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The Power of Parties

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Abstract

As with the market for goods and services, democratic competition involves political parties offering their services (policy programs) to citizen-consumers who vote for their preferred partisan supplier. Little is known about the partial effect of a shift in parties' seat shares for given voter preferences, particularly in proportional representation systems. We estimate party effects using a regression discontinuity design tailored to proportional systems. Based on rich local government data, the analyses show that parties matter for fiscal policies. A larger left-wing party leads to more property taxation and higher user charges. It also leads to higher spending on child care but less on old-age care. These effects are caused both by changes in the representation of individual parties and by shifts between the party blocs.

JEL-Code: C230, D720, H710, H720.

Keywords: fiscal policy, proportional representation, regression discontinuity design.

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1 Introduction

Political parties represent the supply side of democratic politics. Just as we expect firms to matter in economic markets, we expect parties to matter in democratic markets. In the economic market, a positive shift in supply results in lower prices. In politics, the result of a shift from a left-wing to a right-wing majority, holding (voter) demand constant, is expected to reduce taxes. In the field of economics, there is a vast literature devoted to understanding how supply shifts affect prices. The political science literature on the causal effects of political representation, on the other hand, is less developed, in particular with regard to proportional representation (PR) systems. This paper aims to fill this gap.

The supply side effect is a key component of democratic delegation. In order to leave a mark on public policies, parties need to have distinctive platforms as well as a sufficient degree of policy discretion. When conditions allow parties to matter, voters can influence policies by casting a ballot for their preferred party.

The manner in which parties may affect policy outcomes in a proportional election system is not obvious. We propose a simple framework providing the foundation for our empirical analysis. In a majoritarian election system political power is simply a dichotomous variable defined by the party that gains a majority of seats in a legislature. This is similar to PR systems insofar as a party or coalition of parties can only influence policy if it holds a majority in the legislature. What sets PR systems apart is that influence over the policy agenda not only depends on which party enjoys a seat majority, there will be important variations in power within and outside the governing coalitions depending on the representation of individual parties.

We rely on two regression discontinuity (RD) designs specifically tailored to capture these aspects of PR systems. To the best of our knowledge, our study represents the first attempt to estimate the effect of changes in partisan majorities as well as changes in the representation of individual parties on policy outcomes.

As our case we address the fiscal policies of Norwegian local government. Analyses of

these data have several advantages. First, Norwegian municipalities operate in a homogenous institutional framework with considerable autonomy over several fiscal outcomes. We offer a broad analysis of fiscal policies in Norwegian municipalities covering tax setting and user charges as well as public spending allocation. In addition, however, we also have access to a unique and comprehensive set of data on the political preferences of elected officials, allowing us to formally test whether political representation shifts policy in the expected direction.

The policy effects of political representation is probably one of the most intensely studied topics in political science (for reviews, see Boyne (1996); Schmidt (1996); Imbeau, Pétry and Lamari (2001); Besley and Case (2003); Blom-Hansen, Monkerud and Sørensen (2006)). These studies display an impressive variation in terms of theoretical framework, data sources and empirical strategy, and the results vary accordingly. Some studies find an association between left-wing governments, higher taxes, and higher spending levels; other studies do not find the same correlations, however. . While almost all studies explain party effects, including diverging voter preferences, in different ways, the literature as a whole does not address supply-side effects as such. Besley and Case (2003) and Reed (2006) make an explicit attempt to discriminate between the effects of political parties and effects of public opinion. In their study of U.S. states, they include state fixed effects and explicit control for the citizenry's ideological preferences.

Regression discontinuity designs offer a stronger empirical test. Several studies of majoritarian elections systems, most notably that of the United States, apply an RD design to estimate the effect of political representation.[1] These RD designs build on the idea that party representation in majoritarian systems changes discontinuously at the 50 percent vote threshold. Pettersson-Lidbom (2008) use the same approach to estimate the effect of left-wing control on fiscal outcomes in Swedish municipalities.[2] Although Sweden

[1] Lee, Moretti and Butler (2004) pioneered this approach in the U.S. Examples of other studies include Eggers and Hainmueller (2009), Ferreira and Gyourko (2009), Folke and Snyder (2012), Boas and Hidalgo (2011) and Gerber and Hopkins (2011).

