + \beta_4.FEM_i + \gamma.C_{i,j} + \delta.ELEC_j.C_{i,j} + \epsilon_{i,j}$$

Where $POS_i$ gives the politician’s rank in his/her party’s list. $COM_j$, $INCUM_i$ and $FEM_i$ are dummy variables. $COM_j$ equals 1 in those jurisdictions where computerised voting was applied. $INCUM_i$ equals 1 if the politician is an incumbent and $FEM_i$ equals 1 if she is female. The predicted signs of the coefficients are as follows. As a general rule more popular politicians are ranked in higher positions (lower values of $POS_i$). Given that we expect political parties to be confronted with a “scarcity” of political talent, we expect the position effect to be non-linear and thus – based on observation of the data – model this as the inverse of $POS_i$. We expect $\beta_1 > 0$.

As the use of computerised voting is expected to have led to a shift in the preferential votes, away from the highly positioned candidates (those with low values of $POS_i$) towards the lower positioned candidates, we expect $\beta_2 < 0$. Incumbents are expected to have more preferential votes ceteris paribus. As this is not the main focus of our analysis, we disregard the causality issue (they are incumbent because they are popular, they are popular because being an incumbent makes them more “visible” to the electorate): $\beta_3 > 0$. If female politicians are discriminated against, then $\beta_4 > 0$. It should be observed that the claim that women are discriminated against might have led parties to take corrective measures. To the extent that these imply an overreaction we can expect $\beta_4 < 0$. The other predicted signs have been discussed earlier: if Ballot Layout Effects occur we expect $\gamma > 0$ and if a higher “sophistication” of the electorate weakens these effects, then $\delta < 0$.

49 This issue has recently led to the legal imposition of gender equality: since the federal elections in 2003 parties are obliged to have as many men as women in their lists. Moreover, the three first-ranked candidates cannot all be of the same sex (Law of 18 July 2002).
3.2 Empirical results

The empirical specification is estimated by pooled OLS using data on 897 candidates, each running in 8 districts (leading to 7176 observations). The main results are in table 3.1. Before discussing these, it should be noted that pooling the data is not self-evident: as we have multiple observations on the same candidates, observations are possibly correlated across districts. As a consequence, pooled OLS results may be biased and a Least Squares Dummy Variable approach necessary. Such a specification introduces a separate intercept for each candidate and is mathematically equivalent to a panel fixed effects estimation (Verbeek, 2000, 313). Formally, in the previous expression, $\alpha$ is replaced by $\alpha_i$. A standard F-test is used to compare the pooled OLS specification and the fixed effects specification. The null hypothesis of this test is that all candidate-specific intercepts are equal ($\alpha_i = \alpha$). If we are unable to reject this hypothesis – that is, if the added candidate-specific intercepts are jointly insignificant – we can use the pooled OLS estimation. Otherwise fixed effects estimation is warranted. For each of the regressions run, the results of this test are given in the bottom-row of table 3.1.

The presentation of the estimation results in table 3.1 is structured as follows. In columns (1) and (2) we first of all analyse the effect of being in a critical position in itself, without considering possible attenuating effects from the level of “cognitive sophistication” of the electorate. The latter effect is brought into the analysis in columns (3) and (4). Finally, columns (5) and (6) present an alternative specification of the model based on the observation that the candidate-specific intercepts are all equal mainly due to the inclusion of the position dummies for first and last position on the list. Indeed, the F-tests at the bottom of table 3.1 indicate that all candidate-specific intercepts are jointly insignificant

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50 As mentioned, 23 political parties participated in the elections. For our analysis, we concentrate on those that presented a sufficient number of candidates to fill all critical positions in the LO-22 format (leaving 12 parties). As 10 parties had 75 candidates while the others had a list of 73 and 74 candidates respectively, this gives a total of 897 candidates. Analysing 8 voting districts, we obtain 7176 observations.

51 This intercept captures politician i’s “average” relative popularity (controlling for the other independent variables). The fact that it captures relative popularity implies that the intercept also takes into account the effect of i’s fellow party-members’ popularity (if i’s colleagues are highly popular, then this will translate into a lower relative vote share for i himself, and thus a lower value for $\alpha_i$).

52 We added position dummies for the first and last candidate because these are “special” positions in themselves (cfr. supra). Still, even with these dummies in place, the smooth inverse specification may not be able to fully capture the highly skewed distribution of preferential votes. Therefore, we test whether the addition of separate dummies for each position improves the specification. An F-test shows these position dummies to be jointly insignificant (F = 0.855, p > 0.10).
for the models presented in column (1) to (4), including these position dummies. The model excluding these extra position dummies – in columns (5) and (6) – firmly rejects the hypothesis that all candidate-specific intercepts are equal (F = 1.27, p < 0.001). Thus, a fixed effects specification is required in this case. Importantly, as shown in the two last columns of table 3.1, the nature of the empirical conclusions – also with regard to the impact of “cognitive sophistication” – is unaffected. For each of the models presented, the full model is given in the first column while insignificant variables are dropped in the second.

In our description of the empirical results, we mainly focus on the results in columns (1) to (4). The reason is that leaving out the position dummies for the first and last position – as done in the two final columns of table 3.1 – clearly reduces the model’s performance. More precisely, both mentioned variables are statistically significant at beyond the 1% level and leaving them out decreases the explanatory value of the model by about 5%.

A candidate’s position is identified as a crucial “predictor” of his/her preferential vote share. Table 3.1 shows that the preferential vote share of a candidate is positively correlated with the inverse of his/her position in the list. Hence, the further down the list a candidate is positioned, the lower the share of his/her party’s preferential votes (s)he obtains. This reflects the common practice of political parties to reserve the higher ranks for the more popular politicians. The use of the inverse of position implies that this relation is non-linear. The difference between two ensuing candidates becomes smaller the further down the list of candidates we go.

Interestingly, the preferential vote share distribution is different when computerised voting is used. In fact, it is flatter in the computerised districts. This can be seen from the fact that the interaction term (1/Pos)*Computer has the opposite sign from the position variable without interaction. Hence, preferential votes are more evenly distributed among candidates when voting is done via computerised ballots. Note also that the first and last position obtain a significantly higher share of the party’s preferential votes, all else equal. This supports the idea that these positions are typically reserved for highly popular politicians (cfr. supra).
Incumbents have a significant advantage. This is in line with the results from a large political science literature (see Gelman and King, 1990). We find, controlling for other factors, that the preferential vote share of incumbent politicians is 0.87 % higher than that of candidates who did not have a seat in the Brussels parliament in the previous term. Also, women appear to obtain significantly better results than men, ceteris paribus. Given all controls in the model, women have a preferential vote share that is 0.18 % higher than that of men. This could point to the fact that women are systematically discriminated (or underestimated) in the sense that they are given positions too far down the list.

Table 3.1: Regression results

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) OLS</th>
<th>(2) OLS</th>
<th>(3) OLS</th>
<th>(4) OLS</th>
<th>(5) FE</th>
<th>(6) FE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.285 *** (10.20)</td>
<td>0.284 *** (10.17)</td>
<td>0.352 *** (4.50)</td>
<td>0.284 *** (10.18)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>First</td>
<td>13.739 *** (7.70)</td>
<td>12.298 *** (9.96)</td>
<td>13.709 *** (7.65)</td>
<td>12.294 *** (9.95)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Last</td>
<td>1.18 *** (4.13)</td>
<td>1.251 *** (5.39)</td>
<td>1.19 *** (4.14)</td>
<td>1.252 *** (5.39)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(1/POS)* COM</td>
<td>-2.501 *** (-2.85)</td>
<td>-4.265 *** (-3.08)</td>
<td>-2.565 *** (-2.83)</td>
<td>-4.263 *** (-3.08)</td>
<td>-5.328 *** (-2.65)</td>
<td>-5.347 *** (-2.65)</td>
</tr>
<tr>
<td>First* COM</td>
<td>-2.875 (-1.22)</td>
<td>-</td>
<td>-2.823 (-1.19)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Last* COM</td>
<td>0.139 (0.31)</td>
<td>-</td>
<td>0.129 (0.28)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>INCUM</td>
<td>0.876 *** (4.57)</td>
<td>0.875 *** (4.56)</td>
<td>0.874 *** (4.56)</td>
<td>0.873 *** (4.55)</td>
<td>1.242 *** (4.48)</td>
<td>1.244 *** (4.49)</td>
</tr>
<tr>
<td>FEM</td>
<td>0.182 *** (5.15)</td>
<td>0.181 *** (5.12)</td>
<td>0.181 *** (5.13)</td>
<td>0.180 *** (5.10)</td>
<td>0.264 *** (6.66)</td>
<td>0.263 *** (6.63)</td>
</tr>
<tr>
<td>C</td>
<td>0.493 *** (8.31)</td>
<td>0.520 *** (8.50)</td>
<td>1.093 *** (5.33)</td>
<td>1.177 *** (6.13)</td>
<td>1.201 *** (5.78)</td>
<td>1.201 *** (5.23)</td>
</tr>
<tr>
<td>ELEC</td>
<td>-</td>
<td>-</td>
<td>-0.004 (-0.86)</td>
<td>-</td>
<td>0.294 (0.69)</td>
<td>-</td>
</tr>
<tr>
<td>C * ELEC</td>
<td>-</td>
<td>-</td>
<td>-0.040 *** (-3.43)</td>
<td>-0.044 *** (-4.12)</td>
<td>-0.054 *** (-4.56)</td>
<td>-0.054 *** (-4.56)</td>
</tr>
<tr>
<td>R² (adj.)</td>
<td>73.16</td>
<td>73.07</td>
<td>73.17</td>
<td>73.08</td>
<td>68.09</td>
<td>68.02</td>
</tr>
<tr>
<td>F-test</td>
<td>1.038</td>
<td>1.062</td>
<td>1.064</td>
<td>1.064</td>
<td>1.273 *** (5.78)</td>
<td>1.255 *** (5.23)</td>
</tr>
</tbody>
</table>

N = 7176; t-values based on White heteroskedasticity-consistent standard errors between brackets *** sign at 1%; ** at 5%; * at 10%

Our central point of interest is, of course, the Ballot Layout Effect. First of all, in columns (1) and (2), we find confirmation of the existence of layout effects: candidates in critical
positions in the 1995 Brussels election have a significant advantage from being in such a position. This reflects the fact that in multi-column layouts, those politicians whose name appeared at the top or bottom of a column in a given district obtained significantly more votes there than in other districts. The coefficients in table 3.1 show that the size of the gain is about 0.5 % on average.

Secondly, in columns (3) and (4) we find that the “cognitive sophistication” of the electorate plays an important tempering role on the strength of layout effects. The interaction of education with the dummy for critical positions yields a statistically significant negative coefficient. This means that the advantage of candidates in critical positions is lower in those voting districts where the electorate has a higher education level. This effect is not only statistically significant; it is also quite strong. To see this, note that the education variable ranges from 11.00 % to 21.76 % of the population (above age 20) holding a college or university degree. The average gain for candidates in critical positions in the districts with the highest education level thus is estimated to be $[1.177 + (-0.044*21.76)]$ or 0.220 %, ceteris paribus. In the districts with the lowest education level, the average gain is equal to $[1.177 + (-0.044*11.00)]$ or 0.683 %, all else equal. This result clearly indicates that “cognitive sophistication” is a crucial determinant of Ballot Layout Effects. It demonstrates that the layout effects in the Brussels Regional elections were to a large extent related to the (lack of) “cognitive sophistication” of the electorate.

Our results are very strong with respect to statistical significance. The size of the effects, on the other hand, appears to be relatively small. However, in relation to the share of preferential votes these same candidates obtain in LO-75 (when they are not positioned at the top or bottom of a column), they are actually quite sizeable. Indeed, candidates in critical positions on average obtained 0.64 % of their party’s preferential vote shares under LO-75. The estimated coefficients thus imply gains from being on the top or bottom position in a column that are certainly non-negligible. They indicate that candidates in “sophisticated” districts obtain nearly 0.86 % when in a critical position while these same candidates would obtain more than 1.3 % of their party’s preferential votes in the least educated districts.
4. Discussion

Our findings show that the electoral outcome depends on details in the formal organisation of the election. This unambiguous presence of Ballot Layout Effects distorts the voting outcome. In what follows we discuss the political effects from this. Also, at a more fundamental level, we discuss how an analysis of Ballot Layout Effects may help to understand the underlying characteristics of individual voting behaviour in terms of rationality. Finally, we discuss the implications of our findings for the assumptions made in the literature on Ballot Position Effects with respect to the voter’s method of scanning the ballot.

4.1 Political consequences

While the electoral gain from being on a “critical” position for some candidates is very high (doubling the share of preferential votes is no exception), the direct political effect in the election under consideration is less spectacular. Indeed, only one candidate on a critical position was actually elected, viz. the candidate in position 15 on the list of the PS, the francophone socialist party.\(^{53}\) This, of course, does not mean that layout effects will never make a difference. It should not be forgotten that in the context of the Brussels’ elections, the impact of the effects was moderated by the fact that different layouts were used simultaneously. As such, the advantage that certain politicians obtained in some districts was levelled out by their results in other districts. Further, and more generally, marginal effects on the number of votes may have enormous political consequences in alternative circumstances. The 2000 US presidential elections are a perfect illustration. There, layout effects from using the “butterfly ballot” may have decided on the US presidency. Few will deny that this is a highly relevant political consequence. Also, Koppell and Steen (2004) show, on analysing the precinct-level election results for the 1998 Democratic primaries in New York City, that name order-effects are both statistically and substantively important. Indeed, they find that in no less than 7 of the 79 contests “the first-position advantage exceeded the margin of victory. That is to say, the

\(^{53}\) Still, even there it is very unlikely that the layout effect observed was responsible for her election (if only because the LO-15 format was applied in but 1 out of 8 voting districts and as the average advantage for candidates in position 15 in LO-15 compared to LO-75 districts is “only” 14.8 percent of their LO-75 score).
first-position effect was large enough to change the outcome of the election” (Koppell and Steen, 2004, 279).

The absence of *direct* political effects in our specific setting does not exclude the presence of important *indirect* effects. For example, the parties can interpret the high number of preferential votes that individual politicians obtain as signals of support for those politicians and the ideas they stand for. It is not unlikely that these ideas then receive more attention on the political agenda than they “deserve”. Further, it can certainly be expected that these politicians obtain a better rank in future elections (as, indeed, the order in which politicians are ranked on a party’s list reflects to a large extent the expected number of preferential votes). Hence, from a policy point of view, the observation of Ballot Layout Effects is of immediate relevance.

The unequivocal finding of layout effects also raises some fundamental questions with respect to the democratic process. Indeed, the mere presence of Ballot Layout Effects may be taken to imply that such election outcomes are somehow “inferior” to one in which no layout effects occur. Indeed, election outcomes (and their political consequences) should not depend on the layout of the ballot form. The finding of an attenuating influence of “cognitive sophistication” even adds a dimension to this normative argument by showing that the distorting effect of layouts is not homogenous among the electorate. More precisely, we find that the distorting layout effects are stronger among less educated voters.

Nonetheless, elections without layout effects may be hard to organise. As a practical solution for the Brussels’ situation, one could neutralise layout effects by randomising the order of the candidates on any given list (a solution already employed to remedy the consequences of ballot position effects, see section 1.2). This, however, makes the distribution of list votes among the candidates in function of their position on the list impossible (or at least random). Alternatively, the number of names in a column could be randomised (i.e. use more than 3 different layouts) so that each politician would have an equal probability of being on top (bottom) of a column. But this may be difficult to organise in elections – like the one under investigation – where each list has 75 candidates. Moreover, it may well be that any such election is sub-optimal relative to the
layout-neutral ideal. The latter may then serve as a theoretical benchmark, much like a full-information equilibrium in the market.

4.2 Expressive voting?

The existence of layout effects may help understanding the nature of voter rationality. Since the publication of Downs’ (1957) path-breaking work, the discussion on the motivations of the electorate has continued. In a Downsian world, voting is instrumental: voters try to influence the election outcome and through this future public policy (see also Chapter 2, section 1). The most general prediction from this model is that people will not turn out to vote. However, even when the voter turns up, (s)he may have little “instrumental” reason to cast a preferential vote. In the Brussels (Belgian) political system there are two specific reasons for this. First, given the strong party discipline, preferential votes for any individual politician are most unlikely to have “real” policy consequences. Second, given the electoral system – where the actual representatives are assigned mainly through the list votes – a vote for, say, the candidate in position 66 is unlikely to have any direct impact. But people do give preferential votes, also for politicians in position 66. Such voting may be evidence of expressive voting. In other words, preferential voting may be an act of “consumption”. One votes for considerations that are relevant to oneself, such as the satisfaction of expressing a political position, or simply the enjoyment of participating in the political process and casting a vote (Riker and Ordeshook, 1968).

Expressive voting may be candidate-related or not. In the former case the voter votes for a politician with whom (s)he identifies. This identification need not be related to any policy issues. The voter may, for example, identify with the candidate’s moral character, good looks, gender or ethnic origin (Brennan and Hamlin, 2000, 136). In a model of candidate-related expressive voting, layout effects (and, for that matter Ballot Position Effects) reflect that voters have either a low benefit from voting for their preferred candidate or high search costs from finding his/her name among a long list of names (see Bowler et al., 1992). Expressive voting may also be unrelated to the candidate. Having chosen for a political party, voters may cast preferential votes for the mere enjoyment of that act, perhaps even because they “feel better” after supporting a (possibly unknown) flesh-and-blood candidate rather than the more distant and impersonal party. In such a model of
non-candidate-related expressive voting, layout effects reflect the “search” costs – or rather “time” costs as voters do not search for any particular candidate – of casting preferential votes.

The clear presence of Ballot Layout Effects in our setting is, however, no waterproof evidence of expressive voting. These effects may also result from the transition to computerised voting. As mentioned in Chapter 1 (section 1.4), this transition involved a change in the voting procedure. In particular, a stepwise procedure was introduced in which the voter first must choose a party (s)he wishes to support and then, in a second step, obtains a screen that displays the names of the candidates of that party. On this second screen, (s)he can then choose to cast no, one or more preferential votes. Not being familiar with the (relatively new) computerised vote, voters may have been misguided by this two-step procedure. More precisely, they may have felt like the “second” voting action (the candidate-vote) was necessary to cast a valid vote and just point the pen at any name without having a particular preference. Note that this could also explain why we observe more preferential votes under computerised voting. With the current information, it is impossible for us to distinguish between the expressive voting and misguided voter explanations. A controlled experiment or a comparison of successive elections could help here as we could expect the degree to which voters are misguided to fall over time when voters become more familiar with the system of computerised voting.

4.3 Ballot scanning

A fundamental micro-question concerns the origin of the observed layout effects. Referring back to the literature on Ballot Position Effects, the role of search costs has been considered in relation with the individual voter’s decision process and the implied voter rationality. These search costs depend critically on how the voter scans the ballot paper. As discussed, it is implicitly assumed in the Ballot Position Effect literature that people go through the candidate list from top to bottom.\textsuperscript{54} Cognitive weariness or satisficing behaviour may then explain the prevalence of Ballot Position Effects (cfr. section 1.1).

\textsuperscript{54} Experimental evidence supporting such a systematic visual search pattern is provided by Neisser (1964). Scott (1993), however, discusses results revealing random search processes.
Still, for layout effects to occur a more complex scanning mechanism should be assumed. Indeed, if people would regard candidates one by one as they go down the ballot, there should be no layout effect (at least not based on the same theoretical arguments as given for Ballot Position Effects). The voter should be equally weary when he reaches, say, candidate 66 in the LO-75 or in the LO-22 format. Nevertheless, the candidate on position 66 in the list does receive much more votes in the LO-22 format than in the LO-75 format. Whereas this candidate on average obtains 0.54 % of the preferential votes for their party in the LO-75 format, this is no less than 2.48 % of the preferential votes in the LO-22 format! Hence, it may be inaccurate to assume that voters go through the entire candidate list from top to bottom. Especially for multi-column lists like the ones under consideration, the voter may scan in a more complex way.

Limited empirical evidence for this assertion is provided by Hermans et al. (1999). They report on a small-scale experiment that analyses the search process for names in a ballot with multi-column layout by 15 subjects (all older than 55). Eye movements are recorded. Subjects are asked to search for a given name (in a three-column layout). The general conclusion from this experiment is that the search process differs strongly over the 15 subjects. Most of them, however, do not go through the list of names systematically from column one to three. Rather, they start searching in the first column, then go to column three or two and then back to column one. Similar search paths have been observed in an experimental setting by Hung et al. (1993).

5. Conclusion

This chapter analysed in-booth voting behaviour. This represents the second step in the voting process after the decision whether or not to turn out and cast a vote (which was analysed in Chapter 2). More precisely, we focused on the effect of long candidate lists – and the ensuing layout differences – on the voter’s preferential vote decision. The central results of this chapter are first of all that long candidate lists, and the associated need to spread these candidates over several columns on the ballot in the electronic formats, lead to changes in the voting behaviour of the electorate. More precisely, we find that the share of preferential votes for the individual candidates depends strongly on the ballot format: candidates whose names appear at the top or at the bottom of a column obtain a
significant electoral advantage compared to the situation where they are not on such a “critical” position. Secondly, the level of “cognitive sophistication” of the electorate has a strong attenuating effect. A larger share of highly educated voters significantly reduces the strength of these Ballot Layout Effects. These results are in line with the literature on Response-Order effects (e.g. Krosnick and Alwin, 1987; Johnson et al., 1999) and psychological research on framing effects (e.g. Smith and Levin, 1996).

Together with the results presented in Chapter 2, these findings provide evidence of a significant effect of political fragmentation on both voting decisions (turnout as well as the in-booth voting decision). The amount of choice offered to the voter – and the layout differences this at times necessitates – influences the voter in his decision whether or not to cast a vote and who to support by means of his vote. With this in mind, in the following two chapters we turn to the effect of political fragmentation on the decisions taken by politicians once they are in office.
PART III

On Government Behaviour
CHAPTER 4: Tax Innovation

Introduction

Hitherto we have concentrated on the voter’s electoral decisions (i.e. turnout and who to vote for). These analyses have revealed significant evidence that the level of political fragmentation influences voters’ electoral decisions. In the upcoming two chapters, we shift focus to policy decisions taken by the government during its legislative term and the effect political fragmentation might have on these decisions. In particular, we study two crucial policy issues. The first of these concerns taxation and, more specifically, the introduction of environmental taxes in Flemish municipalities since 1990. This will be analysed in the present chapter. The second issue relates to local public debt policy and is explored in Chapter 5.

In a federal system like the one in Belgium, lower-level authorities can experiment with new ideas that, if successful, diffuse among the other authorities. Furthermore, the fact that policy innovation is being stimulated offers a strong normative argument in favour of decentralised government. By assigning decision powers to a multitude of lower-level governments, one creates the opportunity and the incentives to innovate. So far, numerous studies have looked into the elements that lead governments to adopt new policies. However, most of these studies disregard the politically important issue of taxation. A likely explanation is that tax innovations are rare events. It does not happen every day that a government decides to impose a new tax (Berry and Berry, 1992). Nonetheless, questions on the why and when of tax innovations are highly relevant. They help us to shed light on political decision-making in a field – taxation – that is intrinsically unpopular among the electorate.

In the present chapter we examine the determinants of tax innovation by Flemish local authorities. We are thereby particularly interested in the effect of political fragmentation on this diffusion process. To the best of our knowledge, this makes our analysis the first encompassing empirical test of tax innovation hypotheses on non-US data. Specifically, we consider the introduction of environmental taxation at the municipal level in Flanders.