[2] Although published four years later than Lee, Moretti and Butler (2004), the working paper version of Pettersson-Lidbom (2008) appeared at the same time as Lee, Moretti and Butler (2004), making the two papers the first to implement an RD design in an electoral setting.

has a proportional election system, Pettersson-Lidbom (2008) argues that the Swedish multi-party system can be analyzed as two party blocs, which allows him to use the same type of RD design as is used in the study of majoritarian election systems. We use the design of Pettersson-Lidbom (2008) as our starting point to estimate the majoritarian dimension of the party effects, but we introduce certain methodological innovations to address some of the concerns arising from Pettersson-Lidbom's design.

To examine the effect of the individual representation of parties, we start out by presenting survey data on the politicians' policy preferences. By combining these data with data on the individual parties' seat shares in the councils we construct a measure of the average policy position of a municipal council. We then use the RD design developed by Folke (2011), which uses observations close to seat thresholds to isolate a part of the seat allocation that is as good as random.[3] We then use this, arguably random, part of the seat allocation to instrument the average policy position in the municipal council. This allows us to examine not only if party representation affects policy outcomes, but also if it does so in the direction we would expect given the representatives' stated policy positions.

Our analysis shows that local parties do matter for fiscal policies. We find that increased representation of left-wing parties causes higher taxes and a shift in spending towards the young and away from the elderly. Interestingly, the effect on welfare services is not driven by changes in seat majorities. In systems of proportional representation, political parties appear to impact fiscal policies even when traditional coalitions remain unchanged.

2 The Impact of Local Political Parties

Political parties matter as consequence of voter preference: a shift in electoral preference can increase support for particular parties, tilting public policies in voters' preferred

[3]Two recent working papers have applied related research designs, i.e. Curto-Grau, Sole-Olle and Sorribas-Navarro (2012) and Freier and Odendahl (2012).

direction. This is the demand-side effect in politics. We address another issue: does a shift in party representation change public policies when voter preferences are constant? This is the supply-side effect in politics.[4]

This partisan effect can be understood in the context of heterogeneous policy preferences and the institutional rules for mapping preferences into policy decisions. We address two stages of preference aggregation. The first stage is from party vote shares to party seat shares in the elected body; the second from party seat shares to policy decisions. In these stages we can utilize representative institutions that allow us to identify a party supply-side effect.

2.1 The Existence of Divergent Party Platforms

A large theoretical literature on party competition suggests party platforms will diverge when voters have heterogeneous voter preferences. Admittedly, two-party competition leads to a convergence of party platforms under restrictive assumptions. With alternative assumptions, even the two-party models predict policy divergence (for example, Wittman (1983), Calvert (1985), Cox and McCubbins (1986), Glaeser, Ponzetto and Shapiro (2005)). One important reason is that political parties find it impossible to offer credible platforms that deviate from the representatives' underlying preferences (Alesina, 1988). Party positions therefore reflect what party leaders believe to be appropriate policies. Although party platforms display a positive association to the preferences of their supporters, parties' ideological positions and policy preferences also reveal the attitudes of elected politicians.

Generalizations of these models to multi-party systems suggest that parties will take different policy positions even in the case of one conflict dimension (Merrill and Adams, 2001, 2002). Importantly in multi-party systems, post-election bargaining plays a major

[4]Cox (1997) (p. 6-7) discusses coordination mechanisms in democratic markets in a way that is comparable to our conceptualization of parties as suppliers and voters as consumers. He suggests that market-clearing expectations facilitate equilibrium between supply of candidates/parties and the demands of voters.

role in how policy is determined. Kedar (2005) and Duch, May and Armstrong (2010) suggest that voters may therefore find it beneficial to vote for political parties that take relatively extreme policy positions. Political parties may therefore gain by taking more extremist policy positions than their supporters.

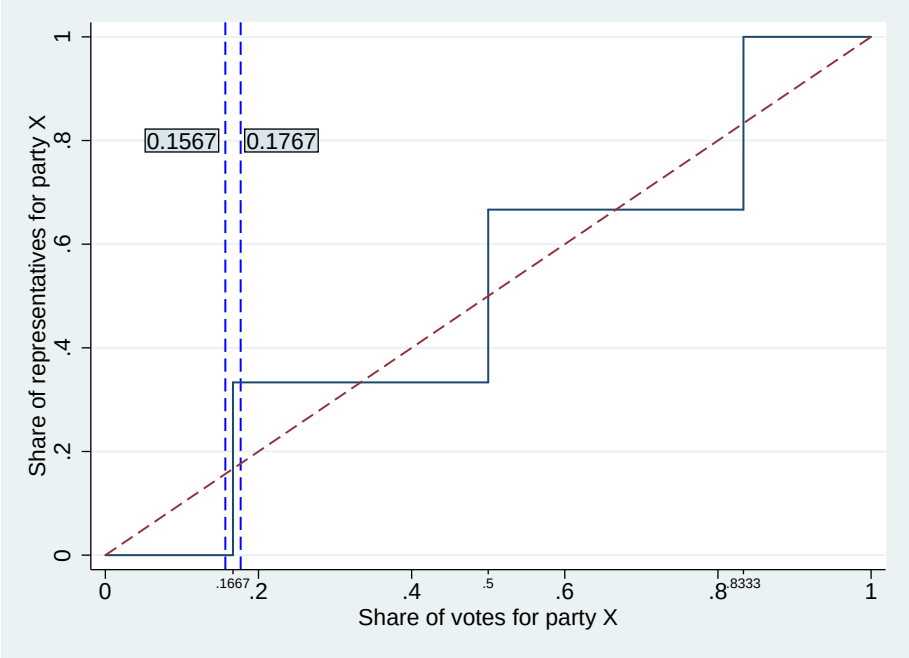
2.2 The Aggregation of Preferences: Votes to Seats

Consider first the case of a majoritarian election system with two candidates competing for political office. Suppose policy preferences diverge within the electorate, and the two candidates have different policy preferences. The candidate winning the majority of the votes wins the seat, and as the successful candidate can set policy autonomously. We might see support for particular parties change significantly without affecting who becomes the ultimate winner. We might also see tiny changes in voter preferences tilting the majority from one candidate to the other, with potentially considerable policy effects. The supply-side effect is due to this non-linear relationship between voter preference and political representation.

We address two key differences between two-party systems and multi-party systems. The first is the transformation of vote shares into council seat shares (i.e. the election system effect); the second is the aggregation of seat shares and party preferences into policy decisions. Consider the mapping of vote shares to party seat shares when two parties are competing for seats in a simple proportional election system, illustrated in Figure 1. A party will get one representative if it receives more than 1/6 of the votes, two if it gets at least half of the votes, and three with more than 5/6 of the votes. Note that with only three representatives the seat share can deviate considerably from the vote share (the red diagonal in Figure 1).

As explained in the introduction, electoral preferences are in practice equal on either side of a seat threshold when we are close enough to it. For illustrative purposes, we may consider voter preferences invariant in a two percentage point window between vote

Figure 1: Mapping vote shares to seat shares with simple PR



Note: The figure illustrates how three seats are allocated on the basis of the Sainte-Laguë Method (a simple proportional election system) when only two parties are running. For illustrative purposes, we may consider an election to be close in a two percentage point window between vote shares of 0.157 and 0.177 (the vertical dotted lines). In the empirical application we use a bandwidth which is one fourth of this.

shares 0.157 and 0.177.[5] Suppose, for example, that the right-wing party received 16 percent of the votes in municipality A and 17 percent in municipality B. Since the electoral preferences are essentially identical in municipalities A and B, but political representation varies, we can identify a party supply-side effect by comparing the policies of the two local governments.