55 In a special issue of “Publius, the Journal of Federalism”, Savage (1985) lists over 60 studies analysing policy diffusion in the American States between Walker’s (1969) path-breaking study and the mid 1980s.
This type of taxation has been a remarkable fiscal success story. In 1990, three municipalities introduced a general green tax. In the course of the following 10 years, this inspired many other authorities such that, by 1999, 70 of the 308 Flemish municipalities raised a similar tax. While the introduction of new municipal taxes is by no means exceptional in Flanders, the rapid diffusion of the green tax is absolutely unique.

The remainder of the chapter is structured as follows. Section 1 reviews the literature. While the work that concentrates explicitly on tax innovations is mainly empirical in nature, the underlying theoretical framework needed for our analysis is well-developed in the tax choice literature (Hettich and Winer, 1999). Section 2 presents a stylised tax choice model integrating hypotheses from the tax innovation literature into the Hettich-Winer framework. Section 3 gives background information on the use of environmental taxes in Flanders. The empirical analysis is discussed in section 4. We find that an innovation in the municipal tax system is less likely during an election year, but is more likely if more neighbouring municipalities already set such taxes or under left wing government. Importantly, with respect to the effect of political fragmentation, two opposing effects can be noted. While coalition governments are more likely to set the tax than single-party governments, the greater the fragmentation of the municipal government, the lower the likelihood that a new tax will be set. A summary and conclusions are presented in section 5.

1. Tax Innovation: A Review of the Literature

An innovation is “an idea, practice or object perceived as new by an individual” (Rogers and Shoemaker, 1971, 19). This does not necessarily mean that the idea or practice has to be new in an objective way as well. It may well have been in existence for quite some time. The crucial point is that the specific individual has never used it before. An innovation may thus be seen as a “first use” of an idea or practice.

Up to the 1980s, little research was done on the question why – and when – governments choose to introduce a new tax. This does not imply that tax systems and the determinants of policy innovations were not looked into. Nevertheless, scholars of tax systems, as Berry (1988) mentions, mostly did not proceed beyond a thorough description of the tax
system of a certain area and related this to a number of characteristics of the area. Articles on policy innovation, such as Walker (1969), Mohr (1969) and Gray (1973), look at a variety of issues including tort laws, corporate chartering, consumer affairs and so on but typically exclude taxation. To our knowledge, Mikesell (1978) was the first to inquire into the characteristics of tax innovations. His results – based on the timing of new introductions over the electoral cycle – suggest that innovations in the US states’ tax systems between 1960 and 1977 were concentrated in the years immediately following an election. New taxation was least likely in the year of the election itself.

Hansen (1983) studies the effect of a number of variables on tax innovation, using a cross-sectional framework on the US states. Three types of taxation are regarded: general sales tax, personal income tax and corporate income tax. Her analysis focuses on bivariate relationships between the variables examined. Three important conclusions can be drawn from her study. Firstly, tax innovations are different from other policy innovations. This is explored using each state’s “innovation score”, taken from Walker (1969). These innovation scores are based on the analysis of 88 different policy programs (no tax issues) adopted by at least 20 states prior to 1965 (Walker, 1969). The earlier a state adopts new policies on average, the higher is its innovation score. Contrary to Hansen’s (1983) expectation, the correlation between this innovation score and the introduction of taxation is consistently negative for all three types of taxation. Hence, the more innovative a state in introducing new policies, the less innovative is its tax policy. Hansen (1983, 147) concludes that “the general propensity to innovate is not much help in explaining broad-based tax adoptions” (Hansen, 1983, 147). Secondly, economic considerations affect tax innovation. More precisely, economic crises reduce the political risks of introducing new taxes. Hansen (1983) shows that the introduction of (3 types of) taxation by US States cluster in the Depression years (early 1930s) and occur only infrequently in the prosperous 1920s and 1950s. Thirdly, the “political opportunity” to innovate is a very important intermediary factor. She studies this by comparing states with unified versus divided party control of the legislative and executive body (see Chapter 1, section 2.1). Hansen (1983, 153) argues that the existence of unified versus divided party control diminishes at least part of the “institutional roadblocks” against policy implementation. As such, unified governments should be more likely to introduce taxes than divided governments. The data show some support for this hypothesis.
The first thorough multivariate investigation of the different elements affecting tax innovation is provided in the work of Berry (1988). The data set covers the introduction of 7 types of taxes in the United States over two time periods: 1919-1939 and 1960-1972. The dependent variable in the regression analysis is a dummy variable equal to 1 if a state adopts at least one of these 7 taxes in a given year and 0 otherwise. The author finds that problematic public finances increase the likelihood of a ‘new’ tax being introduced, confirming Hansen’s (1983) finding that tax introductions are clustered in the Depression years. In line with the results of Mikesell (1978) is the finding that proximity to an election significantly reduces the probability of tax introduction. A simulation on the same data set indicates the presence of a (geographical) diffusion pattern in tax innovation. States are more likely to adopt new taxes if their (geographical) neighbours have already done so. Finally, in contrast to Hansen (1983), Berry (1988) finds no significant effect from government weakness: divided and unified governments are as likely to introduce a ‘new’ tax.\footnote{The empirical analyses in Berry (1988) are thorough. Still, a weakness is that a standard probit estimation is made on the pooled data. It has been shown that ignoring the correlations across periods using the standard probit estimation on the pooled data is “consistent, though inefficient” and that “these values can be used as initial estimates” (Verbeek, 2000, 340). The later work by Berry and Berry (1992; 1994) avoids this weakness and performs panel probit estimations. The results for each of the variables included in their work are very much in line with Berry (1988).}

More recent studies by Heyndels \textit{et al.} (1998) and Tyran and Sausgruber (2003) focus explicitly on whether information about the behaviour of other governments influences one’s own decision. Heyndels \textit{et al.} (1998), on the one hand, use a simulation technique similar to that of Berry (1988) on Flemish municipal environmental tax diffusion over the period 1990-95. They find significant “peer effects”. Specifically, it is shown that diffusion of environmental taxation among Flemish municipalities mainly occurred through municipalities with comparable income levels. Tyran and Sausgruber (2003), on the other hand, analyse the tax innovation decision in an experimental setting where they can control whether or not information about the behaviour of other (experimental) jurisdictions is provided. The authors demonstrate that innovation propensities increase when decision-makers are informed about innovations in other (experimental) jurisdictions. As such, these studies illustrate that information spillovers from “peers” are an important guide in the decision process.
On the whole, only few scholars have analysed the elements that guide governments in their decision to implement a new tax. Nonetheless, this previous research is generally supportive of the theoretical work of Hettich and Winer (1984; 1988) that argues that politicians act in a way to minimise the political costs (in terms of votes lost at election time) of their actions (see infra).57

The results with respect to the effect of political fragmentation on the tax innovation decision are clearly inconclusive. As mentioned, Hansen (1983) presents some evidence that unified governments are more likely to introduce a new tax than divided governments whereas Berry (1988) and Berry and Berry (1992; 1994) find no statistically significant differences between both groups. In this respect, tax innovation appears to be at odds with other policy innovations. Crain _et al._ (1988) and Bowling and Ferguson (2001), for example, look at law enactments in the US and find that unified governments enact more laws than divided governments. Emmert and Traut (2003) show that states with divided government take significantly longer to initiate bans on executing the mentally retarded than states with unified governments, all else equal. Boix (1997) and Rattsø and Sorensen (2002) study the effect of fragmented governments on the likelihood of privatisation schemes for public goods provision. Both studies find strong support for the idea that fragmented governments complete less privatisations. More recently, Langset and Rattsø (2004, 10) conclude that in their dataset on Norwegian local governments there is “no evidence that fragmentation holds back the use competitive tendering in the infrastructure sector”. These results do not imply a judgement towards whether it is “good” or “bad” policy to enact more laws or to privatise public services. However, they do point out that fragmented governments seem to have a bias towards the status quo in such decisions, where this bias is not clearly identifiable in tax innovation decisions (or at least not so strongly). In the remainder of the present chapter, we mean to take another look at this issue by analysing tax innovation in Flemish municipalities.

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57 A number of scholars have also analysed why some states adopt state lotteries to raise revenue while others do not (e.g. Filer _et al._, 1988; Berry and Berry, 1990; 1991, Davis _et al._, 1992; Alm _et al._, 1993; Caudill _et al._, 1995 and Erekson _et al._, 1999). These studies too are in agreement with the idea that “the politician’s support is given only if it is not politically expensive to do so” (Caudill _et al._, 1995, 555).
2. **Theory on Tax Introduction**

2.1 *A graphical exposition*

The previous literature on tax innovations has been fairly empirical in nature. However, Hettich and Winer (1984; 1988) provide a theoretical framework of tax choices. Four elements are essential in explaining these choices: the objectives of politicians, the voters’ reactions to policy outcomes, the framework of political competition and the constraints faced by both politicians and taxpayers (Hettich and Winer, 1999, 43). It is assumed that the government maximises its expected votes. Electoral support for a party or government can then be expressed as a function of a party’s policy platform, the opposition’s policy platform and a number of exogenous factors. In the case of taxation, the probability of an individual voting for the governing party depends positively on the public services provided and negatively on the income loss of the individual due to taxation (i.e. tax payments as well as costs incurred in avoiding/evading taxation). This can be seen in figure 4.1 where we consider a situation in which a unique tax instrument (Tax 1) is available.

![Figure 4.1: Optimal Taxation with one Tax Instrument](image-url)
The marginal cost curve in figure 4.1 (MC\textsubscript{1}) reflects the amount of votes that a government loses (in the next election) for a given tax change. This marginal cost curve is upward sloping and quasi-convex to represent the fact that increasing tax rates become progressively more costly (in electoral terms) for politicians. The marginal benefit curve (MB) on the other hand represents the electoral benefits obtained from public expenditures. This curve has a negative slope to indicate that the additional benefits from spending decrease with the level of government spending. The government will set its tax rate in such a way that the electoral cost of taxation equals the marginal benefit from government spending. In figure 4.1, this corresponds with an expenditure (and tax) level \( R_0 \).

The tax choice (and innovation) problem arises when a second tax instrument becomes available to the government. This is analysed in figure 4.2, where we consider a second tax with marginal political costs given by MC\textsubscript{2}.\textsuperscript{58} The decision to introduce this new tax depends crucially on the relative size of the benefits and introduction (set-up) costs associated with the use of a new tax instrument within the jurisdiction. These introduction costs (and, more generally, costs of changing the existing tax rates) are discussed in much detail in Rose and Karran (1987). They argue that modifications to the tax system provide political opponents with a readily identifiable issue to attack the government. Introducing new taxes or changing existing tax rates thus entails (possibly considerable) electoral costs. The existence of such “fixed” costs is also acknowledged in the work of Hettich and Winer (1984, 71). We assume that these introduction costs are non-sunk – i.e. to be paid only if the tax is actually used – and incurred in the following election. So, the introduction of a new tax during a government’s term will translate itself into an electoral loss for the incumbent at the first election that follows. The implication is that a government will only make use of the tax instrument if the introduction costs are offset by the availability of a sizeable benefit.

\textsuperscript{58} Figure 4.2 is drawn on the assumption that marginal political costs are independent across revenue sources (see Hettich and Winer, 1984, 70).
The benefits of using the new tax (that is, of diversifying ones tax structure) are clarified in figure 4.2. They derive from the fact that it is politically less costly to raise any amount of revenue after the introduction of tax 2. This can be seen when horizontally summing the marginal cost curves of both taxes – leading to $MC_T$. In particular, we can distinguish between two specific benefits from the new tax. A first benefit (shaded area A in figure 4.2) reflects the benefit from the lower political cost of the initial tax revenue $R_0$. To raise the same amount of revenue as before ($R_0$), marginal costs drop sharply from $M_0$ to $M_1$. This revenue is now raised from both taxes ($R_1 + R_2 = R_0$). This is the result of a classic optimisation problem in which the government, for any level of expenditures, will adjust the tax rates until the marginal political costs are equalised over the different tax instruments. A second benefit – shaded area B – arises because the lower marginal costs of taxation in general lead to a political net benefit of raising and spending additional tax revenues ($R_0’ - R_0$).

In conclusion, starting from a tax revenue of $R_0$ that is raised through one tax only, the government will decide to introduce the newly available tax 2 only if the costs of doing so are smaller than the benefits. In other words, as long as (area A) + (area B) is larger than
the introduction costs of the new tax, it is politically rewarding to introduce it (while at the same time lowering the existing taxes).

2.2 Hypotheses

The literature on tax innovation – and on policy innovation more generally – provides us with a number of testable hypotheses concerning the factors affecting tax innovation. We discuss each of these and integrate them into the expanded Hettich and Winer (1984, 1988) framework of tax choices presented above. Most of these hypotheses are generally applicable. That is, they hold independently of the type of taxation that is under consideration. However, some hypotheses are special to the case of the environmental tax explored in the empirical section. Special attention will be drawn to this issue.

The tax structure that is in place reflects the political equilibrium before a ‘new’ tax instrument becomes available. This equilibrium not only determines the amount of total tax revenues but also the composition among different tax instruments. A first hypothesis with respect to the likelihood that the government will actually make use of the newly available green tax instrument is:

**H1:** Innovation is more likely the larger the initial per capita tax revenues.

This is due to the fact that the MC-curves are upward sloping and quasi-convex. Higher initial revenues then indicate higher marginal political costs of these revenues. Hence, the probability that the new tax is politically cheaper *at the margin* than the old tax(es) increases with the level of initial revenues. Also, referring back to figure 4.2, it can readily be seen that the benefits from introducing the new tax (given by area A + B) will be larger the larger is $R_0$. As by assumption the introduction costs are fixed, i.e. unrelated to the size of the tax, larger initial tax revenues imply a higher probability of introduction (as this corresponds with a higher value of A + B).

The availability of a new tax rotates the initial marginal cost curve downward (see figure 4.2). This downward rotation leads to political benefits of introducing the new tax (given by area A + B). Importantly, the lower are the marginal political costs of the new tax (i.e. the flatter the slope of MC$_2$), the stronger this rotation – and the larger the area A + B will
be. The question then obviously becomes what determines the shape of the political cost curve of the new tax. A number of hypotheses can be derived from the literature. It is important to note that some of these arguments not only explain the expected political benefits of \textit{having} the new tax (the area A + B), but also the costs of \textit{introducing} it. An example is implied in:

\textbf{H2:} Innovation is more likely if neighbouring municipalities have already introduced a similar tax.

Political costs of introducing and/or having the green tax will be lower if politicians can refer to “peers”/“neighbours” that have made similar decisions (Hettich and Winer, 1984; Berry and Berry, 1992). Mimicking behaviour – jurisdictions copying each other’s tax policies – may then result. Such policy mimicking is a rational decision in a context of yardstick competition where the behaviour of one government inflicts \textit{informational externalities} on politicians elsewhere: voters compare policies among jurisdictions to overcome information asymmetries in distinguishing “good” from “bad” politicians (Salmon, 1987a, b; Besley and Case, 1995). A number of recent publications have demonstrated the existence of tax mimicking behaviour in different contexts (e.g. Heyndels and Vuchelen, 1998; Revelli, 2001, 2002 and Tyran and Sausgruber, 2003).

In the specific case of the environmental tax, the position of the marginal political cost curve may be influenced by the environmental situation of the jurisdiction. We expect that the public opinion will be more easily convinced (and thus at lower electoral costs) of the need for a new environmental tax in jurisdictions where pollution in most general terms is (considered to be) a problem. This may especially be the case in Flemish municipalities as it is common practice to earmark the revenues from the green tax to “green expenditures”. So a hypothesis that applies to the specific situation of the “green tax” is:

\textbf{H3:} Innovation is more likely in highly polluted jurisdictions.

Introducing and collecting taxes implies that administrative costs of collection are incurred. These costs have been recognised as a crucial determinant of the tax structure (Musgrave, 1969, 133). The presence of fixed administrative costs lowers “net” tax
revenue. As a result, public expenditures will be lower and political opposition higher. When tax collection is organised at a larger scale, these fixed administrative costs can be spread over a larger population. Hence, “net” revenue will be higher in large jurisdictions compared to small ones. This makes the new tax more “productive” from an electoral perspective in more populous areas:

**H4:** Innovation is more likely in larger jurisdictions.

It has been shown in the literature that politicians avoid tax increases and innovations in the tax system when an election is imminent (e.g. Mikesell, 1978; Berry, 1988 and Royed and Borelli, 1999). The literature on Political Budget Cycles (PBC) argues that politicians, motivated by their chances of re-election, want to “signal” their political abilities to the public prior to the election by the manipulation of fiscal policy (Rogoff, 1990). Whereas early models rely on voters’ inadequate consideration of the intertemporal budget constraint to explain the existence of such electoral cycles (e.g. Nordhaus, 1975), later models show that electoral cycles will persist even when rational expectations on the part of the voter are assumed (e.g. Rogoff, 1990). Since increasing expenditures and/or lowering taxation are likely to add to the politicians’ popularity, this suggests:

**H5:** Innovation is more likely the longer is the time until the next election.

Left-wing parties are more in favour of government intervention, while right-wing parties more fiercely support the workings of the market. This generally accepted idea is likely captured by H1 as left-wing governments will then be more likely to have higher initial tax revenues. Still, the same argument may imply that leftist governments face lower political introduction costs. A similar argument is made in Alesina and Rosenthal (1995). They argue that voters do not judge decisions with respect to taxation equally for all parties but rather let their judgment depend on the ideology of the party. Alt *et al.* (1998) provide some empirical support for this idea by showing that the Republican Party in the US is punished more severely for tax increases than the Democratic Party. As a result, we hypothesize:
H6: Innovation is more likely under left-wing governments.

In addition to this ideological revenue-argument, it may be the case that the environmental label of the tax is more convincing for leftist voters to the extent that these have a more positive attitude towards environmental policy in general.

The remaining two hypotheses relate to the fragmentation of government. We expect:

H7: Innovation is less likely under fragmented government.

Different models in the political-economy literature suggest this hypothesis. The basic intuition is that when more parties share power, conflicts will occur leading to government indecisiveness and legislative gridlock (Vuchelen, 1990, Ch. 13; Boix, 1997). Game theory suggests that these conflicts increase in the number of parties (de Haan and Sturm, 1997, 740). This type of indecisiveness lies at the heart of the so-called Weak Government Hypothesis (WGH) that states that fragmented governments tend to run higher budget deficits (Roubini and Sachs, 1989a, b; see also Chapter 5). Note that this hypothesis is supported by recent findings of Ashworth and Heyndels (2001a). They show that fragmentation affects the evolution of the national tax structures in OECD countries when exogenous shocks lead to a divergence from the countries’ ideal structure. More precisely, they find that bringing “the tax structure back in line with its ideal (…) takes longer under more fragmented governments” (Ashworth and Heyndels, 2001a, 377).

An alternative view on hypothesis 7 is based on the assumption that the marginal political costs of individual tax instruments differ between parties. In an extreme scenario, each party’s electorate pays one specific tax and does not contribute to the other taxes. The implication of this is that – for each party – marginal political costs are positive for one tax only. In the more general case this means that marginal political costs are highest for that tax. If a given party is in power, the tax levied on its voters will not be used and tax revenues will have to come from the remaining tax instruments. For example, when we have n political parties and a coalition composed of k out of n parties, we expect tax revenues to come from n-k different tax sources. Thus, the larger the number of coalition parties, the smaller the amount of tax instruments used because each party will veto the use of the tax paid by its voters. In terms of a newly available tax instrument, this means
that the more parties there are in the coalition, the less likely it is that a newly available tax instrument will be chosen (as the probability of a veto against the innovation by one of the coalition members is higher).

Fragmented governments differ from one-party governments in more than just their decision power or their dispersed interests. Indeed, coalition members are – as a general rule – less certain about their position after the following elections. This uncertainty about future legislative power may affect their time perspective. The relevance of this is clear: while the introduction costs of a new tax are non-recurrent, the political benefits from the new tax (area A+B in figure 4.2) are. So, a government with a time perspective that goes beyond the following election will also take the present value of political benefits after future election(s) into account. The longer the time perspective of the government, the more likely it is that net benefits are positive and, thus, the more likely it is that it will adopt the new tax. To the extent that coalition parties are less certain that they will be part of a future government, this idea supports H7.

The latter argument can, however, be generalised. Incumbent governments will be more certain to remain in power after the next election to the extent that they currently have a larger electoral margin (“excess votes” or “excess seats”). Hence, governments with a larger electoral margin will have a longer time horizon, taking also future benefits of the ‘new’ tax into account. Note that this argument holds for single-party majorities as well as for coalitions. Indeed, coalitions with larger electoral margins may find it easier to continue the coalition after the next election. Still, for a given electoral margin, the uncertainty about future government participation will be larger for coalition parties (because of the unpredictability of the coalition process). This implies:

**H8:** Innovation is more likely the larger the electoral margin of government. This effect is stronger under single-party governments.

In support of hypothesis 8, it has recently been argued that “parties tend to make government larger as their likelihood of electoral victory increases” (Caplan, 2001, 825). The reason is that politicians who are fairly sure about their re-election “probably do not care all that much about votes lost by raising taxes” (Solé Ollé, 2003, 686).
3. Environmental Taxes in Flemish Municipalities

Flemish municipalities have a wide-ranging autonomy. This autonomy is a fundamental characteristic of Belgian local governments and is taken up in article 162 of the Belgian constitution. This article basically states that municipal councils “can take any initiative that is not prohibited explicitly by central legislation” (Vanneste, 2002, 82). With respect to taxation this implies that not only are municipal governments free to set tax rates on the existing taxes, they also have a considerable liberty to introduce new taxes. While 80 percent of local tax revenues is raised through local income and local property taxes (both in the form of surcharges on higher-level government taxes), a most visible consequence of Flemish municipalities’ fiscal autonomy is the enormous diversity of tax structures. Currently, about 120 different taxes are being used and the average municipality levies 20 different taxes. Among these, the most “exotic” taxes can be found: taxes on private swimming pools, on balconies, on transportation of drunken persons, on dogs, boats, on free distribution of telephone books, and so on.

In the empirical section of this chapter we analyse the introduction of a general “green tax” levied on inhabitants of the Flemish municipalities.\(^{59}\) These inhabitants can be households as well as firms. Most often, taxation occurs in the form of a lump sum tax to be paid by every household and/or firm. This implies that the green tax is not used as an active policy instrument intended to induce behavioural changes. The link to environmental policy exists in the sense that revenues collected though the green tax are used to finance municipal measures in the field. Very often such earmarking of green taxes for environmental expenditures is mentioned explicitly at their introduction. There is a general view that the earmarking or labelling of tax revenues is used in order to make changes in the tax system politically less costly (Moesen and Van Rompuy, 1997, 105; Matthijs et al., 2001, 223).

The introduction of environmental taxation at the local level in Flanders was a remarkable fiscal success story. Since its introduction in 1990, the popularity of this form of taxation has increased enormously. By 1999, 70 of the 308 Flemish municipalities used a general

\(^{59}\) In the municipal accounts, this tax has the following code: 04036317 (“Milieubelasting”). As of 1995, this code replaces two separate codes, viz. 04036311 ("Milieubijdrage gezinnen en bedrijven") and 04036436 ("Milieubelasting algemeen").
green tax. The evolution from year to year is shown in figure 4.3. The figure clearly illustrates that during the first few years of its existence, the green tax found its way to the accounts of the Flemish municipalities at an increasing speed. The number of municipalities levying the tax increased with 3, 10, 17 and 15 for the first four years respectively. This rapid rise is then suddenly stopped and even reversed in 1994. It is noteworthy that this was an election year. As of 1995, there once again is a steady growth in the number of municipalities that levy the tax. However, the increase is more moderate than during the first years of environmental taxation in Flanders. Hence, figure 4.3 shows the traditional S-shape one finds in numerous studies on innovation diffusion (e.g. Griliches, 1971; Gray, 1973).

As can also be derived from figure 4.3, some municipalities have discontinued the use of the green tax. Hence, the (net) year-to-year rise or fall in the number of municipalities with an environmental tax represented in figure 4.3 is the sum of the amount of introductions and abolitions of the tax. A more detailed representation is provided in

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60 The figure is based on data from the municipal accounts. This explains the minor differences between these data and those presented in the study by Heyndels et al. (1998) where budgetary data are used. Still, the use of accounting data allows us to generate a data set comprising a larger number of years.
figure 4.4 where we represent the data on the number of introductions and abolitions separately for all years in our sample. The dark-grey histograms in figure 4.4 refer to introductions while light-grey histograms indicate abolitions in a given year.

As in figure 4.3, it is clear that the number of municipalities introducing environmental taxation increases rapidly in the first years, while the number of abolitions remains very low. The picture reverses in 1994. Apparently, municipal governments are reluctant to introduce the green tax in the year of an election, but are relatively keen to abolish it – in line with the literature on Political Budget Cycles (cfr. supra). The data also correspond with the empirical result in Ashworth and Heyndels (2002). They find that tax structure manipulation (in either direction) tends to be at a minimum in election years (for OECD countries). In the only election year in our sample 17 changes (5 introductions and 12 abolitions) take place. This number is lower than in any of the two years preceding and any of the two years following the election.

![Figure 4.4: Municipalities adopting/abolishing environmental taxation (1990-99)](image)

Note that the number of introductions in figure 4.4 is not necessarily equal to the number of “first-time adoptions”. In fact, some municipalities at times re-introduce the
environmental tax after having abolished it in the recent past. This means that the actual number of “first-time adoptions” is (slightly) lower than the adoption figures presented in figure 4.4.

4. Empirical Analysis

4.1 Empirical model

We consider Flemish local governments’ decision to innovate their tax system through the adoption of a general green tax. Importantly, we thereby analyse “first-time adoptions” only using data based on the municipal accounts for the period 1991-1999. The hypotheses above suggest the following (reduced form) model to be estimated:

\[ \text{TAX}^{*}_{i,t} = F (\text{TAXR}_{i,t}, \text{NEIGH}_1, \text{NEIGH}_2, \text{POLL}_{i,t}, \text{POP}_{i,t}, \text{ELECT}_{i,t}, \text{ICG}_{i,t}, \text{FRAG}_{i,t}, \text{MAJ}_{i,t}) \]

where one assumes that the decision to adopt a green tax is given by some unobservable variable, TAX*. If TAX* > 0, the tax is adopted and TAX = 1. If TAX* = 0, the tax is not adopted and TAX = 0.

TAXR is the per capita revenue raised from all other taxes in the jurisdiction. NEIGH is a vector incorporating two variables (NEIGH1 and NEIGH2) to test the effect of one’s neighbours having introduced the green tax in the past (H2). NEIGH1 reflects the percentage of neighbouring municipalities with an environmental tax in the previous year. We also include second order neighbours (neighbours of neighbours) (NEIGH2) because a municipality’s influence may reach beyond its direct geographical neighbours. This idea is taken from Heyndels and Vuchelen (1998) and is especially relevant as the average size of Flemish municipalities is small (about 44 km² on average).\(^61\) POLL is a vector measuring the external necessity for the introduction of an environmental tax (H3). It consists of two objective measures of pollution: the amount of waste per capita (WASTE) and the quality of the air (AIRQUAL, measured negatively in terms of the precipitation of

\(^{61}\) We lag our neighbourhood variables by one year to avoid the simultaneity issues that would be present if contemporaneous setting was considered. Hausman (1978) tests of exogeneity were examined using the neighbours’ variables lagged one further period as the instruments (the Sargan test of misspecification of
nitrous and sulphur oxide). POP is the population size of the municipality and tests for possible scale effects in tax collection (H4).

Following Berry and Berry (1992), ELECT examines the Political Budget Cycle hypothesis (H5) via two approaches. Firstly, a dummy variable is introduced for the election year, ELECT1. As an alternative, ELECT2 gives the years until the next election (and ranges from 0 in election years to 5 in the first post-election year). ICG refers to the Ideological Complexion of the Government (Kontopoulos and Perotti, 1999) and reflects the idea that leftist governments may be more induced to introduce (environmental) taxation (H6). It is defined as the weighted average “complexion” of coalition parties. Complexity refers to a party’s ideological position on a scale from 0 (extreme Left) to 10 (extreme Right).62 FRAG is a vector testing for a fragmentation effect (H7). Two measures are included in this vector: NoP is the number of parties (in the coalition) and SOLE is a dummy variable for one-party majorities.63 Finally, MAJ refers to the number of “excess seats” (i.e. seats above simple majority) of the ruling party/parties. This variable, and its interaction with SOLE, are introduced to test the hypothesis that introduction will be more likely when the electoral margin of the government is larger (H8).

Having discussed the variables affecting the adoption of the green tax, it is necessary to discuss the appropriate estimating technique that takes into account the specific nature of the dependent variable. Since the real interest here is in the timing of the tax innovation decision, we consider a discrete-time hazard model. In such a model, the aim is to use data on independent variables in a given year to determine the probability of a given action (in our case tax adoption) in that year. Whilst hazard functions as such are widely used in economics, the use of discrete-time hazard models is less widespread though, as will be seen, they have been used de facto. The likelihood function for the discrete-time hazard model is made up of two types of probabilities. Firstly, for municipalities that have

\[ \text{the instruments indicated that this choice is satisfactory). The Hausman test points to exogeneity and so the results presented in table 4.1 are from the estimation without instruments.} \]

62 The data concerning a party’s ideological position were obtained from Deschouwer (1996). They are based on a self-placement survey. Data were obtained by asking presidents and spokesmen of the parties in the municipalities to locate their party on an ideological scale between 0 (Left) and 10 (Right). The figures range from 2.8 (SP) to 5.6 (VLD) in 1988 and from 2.6 (Agalev) to 6.1 (VLD) in 1994.

63 Importantly, we checked whether the size inequalities between the parties in the coalition have an additional effect on the tax innovation decision. To do so, we included the “effective” number of parties
adopted the tax in the sample period, there is the probability that municipality i “needs” t periods to adopt the tax:

$$P(T_i = t) = P_a \prod_{j=1}^{t-1} (1 - P_i)$$

This equals the probability of the municipality adopting the tax in time t multiplied by the probabilities that the tax was not adopted in periods 1 through to t-1. For any municipality that has not adopted the tax throughout the entire sample period, there is the second expression:

$$P(T_i > T) = \prod_{j=1}^{T} (1 - P_i)$$

The likelihood function for the entire sample is the product of these probabilities:

$$L = \prod_{i=1}^{N} [P(T_i = t)]^{c_i} [P(T_i > T)]^{1-c_i}$$

where $c_i = 1$ if local authority i adopted the tax and $c_i = 0$ if local authority i did not adopt the tax during the period under consideration. Assuming that the probabilities are expressed as a logit model, as Allison (1982) and Caudill et al. (1995) show, the model can be estimated as a standard (pooled) logit model. Before we turn to the results, it should be noted that an important part of the analysis is that the observations for a given municipality are cut off once that municipality adopts the tax for the first time. Since these municipalities are then no longer “at risk” of adopting the policy (and certainly not “at risk” of a first-time adoption), they are removed from the risk set for subsequent years. That is, the dataset is “right-censored”.

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64 In principle, it would be possible to introduce a normal error term to the model. However, the hazard function does not simplify as neatly under those circumstances. Hence we assume the standard logistic distribution. The probability of a tax being introduced is then given by the familiar logit formula. Similar sort of analyses are undertaken by Alm et al. (1993) and Erekson et al. (1999) with respect to lottery adoption in the US.
4.2 Empirical results

The results of our estimation are presented in table 4.1. They are presented such that the most general specification is followed by a more restricted version. In the latter, insignificant variables have been omitted in order to make a more efficient model without compromising the diagnostic tests. Columns (1) and (2) differ from columns (3) and (4) only by the inclusion of a different measure for the Political Budget Cycle Hypothesis. Whereas we use the time before the election (ELECT2) to obtain the first set of regression results, a dummy equal to 1 in election years and 0 otherwise (ELECT1) is used in the second set of results.

Also, it should be noted that two basic functional forms were examined. They differ by the inclusion of (the natural logarithm) of a time trend, TIME, to examine the presence of a “bandwagon” effect (see last two columns in table 4.1). The negative sign of this variable indicates that there is a general tendency for negative duration dependence. This would reflect that municipalities with a predisposition to adopt a green tax will do so early, leaving only those with a predisposition to non-adoption. To identify which of these specifications is superior we carried out the Davidson and MacKinnon (1993) J-test (see also Chapter 2, section 3.3). It can be seen that both of the resulting “preferred equations” are well-specified (t-values below the critical value at the 5% level) and that the Davidson and MacKinnon (1993) J-test thus does not identify one or other form as being superior. Note, however, that the addition of the trend effect “casts some mist” over the estimation. If it is included, this time trend makes the ideology variable insignificant. Thus any interpretation with respect to this variable must be taken with caution. In what follows below, interpretation is given to the estimation without the trend though the comments of this paragraph should not be forgotten.

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65 Sixteen municipalities had to be removed from the dataset due to an incomplete series of accounts. In addition, Mechelen, Lokeren and Sint Niklaas are removed from the tax setting hazard as they introduced environmental taxes in 1990. This is in line with the standard practice in the literature to take the year after the first introductions have taken place as the starting point of the analysis.

66 We could also have tested both models against each other using a non-nested F-test instead of the J-test. However, as the latter is more parsimonious, we opted for the Davidson and MacKinnon (1993) J-test.
Table 4.1: Discrete-Time Hazard Estimation Results

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<th>(4)</th>
<th>(5)</th>
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<td>(0.555)</td>
<td>(0.555)</td>
<td>(0.555)</td>
<td>(0.500)</td>
</tr>
<tr>
<td>SOLE</td>
<td>-0.980 *</td>
<td>-0.995 **</td>
<td>-0.993 *</td>
<td>-1.059 **</td>
<td>-0.954 *</td>
<td>-1.002 **</td>
</tr>
<tr>
<td></td>
<td>(0.550)</td>
<td>(0.499)</td>
<td>(0.555)</td>
<td>(0.500)</td>
<td>(0.555)</td>
<td>(0.500)</td>
</tr>
<tr>
<td>NoP (coalition)</td>
<td>-0.657 *</td>
<td>-0.698 *</td>
<td>-0.677 *</td>
<td>-0.712 *</td>
<td>-0.658 *</td>
<td>-0.705 *</td>
</tr>
<tr>
<td></td>
<td>(0.397)</td>
<td>(0.395)</td>
<td>(0.397)</td>
<td>(0.397)</td>
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<tr>
<td>ICG</td>
<td>-0.265 **</td>
<td>-0.246 **</td>
<td>-0.220 **</td>
<td>-0.229 **</td>
<td>-0.075</td>
<td>-0.075</td>
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<td></td>
<td>(0.120)</td>
<td>(0.105)</td>
<td>(0.103)</td>
<td>(0.094)</td>
<td>(0.139)</td>
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<td>MAJ</td>
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<td>0.005</td>
<td>0.007</td>
<td>0.007</td>
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<tr>
<td></td>
<td>(0.013)</td>
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<td>(0.014)</td>
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</tr>
<tr>
<td>MAJ*SOLE</td>
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<td>0.008</td>
<td>0.008</td>
<td>0.008</td>
<td>0.008</td>
<td>0.008</td>
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<tr>
<td></td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.024)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>TIME</td>
<td>-0.427</td>
<td>-0.427</td>
<td>-0.427</td>
<td>-0.427</td>
<td>-0.427</td>
<td>-0.427</td>
</tr>
<tr>
<td></td>
<td>(0.260)</td>
<td>(0.260)</td>
<td>(0.260)</td>
<td>(0.260)</td>
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<td>(0.260)</td>
</tr>
</tbody>
</table>

Notes: Estimated standard errors in parentheses (** Significant at 1 % level; * at 10% level); χ² is the test of overall significance of the equation; χ²(R) is the test of the omission of variables from the general model with R the number of omitted variables (values between brackets here refer to the number of degrees of freedom). The other tests are explained in the text. In all cases if the insignificant intercept is removed, the remaining variables become more significant.

Before we turn to the interpretation of the coefficient estimates, we note that the underlying assumptions of the estimating equations are not contradicted by the diagnostic tests available. Firstly, Ramsey’s (1969) Regression Equation Specification Error Test (RESET) provides a general test for the functional form of the model (see also Chapter 2, section 3.3). The results indicate that the test statistic for RESET³ is significant at the 5 %
level (though not at the 1% level) in the model with the time trend, but not in the model without the time trend. For RESET², we cannot reject the hypothesis that the parameters for the squared and cubed fitted values are equal to zero in either model (at reasonable levels of significance). Secondly, the test-statistics for the White test for heteroskedasticity, shown in the bottom row of the table, illustrate that heteroskedasticity appears not to be a problem in our sample – at least for the models where the insignificant variables have been removed. The test statistics indicated at the bottom of columns (2), (4) and (6) remain under the relevant critical value taken from the Chi² distribution (equal to Chi²_{22;0.05} = 33.924). Given the results of these diagnostic tests, the results presented in table 4.1 can be taken as offering a tentative explanation of the green tax phenomenon in Flanders.

Initially, we look at the results for the central variables of the analysis, those measuring the effect of political fragmentation. Firstly, a one-party majority is less likely to adopt the new tax compared to coalition governments. This is clearly in contrast to hypothesis 7. A possible explanation for this finding is that, in the case of coalition governments, the electorate cannot easily distinguish which party has “caused” the taxes to be levied. Therefore, the political cost of tax innovation may be smaller for parties in a coalition. In other words, fragmented governments may be less hesitant to introduce new taxes as each member of the coalition can “blame” the other coalition partners for the introduction. However, and crucially, there is a significant offsetting effect when the number of parties in the municipal government becomes larger. Indeed, there is a lower probability of introducing the new tax the more fragmented the government; a robust finding in all specifications. This is in support of our general hypothesis that fragmented governments are more likely to be gridlocked.

It thus appears that there are two conflicting effects from fragmentation. On the one hand, the “clarity of responsibility” is lower in coalition governments. Voters cannot distinguish which party is “to blame” for the new tax. This decreases the costs of unpopular actions for each given party and increases the likelihood to introduce new taxation. On the other hand, though larger coalitions may agree on the need for new revenue sources, they may be unable to decide on the form of taxation as each will veto a tax levied on its voters. This becomes increasingly problematic as the number of parties
in the coalition increases. Larger coalitions are thus less likely to introduce a new tax than small coalitions.

Importantly, the same result also holds when the “effective” number of parties in the government (ENP, see Chapter 1) is used instead of the “actual” number of parties (NoP). The general fit of the model, however, is better in the specification disregarding size inequalities between the parties in the coalition. This indicates that the relative size of the coalition partners does not have a separate effect on tax innovation in Flemish municipalities, over and above the number-of-parties effect.

Let us now cast a look at the remaining results in table 4.1. Starting with the significant results, it can be seen that, first of all, the election-variables have the expected sign and are statistically significant at least at the 5% level. The presence of elections thus has a strong negative effect on the likelihood of introducing the tax. Also, the further in time an election is, the more likely it is that the green tax will be installed, confirming hypothesis 5. Note also that upon comparing columns 2 and 4 in table 4.1, it is clear that the fit of the model is better when we take the election-year dummy (the $\chi^2$-statistic of the latter specification is much higher than in the specification using ELECT2). This is in line with Berry and Berry (1992) who find strong effects for the election year dummy variable but (much) less clear results for the election cycle model. They interpret these results as evidence of strong voter myopia.

Secondly, the ideological complexion of the government (ICG) has the expected negative sign and, in the absence of the time trend, is statistically significant. This means that more leftist governments (as lower numbers for the variable refer to more leftist orientation) are more likely to introduce an environmental tax, in line with hypothesis 6. As mentioned previously, this may reflect one of two things. On the one hand, it is possible that the fixed costs of tax introduction are lower for leftist parties. On the other hand, it may also be specific to the case of the green tax. Because the green tax is earmarked to expenditures in the field of environmental policy, a field that is more prevalent among the leftist electorate, the marginal cost curve may lie lower for leftist parties.
Thirdly, we find support for the “neighbours” effect (H2). Both the (relative) number of direct neighbours and the (relative) number of second-order neighbours that had an environmental tax in the previous year have the expected positive sign. A rise in the proportion of neighbours already setting the green tax thus leads to a rise in the likelihood of setting that same tax. Still, there is a less robust message concerning significance. Overall, first order neighbours are the dominant factor (a standard J-test against an equation containing only second order neighbours confirming this) with multicollinearity present when both sets of neighbours are included.

Finally, we briefly consider those variables that are insignificant. It can be seen that there is no effect from the other tax revenue sources (H1). In addition, population size has no effect, which points to the absence of scale effects in setting the green tax (H4). There is furthermore only limited support for the pollution effect (H3). It appears that municipalities with more waste per capita have a higher likelihood of adopting an environmental tax – the “waste” variable always has the anticipated positive sign – but it only approaches 10% significance. Air quality is never statistically significant. The latter finding may point to the fact that air pollution is simply less visible to the electorate. So, generally, the likelihood of adoption of green taxes is unaffected by environmental problems in the municipality. Finally, there is no convincing evidence for the proposition that a larger majority leads to a greater likelihood of setting the tax (H8). The excess seats variable has the anticipated positive effect but this is not significant. Moreover, there is no differential effect depending on the fragmentation of the government.

5. Conclusion

In this chapter we shifted focus from political decisions taken by the voters to those taken by the government during its legislative term. More precisely, the present chapter

67 The latter result is at odds with empirical evidence presented in Caplan (2001) and Solé Ollé (2003). These scholars show that tax revenues per capita are higher in US states where the electoral victory of the incumbents is more certain (Caplan, 2001) and that tax rates in Spanish municipalities are higher when the local government has a larger electoral margin (Solé Ollé, 2003).
68 We should note that we also tested whether the level of indebtedness of the municipality influences the introduction of the green tax. Including the level of local public debt per capita results in a non-significant positive coefficient. As such, higher levels of local public indebtedness do not appear to materially increase the likelihood of adopting a new tax. There is also no material change to the other results presented.
considered policy innovation in the field of municipal taxation and the effect political fragmentation might have on this decision. Though research on the characteristics of policy innovation is in general well developed, taxation is often disregarded in this literature. The present analysis assists in filling this void. Moreover, the specific case under consideration here – the green tax in Flemish municipalities – is of particular interest. Indeed, whilst all new taxes can be considered to have a political cost, the green tax will have a degree of favour amongst some of the voters as the tax is (often) earmarked to expenditures in the field of environmental policy. Despite this, it very clearly is a tax and thus a “bad” for the voter.

The adoption of green taxes by Flemish municipalities clearly demonstrates the role of politics on environmental tax policy. Tax adoptions follow a pattern dictated by the electoral constraints under which incumbent governments work. The presence of an election discourages innovation. Further, neighbour effects are crucial: the greater the adoption of the tax amongst neighbours, the greater the probability that a given municipality will introduce the tax. This holds despite a trend over time towards non-adoption once the committed have innovated. Additionally, the adoption of green taxes seems to depend more heavily on the political-institutional context than, say, on the environmental situation of the jurisdiction. The results indeed show that the green tax is not more likely to be adopted in highly polluted municipalities. This, of course, may be a consequence of the specific nature of the municipal green tax in Flanders. It is essentially a lump-sum tax and thus clearly not an instrument to induce taxpayers’ behavioural reaction.

Importantly, we find statistically significant evidence that political fragmentation affects the decision to introduce the new tax. The effect itself is, however, not fully in line with our *a priori* expectations. It is found that coalition governments are *more* likely to set the new tax than one-party governments. As coalition governments were expected to be more liable to legislative gridlock and to have shorter time horizons (thus disregarding future benefits from the new tax), this implies a clear rejection of the hypothesis brought forward. A possible explanation for this is that the political costs from the new tax can be dispersed over the various coalition partners. The voters are unclear about who to hold responsible and the costs of unpopular decisions are lower for each party separately. Still, this result is driven by the smaller (two-party) coalitions. Indeed, we also show that the
more fragmented the government, the less likely green tax innovation will be. The reason is that legislative gridlock becomes more likely with the number of parties attending in the decision-making process.
Chapter 5: Municipal Debt Development

Introduction

From taxation to public debts is only a minor step. The relation between the two lies in the fact that the government has two options to finance the expenses it incurs to provide public goods and services. It can either levy certain taxes on its inhabitants in the present period or it can borrow the necessary funds. Obviously, loans have to be repaid sometime. This means that in some future period revenues will have to be sought by the government. Hence, public debt is merely deferred taxation. The present chapter deals with the development of local public debts in Flemish municipalities. More precisely, we wish to infer whether municipalities with more fragmented governments follow a different debt policy than municipalities where the government is less fragmented.

In contrast to the taxation-innovation issue analysed in Chapter 4, there is a large literature available that looks at the effect of political fragmentation on public deficits and debts. In a path-breaking study, Roubini and Sachs (1989a, b) show that “weaker” (i.e. more fragmented) governments tend to face larger budget deficits and debts. This came to be known as the Weak Government Hypothesis (WGH). Since this seminal contribution, numerous studies have examined the link between government fragmentation and public debt and deficits confirming (or rejecting) the original findings of Roubini and Sachs. Hitherto, most studies in the WGH-literature perform an analysis based on panel-data from a number of (mostly OECD) countries or employ a time-series design using data from one specific country. There thus is a strong focus on country-level data.

Still, the use of data on lower-level governments provides an interesting means to test the WGH on a much broader database. Indeed, an international country-level dataset is necessarily restricted in size due to a by definition limited number of countries of which reliable data are available. Usually approximately 20 countries are considered. This can be drastically expanded when one moves to a lower level of government, which considerably increases the potential of the dataset. Several scholars have therefore taken up the analysis of lower-level data. Clingermayer (1991), Alt and Lowry (1994), Poterba (1994) and Clingermayer and Wood (1995) look at US state-level data. Tovmo (2001)
and Borge (2003) look at Norwegian municipalities. Rattsø and Tovmo (2002) regard Danish local governments. In the present chapter, we provide a test of the Weak Government Hypothesis making use of a new Flemish municipality-level dataset.

We analyse the determinants of local public indebtedness across 296 Flemish municipalities over the period 1977-2000. Though we include various possible determinants of municipal debt financing in our model, the focus lies on the effect of political fragmentation. The main findings are supportive of the Weak Government Hypothesis. More precisely, we show that the effect of fragmentation on local indebtedness is significantly non-linear and is strongest for two-party coalitions. These lead to higher increases (or lower decreases) in the municipalities’ indebtedness compared to other levels of political fragmentation. This is in line with theoretical predictions by Tornell and Lane (1999).

The remainder of the chapter is structured as follows. Section 1 provides an overview of the Weak Government Hypothesis literature: theoretical as well as empirical. Section 2 then presents the central data of the present study, viz. long-term indebtedness in the Flemish municipalities. The main hypotheses and empirical analysis follow in section 3. Finally, section 4 concludes.