2.3 The Aggregation of Preferences: Seats to Policy Decisions

The second stage of aggregation is from seat shares in the elected assembly to policy decisions. The mapping from seat shares to policy decisions is an important part of the supply-side effect. Since the decisions in the elected assembly are made by majority

[5]In the empirical application we use a bandwidth of 0.25 percentage points. We outline the details of the identification strategy in section 4.

voting, it is not clear how the relationship between partisan seat shares and policymaking will look. One class of models argues that when the multi-party system has been organized into two-party blocs it can be treated as a majoritarian two-party system in which it is the majority bloc that decides policy (cf. Pettersson-Lidbom, 2008). This approach assumes the parties have coalesced into binding alliances, where the coalition members are, for example, defined by national party organizations. In this setting a change in seat shares should matter only if the change shifts the majority between political blocs, but not within one political bloc.

Another class of models assumes that binding party coalitions do not exist. In this setting it is often argued that when there is a single dimension of conflict the median party will be decisive in setting policy (Strøm, 1990, Powell, 2000, chapter 9). A change in seat shares could imply a change of median party, with policies matching the preferences of the new median party. Faced with cross-cutting conflict dimensions, however, the median party model breaks down. It is hard to predict the extent to which representation will affect the parties' relative bargaining power. Finally, budget-making implies that the elected representatives participate in inter-party discourses in closed committees as well as open council meetings. A party with a single elected representative can influence fiscal outcomes simply by making a convincing case for her preferred solution or the interests of her voters (Lijphart, 1999, p.6, Powell, 2000, p. 15, Borge and Sørensen, 2002, Folke, 2011). In this paper we examine party effects by invoking the two-bloc model as well as a more flexible approach to capturing party effects that are not conditional on a shift from a left-wing party bloc majority to a right-wing majority (or vice versa).

3 Data and Institutional Setting

In this paper we rely on two data sources. The main analysis is built around a panel data set on tax and spending policies, covering around 400 municipalities over the period 2000-2010. In addition, we use data from an extensive survey questionnaire aimed at

establishing council members' preferences for particular municipal spending programs and tax policy. In the following section we present the institutional setting and the data.

3.1 Institutional Setting

Studies from the U.S. indicate that parties matter more at the national level than in the local arena. This may be due, according to Ferreira and Gyourko (2009), to Tiebout (1956) style forces, where local political parties serve populations in relatively small and homogenous areas (Oates, 1972). We believe another factor is more important. The essence of party conflict is economic redistribution and social issues (Glaeser, 2006). Local authorities in the U.S. provide local public goods, i.e. infrastructure, water supply and sewage, waste collection and disposal and some cultural and sports facilities. The mandate of Norwegian local governments is much broader. We analyze data on about 430 municipalities providing individual welfare services and local public goods. Responsibilities include the operation of kindergartens, primary schools and senior citizen care at home and in nursing institutions. These tax-financed welfare services target specific age-groups, and have significant redistributive effects (Aaberge et al., 2010).

Tax revenues account for about 45 percent of municipal revenues. Most of the tax revenues are collected as a proportional income tax. Central government stipulates the minimum and maximum levels of tax rates. All municipalities use the maximum tax-rates throughout the period analyzed here. Block and earmarked grants account for most of the other revenues. Municipalities have to take these revenue sources largely as given. They may, however, influence revenues from two additional sources.

First, municipalities collect user fees in several sectors, primarily for infrastructure services (sewage, water supply, and collection and management of garbage).[6] Local governments may choose to subsidize some infrastructure services, which means that user fees can be seen as implicit taxation (although the law stipulates that user charges cannot

[6]User charges for infrastructure services account for about half of the revenue from user charges, the remainder stemming from user charges for child and old-age care (Borge, 2000).

exceed production costs).