1. Review of the literature

1.1. Theory

Two groups of models concerning the (fiscal) policy effects of fragmented government have been advanced. The first group comprises models that explain government inactivity as such and the budget deficits that may be the consequence of it. The most well-known of these is the “war of attrition”-model (cfr. Alesina and Drazen, 1991). In this model, political action is delayed because the parties involved in the decision-making process cannot agree upon the distribution of the costs and benefits of the policy. A second group of models are the “common pool” models (cfr. Weingast et al., 1981). These argue that each politician in a decentralised or fragmented political system with common finances
neglects taking the effects of his actions on other areas/politicians into account, hence creating overexpenditures and – in a dynamic setting – deficits.

a) Government inaction

Alesina and Drazen (1991) present a “war of attrition” model for fiscal decisions within coalition governments. The basic idea of the model is that the number and power of the different partners in a decision-making process affects the timing of a decision. More precisely, decisions are delayed until the costs of this delay become too big for (at least) one of the decision-makers. Consider a government facing a permanent shock that disturbs the government’s budget and leads to budget deficits and debt accumulation. These deficits are assumed to be financed through distortionary taxes and thus lead to welfare losses for the population. The losses suffered are increasing over time. However, they can be avoided if a stabilisation package is agreed upon. Now, Alesina and Drazen (1991) argue that a coalition government may agree on the need for fiscal consolidation, but is very likely to disagree on how the burden of this consolidation will be divided over the parties (and their voters). Crucially, a party that by delaying the decision forces the other party (parties) to give in, can pass the largest part of the negative effects of a decision to the supporters of this other party (parties). Moreover, there is an information asymmetry problem in that none of the parties know the size of the cost borne by the other parties. Hence, they all have an incentive to wait and see whether the others will give in first. Stabilisations are delayed until “one group concedes and bears a disproportionate share of the burden” (Alesina en Drazen, 1991, 1170).

This model first of all leads to the hypothesis that fragmented governments have a tendency to postpone changes in their policy (Alesina en Drazen, 1991, 1181). As a consequence, budget deficits tend to be higher in countries with fragmented governments following (negative) shocks to the economy. Because fiscal consolidations are delayed, budget deficits and government debt are allowed to increase further than in case of a one-party majority government. However, it is important to realise that in this model

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69 See Bulow and Klemperer (1999) for a generalised war of attrition model and the implications thereof on economic policy.
70 Note that the delay in decision-making in the model by Alesina and Drazen (1991) is due to uncertainty about the size of the cost borne by the other party (parties). Fernandez and Rodrik (1991) show that the same result – inaction – may also occur if there is uncertainty about who gains/loses from the change in policy.
coalition or divided governments do not create budget deficits, but rather, procrastinate the adjustment to shocks” (Alesina and Perotti, 1995, 19, original italics). Finally, as mentioned, the power of the different parties in the coalition matters. A coalition with one strong party may face lower deficits, as the dominant party may be able to “put pressure on the relatively weaker party (parties) in order to stabilize the budget” (Huber et al., 2003, 338).

Howitt and Wintrobe (1995) present a model of government inaction in a two-party democracy (though it may be extended to a multi-party system). This model is “directed at a situation where there is a festering social or economic problem of which everyone may be aware, but nothing is done” (Howitt and Wintrobe, 1995, 335n). Suppose there is an unsatisfactory and inefficient policy in place (e.g. budget deficits) and that both parties (C and D) prefer a different policy to remedy this problem (e.g. tax increases and expenditure reductions respectively). In such a situation, political competition may lead to inaction. More precisely, neither party may raise the issue because by raising the issue party C (D) entails the risk that it ends up with the policy preferred by party D (C) – e.g. if it loses the following election. The latter situation is assumed to be worse than the status quo from party C’s (D) perspective (Howitt and Wintrobe, 1995). Hence, since both parties want to avoid ending up with the other party’s policy, they both stay silent on the issue and no action is undertaken. Howitt and Wintrobe (1995, 329) furthermore argue that “the problem is likely to be particularly serious, the more evenly matched is political competition”. The reason is that the risk of ending up with the other party’s policy decreases if one is dominant.

b) Common pool problems

Weingast et al. (1981) present a static model explaining the inefficiency of government spending decisions under fragmented decision-making. In this model, representatives with a geographically based electorate take decisions on what projects they want to finance. The funds to pay for these expenditures, however, are obtained from nationwide taxation. In other words, the process of fiscal choice is seen “as a coordination game for the allocation of a common pool resource” (Inman and Fitts, 1990, 81). It is furthermore assumed that politicians derive political benefits from the provision of “projects” to their constituents and are confronted with political costs from taxation faced by these
constituents. These political costs and benefits can be seen as the gain or loss of electoral support. Finally, all actors in the model pursue their own self-interest, which in the case of politicians is re-election.

Though the model presented above – and classically referred to when it concerns common pool analyses – assumes representatives to deliver projects to a specific geographic area, geography is not central to the analysis of the common pool problem. A similar argument can be developed equally well if one assumes each representative to have a certain policy area he wants to take care of (instead of a region) and can extract funds from a “common pool”. For example, some minister may wish to improve the social security system while others feel more strongly about enhancing the schooling system or the transportation infrastructure. Hence, “any governmental activity which benefits a given individual or group of voters and which is paid for by general taxation could be fitted into [such a] model” (Tullock, 1959, 577; see also the model of Von Hagen and Harden, 1995).

In a common pool context, the rational strategy of each politician is to “oversupply” his own preferred policy project. The reason is that there is a discrepancy between who benefits from and who pays for the project. The expenditures of each project can be closely targeted to the group one represents. Hence, the benefits are taken up almost entirely by this group. The costs, however, are distributed over a larger group of voters (including those of other parties). As a consequence, each representative internalises only part of the real cost of his project and will want to spend more than is socially optimal. In other words, when politicians lack a uniform objective function and are able to finance their expenditures from a common source, they each will have a tendency to overspend on their own project, leading to a “spending bias” (Velasco, 2000, 108).

This problem will be worse when the number of parties (ministers) in the coalition increases. The reason is that the part of the costs internalised by each group becomes lower as the number of groups increases. This leaves each group with an increasing temptation to overspend. This is known as the “Law of 1/n” (Weingast et al., 1981, 654; Bradbury and Stephenson, 2003, 186). Moreover, the smaller the number of parties (ministers), the easier it is to come to a cooperative (and socially optimal) solution (Olson, 1982; 1993). Similar results are derived from the models presented by Spolaore (1993) and Velasco (1999, 2000). Spolaore (1993) shows that the “inefficiencies in policy
reactions in a coalition government increase with the number of coalition members” (Alesina and Perotti, 1995, 18). Velasco (1999, 2000) finds that “the larger the number of interest groups (...), the greater the deficit bias” (Velasco, 1999, 46).

Tornell and Lane (1999), however, show that the relationship between the number of participants in an appropriation process and the extent of inefficiency in allocating resources may well be non-monotonic. The inefficiency (in our case, overspending) is at a minimum when there is only one agent and at a maximum with two agents. Further increases in the number of participants lead to lower levels of overspending. The reason for this prediction is that “an increase in the number of powerful groups [leads to] a dilution of power concentration” (Tornell and Lane, 1999, 32). In other words, the power of each participant to appropriate transfers from the common pool becomes smaller as the group increases.

Finally, it is clear that the common pool model mainly addresses the size of the expenditures and not directly the problem of the budget deficit (and debts). To analyse the relation between fragmentation and the deficit, a dynamic model is needed (Kontopoulos and Perotti, 1998). Such a dynamic model is presented in Velasco (1999, 2000). In this model, the common pool consists of the whole of government assets (including present value of future taxation). Each decision-maker must decide his time path of expenditure demands. If one of these would temper his demands the other decision-makers will, in a non-cooperative setting, appropriate much of these savings. The consequence is that the perceived rate of return of savings is below the social rate of return and all decision-makers will have an incentive to increase their present demands. This incentive even increases with the number of decision-makers (Velasco, 1999, 46). Given the path of taxation, “higher expenditure at the beginning also means larger deficits” (Perotti and Kontopoulos, 2002, 197).

1.2. Empirical literature

The seminal empirical papers in this field are Roubini en Sachs (1989a, b). They analyse the fiscal behaviour of 13 OECD countries over the period 1960-1985. The main conclusions of their study are drawn with respect to their “Type of Government”-index. This index has values between 0 and 3. One-party majority governments or presidential
systems receive the value 0. Coalition governments consisting of two parties or presidential systems with or presidential systems with different parties in the majority in the executive and legislative branch receive the value 1. Coalition governments with more than two parties get the value 2. Finally, minority governments get a value of 3 (Roubini and Sachs, 1989a, 923).

Introducing this “Type of Government”-index as a measure of political fragmentation, it is shown that multi-party coalition governments face higher budget deficits (measured by the year-to-year change in the debt-to-GDP ratio). This is known as the Weak Government Hypothesis. In the second step of their analysis, Roubini and Sachs (1989a, b) interact their fragmentation index with a dummy variable equal to 1 in the period 1975-1985 (and 0 otherwise) to test whether the effect of political fragmentation is stronger under adverse economic conditions. The results support this hypothesis. This finding is in line with the predictions from the war of attrition models (cfr. section 1.1) and was later reproduced by Borelli and Royed (1995), Kontopoulos and Perotti (1998, 1999) and Perotti and Kontopoulos (2002), among others. Roubini and Sachs (1989a, b) conclude that weaker (i.e. more fragmented) governments tend to delay necessary policy decisions longer and consequently run larger budget deficits.

Since the seminal work of Roubini en Sachs (1989a, b), numerous studies have been done in this field. A review of these can be seen in table 5.1. Most scholars have more or less remained true to the basic model. That is, most of the studies that attempt to explain changes in the debt-to-GDP ratio (i.e. fiscal deficits) do so on the basis of the same variables introduced by Roubini and Sachs (1989a, b). These include the lagged dependent variable and the changes in unemployment rate, debt servicing costs and GDP growth rate.

Despite this similarity in the modelling throughout the literature, subsequent research has cast some doubt on the robustness of the findings of Roubini and Sachs (1989a, b). Edin and Ohlsson (1991, 1597), for example, have argued that the “Type of Government”-index mainly “captures the effects of minority governments”. They re-estimate the Roubini and Sachs (1989a) model with the same dataset but change the operationalization of the fragmentation variable. Instead of using the “Type of Government”-index an sich, they introduce 3 separate dummy variables (representing three of the four categories in the
index): one for 2-party coalitions, one for coalitions consisting of three or more parties and one for minority governments. The reference category is the group of single-party majorities. The results show that the fragmentation effect found by Roubini and Sachs (1989a, b) is “entirely due to minority governments having larger budget deficits” (Edin and Ohlsson, 1991, 1601).

Later studies have provided mixed support for the Weak Government Hypothesis, or for the thesis of Edin and Ohlsson (1991) for that matter. Alesina and Perotti (1995) show that coalition governments are less successful in introducing fiscal adjustment measures. Borelli and Royed (1995), using an index comprised of various measures of government “strength”, find that “weaker” governments show a significant rise in deficits only when GDP-growth is low. Kontopoulos and Perotti (1998) and Woo (2003) fail to find any significant results using a “Type of Government”-index. Hahm et al. (1996), however, fail to find any significant results using a slightly adapted “Type of Government”-index. Hallerberg and Von Hagen (1997) only look at minority governments but also fail to find any significant results (this lack of ‘minority’-effect is also shown in Woo (2003)). Finally, Perotti and Kontopoulos (2002) and Kontopoulos and Perotti (1998, 1999) focus more on the actual number of decision-makers, where previous research was more inclined to look at majority/minority government differences, especially after the study of Edin and Ohlsson (1991). The
argument Kontopoulos and Perotti (1998, 1999) bring forward for this is based on the Law of $1/n$ in the “common pool” literature (cfr. supra).

Kontopoulos and Perotti (1998, 1999) analyse not only the deficit as a whole, but also its constituent parts: expenditures and revenues. The results show that fragmentation (measured by NoP as well as NSM) significantly increases the deficit and that this effect is mostly due to the effect of fragmentation on expenditures.\(^71\) In other words, fragmentation leads to looser fiscal policy in the sense that expenditures are significantly higher. This then leads to larger budget deficits as the revenues of the government are not affected.

Of importance in the results of Kontopoulos and Perotti (1998, 1999) is the significant difference in the results when they split their sample into three periods. In the ‘sixties’ (1960-1973), “political and institutional variables have very little effect on fiscal policy” (Kontopoulos and Perotti, 1999, 91). The ‘seventies’ (1974-1983) and ‘eighties’ (1984-1995) provide a very different picture. During the seventies, there is a positive and statistically significant effect from NSM, while the effect of NoP is virtually non-existent. The eighties show the opposite to be true: a highly significant positive effect of NoP and hardly any effect of NSM.\(^72\) Kontopoulos and Perotti (1999, 91) argue that this striking difference is due to the nature of the fiscal shocks in the two periods. The shocks in the seventies were mainly external (e.g. the oil crises) and containing the growth of expenditure then largely depends “on how the executive decision-making process was organized” (Kontopoulos and Perotti, 1999, 91). Hence, NSM is the relevant variable in this decade. The eighties on the other hand witnessed internal fiscal shocks (e.g. fiscal consolidations). This is a “largely political decision and requires cohesive government agreeing” (Kontopoulos and Perotti, 1999, 91). Consequently, NoP can be expected to bear most relevance here. Ashworth and Heyndels (2001b) also present evidence that the relevant dimension of fragmentation differs depending on the context. Analysing the

\(^{71}\) Several studies have found support for the notion that government fragmentation increases government spending levels (see e.g. Borge, 1995; Gilligan and Matsusaka, 1995 and 2001; Langbein et al., 1996; Falch and Rattsø, 1999; Volkerink and de Haan, 2001; Bradbury and Crain, 2001; Feld et al., 2003; Bradbury and Stephenson, 2003 and Ricciuti, 2004). Some studies, however, fail to find a significant association. Such results are presented in, for example, Kalseth and Rattsø (1998) and Jones et al. (2000).

\(^{72}\) The empirical efforts of de Haan et al. (1999) on 20 OECD countries for 1979-1995 also lead to the conclusion that NoP is the relevant measure for this decade. The insignificant results for NoP in the works of Franzese (1998) and Volkerink (1999) may be due to the fact that their samples (1956-1990 and 1965-1995 respectively) range across the three “decades”. In fact, Kontopoulos and Perotti (1998, 1999) also find NoP to be non-significant for the full sample.
change in Flemish local government expenditures (per capita) for the period 1989-1996, they find that the number of parties has a significant effect on expenditures in “good” times (when grants increase). The number of Aldermen has a more prominent effect on spending in “bad” times (when grants decrease).

All the studies from table 5.1 mentioned so far look at budget deficits using country-level data. We already mentioned that there are some exceptions to this “rule”. Clingermayer (1991), Alt and Lowry (1994), Poterba (1994) and Clingermayer and Wood (1995), for example, analyse debts and deficits of US states. The first uses a dummy variable equal to 1 where competition between the 2 major parties is strong (based on vote and seat distributions in the States’ legislative bodies in the past). It is shown that competitive states witness higher debt financing. The next two studies operationalize fragmentation via a dummy variable for the existence of “compound” divided government in the state (see Chapter 1, section 2.1). Both these studies provide some support for the Weak Government Hypothesis. Alt and Lowry (1994) find that divided governments are less able to react to revenue shocks. Poterba (1994) shows that in states where the government is divided, taxes are raised and spending is cut by lower amounts in response to deficit shocks. Clingermayer and Wood (1995) use three different dummy variables to represent all possible forms of divided government and find no support for the Weak Government Hypothesis.

Only three studies have estimated the effect of political fragmentation on deficits at the municipal level. Tovmo (2001), Rattsø and Tovmo (2002) and Borge (2003) each introduce a Herfindahl-Hirschmann concentration index to measure fragmentation. The former two studies are concerned with Norwegian and Danish municipalities respectively and find that “there is not much support for the hypothesis that deficits will be lower in local governments with a strong political leadership” (Tovmo, 2001, 12). Borge (2003), on the other hand, finds a very robust effect of fragmentation on the deficit in his sample of more then 350 Norwegian municipalities over the period 1991-1999.
Table 5.1: Effects of political fragmentation on budget deficits and debts

<table>
<thead>
<tr>
<th>Study</th>
<th>Measure</th>
<th>Sample</th>
<th>Dependent variable</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roubini and Sachs (1989a)*</td>
<td>-ToG</td>
<td>13 OECD countries (1960-85)</td>
<td>Deficit</td>
<td>a) ToG: + significant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) Effect stronger in “bad” times</td>
</tr>
<tr>
<td>Roubini and Sachs (1989b)*</td>
<td>-ToG</td>
<td>13 OECD countries (1960-85)</td>
<td>Deficit</td>
<td>a) ToG: + significant</td>
</tr>
<tr>
<td>Edin and Ohlsson (1991)*</td>
<td>-ToG (dummies)</td>
<td>13 OECD countries (1960-85)</td>
<td>Deficit</td>
<td>a) ToG-effect due to minority gov.</td>
</tr>
<tr>
<td>Grilli et al. (1991)</td>
<td>- % of years with majority Government</td>
<td>15 OECD countries (1970-89)</td>
<td>Deficit</td>
<td>a) No significant effect</td>
</tr>
<tr>
<td>Clingermayer (1991)</td>
<td>2-party competition (dummy)</td>
<td>US States (1985-87)</td>
<td>New debt</td>
<td>a) States designated as “competitive” 2-party states have higher average issuance of new debt over the period.</td>
</tr>
<tr>
<td>Alt and Lowry (1994)</td>
<td>-Divided Government</td>
<td>48 US states (1968-87)</td>
<td>-Total revenue -Total expenditure</td>
<td>a) Divided Gov: less able to react to revenue shocks</td>
</tr>
<tr>
<td>Poterba (1994)</td>
<td>-ToG</td>
<td>27 US States (1988-92)</td>
<td>-Spending -Taxes</td>
<td>a) States with divided gov raise taxes and cut spending by lower amounts in response to deficit shocks</td>
</tr>
<tr>
<td>de Haan and Sturm (1994)</td>
<td>-ToG</td>
<td>12 EC countries (1981-89)</td>
<td>Deficit</td>
<td>a) ToG: non-significant</td>
</tr>
<tr>
<td></td>
<td>-ToG (dummies)</td>
<td></td>
<td></td>
<td>b) ToG (dummies): non-significant</td>
</tr>
<tr>
<td>Borelli and Royed (1995)**</td>
<td>-Strength of Government index (3 el.)</td>
<td>16 OECD countries (1959-90)</td>
<td>Deficit</td>
<td>a) Weaker governments show a significant rise in debt only when GDP-change is low</td>
</tr>
<tr>
<td>Hallerberg and Von Hagen (1997)</td>
<td>-ToG (adapted)</td>
<td>9 countries (1958-90)</td>
<td>Deficit</td>
<td>a) ToG (adapted): non-significant</td>
</tr>
<tr>
<td>de Haan and Sturm (1997)</td>
<td>-ToG</td>
<td>21 OECD countries (1982-92)</td>
<td>Deficit</td>
<td>a) ToG: + significant</td>
</tr>
<tr>
<td></td>
<td>-ToG (dummies)</td>
<td></td>
<td></td>
<td>b) ToG (dummies): non-significant</td>
</tr>
<tr>
<td>Kontopoulos and Perotti (1998)*</td>
<td>-NoP</td>
<td>20 OECD countries (1960-95)</td>
<td>-Deficit -Expenditure -Revenue</td>
<td>a) NoP: + significant in 1984-95 for deficit and expenditure</td>
</tr>
<tr>
<td></td>
<td>-NSM</td>
<td></td>
<td></td>
<td>b) NSM: + significant in 1974-83 for deficit and expenditure</td>
</tr>
<tr>
<td></td>
<td>-ToG</td>
<td></td>
<td></td>
<td>c) Effects stronger in “bad” times</td>
</tr>
<tr>
<td>Kontopoulos and Perotti (1999)*</td>
<td>-NoP</td>
<td>20 OECD countries (1965-95)</td>
<td>Deficit</td>
<td>a) NoP: + significant</td>
</tr>
<tr>
<td></td>
<td>-NSM</td>
<td></td>
<td></td>
<td>b) NSM: + significant</td>
</tr>
<tr>
<td></td>
<td>-ToG</td>
<td></td>
<td></td>
<td>c) NSM: + significant</td>
</tr>
<tr>
<td></td>
<td>-NoP</td>
<td></td>
<td></td>
<td>d) ToG-effect due to minority gov.</td>
</tr>
<tr>
<td>Volkerink (1999)**</td>
<td>-ToG</td>
<td>20 OECD countries (1979-95)</td>
<td>Deficit</td>
<td>a) ToG: non-significant</td>
</tr>
<tr>
<td></td>
<td>-ToG (dummies)</td>
<td></td>
<td></td>
<td>b) ToG (dummies): non-significant</td>
</tr>
<tr>
<td></td>
<td>-NoP</td>
<td></td>
<td></td>
<td>c) NoP : + significant for gross central gov debt data</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Method(s)</td>
<td>Countries/Periods</td>
<td>Variable(s)</td>
<td>Results</td>
</tr>
<tr>
<td>-------------------</td>
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<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Volkerink and de</td>
<td>-ENP (coalition)</td>
<td>22 OECD countries (1971-96)</td>
<td>-Deficit</td>
<td>a) ENP and NSM: + significant for deficit and expenditure</td>
</tr>
<tr>
<td>Haan (2001)**</td>
<td>-NSM</td>
<td></td>
<td></td>
<td>b) Excess seats: - significant for deficit and expenditure</td>
</tr>
<tr>
<td></td>
<td>-Excess Seats</td>
<td></td>
<td></td>
<td>c) Effects stronger in “bad” times</td>
</tr>
<tr>
<td></td>
<td>-ENP (council)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) Interaction NoP with lagged dependent variable: + significant</td>
</tr>
<tr>
<td>Padovano and</td>
<td>-Herf (coalition and opposition)</td>
<td>Italy (1948-94)</td>
<td>-Deficit</td>
<td>a) Herf coalition (opposition) significantly reduces (raises) deficit</td>
</tr>
<tr>
<td>Venturi (2001)**</td>
<td>-Banzhaf-index</td>
<td></td>
<td></td>
<td>c) Banzhaf gives same results as ENP</td>
</tr>
<tr>
<td>Balassone and</td>
<td>- NoP</td>
<td>8 European countries (1971-90)</td>
<td>Deficit</td>
<td>a) NoP: + significant</td>
</tr>
<tr>
<td>Giordano (2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tovmo (2001)</td>
<td>-Herf (coalition)</td>
<td>393 Norwegian municipalities (1991-96)</td>
<td>Deficit</td>
<td>a) No significant effect</td>
</tr>
<tr>
<td>Perotti and</td>
<td>-NoP</td>
<td>19 OECD countries (1970-95)</td>
<td>-Deficit</td>
<td>a) NoP; + non-significant</td>
</tr>
<tr>
<td>Kontopoulos</td>
<td>-NSM</td>
<td></td>
<td></td>
<td>b) NSM: + significant for deficit and expenditure (very robust)</td>
</tr>
<tr>
<td>(2002)*</td>
<td>-ToG</td>
<td></td>
<td></td>
<td>c) Effects stronger in “bad” times</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>d) ToG-effect depends on sample, specification and coding</td>
</tr>
<tr>
<td>Rattso and Tovmo</td>
<td>-Herf (coalition)</td>
<td>275 Danish municipalities (1984-96)</td>
<td>-Expenditure</td>
<td>a) No significant effect</td>
</tr>
<tr>
<td>(2002)</td>
<td></td>
<td></td>
<td>-Revenue</td>
<td></td>
</tr>
<tr>
<td>Galli and</td>
<td>-Herf (coalition and opposition)</td>
<td>Italy (1950-98)</td>
<td>-Deficit</td>
<td>a) Herf of coalition parties significantly reduces deficit</td>
</tr>
<tr>
<td>Padovano (2002)**</td>
<td>-Banzhaf-index</td>
<td></td>
<td></td>
<td>b) Herf of opposition parties significantly increases deficit</td>
</tr>
<tr>
<td>Huber et al.</td>
<td>-NSM</td>
<td>21 OECD countries (1970-99)</td>
<td>Deficit</td>
<td>a) Deficits lower if 1 strong party exists in coalition, higher if parties are more equal in ‘political strength’</td>
</tr>
<tr>
<td>(2003)*</td>
<td>-ToG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>woo (2003)</td>
<td>-Rae</td>
<td>57 countries (1970-90)</td>
<td>Deficit</td>
<td>a) Rae and TOG provide insignificant results</td>
</tr>
<tr>
<td>Borge (2003)</td>
<td></td>
<td></td>
<td></td>
<td>b) NSM strongly significant and robust</td>
</tr>
<tr>
<td>Fiorino and</td>
<td>-Shapley-Shubik index</td>
<td>Italy (1950-92)</td>
<td>Deficit</td>
<td>a) Significant effect in 1950-71 sub-period only</td>
</tr>
<tr>
<td>Triacca (2003)</td>
<td></td>
<td></td>
<td></td>
<td>b) No long-run relation between fragmentation and Deficits</td>
</tr>
<tr>
<td>Ricciuti (2004)</td>
<td>-Rae (coalition and opposition)</td>
<td>19 OECD countries (1975-95)</td>
<td>-Deficit</td>
<td>a) only NSM consistently provides significant results (reducing the surplus and increasing expenditure)</td>
</tr>
<tr>
<td></td>
<td>-NSM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Size of majority</td>
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<td></td>
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</tr>
</tbody>
</table>

Note:  
* Data for general government indicated by *, data for central government indicated by **  
* ‘Significant’ means a statistically significant result at least at the 95% confidence level  
* ‘ToG’ is the Type of Government, ‘NoP’ the number of parties in the coalition and ‘Herf’ the Herfindahl-Hirschmann concentration index (of which ENP is the reverse), ‘Rae’ equals Rae’s (1971) fractionalisation index and ‘NSM’ the number of spending ministers. Both the Shapley-Shubik and the Banzhaf indices are voting power indices (Shapley and Shubik, 1954; Banzhaf, 1965).
Finally, we must mention the recent works of Padovano and Venturi (2001), Galli and Padovano (2002) and Ricciuti (2004). They not only measure the effect from government fragmentation, but include a separate measure for the fragmentation of the opposition parties. Padovano and Venturi (2001) find this effect to be statistically significant and in the opposite direction of the government fragmentation effect. The reason is that more concentrated opposing coalitions “are more able to resist redistribution of the fiscal burden from the constituencies of the government to their own” (Padovano and Venturi, 2001, 38). Galli and Padovano (2002) find similar results in a time-series analysis of Italian governments between 1950-1998 whereas Ricciuti (2004) fails to find a significant effect in a sample of 19 OECD-countries.