Second, municipalities can levy commercial and residential property taxation according to specific criteria.[7] Although this source of revenue accounts, on average, for only about 2 percent of total municipal income, it is an important marginal source of revenue (Fiva and Rattsø, 2007).

For a given level of revenue, local authorities can in principle allocate resources to sectors they elect to prioritize. Budgetary allocations are limited by entitlement legislation under which every citizen enjoys a statutory right to particular services. Primary schooling has always been an element of this legislation, but health care and nursing services are playing an increasing role. Councils' freedom to allocate spending is also constrained by numerous standards, particularly pertaining to staffing and personnel qualifications. Finally, matching grants for child care and central government 'action plans' (particularly for old-age care), are designed to get councils to prioritize particular services.

3.2 Election System and Political Representation

The electoral system is an open-list proportional system of representation with one election district per municipality. Until 2003, the d'Hondt seat allocation method was used to allocate council seats. It was replaced in the 2003 election by a modified Sainte-Laguë seat allocation method.[8] Fiva and Folke (2011) study this electoral reform in detail.

We analyze the impact of local party organizations. Most of the local parties are affiliated with a hierarchical national party organization which defines the broad ideological profile of local branches. This yields a number of advantages to the local groups, including more resources for local election campaigns. It also gives the central party organization an opportunity to impose discipline on local representatives to promote the party nationally. Local party platforms tend therefore to mirror the standpoints of the

[7] Prior to 2007, residential property taxation could only be levied in urban areas. Commercial property taxation is basically a tax on hydro power production (see Andersen, Fiva and Natvik (2010)).

[8] A few municipalities have a parliamentary system. These authorities are not included in the empirical analyses.

national party, rather than the preferences of the local electorate.[9]

The main political cleavage in Norway goes between the left-leaning socialist and the right-leaning conservative camps. The Labor Party (DNA) is the dominant party within the left-leaning bloc, which also consists of the Socialist Left Party (SV) and Red Electoral Alliance (RV). The right-leaning bloc consists of five parties and is more fragmented. They are the Center Party (SP), the Christian Peoples' Party (KrF), the Liberal Party (V), the Conservative Party (H), and the Progress Party (FrP). In addition there are independent party lists, not represented at the national level, small parties that fail to obtain much nationwide support and joint lists of several parties. Appendix Table A.1 offers descriptive statistics on the political representation of all parties.[10]

3.3 Parties' Ideological Positions and Policy Preferences

The survey data provide information on all council members in 120 municipalities for the election periods 1999-2003, 2003-2007, 2007-2011 (response rates: 60-65 percent).[11]

In Figure 2, the upper diagram displays the left-right positions of local council members by party. As expected, the political parties take different positions. What is striking are the large ideological differences between the parties. On the 0-10 left-right scale, the average score of Socialist Left Party representatives is 2.02, the Labor Party 3.6, and the Progress Party 8.4. The positions are national averages, but average party position

[9]Organizational integration is reinforced by local governments' responsibility to implement national welfare policies adopted by parliament. The national parties have an interest in seeing policies uniformly implemented across the country.

[10]Voters can affect the election outcome by voting for a party list and by casting preferential votes for particular candidates. We have data on the allocation of votes both before and after preferential votes are taken into account. Since our research design requires exact voting data for all parties running in the municipal elections, we chose a conservative strategy so as to exclude all observations where the sum of votes before preferential votes are allocated ('partistemmer') are not equal to the sum of votes after the preferential votes are allocated ('listestemmer'). In most of these cases the inconsistency is minor (e.g. a single vote appears to be missing). We also exclude a limited number of observations displaying inconsistency between the final distribution of votes and the distribution of seats (likely caused by errors in the seat data). Altogether then, about 13 percent of the sample is excluded.