Note that Padovano and Venturi (2001) also introduce a new way to measure fragmentation, viz. through voting power indices. Huber et al. (2003) and Fiorino and Triacca (2003) have recently followed this example. Such indices measure the power of each party “to enable a winning coalition or to break up an existing one” (Huber et al., 2003, 337). They thus relate the total number of majority coalitions that can be formed (based on the seat distribution in parliament) to the number of majority coalitions in which a given party is represented. This reflects to what extent the party is “needed” to form a majority coalition, and thus its power. Padovano and Venturi (2001) and Huber et al. (2003) use the Banzhaf power index, whereas Fiorino and Triacca (2003) prefer the Shapley-Shubik index. The dispersion of power in the government (i.e. fragmentation) is measured by the standard deviation of the voting powers of the governing parties. The estimation results indicate that deficits are lower if there is one strong party in the coalition compared to the situation where a number of parties of equal strength form a coalition. The explanation provided by Huber et al. (2003, 342) is that “the war of attrition can be stopped more easily if there is a leading party of considerable size in a governing coalition”.

2. Municipal Debt in Flanders: data and measurement

Flemish (and by extension Belgian) municipalities need no prior approval of higher-level governments to borrow funds under the condition that a financial institution provides these loans. Still, they can in principle also obtain fresh capital by issuing bonds. Such public loans do need the prior approval of the Finance Minister. Even though municipal
governments have the possibility to arrange public loans, they nonetheless borrow almost exclusively from banks. In fact, the Vlaamse Vereniging voor Steden en Gemeenten (VVSG, “Flemish Society of Cities and Municipalities”) maintains that the banks’ control over the market for long-term loans to municipalities is as yet uncontested. This is, however, no longer the case for short-term credit lines as a number of large cities (e.g. Hasselt, Leuven, Gent and Antwerpen) have publicly issued treasury notes to solve temporary monetary imbalances (Jan Leroy, personal communication, 18/11/2003). Indeed, while the budget may be in balance when considering revenues and expenditures over the entire fiscal year, incongruities in the timing between revenues and expenditures may cause temporary financial problems. These can and are allowed to be solved through short-term credit lines.

The empirical analysis in the present chapter concentrates on long-term municipal debts. The reason for this focus is that these debts are an indicator for a municipality’s “budgetary stress” (Moesen, 2001, 11), while short-term loans may only indicate temporary imbalances due to, say, late payments by the federal government of local income (or property) tax revenues. Note that while debt gives an indication about a municipality’s financial health, this should not be taken to mean that loans are necessarily to be avoided or that any level of indebtedness is problematic. In fact, loans are, for example, an important instrument to spread the costs of an investment over its (economic) lifetime. Nevertheless, it is clear that high levels of debt indicate (possibly severe) budgetary problems – just as this is the case for any company or individual.

Before we describe the data with respect to municipal indebtedness in Flanders, we first have to make one important remark. Not all loans arranged by a given municipality add to its debt burden. By this we mean that the municipality arranging a loan is not always responsible for the repayment of that loan. In some cases, municipalities borrow money for third parties (e.g. church fabrics) and pass through both the funds and the repayment responsibilities to these third parties. Passing through these responsibilities implies that

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73 Until the late 1970’s, it was common practice for large cities to issue bonds (Van Audenhove, 1990). Recently, the “Openbaar Centrum voor Maatschappelijk Welzijn” of Hasselt (OCMW, “local welfare agency”) resumed this practice. This bond issuance, with a value of 6.4 million euro, was started in 2002 to finance the purchase of a building with 39 apartments (Leroy, 2003).

74 The federal government in Belgium takes care of the collection of income and property taxes. It also collects the income and property tax revenues levied by the municipalities (and which are surcharges on the higher-level taxes). These tax revenues are then transferred to the local governments.
those loans do not diminish the municipality’s capacity to arrange (and repay) new loans and as such do not add to the municipality’s indebtedness. This will become important in the empirical section of this chapter where we will only take into account those loans for which the financial burden falls completely on the municipal government, the so-called “own share” loans (“leningen eigen aandeel”). These indicate most closely the strain on the municipality’s budget. They also take up the majority of the municipalities’ debt. Loans for which the interest and amortization payments are taken care of by other parties represented less than 5% of the total loan volume in 2000 (Dexia, 2001a).

Data with respect to local sector indebtedness (of which municipal debts are a major part) were not readily available for a long time-span, a problem indicated previously in Matthijs et al. (2001, 345). Hence, we had to establish a completely new dataset to test the Weak Government Hypothesis on local data. More precisely, we set about collecting data with respect to the level of “own share” loans for all 308 Flemish municipalities. These data were extracted from appendix 14 of the municipal budgets – which shows the evolution of municipal debt broken down in “own share”, “government share” and “third party” loans – for the years from 1977 to 1994. Data for the years between 1995 and 2000 were obtained from Dexia Bank and were supplemented if necessary with data from the municipal budgets. Hence we obtained a near-complete dataset covering the evolution of local government debt from 1977 to 2000 (end of year data).

Some key data with respect to local government indebtedness are presented in figure 5.1. We depict the average local debt ratio. This ratio is defined as total long-term debt as a percentage of total local income. The latter is a proxy for the tax capacity of the municipal government and equal to the total taxable income earned by all inhabitants of the municipality. This debt ratio corresponds to the idea that high levels of debt are more problematic if the total income of the municipalities’ inhabitants is too low to allow for the revenue generation necessary to repay the debt. As such, a higher ratio of debt-over-

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75 Two other types of loans can be distinguished. “Government share” loans (“leningen ten laste van de staat”) represent those loans that the municipality arranges in its own name, but for which the burden of interest and amortization is borne by a higher-level government. “Third party” loans or “pass-through” loans (“leningen ten laste van derden”) are arranged for and repaid by a third party (e.g. church fabrics). In neither of these two cases are there any budgetary consequences for the municipality itself.

76 We had to remove 10 municipalities from the dataset due to incomplete data-series. Moreover, Antwerpen and Gent were removed as they obtained sizeable “reorganization loans” from the federal “hulpfonds tot financieel herstel van de gemeenten” during the mid-1980’s (including them does not
income indicates more problematic local public finances (cfr. Bahl and Duncombe, 1993). Moreover, scaling debt by income makes the data comparable over the various municipalities.

Figure 5.1: Average debt ratio, in % of income (N=296)

Figure 5.1 shows that average municipal debt levels have been lingering in a range between 8 and 13 percent of personal income levels. Three main periods can be distinguished. The first runs from 1977 to 1981 and is characterised by steadily increasing local indebtedness. More precisely, by 1981, local public debt in Flanders had risen to almost 13 % of total taxable income earned by the municipalities’ inhabitants. This increase reflects the general problematic nature of the municipal finances at the end of the 1970’s when the oil shocks, booming interest rates and lagging economic growth drastically affected local public expenditures as well as revenues (Dexia, 2001b). The federal government even added to the worries of the local governments by cutting back grants and by creating ever-longer delays in their payments to the municipalities.77 Moreover, instead of insisting on a reorganization of local public finances, they permitted

77 As mentioned in footnote 74, the federal government in Belgium collects the income and property tax revenues levied by the municipalities and transfers these funds to the local governments.
the escalating deficits to be financed time and again with new loans, essentially postponing the bankruptcy of the municipal finances (Van Audenhove, 1990, 711-720).

The second period starts in the early 1980’s. By then, it was agreed that action was necessary to maintain the viability of the local public sector’s finances and a number of important reform measures were implemented (Van Audenhove, 1990, 735-741; Vanneste and Moesen, 1993, 366-368). One principal step in this direction was the introduction of a balanced budget rule for local government budgets. The decision to impose such a constraint was taken in 1982 and implied that budgets ought to be balanced at the latest by 1988. This decision, among others, led to a steep downward movement in local public debt-to-income ratios, especially from 1982 to 1986.

The third and longest period commences with the reversal of the downward trend in 1987. Since then, the average debt-to-income ratio for all 296 Flemish municipalities has persistently hovered around 9% of total personal income. Still, increases can be noted toward election years (1988, 1994 and 2000) while decreases appear to occur mainly when elections are past.

3. **Empirical Analysis**

3.1. **Hypotheses and method**

We analyse the effect of political fragmentation on local public debt development using a panel dataset containing 296 Flemish municipalities over the period 1977-2000. Based on the Weak Government Hypothesis literature, we estimate the following model (where \(i\) and \(t\) are municipality and time indices respectively).

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78 Moesen (1985) and Van Audenhove (1990) correctly argue that such a balanced budget rule already existed for Belgian local governments since 1945, but that it was not enforced in practice. This changed with the new legislation. The supervising provincial government now became authorised to force expenditure reductions or revenue increases upon local governments to assist a development towards a balanced budget. The effectiveness of this rule is illustrated by the fact that in 1982 almost 20% of the Flemish municipalities (63 out of 308) had a negative balance on the “general” budget. By 1988, all municipalities managed to eliminate their financial problems.
\[ \Delta \text{DEBT}_{i,t} = a + b_1 \Delta \text{DEBT}_{i,t-1} + b_2 \Delta \text{DEBT}_{i,t-1} + b_3 \text{POP}_{i,t} + b_4 \Delta \text{COST}_t + b_5 \text{ELECT}_t + b_6 \text{BBR}_t + b_7 \text{FRAG}_{i,t} + \epsilon_{i,t} \] (1)

The dependent variable is defined as the change in the debt ratio (DEBT, see previous section). In this we follow the common method applied in the literature. Note that this also avoids possible non-stationarity issues that may occur when using time-series (Thomas, 1997, 378). Such non-stationarity may lead to spurious regression results and incorrect inferences (Granger and Newbold, 1974).

We include a full set of municipality-specific intercepts and a full set of year dummies. Kontopoulos and Perotti (1999) stress the importance of this aspect in the empirical specification: shocks to municipal finances (e.g. due to macro-economic shocks or changes in federal or regional legislation) are likely to be highly correlated across the municipalities. To the extent that our control variables do not fully capture these changing environmental circumstances, year dummies pick up these effects. The role of municipality-specific dummy variables is perhaps even more important. The reason is that the right-hand side of our regression equation includes political variables, which are “arguably highly correlated with unobservable and time-invariant cultural and historic (…) characteristics” (Kontopoulos and Perotti, 1999, 92; see also Ricciuti, 2004). If the latter also influence the municipalities’ use of public indebtedness, we must eliminate this source of endogeneity bias by including a separate intercept for each municipality.

Debt accumulation (be it positive or negative) is supposed to be subject to slow adjustment. To pick this up, the lagged value of the dependent variable is introduced in the specification. We expect \( b_1 > 0 \), reflecting the interdependence over time. Municipalities facing budgetary difficulties – for whatever reason – are expected to be unable to magically resolve these. Similarly, a municipality that succeeds in improving its budgetary situation (reducing its debt rate) in one year is likely to be more able to carry on this effort in the following years.

The central interest of our analysis is the effect of political fragmentation on municipal indebtedness. From the assessment of the theoretical literature in section 1.1, we hypothesise that fragmented governments face larger deficits and debts. This has been
frequently supported in the subsequent empirical literature. We measure fragmentation (FRAG) in a number of ways.

- Firstly, we include a single dummy variable, COAL, that is 1 in case of coalition governments and 0 for single party majorities. We expect the coefficient on this dummy variable to carry a positive sign.

- Secondly, in acknowledgment of the fact that including one dummy variable is only a crude estimation of the fragmentation effect, we split the municipalities with coalitions into two separate groups depending on the number of parties in the coalition. For each group we create a separate dummy variable. The first, TOG2, is 1 where there are exactly two parties in the coalition, 0 otherwise. The other, TOG3, is equal to 1 where there are three or more parties represented in the coalition, 0 otherwise.79 We then re-estimate the model including these two dummy variables (the reference category being those municipalities with single party majorities). This model is equivalent to the dummy-variable approach to Roubini and Sachs’ (1989) “Type of Government”-index proposed by Edin and Ohlsson (1991). It should detect differences in the fragmentation effect owing to the size of the coalition. When increases in coalition size lead to more problematic public finances, we expect the coefficient on both variables to be significantly positive, and a larger coefficient for TOG3. If, however, the relation is non-monotonic (see Tornell and Lane, 1999 and section 1.1), we should find that the parameter for the larger coalitions is smaller than that for the 2-party coalitions.

- Finally, in line with more recent studies (Kontopoulos and Perotti, 1998 and Volkerink and de Haan, 2001), we provide the results of estimations using the “actual” (NoP) and “effective” number of parties (ENP) in the municipal coalition. To test for a possible non-linear effect of fragmentation in these estimations, we add the squared values of the (effective) number of parties. Employing these alternative fragmentation measures allows us to ascertain whether our findings are dependent on the way in which we operationalize political fragmentation (i.e. a standard sensitivity analysis).

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79 We put all municipalities with coalitions of 3 or more parties into one group due to a limited number of very large coalitions (4 or 5 parties) (see Chapter 1, section 2.2).
We – like the main part of the WGH-literature – follow Roubini and Sachs (1989a, b) in including a number of economic control variables in the model. *Firstly*, we include measures for the change in the tax capacity of the local government. A change in the capacity to generate revenue obviously affects the government’s ability to repay its debts. The taxable base within a municipality depends on both the number and the wealth of a municipality’s inhabitants. Hence, we include the growth rate of real per capita taxable income ($\dot{Y}$) and the growth rate of the population ($\dot{POP}$) in our model. As our dependent variable is defined as the change in DEBT, that is: the change in debt divided by tax capacity, there is a “mechanical” effect of both changes in Y and POP on changes in DEBT. Such a “mechanical” effect implies that changes in Y and POP translate immediately in parallel changes in DEBT. Still, it is clear that changes in income and population may induce economic responses too. To the extent that increases in income and/or population lead to an additional demand for public expenditures the absolute level of debt may increase, thus (partially) offsetting the mechanical effect. The expected signs of the coefficients depend on the “actual” interpretation of the debt ratio. If, as has been suggested in the literature (and in the previous paragraphs), this ratio is (also) an indicator for financial stress, we expect increases in Y and POP to translate into reductions of the debt ratio, and thus: $b_2 < 0$ and $b_3 < 0$.

It should be noted that, with respect to the effects of changes in per capita income, the same empirical finding ($b_2 < 0$) will be obtained as the result of local politicians’ countercyclical behaviour. Though it is generally acknowledged that such Keynesian demand policies are not central to the municipal governments’ policy objectives (Matthijs *et al.*, 2001), local politicians may nonetheless be tempted to increase expenditures in “hard times” in order to jump-start the local economy (postponing the cost through loan-financing). As mentioned, a negative sign for the coefficient of this variable will then come about (Roubini and Sachs, 1989a, b; Kontopoulos and Perotti, 1999). Casual observation of Flemish municipalities’ budgetary policies suggests that the local governments follow the textbook prescription and leave stabilisation policy to the higher levels of government.

\footnote{An alternative view may be to see municipal debt *merely* as an indicator of municipal investments. From that perspective, increases in tax capacity may – if such investments are luxury goods – result in rising debt ratios.}
COST is the interest rate, measuring the cost of loan financing. We use the year-to-year change in the real interest rate on long-term (federal) government bonds to measure changes in the cost of borrowing. To the extent that higher costs lead governments to curtail their borrowing, we expect $b_4 < 0$ (Clingermayer and Wood, 1995).

Finally, two political control variables were included. ELECT1 is a dummy variable equal to 1 in election years, and 0 otherwise. This picks up the effect of potential political budget cycles in Flemish local indebtedness (cfr. Baber and Sen, 1986; Clingermayer and Wood, 1995 and Huber et al., 2003). The idea here is that local politicians, motivated by their chances of re-election, will increase expenditures and/or lower taxation before elections (see also Chapter 4, section 2.2). Both policies negatively affect the budget balance of the government. Hence, it is expected that deficits and thus debt growth will be higher before elections, or $b_5 > 0$.

A second political control variable – BBR – measures the effect of a local Balanced Budget Rule in Flanders. Such rules are often argued (and found) to be effective in limiting debts and deficits (for reviews of this literature, see Alesina and Perotti, 1996; Millar, 1997; Imbeau and Chenard, 2002; Kirchgässner, 2003). The introduction of such a Balanced Budget Rule for Belgian municipalities dates back to 1982 when it was enacted by the federal government to tackle “historic” levels of local public debt. By 1988, all municipal governments were obliged to present a balanced budget. Hence, between 1983 and 1988 (the “transition” period), Belgian municipalities were obliged to cut spending and/or increase revenue in order to present a budget in balance at the end of the period. To measure the effect of the balanced budget rule, we create a dummy variable ("BBR") equal to 1 in the transition period (1983-1988), 0 otherwise. We expect the coefficient of this variable to bear a negative sign, i.e. $b_6 < 0$.

3.2. Empirical results

Methods for analysing panel data sets of this kind are now well developed (see, for example, Greene, 2000). Most importantly there are two kinds of effects to be

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81 As an alternative, we included the time before election (measured in years). This is equal to 5 in post-election years, 4 in the second year after the election … and 0 in the election year. To take up the non-linearity apparent in figure 5.1, we also add the squared term. The results show that the debt-over-
distinguished: fixed effects and random effects. When analysing country or municipal
data over time a common formulation of the fixed effects model captures differences
between countries or municipalities by differences in the constant term. We tested against
the alternative of a random-effects model (Greene, 2000) by a Hausman test. The results
in the bottom row of table 5.2 show the fixed effects specifications proved superior. Note
also that the results of Ramsey’s (1969) RESET-tests do not reject the functional form of
the model. This implies that we can be fairly confident that the model is correctly
specified. Finally, the F-statistics at the bottom of table 5.2, F (full model), test the
hypothesis that all coefficients included in the model are jointly insignificant. This
hypothesis is firmly rejected for each case. Hence, our model significantly outperforms a
model with only a constant term.

To start the discussion of the results with the prime (political fragmentation) variables, we
see from column (1) that public debt policy in Flemish municipalities was not significantly
affected by the presence of a coalition government. The effect is in the expected direction
(coalition governments generate higher debts), but the coefficient is (marginally) not
statistically differentiable from 0. However, as mentioned, adding a dummy variable
representing the presence/absence of a coalition government is only a crude measure of
political fragmentation. To remedy this, in column (2), we operationalize fragmentation
through two dummy variables depending on the size of the coalition.

The results show that political fragmentation does influence local indebtedness. Still, only
the coefficient on TOG2 is statistically significant. This implies that the change in local
public indebtedness is significantly larger in municipalities where there are two parties in
the coalition compared to all other government sizes. This finding provides some support
for the idea that there is a non-monotonic relation between fragmentation and
indebtedness. This result is in line with the theoretical model in Tornell and Lane (1999).
In that model, larger coalitions are closer to the social optimum because the power of each
participant to appropriate transfers from the common pool becomes smaller as the group
increases in size.

income ratio first decreases after elections and increases when elections are imminent. The other results
are not affected except for a reduced joint significance of the time dummies (see Appendix E).
The results presented in columns (3) and (4) use yet different operationalizations of political fragmentation and provide a sensitivity analysis with respect to the results obtained in columns (1) and (2). Both the use of the “actual” number of parties (column (3)) and the “effective” number of parties (column (4)) indicates that there is a non-linear relation between fragmentation and indebtedness. The local government’s indebtedness first rises with the number of parties and then diminishes. Interestingly, these results show higher levels of statistical significance compared to the dummy variable approach in the previous estimation. Depending on the exact operationalization of fragmentation, the maximum effect on local public indebtedness is reached for 2.29 parties (“actual” number of parties) or 2.12 parties (using the “effective number of parties). This reinforces the results obtained in columns (1) and (2).

As an additional test for the sensitivity of our results, we consider whether “reorganization loans” – mainly awarded to large cities since the 1980’s – affect our analysis. We do this by re-estimating the model after deleting all 13 largest cities from the sample.\(^{82}\) The results (reported in Appendix E) are very similar to those in table 5.2 and the statistical significance of the fragmentation variables is slightly increased.

Importantly, we observed in section 1.1 that the theoretical literature indicates that the power of the different parties in the coalition may affect their policy behaviour (see Alesina and Drazen, 1991; Howitt and Wintrobe, 1995; Huber et al., 2003). This would imply that the size inequalities of the parties in the coalition might have an additional effect on their indebtedness. Since these are only explicitly taken up in the estimation with the “effective” number of parties, we can test whether this is supported by our data by comparing these results with those obtained when using the “actual” number of parties. This comparison of the results in columns (3) and (4) is done using the Davidson and MacKinnon (1993) J-test (see also Chapters 2 and 4). The results are provided at the bottom of table 5.2. Both equations are well-specified (t-values below the critical value at the 5% level). Hence, the J-test thus does not identify one or other form as being superior. This would indicate that size inequalities do not have a statistically significant additional effect on the municipalities’ indebtedness (in line with Chapter 4 where the “actual”

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82 Besides Antwerpen and Gent, this means we drop Aalst, Brugge, Hasselt, Kortrijk, Genk, Leuven, Mechelen, Oostende, Roeselare, Sint-Niklaas and Turnhout from the sample (see Dexia, 2000; Moesen, 2001).
number of parties outperformed the “effective” number of parties in explaining tax innovation).

Table 5.2: Estimation results

<table>
<thead>
<tr>
<th></th>
<th>(1) (FE)</th>
<th>(2) (FE)</th>
<th>(3) (FE)</th>
<th>(4) (FE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\Delta \text{DEBT}_{t-1})</td>
<td>0.045 *** (3.77)</td>
<td>0.045 *** (3.74)</td>
<td>0.045 *** (3.76)</td>
<td>0.045 *** (3.76)</td>
</tr>
<tr>
<td>(\hat{Y})</td>
<td>-0.102 *** (-18.29)</td>
<td>-0.102 *** (-18.26)</td>
<td>-0.102 *** (-18.28)</td>
<td>-0.102 *** (-18.28)</td>
</tr>
<tr>
<td>(p\Delta \text{COST})</td>
<td>-0.062 *** (-4.56)</td>
<td>-0.063 *** (-4.62)</td>
<td>-0.063 *** (-4.62)</td>
<td>-0.063 *** (-4.62)</td>
</tr>
<tr>
<td>(\Delta \text{COST})</td>
<td>0.073 *** (3.45)</td>
<td>0.073 *** (3.43)</td>
<td>0.072 *** (3.41)</td>
<td>0.073 *** (3.43)</td>
</tr>
<tr>
<td>(\text{ELECT1}) (dummy)</td>
<td>1.002 *** (11.39)</td>
<td>1.003 *** (11.41)</td>
<td>1.003 *** (11.40)</td>
<td>1.003 *** (11.40)</td>
</tr>
<tr>
<td>(\text{BBR}) (dummy)</td>
<td>-1.030 *** (-13.84)</td>
<td>-1.027 *** (-13.79)</td>
<td>-1.027 *** (-13.79)</td>
<td>-1.029 *** (-13.83)</td>
</tr>
<tr>
<td>(\text{COAL}) (dummy)</td>
<td>0.066 (1.62)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(\text{TOG 2}) (dummy)</td>
<td>-</td>
<td>0.078 * (1.87)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(\text{TOG 3}) (dummy)</td>
<td>-</td>
<td>0.010 (0.17)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(\text{NoP})</td>
<td>-</td>
<td>-</td>
<td>0.171 * (1.81)</td>
<td>-</td>
</tr>
<tr>
<td>(\text{NoP}^2)</td>
<td>-</td>
<td>-</td>
<td>-0.037 * (-1.72)</td>
<td>-</td>
</tr>
<tr>
<td>(\text{ENP})</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.287 ** (2.16)</td>
</tr>
<tr>
<td>(\text{ENP}^2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.068 ** (-2.07)</td>
</tr>
<tr>
<td>Year dummies (F-statistic)</td>
<td>YES (37.61) ***</td>
<td>YES (37.64) ***</td>
<td>YES (37.67) ***</td>
<td>YES (37.65) ***</td>
</tr>
<tr>
<td>F (full model)</td>
<td>64.72 ***</td>
<td>62.40 ***</td>
<td>62.34 ***</td>
<td>62.41 ***</td>
</tr>
<tr>
<td>Hausman</td>
<td>199.35 ***</td>
<td>199.10 ***</td>
<td>203.75 ***</td>
<td>202.16 ***</td>
</tr>
<tr>
<td>RESET2</td>
<td>1.04</td>
<td>0.92</td>
<td>0.86</td>
<td>0.83</td>
</tr>
<tr>
<td>RESET3</td>
<td>0.94</td>
<td>0.85</td>
<td>0.82</td>
<td>0.83</td>
</tr>
<tr>
<td>J-test (3) – (4)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

N = 6808; t-statistics between brackets;
*** significant at 1%; ** at 5% and * at 10%.
Notes: NoP is the “actual” number of parties, ENP the “effective” number of parties, TOG2 equals 1 for 2-party coalitions and TOG3 equals 1 for coalitions larger than 2 parties (both are 0 otherwise).

Let us now consider the other variables in the model. The lagged dependent variable has a small but statistically significant positive coefficient, as expected. This reveals the
intertemporal dependence of budgetary policy at the municipal level where budgetary health (or lack thereof) persists over time.

Changes in the municipal tax capacity significantly affect local indebtedness. The parameter estimate for the growth rate in real per capita income ($\dot{Y}$) is significantly negative. For the average municipality, a 1 % increase in per capita income decreases the debt-to-income ratio with 0,1 %. Similarly, the growth rate of the municipal population has a negative and significant effect on the debt-ratio. Higher population growth leads to larger falls (or smaller increases) in local indebtedness. Both results reflect that the additional tax base (be it through the current population becoming wealthier or through an influx of new residents) allows the municipality to reduce its debt-ratio. Prosperity helps in solving the budgetary stress. Municipalities that lose residents or where the current residents lose wealth are confronted with larger public indebtedness. This phenomenon is well-known to the casual observer of Flemish, and by extension Belgian, municipal budgetary evolutions: larger cities have been confronted with not only net out-migration or marginal in-migration, they have also witnessed a relative decline in the per capita incomes of the remaining residents (see also Ashworth and Heyndels (2001c) and Ashworth et al. (2003) for an analysis of the income tax base evolution in the 19 municipalities in the Brussels Region between 1980 and 1999).

Surprisingly, table 5.2 reveals that changes in the interest rates have a positive effect on local indebtedness. Higher costs of loan financing increase the debt-to-income ratio of the governments. This is at odds with the idea that rational governments would decrease their borrowing when interest rates rise. The result in table 5.2 may, however, reveal the perverse effect that high interest rates may have on high-debt municipalities (the so-called “snowball effect”). Rising interest rates increase debt-related expenditures while falling interest rates reduce this category on the budget. These changes in debt-related expenditures may affect the budget balance and thereby indebtedness (Roubini and Sachs, 1989a, 921). As this perverse type of relation can be expected to be more urgent in
times of very high budgetary stress, we re-estimated our regression, now considering the period 1984-2000. This period is selected as the budgetary position of Flemish municipalities was already drastically improved by 1984, leading to a (modest) overall surplus on the current accounts for that year (Moesen and Vanneste, 1993; Moesen and Van Damme, 1994, 5). While leaving the other coefficients mainly unaffected, this change in the time period investigated does give a significant and negative coefficient for the COST variable in our model (results in Appendix E).

Our two political control variables perform as expected and are statistically significant. Firstly, elections increase indebtedness. This confirms a standard finding in the public choice literature (Imbeau and Chenard, 2002, 12) and a characteristic of local public finances that is widely acknowledged among the general population. Secondly, the introduction of the balanced budget rule in Flanders significantly decreased local indebtedness. The period between 1983 and 1988, when local governments were obliged to alter their expenditure and revenue patterns to achieve a balanced budget by 1988, saw sharply declining debt-to-income ratios. This confirms the observations made from figure 5.1.

4. Conclusion

A largely empirical research literature beginning in the late 1980’s has shown that political fragmentation leads to larger public debts and deficits. This relation is known as the Weak Government Hypothesis (Roubini and Sachs, 1989a, b). So far, this literature has concentrated almost exclusively on country-level data. The few exceptions to this rule focus on deficits and debt data from US states or Scandinavian municipalities. Still, the

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84 Finally, we note that – as can be seen in table 5.2 – the year dummies in the model are jointly significant. This implies that there are a number of year-specific events we have not covered through the inclusion of the control variables in our model. One such specific event is the Initial Public Offering (IPO) of Dexia Bank in 1996 and additional sales of Dexia-shares in late 1997 and 2000. The municipalities, being prime shareholders of this financial institution, obtained large capital inflows from these events. For instance, the special dividends following the IPO in 1996 led to inflows of approximately 811 million Euro during 1997. Adhering to the “advice” of the Flemish Regional Government to use at least 80% of the IPO’s benefits for debt reduction (Peeters, 1996), municipal governments reduced their debts with 778 million via these capital inflows (Dexia, 1998, 82). A second part of Dexia Bank was listed on the stock market later in 1997 creating additional capital inflows of roughly 521 million Euro (Dexia, 1998, 82). Recently, a new sale of Dexia-shares and the distribution of Dexia-certificates generated large capital inflows for the fiscal year 2000 (Sauwens, 1999, 2001;
use of data on lower-level governments has the important advantage of permitting the creation of a (much) larger dataset. In point of fact, the present analysis relies on data from 296 Flemish municipalities over the period 1977-2000, whereas most studies in the literature are (through lack of reliable data) restricted to at most 20 countries over a comparable time period.

Our control variables point to a number of interesting issues. Firstly, there is a strong confirmation for the theory of Political Budget Cycles. Politicians at the local level – driven by their chances of re-election – increase local public indebtedness prior to elections. This is a consequence of pre-electoral policies consisting of increasing expenditures and/or decreasing revenues in order to boost their popularity. Secondly, and surprisingly, increasing interest rates lead to higher levels of public debt for the period 1977-2000. This is at odds with the hypothesis that politicians rationally decrease loan financing when the cost of these funds is high (and/or rising). Still, estimations on a shorter time period (1984-2000) point to a possible explanation. In this period, the effect was indeed as expected, and statistically significant. This indicates that the exceptionally high interest rates in the early 1980’s may have negatively affected the already precarious budgetary position of Flemish municipalities, necessitating extra borrowing.

The focus of the present analysis was, however, on the effect of political fragmentation on local public indebtedness. The main findings here are supportive of the Weak Government Hypothesis. To be precise, the effect of our various fragmentation measures was always in the expected direction and mostly statistically differentiable from 0 at conventional significance levels. Moreover, the estimates show that the effect is significantly non-linear. The effect is strongest for 2-party coalitions. As mentioned, this result is in line with the theoretical model in Tornell and Lane (1999). Note also that, in Chapter 4, we found that 2-party governments were most likely to introduce the ‘new’ environmental tax. In the light of the present findings, this could indicate that these governments are more in need of extra revenues to keep their finances in order.

Interestingly, our results do not confirm the theoretical prediction that the power of the different parties in the coalition affects their policy behaviour (see Alesina and Drazen, 2001). Each of these operations is likely to have led to a reduction in local indebtedness. This is supported by highly significant negative year-effects in 1997 and 2000 (not reported).
1991; Howitt and Wintrobe, 1995; Huber et al., 2003). The size inequalities between the coalition partners do not have a statistically significant additional effect on their indebtedness, over and above the effect obtained for the number of parties. This is in agreement with the finding in Chapter 4 that the “actual” number of parties outperforms the “effective” number of parties in explaining tax innovation.
General conclusion

It is intuitively clear that a decision-making process is influenced by the number of options one is allowed to choose from as well as the number of persons involved in the decision-making. Take the example of a family with four children wishing to book a summer holiday. If a given travel agency offers only two vacations, the choice will be fairly easy. However, if the travel agency offers, say, two dozen different vacations, the decision-process becomes more complicated. Moreover, it will be easier to reach a decision about the holiday destination when only the parents decide rather than when all four children get to have their say as well. Each member of the family will have its own specific wishes and reaching a consensus is likely to take more time if all family-members become involved. Both the number of options to choose from and the number of decision-makers thus designate the difficulty of a decision-making process.

Additionally, the relative power of each participant in the decision process is likely to influence the decision-making process. To keep with our example, the choice of destination is likely to be easier if the parents have a decisive vote in the process rather than when the parents and the children all have an equal say. Indeed, a dominant party is often able to put pressure on the smaller parties to give in to their demands.

The example can easily be generalised and also holds for decisions in the political arena. The number of parties (or politicians) and their size inequalities influence political decision-making by the voter as well as by the government. Hence, political fragmentation – as defined in the present work – refers to the number of parties (or politicians) that are involved in a decision-making process and their relative sizes. The effect of political fragmentation on political decision-making at the local government level was the central issue addressed in the empirical work.

Before we started our empirical analyses, we presented an overview of the current Belgian local political situation. The first chapter, after going through some important institutional aspects of the Belgian electoral system, revealed that the political landscape in Belgium is at times highly fragmented. There is a thriving competition between large numbers of political parties in local elections and coalition formation is standard practice in Belgian
local municipalities. This highly fragmented political landscape was most obvious in the 19 municipalities of the Brussels Region though it also held for Flanders and – to a lesser extent – Wallonia. Since the 2000 municipal elections, the College of Mayor and Alderman consisted of representatives from 1.57 parties on average in Wallonia and 1.87 and 2.63 in Flanders and Brussels respectively. The average number of parties with representation in the local councils stood at 3.48 in Wallonia, 4.28 in Flanders and 5.21 in Brussels since that same election.

As mentioned, the key questions of this work refer to the effect of political fragmentation on political decision-making at the local level. Importantly, we regard both the electoral decisions by the electorate and actual policy-making by the government. The argument being that the level of fragmentation is likely to influence both these processes. In order to structure the analysis, we performed our analyses following the progress of the political process. First, we analysed (and presented) the impact of fragmentation on voter’s decisions and then switched to its influence on the government’s policy-decisions. Let us now review the questions asked and the answers we provided to these questions, keeping that same order.

The first question pointed at the effect of political fragmentation on the voter’s decision to turn out and cast a vote on Election Day. Is a given voter more or less likely to turn out when (s)he has a broader choice on the ballot? A number of studies have already pointed towards the importance of fragmentation in turnout studies. Still, the results have not been unambiguous. We reconsidered the question on the basis of Flemish data from the 2000 municipal elections. Even though voting is compulsory in Belgium, prosecution is exceptional in practice and turnout varies considerably over the municipalities, allowing meaningful statistical analysis of the turnout phenomenon. Specifically, we dealt with two empirical issues. Firstly, we asked ourselves whether political fragmentation stimulates or dampens participation in elections. Since both hypotheses have theoretical backing, the observed effect is essentially an empirical question. Secondly, several scholars have argued that not only the number of parties matters for the level of turnout, but also the size inequalities between these parties. However, it has been common practice to either disregard one of the dimensions (looking only at the number of parties) or to treat both dimensions simultaneously in one index (e.g. the “effective” number of parties, ENP, which equals the inverse of the Herfindahl-Hirschmann concentration index). We have –
by decomposing the ENP-index – empirically disentangled both effects in our empirical model.

Our results confirmed that fragmentation affects the level of voter turnout. Moreover, we illustrated that both the number of parties in the election and their relative sizes have an independent and opposite impact on turnout. The former effect, however, was statistically much stronger than the latter. Indeed, while the number-of-parties effect was highly statistically significant, the size-inequalities effect only approached significance at the 10% level. Our findings show that a significantly lower number of voters present themselves at the polling station when more parties compete in the election. This finding is in line with earlier results on Belgian elections reported in De Winter et al. (1991). Voter turnout, however, rises when the size inequalities between the parties augment.

These results indicate that the voter’s decision to turn out on Election Day is affected by the costs and benefits of this action. For example, more parties to choose from increase the information costs faced by the voter, such that (s)he is more likely to stay home. Given the negative relation between fragmentation and turnout, this cost-effect is stronger than the increase in benefits deriving from a broader choice. Such a cost-benefit analysis in the turnout decision points to “rational” behaviour on the part of the Flemish voter. If something costs him more than it brings him benefit, he refrains from the action. The results, however, also imply that the benefits the Flemish voter derives from voting go beyond purely instrumental ones (i.e. to influence the outcome). Another source of benefit is the enjoyment from the act itself (or the dislike the individual has for being branded as a non-voter). Our finding that the presence of a more dominant party (i.e higher size inequalities) leads to higher turnout seems to support this view. There is no instrumental reason for voting when one already “knows” who the winner will be. However, people may still turn out for the (clearly expressive) benefit from supporting the winning team (see also Schuessler, 2000a, b).

Question two aimed at the effect of political fragmentation on the voter’s behaviour inside the poll booth. Is the voter’s decision influenced by the layout differences that may derive from lengthy candidate lists? The literature on so-called Ballot Position Effects has frequently shown that long candidate lists affect the in-booth voting process. Specifically, candidates on the top (and/or bottom) of the list tend to receive more votes ceteris paribus.
Our own analysis concentrated on the effect produced by differences in the layout of the ballot associated with long candidate lists. Indeed, a long list of candidates must under certain circumstances be spread over separate columns (or pages). The difference with the (traditional) “one party - one column” layout may influence the voter’s search pattern and also who (s)he ends up voting for.

We made use of preferential vote data taken from the 1995 Brussels’ Regional Elections. In these elections, three different layouts were used concurrently while preserving the order of the candidates on the party lists. This natural experiment enabled us to estimate the (dis)advantage from being on a certain place on the ballot given one’s position in the party’s candidate list. The results indicated that differences in layout affect the preferential voting behaviour of the electorate, creating Ballot Layout Effects. Specifically, we found that candidates whose names appear at the top or at the bottom of a column obtain a significantly larger share of their party’s preferential votes compared to the situation where they are not on such a “critical” position.

The conclusion is straightforward. Layout matters. Moreover, results related to our findings were witnessed in the US presidential race in 2000, the Dutch provincial elections of 1999 and the LA Junior College Board primary election in 1969. In each of these elections, the layout of the ballot meant a (dis)advantage for certain candidates. Though in most cases no direct political consequences of the layout effect were observed (i.e. a candidate being elected due to the advantage he obtained by the layout of the ballot), even the possibility of indirect effects (e.g. increased attention for a “popular” candidate’s ideas) is sufficient to make a case for avoiding the occurrence and/or impact of such layout effects. Also, from a normative point of view, one can argue that election outcomes exhibiting such layout effects are “inferior” to those in which no layout effects occur. Layout should not matter. Our finding that the observed Ballot Layout Effects were stronger when the level of “cognitive sophistication” of the electorate (proxied by its education level) was lower, adds a dimension to this normative argument. Not only does the layout of the ballot have a significant distorting effect on the election outcome, this distortion is also not homogenous among the electorate! Devising a layout-neutral election may, however, not be straightforward. Possible solutions such as randomising politicians’ place in the list (or randomising the number of columns) are a costly
undertaking and would, in the Belgian system, seriously complicate the distribution of list votes over the candidates.

The fact that voters cast preferential votes in Belgium indicates that voting has at least some expressive content. Indeed, given the strong party discipline and an electoral system where the actual representatives are assigned mainly through the list votes, preferential votes for any individual politician are most unlikely to have “real” policy consequences. Preferential voting may then be an act of “consumption”. This may be candidate-related or not. In the former case the voter votes for a politician with whom (s)he identifies. In the latter case the identity of the candidate is not central to the voter’s decision. That is, (s)he casts a preferential vote because (s)he “feels better” after supporting a (possibly unknown) flesh-and-blood candidate rather than an (impersonal) party.

Importantly, the finding of layout effects (and for that matter Ballot Position Effects) shows that the value of a preferential vote is likely to be small (see Bowler et al., 1992). The reason is that its occurrence is influenced by the time (or “search”) costs of finding a (preferred) candidate. These “search” costs can be assumed to be small as the time needed to find any given candidate on the list is (on average) not very long. Hence, even though an individual may like to vote (and vote for a specific candidate), it should not take him too much effort to find “his/her” party or candidate.

While the two previous questions pondered on issues relating to the process of selecting a government – and found that they are significantly influenced by the level of fragmentation – the remaining two issues are concerned with decisions taken by politicians once they are in office.

**Question three** asked after the determinants of a government’s decision to introduce a ‘new’ tax, with particular attention for the effect of political fragmentation on this diffusion process. Are coalition governments equally likely to introduce a ‘new’ tax compared to one-party majorities? ‘New’ is placed between inverted commas as the tax need not be ‘new’ in an objective way. Others may have used it before. The crucial point is that it has never existed in the specific jurisdiction that is planning its introduction. Flemish municipal data are extremely advantageous to tackle this specific question as Flemish municipalities have a wide-ranging autonomy when it concerns their tax policy.
This has led to widely differing tax systems across municipalities and to frequent innovations in local tax policy. Moreover, taxes are more comparable at the local level than in an international context and the number of observations is larger. Hence, looking at the local government level (in Flanders) resolves a number of problems that have until now prevented the emergence of a significant international literature in this field (Berry and Berry, 1992). Specifically, we analysed the introduction of “green taxes” in Flemish municipalities as of 1990. This tax is particularly interesting. The reason is that, even though it is a tax and thus a “bad” for the voter, it may have some degree of favour with the electorate due to the earmarking of its revenues for expenditures in the field of environmental policy.

The results clearly demonstrated the role of politics on environmental tax adoption in Flemish municipalities. In particular, we demonstrated that coalition governments were significantly more likely to innovate their tax policy and introduce the green tax compared to one-party governments – in contrast to our initial expectations. Given that coalition governments are more prone to legislative gridlock and that they generally have shorter time horizons (thus disregarding future benefits from the new tax), our hypothesis was that coalition governments should be less likely to take up the new tax. Based on the theoretical idea – taken from game-theory – that (legislative) gridlock becomes more likely when the number of participants in the decision-making process rises (see de Haan and Sturm, 1997), we even expected this effect to become stronger with the number of parties. A possible explanation for our finding is that the electoral cost of the new tax can be dispersed in a coalition government. Indeed, in coalition governments the voter is unclear about whom to hold responsible for the new tax (i.e. lower “clarity of responsibility”) and, hence, the costs of unpopular decisions are lower for each party separately. Note that this effect also is likely to grow with the number of parties. More parties in the coalition creates more “hiding space” for each of these; increases the possibility of dispersing the cost of unpopular policies.

Importantly, we find that which of both these effects – “gridlock” and “clarity of responsibility” – dominates, depends upon the number of parties in the coalition. Indeed, the finding that coalition governments increase the probability of tax innovation was driven by the smaller, two-party coalitions. Increasing the size of the governing coalition beyond two parties leads to a lower probability of introducing the new tax. This implies
that for larger coalition sizes the “gridlock” effect becomes strong enough to offset the “clarity of responsibility” effect, whereas this is not yet the case for two-party coalitions.

The fourth and final question looked at local public indebtedness in Flanders in the period 1977-2000. Do weak – i.e. more fragmented – governments have higher budget deficits and debts? The theoretical and empirical literature on this subject has clearly shown that fragmentation is an important factor in decisions on public finances. Since the path-breaking (empirical) study of Roubini and Sachs (1989a), various scholars have shown that political fragmentation leads to larger public debts and deficits. This relation is known as the Weak Government Hypothesis. In contrast to the majority of these works, however, we concentrated on local-level data. This route has been only infrequently taken, though it has the important advantage of allowing one to establish a much larger dataset to test one’s predictions and this in an institutionally homogeneous setting.

We analysed the effect of political fragmentation on the change in local public indebtedness over the period 1977-2000 in 296 Flemish municipalities. We found that more fragmented governments tend to have more problematic public finances, in support of the Weak Government Hypothesis. The effect is significantly non-linear. Coalitions consisting of representatives from two different parties perform worst. This result is in line with the theoretical model in Tornell and Lane (1999). They show that the power of each participant to extract funds from the “common pool” falls with an increase in the number of participants, leading to lower inefficiency. Another theoretical prediction – that the power of the different parties in the coalition affects policy (Alesina and Drazen, 1991; Howitt and Wintrobe, 1995; Huber et al., 2003) – is not supported. Indeed, introducing a measure that incorporates both the number of parties and the size inequalities between the parties (i.e. the “effective” number of parties) did not significantly add explanatory value to a model with only the number of parties taken into account. Interestingly, the same finding occurred in our analysis of tax innovation in Flanders. There we found that the “actual” number of parties outperforms the “effective” number of parties in explaining tax innovation.

The results from the latter two chapters illustrate that the number of parties in a government affects the decision process, but that the relative size of the coalition partners hardly has any additional importance. Two-party coalitions are most likely to introduce a
‘new’ tax and they lead to higher increases (or lower decreases) in the municipalities’ indebtedness (compared to other levels of political fragmentation). These results could of course be related in the sense that the more problematic public finances faced by two-party majorities urge them to install new taxes more readily. Otherwise, two-party coalitions may have higher spending levels. Financing these higher expenditures may then lead to ‘new’ taxes (and/or higher tax rates) and additional debts.

In conclusion, our research effort clearly illustrates the significant impact of political fragmentation on decision-making by the electorate as well as the (local) government. These findings improve our understanding of the workings of parliamentary democracy and, given the relation between an electoral system’s (dis)proportionality and the level of political fragmentation, the pro’s and contra’s of going for more (or less) proportional systems. As political leaders have some degree of choice as to the electoral system they implement – or in making changes to the existing system (increasing or reducing its proportionality along the way) – this is important not only from a scientific point of view.

“All progress is precarious, and the solution of one problem brings us face to face with another problem.” Though Martin Luther King Jr. was referring to the Civil Rights movement in the US mid-20th century when he uttered these words, the idea is much more general. Indeed, every answer provokes new questions. So too will it unavoidably be with the present study. While we present a number of questions to the reader and propose the answers to these questions, we also arouse a number of new questions for future research. We have already pointed towards a number of these in the conclusions and discussions of the various chapters. Others may arise in the mind of every new reader. Let this be a start, not an end.
Appendices
Appendix A: “Highest Averages” versus “Largest Remainders”

To explain the working of both systems of seat allocation, we look at one commonly used rule of each type: highest average D’Hondt and largest remainders Hare. We explain these using the following (hypothetical) election in which 4 parties compete for 7 seats while 20000 votes have been cast: party A 7200 votes, party B 6300, party C 4200 and party D 2300.

We first consider “highest averages” D’Hondt. In “highest averages” systems, the party’s vote total is successively divided by a series of divisors. More specifically, the D’Hondt rule uses 1, 2, 3 and so on for dividing the party’s vote share. After each division, a seat is awarded to the party with the “highest average” until all seats are allocated. The resulting seat distribution is given in table A.1. The first two columns show the different parties and their respective vote totals. The next four columns give these vote totals divided by the relevant divisor series (the numbers between brackets refer to the sequence in which the seats are allocated). The final column shows the number of seats obtained by each party. It can be seen that the first seat is allocated to the largest party – party A – whose vote total is then divided by the next divisor. The second seat is awarded to party B as it’s current average (6300 or it’s original vote total) is higher than that of all other parties (for party A, Vote/2 is the relevant value now). The final seat division will be such that parties A, B, C and D will respectively get 3, 2, 1 and 1 seats.

Table A.1: Example of the use of highest averages D’Hondt

<table>
<thead>
<tr>
<th>Party</th>
<th>Vote total</th>
<th>Vote/1</th>
<th>Vote/2</th>
<th>Vote/3</th>
<th>Vote/4</th>
<th># seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7200</td>
<td>7200 (1)</td>
<td>3600 (4)</td>
<td>2400 (6)</td>
<td>1800</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>6300</td>
<td>6300 (2)</td>
<td>3150 (5)</td>
<td>2100</td>
<td>1575</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>4200</td>
<td>4200 (3)</td>
<td>2100</td>
<td>1400</td>
<td>1050</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>2300</td>
<td>2300 (7)</td>
<td>1150</td>
<td>767</td>
<td>575</td>
<td>1</td>
</tr>
</tbody>
</table>

Largest remainder-systems use a quota to allocate seats. For the Hare-rule we consider here, the quota is equal to the total number of votes cast in the election divided by the number of seats to be allocated. With 20000 votes cast and 7 seats, the quota equals 2857 votes in our example. The subsequent division of each party’s vote total by this quota offers an integer value k, plus a remaining fraction (e.g. party A = 7200/2857 = 2.52).
Each party then obtains a number of seats equal to this integer value (e.g. party A gets 2 seats and has a remaining share of 0.52 seats or 1486 votes). If there are seats unallocated after all parties have obtained the seats they are entitled to according to the quota (2 seats in our example), these are assigned to those parties with the largest remaining fractions (parties A and D). Table A.2 shows the final seat distribution, which is (by chance) the same as in table A.1.

Table A.2: Example of the use of largest remainder Hare

<table>
<thead>
<tr>
<th>Party</th>
<th>Vote total</th>
<th>Vote/quota</th>
<th>Seats</th>
<th>Remainder</th>
<th>Final # seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7200</td>
<td>2.52</td>
<td>2</td>
<td>1486</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>6300</td>
<td>2.21</td>
<td>2</td>
<td>586</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>4200</td>
<td>1.47</td>
<td>1</td>
<td>1343</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>2300</td>
<td>0.81</td>
<td>0</td>
<td>2300</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix B: “highest averages” D’Hondt versus “highest averages” Imperiali

To evaluate both electoral systems, we refer back to the (hypothetical) election result used in Appendix A and calculate the seat distribution under both systems in tables B.1 and B.2. The first two columns present the different parties and their respective vote totals. The next four columns represent these vote totals divided by the relevant divisor series (1, 2, 3 and 4 for D’Hondt and 2, 3, 4 and 5 for Imperiali). The final column shows the number of seats obtained by each of the parties. The numbers between brackets and in italics refer to the sequence in which the seats are allocated. Note that table B.1 is the same as table A.1 in Appendix A. As explained there, comparison of the successive “averages” using the D’Hondt rule leads to a final seat distribution such that parties A, B, C and D will respectively get 3, 2, 1 and 1 seats.

Table B.1: Example of the use of highest averages D’Hondt

<table>
<thead>
<tr>
<th>Party</th>
<th>Vote total</th>
<th>Vote/1</th>
<th>Vote/2</th>
<th>Vote/3</th>
<th>Vote/4</th>
<th># seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7200</td>
<td>7200 (1)</td>
<td>3600 (4)</td>
<td>2400 (6)</td>
<td>1800</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>6300</td>
<td>6300 (2)</td>
<td>3150 (5)</td>
<td>2100</td>
<td>1575</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>4200</td>
<td>4200 (3)</td>
<td>2100</td>
<td>1400</td>
<td>1050</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>2300</td>
<td>2300 (7)</td>
<td>1150</td>
<td>767</td>
<td>575</td>
<td>1</td>
</tr>
</tbody>
</table>

Obviously, the system of seat allocation under the Imperiali rule is identical to that under D’Hondt. However, as the series of divisors differs, the resulting (order of) seat allocation will not necessarily be the same. For example, as can be seen from table B.2, the third seat is not given to party C under Imperiali, but to party A. More important is the change in allocation of the 7th and last seat. This will not go to the smallest party in the example (party D) but will instead be awarded to party B. The final seat allocation under Imperiali will thus be to award 3, 3, 1, 0 seats to parties A, B, C and D respectively.

Table B.2: Example of the use of highest averages Imperiali

<table>
<thead>
<tr>
<th>Party</th>
<th>Vote</th>
<th>Vote/2</th>
<th>Vote/3</th>
<th>Vote/4</th>
<th>Vote/5</th>
<th># seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7200</td>
<td>3600 (1)</td>
<td>2400 (3)</td>
<td>1800 (6)</td>
<td>1440</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>6300</td>
<td>3150 (2)</td>
<td>2100 (5)</td>
<td>1575 (7)</td>
<td>1260</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>4200</td>
<td>2100 (4)</td>
<td>1400</td>
<td>1050</td>
<td>840</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>2300</td>
<td>1150</td>
<td>767</td>
<td>575</td>
<td>460</td>
<td>0</td>
</tr>
</tbody>
</table>
Thus, as the series of divisors changes, not only the order in which the seats are allocated can change, but also the total number of seats each party is awarded. Imperiali, in making it harder for smaller parties to achieve their first seat, is less proportional than the D'Hondt rule. Still, both allocation rules are by far more proportional than for example the simple plurality rule which would simply give all seats to the largest party (A in our case).
Appendix C: Voting in a multi-party context

Any given individual will vote only if the net benefits of voting are strictly positive, i.e. if:

\[ R = \left[ \sum_{i=1}^{N-1} (p_i^V - p_i^A)(U_i - U_N) \right] - C + D > 0 \]  

(C.1)

\begin{itemize}
  \item R : Net satisfaction, in utiles, an individual receives from voting
  \item N : Number of possible outcomes (winning parties/coalitions)
  \item \( p_i^V \) : Probability that party/coalition i wins if you vote
  \item \( p_i^A \) : Probability that party/coalition i wins if you abstain
  \item U_i : Utility from the victory of party/coalition i
  \item C : Costs of voting
  \item D : Expressive Benefits of voting
\end{itemize}

This expression applies to all potential voters, irrespective of their favourite option. To prove this, we present the derivation of expression (C.1) – first for the situation with three options and later present a generalisation to N options.

The case with 3 options

Assume initially that there are three options (X, Y and Z) to choose from. It then holds for any given voter that the expected utility from casting a vote (\( U^V \)) is equal to:

\[ U^V = \left[ p_X^V \cdot U_X \right] + \left[ p_Y^V \cdot U_Y \right] + \left[ p_Z^V \cdot U_Z \right] \]

As can be seen, \( U^V \) consists of, for each of the three possible options, the product of the utility the voter expects from that particular option and the probability that this option is victorious when (s)he casts a vote. Similarly, the expected utility if the voter decides to abstain (\( U^A \)) equals:

\[ \sum_{i=\{X,Y,Z\}} p_i^A = 1 \]

\(^{85}\) “Options” refers to the various possible outcomes of the election (i.e. winning party/coalition).
\[ U^A = [p_{X}^A \cdot U_X] + [p_{Y}^A \cdot U_Y] + [p_{Z}^A \cdot U_Z] \]

\[ \text{with } \sum_{i=X,Y,Z} p_i^A = 1 \]

In this case, we look at, once again for each of the three possible options, the product of the utility the voter expects from that particular option and the probability that this option is victorious when (s)he abstains. Consequently, the net utility from turning out equals the difference between these two expectations.

\[ U^{V} - U^{A} = [p_{X}^{V} \cdot U_X] + [p_{Y}^{V} \cdot U_Y] + [p_{Z}^{V} \cdot U_Z] - [p_{X}^{A} \cdot U_X] - [p_{Y}^{A} \cdot U_Y] - [p_{Z}^{A} \cdot U_Z] \]

\[ = U_X[\text{p}_{X}^{V} - p_{X}^{A}] + U_Y[\text{p}_{Y}^{V} - p_{Y}^{A}] + U_Z[\text{p}_{Z}^{V} - p_{Z}^{A}] \]

Since it holds that \( \sum_{i=X,Y,Z} p_i^V = \sum_{i=X,Y,Z} p_i^A = 1 \), we can substitute \( p_{Z}^{V} \) by \( 1 - p_{X}^{V} - p_{Y}^{V} \) and \( p_{Z}^{A} \) by \( 1 - p_{X}^{A} - p_{Y}^{A} \). This leads to:

\[ U^{V} - U^{A} = U_X[\text{p}_{X}^{V} - p_{X}^{A}] + U_Y[\text{p}_{Y}^{V} - p_{Y}^{A}] + U_Z[\text{p}_{Z}^{V} - p_{Z}^{A} - (1 - p_{X}^{V} - p_{Y}^{V})] + U_Z[\text{p}_{Z}^{A} + p_{Y}^{A} - p_{Z}^{A}] \]

Rearranging terms, we obtain:

\[ U^{V} - U^{A} = \left[ \sum_{i=X,Y} (U_i - U_Z)(p_i^V - p_i^A) \right] \]

Note that the above expression does not contain a direct comparison of options X and Y. Still, this effect is (implicitly) taken up through the comparison of options Y and Z and X and Z respectively. Since we assume a one-dimensional policy space, the idea here is similar to a situation where three points lie on a straight line. In such a case, one only needs information on the distance between A and B and that between B and C to identify the distance between A and C.
Moreover, the instrumental benefit term in expression (??).1) will always be strictly non-negative. As derived above, with N=3, the instrumental benefit can be written as:

\[ [U_X - U_Z].[p_X^V - p_X^A] + [U_Y - U_Z].[p_Y^V - p_Y^A] \]  \hspace{1cm} (C.2)

Voter favouring option X:  +  +  +/-  -
Voter favouring option Y:  +/-  -  +  +
Voter favouring option Z:  -  -  -  -

Positive (negative) signs denote a higher (lower) probability of turning out to cast a vote. For a voter favouring – and voting for – the option that constitutes the reference category in expression (C.2), viz. option Z, it is straightforward to see that the result of expression (C.2) is a positive number. The first term on the right-hand side, \([U_X - U_Z].[p_X^V - p_X^A]\), is clearly positive. Indeed, the probability that option X wins if (s)he votes \((p_X^V)\) is smaller than if (s)he abstains \((p_X^A)\). Hence the negative sign. Since (s)he prefers option Z to option X, that is, attaches higher utility to that option, the difference in expected utility will also be negative. In similar vein, the sign of the second term on the right-hand side of expression (C.2), \([U_Y - U_Z].[p_Y^V - p_Y^A]\), is also positive.

Things are slightly more intricate when regarding voters that do not prefer the option used as a reference category. Let us by way of example look at the uppermost row (“Voter favouring option X”). The first term on the right-hand side of expression (C.2), \([U_X - U_Z].[p_X^V - p_X^A]\), is still clearly positive. Indeed, the probability that option X wins if (s)he votes \((p_X^V)\) is larger than if (s)he abstains \((p_X^A)\). Since (s)he prefers option X to option Z, that is, attaches higher utility to that option, the difference in expected utility will also be positive.

With regard to the second term on the right-hand side, casting a ballot for option X reduces the probability that option Y will come about. Hence, \([p_X^V - p_X^A]\) will be negative. However, \([U_Y - U_Z]\) can be either positive or negative depending on the ordering of less-preferred options. If, on the one hand, the voter favouring option X prefers option Z to option Y (that is, \(U_X > U_Z > U_Y\)), \([U_Y - U_Z]\) would have a negative sign such that the
entire second term on the right-hand side of expression (C.2) would be positive. In this case, the instrumental benefit from voting is sure to be positive. If, on the other hand, the voter favouring option X prefers option Y to option Z (that is, \( U_X > U_Y > U_Z \)), we observe \( [U_Y - U_Z] > 0 \). The entire second term on the right-hand side of expression (C.2) then becomes negative. Nonetheless, the sum of the positive first term in expression (C.2) and the negative second term will even then carry a positive sign – conferring to the voter an instrumental benefit from turning out.

The reason is as follows. Given the voter’s preference ordering, \( X > Y > Z \), we know that \([U_X - U_Z] > [U_Y - U_Z]\). Also, since \( \sum_{i=X,Y,Z} p_i^v = \sum_{i=X,Y,Z} p_i^a = 1 \), the increase in the probability of option X winning if the voter votes leads to declining probabilities of victory for options Y and Z. Since these changes must cancel out, \([p_Y^v - p_Y^a]\) can at most be equal to \([p_X^v - p_X^a]\). As such, \([U_X - U_Z][p_Y^v - p_Y^a]\) will always be at least as large as \([U_Y - U_Z][p_Y^v - p_Y^a]\), creating a positive instrumental benefit from voting.

- **Generalization**

More generally, we can set the number of options to choose from to \( N \). For any given voter, the expected utility from casting a vote \( (U^v) \) then is equal to:

\[
U^v = \sum_{i=1}^N [p_i^v U_i] \quad \text{with} \quad \sum_{i=1}^N p_i^v = 1
\]

Hence, \( U^v \) amounts to the utility from each possible option \( i \) \( (U_i) \) multiplied by the probability that this option “wins” if the voter casts a vote \( (p_i^v) \). Similarly, the expected utility if the voter decides to abstain \( (U^a) \) equals:

\[
U^a = \sum_{i=1}^N [p_i^a U_i] \quad \text{with} \quad \sum_{i=1}^N p_i^a = 1
\]

As before, the net utility equals the difference between these two expectations.
\[ U^V - U^A = \sum_{i=1}^{N} [p^V_i U_i] - \sum_{i=1}^{N} [p^A_i U_i] \]
\[ = \sum_{i=1}^{N} [p^V_i U_i] - (p^A_i U_i)] \]
\[ = \sum_{i=1}^{N} U_i [p^V_i - p^A_i] \]
\[ = \sum_{i=1}^{N-1} U_i [p^V_i - p^A_i] + U_N [p^V_N - p^A_N] \]

Since it holds that \( \sum_{i=1}^{N} p^V_i = \sum_{i=1}^{N} p^A_i = 1 \), we can substitute \( p^V_N \) by \( (1-\sum_{i=1}^{N-1} p^V_i) \) and \( p^A_N \) by \( (1-\sum_{i=1}^{N-1} p^A_i) \). This leads to:

\[ U^V - U^A = \sum_{i=1}^{N-1} U_i [p^V_i - p^A_i] + U_N [1-\sum_{i=1}^{N-1} p^V_i -1+\sum_{i=1}^{N-1} p^A_i] \]
\[ = \sum_{i=1}^{N-1} U_i [p^V_i - p^A_i] - U_N [\sum_{i=1}^{N-1} p^V_i - \sum_{i=1}^{N-1} p^A_i] \]
\[ = \left[ \sum_{i=1}^{N-1} (p^V_i - p^A_i)(U_i - U_N) \right] \]

Q.E.D.

Analogous to the case with three options, it can be shown that this term will always be strictly non-negative. Before we demonstrate this, note that we designate the voter’s favourite option as 1 and the reference category as N. No assumptions as to the voter’s preference ordering are made other than the fact the option 1 is strictly preferred to each of the other options \( (\forall i \in [2, N]: U_1 > U_i) \). The problem at hand is whether the following equation holds:

\[ \sum_{i=1}^{N-1} (p^V_i - p^A_i)(U_i - U_N) > 0 \]

Rewriting this by taking the elements relating to the voter’s preferred option (i.e. option 1) apart, this implies that:
\[
\left[(p_i^V - p_i^A)(U_1 - U_N)\right] + \sum_{i=2}^{N-1} (p_i^V - p_i^A)(U_i - U_N) > 0
\]  
(C.3)

To show that expression (C.3) holds, we must demonstrate that the first term is at least as large as the second term. Note that, since the voter is assumed to vote for his / her preferred option, the first term will always be positive while the second term may well be negative. More precisely, \( \forall i \in [2, N] \), \( p_i^V - p_i^A \) will always be negative – as the chance of each other option to be victorious is lower when the voter votes for option 1 compared to when (s)he abstains – while \( U_i - U_N \) can be positive or negative depending on the exact preference ordering of the voter (see example above). For further derivations, it is more convenient to write expression (C.3) as follows:

\[
\left[(p_i^V - p_i^A)(U_1 - U_N)\right] > -\sum_{i=2}^{N-1} (p_i^V - p_i^A)(U_i - U_N)
\]  
(C.4)

Both the left- and right-hand side of the inequality sign will now be further analysed.

\[
\left[(p_i^V - p_i^A)(U_1 - U_N)\right] = (U_1 - U_N) \cdot \left[1 - \sum_{i=2}^{N} p_i^V - 1 + \sum_{i=2}^{N} p_i^A \right]
\]

\[
= (U_1 - U_N) \cdot \left[\sum_{i=2}^{N} (p_i^V - p_i^A) \right]
\]

\[
= (U_1 - U_N) \cdot \left[\sum_{i=2}^{N} (p_i^V - p_i^A) \right]
\]

\[
= -U_1 \cdot \sum_{i=2}^{N} (p_i^V - p_i^A) + U_N \cdot \sum_{i=2}^{N} (p_i^V - p_i^A)
\]

\[
= -U_1 \cdot \sum_{i=2}^{N} (p_i^V - p_i^A) + U_N \cdot \sum_{i=2}^{N-1} (p_i^V - p_i^A) - U_N \cdot (p_N^V - p_N^A)
\]

\[
= -\sum_{i=2}^{N-1} (p_i^V - p_i^A)(U_i - U_N)
\]

Returning these results into expression (C.4), we obtain:
\[-U_1 \cdot \sum_{i=2}^{N-1} (p_i^{y} - p_i^{a}) + U_{N-1} \cdot \sum_{i=2}^{N-1} (p_i^{y} - p_i^{a}) - U_1 \cdot \left[(p_N^{y} - p_N^{a})\right] + U_{N-1} \cdot \left[(p_N^{y} - p_N^{a})\right]\]

\[> - \sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right] + U_{N-1} \cdot \sum_{i=2}^{N-1} (p_i^{y} - p_i^{a})\]

After deleting common terms at both ends and some minor rearranging, we get:

\[-U_1 \cdot \sum_{i=2}^{N-1} (p_i^{y} - p_i^{a}) + \left[U_{N-1} - U_1\right]\left[p_N^{y} - p_N^{a}\right] > - \sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right]\]

or

\[-\sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right] + \left[U_{N-1} - U_1\right]\left[p_N^{y} - p_N^{a}\right] > - \sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right]\]

Bringing everything to the left-hand side of the inequality operator, we obtain:

\[-\sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right] + \left[U_{N-1} - U_1\right]\left[p_N^{y} - p_N^{a}\right] + \sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right] > 0\]

Two remarks should suffice to show that this expression is indeed positive. Firstly, as it holds that \( \forall \ i \in [2, N]: (p_i^{y} - p_i^{a}) \) is negative (cfr. supra) and \( U_1 > U_N \), we see that the first two terms on the left-hand side of the inequality sign are positive. The last term will carry a negative sign. Secondly, since \( \forall \ i \in [2, N]: U_1 > U_i \), it is easy to see that \( \sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right] \) will be larger than \( \sum_{i=2}^{N-1} \left[U_i \cdot (p_i^{y} - p_i^{a})\right] \). Hence, there is always a non-negative instrumental benefit to turning out. \( Q.E.D \)
Appendix D: Voter turnout: additional results

We performed two sensitivity tests on the results provided in the main text. The results are presented in table D.1.

In columns (1) and (2), we test whether our results are affected by the exclusion of the 32 municipalities in the judicial area “Dendermonde”. Since the data with respect to the prosecution level in this area were missing from our survey, we – in the main text – made the assumption that there was no prosecution after the 2000 municipal elections. Hence, these 32 municipalities all obtained a value 0 for the prosecution dummy. The results given in columns (1) and (2) of table D.1 exclude these 32 municipalities. Comparison with the results in the main text shows that the results are clearly not affected by the assumption made.

Columns (3) and (4) test for a possible non-linearity in the effect of the number of parties on voter turnout. This result was observed by De Winter et al. (1991) when studying turnout in Belgian elections. Our results do not confirm this. The effect of the squared number of parties is statistically indistinguishable from 0. Moreover, the adjusted R² of this regression is lower than the one not including the squared term (which was 59.44; see table 2.3). Adding the squared number of parties thus does not add any explanatory value to the model. Note also that the multicollinearity between the number of parties and its squared value leads the coefficient on the number of parties to become insignificant at 10% levels of significance. An F-test shows, however, that they are jointly significant (see bottom of table D.1). It is of note that the overall effect using the coefficients on NoP and NoP² was still negative for the entire observed data set – reinforcing the conclusion of the main text. In addition, when either term was omitted, the other became negative and significant. The choice of preferred functional form – provided in the main text – was dictated by significance and fit.

Finally, we tested whether the imposition of the restriction that the coefficients on log (NoP) and log (1 + cv²) should add up to –0.189 (i.e. the coefficient on log (ENP)) would affect our results. This restriction makes an estimation including log (ENP) perfectly equivalent to one where log (NoP) and log (1 + cv²) are introduced separately. Not imposing the restriction creates a (slightly) more general model. The estimation results in
column (5) show that our findings are clearly not affected by the restriction imposed. The sole difference is that the variable measuring inequality no longer approaches 10% significance.

<table>
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<tr>
<th>Variable (in logs)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>REG</td>
<td>-0.153 *** (4.84)</td>
<td>-0.148 *** (4.68)</td>
<td>-0.155 *** (5.06)</td>
<td>-0.152 *** (4.97)</td>
<td>-0.136 *** (4.99)</td>
</tr>
<tr>
<td>DENS</td>
<td>-0.139 *** (4.79)</td>
<td>-0.135 *** (4.58)</td>
<td>-0.136 *** (4.85)</td>
<td>-0.132 *** (4.63)</td>
<td>-0.131 *** (4.73)</td>
</tr>
<tr>
<td>MIGR</td>
<td>-0.357 *** (4.41)</td>
<td>-0.364 *** (4.47)</td>
<td>-0.360 *** (4.61)</td>
<td>-0.374 *** (4.77)</td>
<td>-0.355 *** (4.65)</td>
</tr>
<tr>
<td>AGE</td>
<td>-0.274 *** (3.33)</td>
<td>-0.275 *** (3.30)</td>
<td>-0.271 *** (3.41)</td>
<td>-0.273 *** (3.39)</td>
<td>-0.266 *** (3.35)</td>
</tr>
<tr>
<td>Y</td>
<td>0.119 (0.58)</td>
<td>0.111 (0.53)</td>
<td>0.162 (0.81)</td>
<td>0.162 (0.80)</td>
<td>0.148 (0.74)</td>
</tr>
<tr>
<td>INCDIV</td>
<td>-1.009 *** (4.15)</td>
<td>-1.008 *** (4.09)</td>
<td>-1.056 *** (4.46)</td>
<td>-1.064 *** (4.44)</td>
<td>-1.051 *** (4.46)</td>
</tr>
<tr>
<td>UNEM</td>
<td>-0.026 (-0.52)</td>
<td>-0.018 (-0.35)</td>
<td>-0.028 (-0.57)</td>
<td>-0.021 (-0.42)</td>
<td>-0.030 (-0.62)</td>
</tr>
<tr>
<td>PROSEC</td>
<td>-0.105 ** (2.42)</td>
<td>-0.107 ** (2.44)</td>
<td>-0.110 ** (2.64)</td>
<td>-0.111 ** (2.64)</td>
<td>-0.106 ** (2.55)</td>
</tr>
<tr>
<td>NoP (election)</td>
<td>-0.200 *** (3.42)</td>
<td>-0.161 *** (2.73)</td>
<td>-0.247 (-1.08)</td>
<td>-0.270 (-1.08)</td>
<td>-0.224 (-4.13)</td>
</tr>
<tr>
<td>NoP² (election)</td>
<td>-0.016 (0.20)</td>
<td>0.016 (0.20)</td>
<td>0.039 (0.48)</td>
<td>0.039 (0.48)</td>
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</tr>
<tr>
<td>I</td>
<td>0.127 (1.41)</td>
<td>-</td>
<td>0.127 (1.49)</td>
<td>-</td>
<td>0.036 (0.66)</td>
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<tr>
<td>35-40% dummy</td>
<td>-</td>
<td>-0.008 (-0.20)</td>
<td>-</td>
<td>-0.008 (-0.15)</td>
<td>-</td>
</tr>
<tr>
<td>40-45% dummy</td>
<td>-</td>
<td>0.096 ** (1.99)</td>
<td>-</td>
<td>0.097 ** (2.17)</td>
<td>-</td>
</tr>
<tr>
<td>45-50% dummy</td>
<td>-</td>
<td>0.043 (0.71)</td>
<td>-</td>
<td>0.052 (0.91)</td>
<td>-</td>
</tr>
<tr>
<td>50-55% dummy</td>
<td>-</td>
<td>0.055 (0.96)</td>
<td>-</td>
<td>0.059 (1.10)</td>
<td>-</td>
</tr>
<tr>
<td>55-60% dummy</td>
<td>-</td>
<td>0.029 (0.47)</td>
<td>-</td>
<td>0.033 (0.57)</td>
<td>-</td>
</tr>
<tr>
<td>Above 60% dummy</td>
<td>-</td>
<td>0.053 (0.94)</td>
<td>-</td>
<td>0.057 (1.07)</td>
<td>-</td>
</tr>
<tr>
<td>N</td>
<td>284</td>
<td>284</td>
<td>307</td>
<td>307</td>
<td>307</td>
</tr>
<tr>
<td>R² (adj)</td>
<td>60.02</td>
<td>59.85</td>
<td>59.31</td>
<td>4.21 **</td>
<td>59.46</td>
</tr>
<tr>
<td>F (2, 295)</td>
<td>284</td>
<td>6.51 ***</td>
<td>307</td>
<td>421 **</td>
<td>307</td>
</tr>
</tbody>
</table>

*** Significant at 1 % level; ** at 5 % level; * at 10% level

t-statistics between brackets
Appendix E: Municipal debt development: additional results

Four tests with respect to the sensitivity of the results provided in the main text (Chapter 5) have been performed. The results of these are presented in tables E.1 to E.4. Firstly, in table E.1, we include both Antwerpen and Gent. These were excluded in the original estimations due to the significant financial aid they were provided with from the federal “Hulpfonds tot financieel herstel van de gemeenten”. Comparison of the results in table E.1 with those in table 5.2 indicates that this exclusion does not influence the main conclusions from the analysis. If anything, the effect of our measures of political fragmentation increases (strongly) in statistical significance. The other variables remain highly statistically significant.

A second test, of which the results are reported in table E.2, excludes all 13 large cities from the sample. This measure is dictated by the observation that especially larger municipalities obtained significant aid from federal and/or regional government(s) during the 1980’s. It can be readily seen that no changes in the significance and coefficient estimates takes place in comparison to table 5.2. These observations thus have no influence on our conclusions. Note that once again the results of our measures of political fragmentation outperform those presented in the main text (albeit marginally) in statistical significance.

Thirdly, we replace the election-year dummy, ELECT1, by a variable measuring the time before the next election (ELECT2). ELECT2 equals 0 in election years and increases to a value 5 in the first post-election year. Inclusion of this variable is driven by the observation, in figure 5.1, that especially since the mid 1980’s there appears to be a U-shape in municipal indebtedness over each legislative term. This is confirmed in table E.3. Post-election years show an increasing tendency to reduce indebtedness (or decreasing rise in the debt ratio). This effect reaches its peak in the third year after the election. Afterwards, the reduction in local debt ratios (or the holding back of its rise) becomes weaker.

Finally, we performed an additional analysis on a shorter time period (1984-2000). This aims to test whether the positive (and significant) coefficient on our COST variable (see table 5.2.) could be due to the perverse effect that high interest rates have on high-debt
municipalities. We take the 1984-2000 period because the budgetary position of Flemish municipalities was already drastically improved by 1984 (Vanneste and Moesen, 1993; Moesen and Van Damme, 1994, 5). The results are much in line with the original estimation results shown in table 5.2. The statistical significance of the fragmentation variables even increases. Importantly, we now do find a significant and negative coefficient for the COST variable in our model, indicating the government in this (shorter) time period did rationally reduce its debt ratio (or temper the rise in it) when interest rates were high.
Table E.1: Results including Gent and Antwerpen

<table>
<thead>
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<th></th>
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<th>(2) (FE)</th>
<th>(3) (FE)</th>
<th>(4) (FE)</th>
</tr>
</thead>
<tbody>
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<td>( \Delta \text{DEBT} )(_{t-1} )</td>
<td>0.030 ***</td>
<td>0.030 ***</td>
<td>0.029 ***</td>
<td>0.029 ***</td>
</tr>
<tr>
<td></td>
<td>(2.54)</td>
<td>(2.48)</td>
<td>(2.44)</td>
<td>(2.41)</td>
</tr>
<tr>
<td>( \hat{Y} )</td>
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<td>-0.101 ***</td>
<td>-0.101 ***</td>
<td>-0.101 ***</td>
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<tr>
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<td>(-17.16)</td>
<td>(-17.16)</td>
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<tr>
<td>( \Delta \text{COST} )</td>
<td>0.071 ***</td>
<td>0.070 ***</td>
<td>0.070 ***</td>
<td>0.070 ***</td>
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<tr>
<td></td>
<td>(3.17)</td>
<td>(3.15)</td>
<td>(3.13)</td>
<td>(3.15)</td>
</tr>
<tr>
<td>( \text{ELECT1} ) ( (\text{dummy}) )</td>
<td>0.971 ***</td>
<td>0.973 ***</td>
<td>0.974 ***</td>
<td>0.975 ***</td>
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<tr>
<td></td>
<td>(10.45)</td>
<td>(10.47)</td>
<td>(10.49)</td>
<td>(10.50)</td>
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<tr>
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<td>-1.009 ***</td>
<td>-1.004 ***</td>
<td>-1.004 ***</td>
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<td>(-12.77)</td>
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<tr>
<td>( \Delta \text{COST} )</td>
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<td>0.973 ***</td>
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<td>(10.50)</td>
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<td>(3.15)</td>
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<td>(10.50)</td>
</tr>
<tr>
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<td>-1.004 ***</td>
<td>-1.004 ***</td>
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<td>( \Delta \text{COST} )</td>
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<td>(3.17)</td>
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<td>(3.15)</td>
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<tr>
<td>( \text{ELECT1} ) ( (\text{dummy}) )</td>
<td>0.971 ***</td>
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<td>0.974 ***</td>
<td>0.975 ***</td>
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<td>(10.47)</td>
<td>(10.49)</td>
<td>(10.50)</td>
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<tr>
<td>( \text{BBR} ) ( (\text{dummy}) )</td>
<td>-1.009 ***</td>
<td>-1.004 ***</td>
<td>-1.004 ***</td>
<td>-1.008 ***</td>
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- \( t \)-statistics between brackets;
- *** significant at 1%; ** at 5% and * at 10%;
Table E.2: Results excluding all 13 large cities

<table>
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<th>(4) (FE)</th>
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<td>( \Delta DEBT_{t-1} )</td>
<td>0.047 ***</td>
<td>0.047 ***</td>
<td>0.047 ***</td>
<td>0.047 ***</td>
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<tr>
<td></td>
<td>(3.93)</td>
<td>(3.88)</td>
<td>(3.91)</td>
<td>(3.90)</td>
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<tr>
<td>( Y )</td>
<td>-0.102 ***</td>
<td>-0.101 ***</td>
<td>-0.102 ***</td>
<td>-0.102 ***</td>
</tr>
<tr>
<td></td>
<td>(-18.13)</td>
<td>(-18.10)</td>
<td>(-18.12)</td>
<td>(-18.12)</td>
</tr>
<tr>
<td>( POP )</td>
<td>-0.062 ***</td>
<td>-0.062 ***</td>
<td>-0.063 ***</td>
<td>-0.063 ***</td>
</tr>
<tr>
<td></td>
<td>(-4.50)</td>
<td>(-4.57)</td>
<td>(-4.57)</td>
<td>(-4.57)</td>
</tr>
<tr>
<td>( \Delta COST )</td>
<td>0.062 ***</td>
<td>0.061 ***</td>
<td>0.061 ***</td>
<td>0.061 ***</td>
</tr>
<tr>
<td></td>
<td>(2.86)</td>
<td>(2.84)</td>
<td>(2.82)</td>
<td>(2.84)</td>
</tr>
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<td>0.995 ***</td>
<td>0.995 ***</td>
<td>0.995 ***</td>
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<td>(11.12)</td>
<td>(11.12)</td>
<td>(11.12)</td>
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<td>(-13.29)</td>
<td>(-13.29)</td>
<td>(-13.34)</td>
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<td>( COAL )</td>
<td>0.072 *</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( TOG 2 )</td>
<td>-</td>
<td>0.086 **</td>
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<td>-</td>
<td>0.188 *</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>( NoP^2 )</td>
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<td>-</td>
<td>-0.041 *</td>
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<td>YES (37.16 ***</td>
<td>YES (37.14 ***</td>
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<tr>
<td>(F-statistic)</td>
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<td>6555</td>
<td>6555</td>
<td>6555</td>
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<tr>
<td>F (full model)</td>
<td>63.03 ***</td>
<td>60.80 ***</td>
<td>60.72 ***</td>
<td>60.84 ***</td>
</tr>
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</tr>
<tr>
<td>Hausman</td>
<td>192.59 ***</td>
<td>193.86 ***</td>
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\( t \)-statistics between brackets;
*** significant at 1%; ** at 5% and * at 10%;
Table E.3 Results using “time before election” variable

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<td>(FE)</td>
<td>(FE)</td>
<td>(FE)</td>
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<tr>
<td>ΔDEBT t-1</td>
<td>0.045 ***</td>
<td>0.045 ***</td>
<td>0.045 ***</td>
<td>0.045 ***</td>
</tr>
<tr>
<td></td>
<td>(3.77)</td>
<td>(3.74)</td>
<td>(3.76)</td>
<td>(3.76)</td>
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<tr>
<td>Y</td>
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<td>-0.102 ***</td>
<td>-0.102 ***</td>
<td>-0.102 ***</td>
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<td>POP</td>
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<td>-0.063 ***</td>
<td>-0.063 ***</td>
<td>-0.063 ***</td>
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<tr>
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<td>(-4.62)</td>
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<tr>
<td>ΔCOST</td>
<td>0.187 ***</td>
<td>0.187 ***</td>
<td>0.187 ***</td>
<td>0.187 ***</td>
</tr>
<tr>
<td></td>
<td>(8.63)</td>
<td>(8.62)</td>
<td>(8.60)</td>
<td>(8.62)</td>
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<tr>
<td>ELECT2</td>
<td>-0.574 ***</td>
<td>-0.575 ***</td>
<td>-0.574 ***</td>
<td>-0.574 ***</td>
</tr>
<tr>
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<td>(-8.73)</td>
<td>(-8.73)</td>
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<td>ELECT2²</td>
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<td>0.084 ***</td>
<td>0.084 ***</td>
<td>0.083 ***</td>
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<td>(6.33)</td>
<td>(6.33)</td>
<td>(6.33)</td>
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<td>-0.764 ***</td>
<td>-0.766 ***</td>
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<td>(1.75)</td>
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<td>0.078 *</td>
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<td>(1.87)</td>
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<td></td>
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<td>-</td>
<td>-0.037 *</td>
<td>-</td>
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<td>(-1.72)</td>
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<td>NoP²</td>
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<td>-</td>
<td>0.287 **</td>
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<td>-</td>
<td>-</td>
<td>-0.068 **</td>
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<td>-</td>
<td>0.287 **</td>
<td>-</td>
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<td>(2.16)</td>
<td></td>
</tr>
<tr>
<td>Year dummies</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>(F-statistic)</td>
<td>(34.75) ***</td>
<td>(34.79) ***</td>
<td>(34.83) ***</td>
<td>(34.81) ***</td>
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<td>N</td>
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<tr>
<td>F (full model)</td>
<td>64.72 ***</td>
<td>64.72 ***</td>
<td>64.72 ***</td>
<td>64.72 ***</td>
</tr>
<tr>
<td>Hausman</td>
<td>203.05 ***</td>
<td>203.05 ***</td>
<td>203.05 ***</td>
<td>203.05 ***</td>
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<tr>
<td>RESET²</td>
<td>1.08</td>
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<tr>
<td>RESET³</td>
<td>0.94</td>
<td>0.85</td>
<td>0.82</td>
<td>0.83</td>
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**t-statistics between brackets;*** significant at 1%; ** at 5% and * at 10%;**
Table E.4: Results for the period 1984-2000

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<th>(4) (FE)</th>
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<td><strong>ΔDEBT</strong>  t-1</td>
<td>0.049 *** (3.23)</td>
<td>0.049 *** (3.20)</td>
<td>0.048 *** (3.18)</td>
<td>0.049 *** (3.20)</td>
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<tr>
<td><strong>Ŷ</strong></td>
<td>-0.090 *** (-14.40)</td>
<td>-0.089 *** (-14.36)</td>
<td>-0.089 *** (-14.37)</td>
<td>-0.090 *** (-14.38)</td>
</tr>
<tr>
<td><strong>POP</strong></td>
<td>-0.070 *** (-2.94)</td>
<td>-0.073 *** (-3.05)</td>
<td>-0.074 *** (-3.09)</td>
<td>-0.074 *** (-3.09)</td>
</tr>
<tr>
<td><strong>ΔCOST</strong></td>
<td>-0.141 *** (-5.48)</td>
<td>-0.142 *** (-5.48)</td>
<td>-0.142 *** (-5.48)</td>
<td>-0.142 *** (-5.48)</td>
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<td><strong>ELECT1</strong> (dummy)</td>
<td>1.109 *** (14.06)</td>
<td>1.111 *** (14.09)</td>
<td>1.112 *** (14.10)</td>
<td>1.112 *** (14.09)</td>
</tr>
<tr>
<td><strong>BBR</strong> (dummy)</td>
<td>-0.664 *** (-9.94)</td>
<td>-0.662 *** (-9.90)</td>
<td>-0.663 *** (-9.92)</td>
<td>-0.663 *** (-9.91)</td>
</tr>
<tr>
<td><strong>COAL</strong></td>
<td>0.063 (1.23)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOG 2</strong></td>
<td>-</td>
<td>0.079 (1.51)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOG 3</strong></td>
<td>-</td>
<td>-0.008 (-0.12)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>NoP</strong></td>
<td>-</td>
<td>-</td>
<td>0.245 ** (2.13)</td>
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<tr>
<td><strong>NoP ²</strong></td>
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<td>-</td>
<td>-0.058 ** (-2.38)</td>
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</tr>
<tr>
<td><strong>ENP</strong></td>
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<td>-</td>
<td>-</td>
<td>0.288 * (1.87)</td>
</tr>
<tr>
<td><strong>ENP ²</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.079 ** (-2.16)</td>
</tr>
<tr>
<td>Year dummies (F-statistic)</td>
<td>YES (33.98) ***</td>
<td>YES (34.02) ***</td>
<td>YES (34.04) ***</td>
<td>YES (34.03) ***</td>
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<tr>
<td>N F (full model)</td>
<td>4736</td>
<td>4736</td>
<td>4736</td>
<td>4736</td>
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<tr>
<td>Hausman</td>
<td>401.83 ***</td>
<td>401.65 ***</td>
<td>426.35 ***</td>
<td>431.06 ***</td>
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<tr>
<td>RESET²</td>
<td>0.16</td>
<td>0.12</td>
<td>0.06</td>
<td>0.02</td>
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<tr>
<td>RESET³</td>
<td>1.74</td>
<td>1.70</td>
<td>1.69</td>
<td>1.68</td>
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*Significance levels:* *** significant at 1%; ** at 5% and * at 10%;

t-statistics between brackets;
## Appendix F: Definition of variables and data sources

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<th>Definition</th>
<th>Source</th>
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<td>TURNOUT</td>
<td>Number of votes cast / Number of registered voters</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>RPV</td>
<td>Number of preferential votes candidate i / total preferential votes i’s party</td>
<td>Council of the Brussels Region</td>
</tr>
<tr>
<td>TAX</td>
<td>Dummy. 0 until year of introduction of green tax, 1 in year of introduction, no data afterwards</td>
<td>Municipal Account data provided by Flemish Ministry of Internal Affairs</td>
</tr>
<tr>
<td>DEBT</td>
<td>Total (“own share”) long-term public debt / inhabitants’ total taxable income</td>
<td>Municipal Budgets</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Explanatory Variables</th>
<th>Definition</th>
<th>Source</th>
</tr>
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<td>COAL</td>
<td>Dummy. 1 if coalition government, 0 otherwise</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>TOG2</td>
<td>Dummy. 1 if 2-party coalition, 0 otherwise</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
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<td>TOG3</td>
<td>Dummy. 1 if coalition larger than 2 parties, 0 otherwise</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>NoP</td>
<td>Number of parties (in election or coalition)</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>ENP</td>
<td>“Effective” number of parties (in election or coalition)</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>AGE</td>
<td>Number over 65 / Size of population</td>
<td>National Institute for Statistics (NIS/INS)</td>
</tr>
<tr>
<td>AIRQUAL</td>
<td>Emission of NOx and Sox (in kg/km²)</td>
<td>Vlaamse Milieumaatschappij (VMM)</td>
</tr>
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<td>BBR</td>
<td>Dummy. 1 in period 1983-1988, 0 otherwise</td>
<td>Based on data from Council of the Brussels Region</td>
</tr>
<tr>
<td>C</td>
<td>Dummy. 1 if “critical” position (see main text), 0 otherwise</td>
<td>Based on data from Council of the Brussels Region</td>
</tr>
<tr>
<td>COM</td>
<td>Dummy. 1 if computerised voting, 0 otherwise</td>
<td>Based on data from Council of the Brussels Region</td>
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<td>COST</td>
<td>Real interest rate on long-term (federal) government bonds</td>
<td>International Financial Statistics Yearbook (IMF)</td>
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<tr>
<td>DENS</td>
<td>Size of population / m²</td>
<td>National Institute for Statistics (NIS/INS)</td>
</tr>
<tr>
<td>ELEC</td>
<td>Number holding college or university degree / Size of population (&gt;20 years)</td>
<td>Own calculations using data from National Institute for Statistics (NIS/INS)</td>
</tr>
<tr>
<td>ELECT1</td>
<td>Dummy. 1 in election year, 0 otherwise</td>
<td></td>
</tr>
<tr>
<td>ELECT2</td>
<td>Time before election (in years): 0 in election years and increases to 5 in first post-election year.</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Source</td>
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<td>----------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
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<td>Dummy. 1 if female candidate, 0 otherwise</td>
<td>Based on data from Council of the Brussels Region</td>
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<td>Ideological Complexion of Coalition</td>
<td>Own calculations using data from Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
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<td>INCDIV</td>
<td>Interquartile difference in income / median income</td>
<td>National Institute for Statistics (NIS/INS)</td>
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<td>INCUM</td>
<td>Dummy. 1 if incumbent, 0 otherwise</td>
<td>Based on data from Council of the Brussels Region</td>
</tr>
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<td>MAJ</td>
<td>Number of seats coalition parties hold in the council in excess of simple majority (in %)</td>
<td>Own calculations using data from Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>MIGR</td>
<td>Out- and inward migration / Size of population</td>
<td>National Institute for Statistics (NIS/INS)</td>
</tr>
<tr>
<td>POP</td>
<td>Size of population</td>
<td>National Institute for Statistics (NIS/INS)</td>
</tr>
<tr>
<td>POS</td>
<td>(Numerical) position of candidate in list</td>
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</tr>
<tr>
<td>PRN1</td>
<td>% of neighbours with green tax</td>
<td>Own calculations using Municipal Account data provided by Flemish Ministry of Internal Affairs</td>
</tr>
<tr>
<td>PRN2</td>
<td>% of neighbours of neighbours with green tax</td>
<td>Own calculations using Municipal Account data provided by Flemish Ministry of Internal Affairs</td>
</tr>
<tr>
<td>PROSEC</td>
<td>Dummy. 1 if prosecution takes place, 0 otherwise</td>
<td>Survey results - Department of Micro-Economics (MICE) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>REG</td>
<td>Number of registered voters</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>SOLE</td>
<td>Dummy. 1 if single party majority, 0 otherwise</td>
<td>Department of Political Science (POLI) Vrije Universiteit Brussel.</td>
</tr>
<tr>
<td>TAXREV</td>
<td>Total per capita Tax Revenue</td>
<td>Municipal Budget data provided by Flemish Ministry of Internal Affairs</td>
</tr>
<tr>
<td>TIME</td>
<td>“Time trend”</td>
<td></td>
</tr>
<tr>
<td>UNEM</td>
<td>Number unemployed / Size of population</td>
<td>Rijksdienst voor Arbeidsbemiddeling (RVA)</td>
</tr>
<tr>
<td>WASTE</td>
<td>Total Waste in kg/capita</td>
<td>Openbare Vlaamse Afvalstoffenmaatschappij (OVAM)</td>
</tr>
<tr>
<td>Y</td>
<td>Total taxable income / Size of population</td>
<td>National Institute for Statistics (NIS/INS)</td>
</tr>
</tbody>
</table>
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