[11]Municipalities are drawn as a random sample of municipalities. The survey questions were also answered by mayors and deputy mayors in the remaining municipalities. For further documentation on the survey data, see Monkerud (2007). The survey is conducted in the beginning of the fourth year of each election period. Previous studies using data on previous election periods include Sørensen (1995) and Borge and Sørensen (2002).

changes very little when we estimate left-right scores within local councils.[12] Within political blocs variations are modest: average standard deviations by party range from 0.37 (the Red Electoral Alliance) to 1.21 (the Labor Party). This lends little support for the notion of ideologically homogeneous local governments. When party is fixed, the average positions vary moderately between the municipalities.[13] The party label captures most of ideological variations between and within the local councils.

The lower diagrams in Figure 2 display party members' preferences for increasing or decreasing property taxes and user charges for infrastructure services. Property tax preferences are a mirror image of the left-right positions; left-leaning representatives want to increase property taxes to a greater extent than the right. User charges display less left-right polarization, probably a consequence of the different distributive effects of the two instruments of taxation (Borge and Rattsø, 2004).

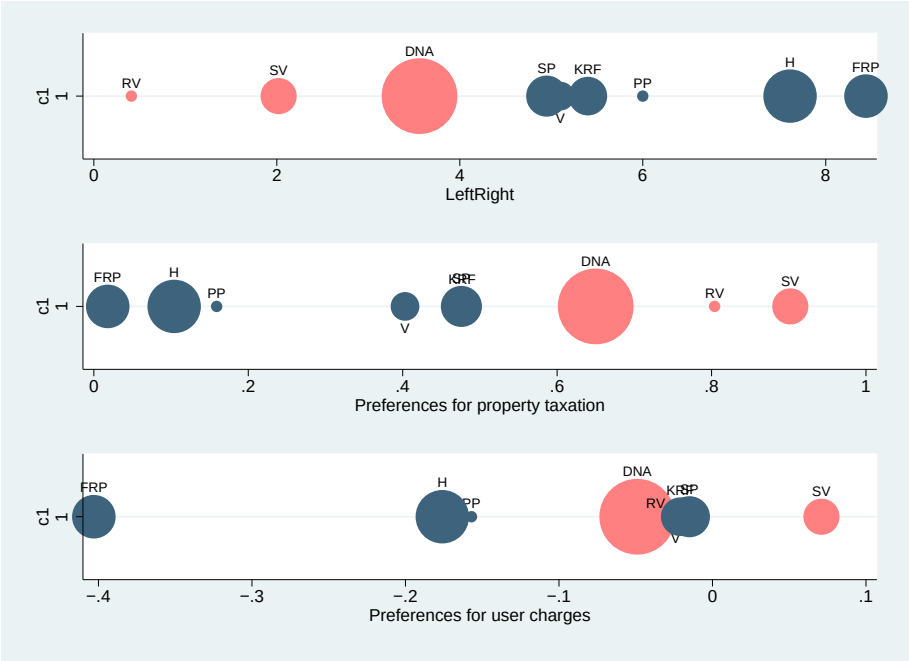
Figure 3 displays party preferences for spending allocations. The services are ranked by the extent to which all parties prioritize the service sector. In the case of old age care, the Progress Party wants to spend more than the other parties; for education the Socialist Left Party wants higher spending and the Progress Party less. Finally, child care spending preferences appear to correspond quite closely with parties' left-right positions. On health care, party spending preferences do not vary significantly. The overall pattern suggests that left-wing parties prioritize services for children, and right-wing parties want to spend relatively more on services for the elderly (Rattsø and Sørensen, 2010).

Elected politicians appear to give less priority to local public goods than they do to welfare services. We observe distinct party preferences: the Progress Party wants more spent on the transportation sector; the right-wing parties less on administrative items. Party differences on allocations to culture (cultural and sports facilities, public parks,

[12]For example, a model with fixed effect for party and municipality yields an R-Square of 0.75. The estimated within-council difference between the Progress Party and the Labor Party is 4.9 and between the Progress Party and the Socialist Left Party 6.5 on the left-right scale.

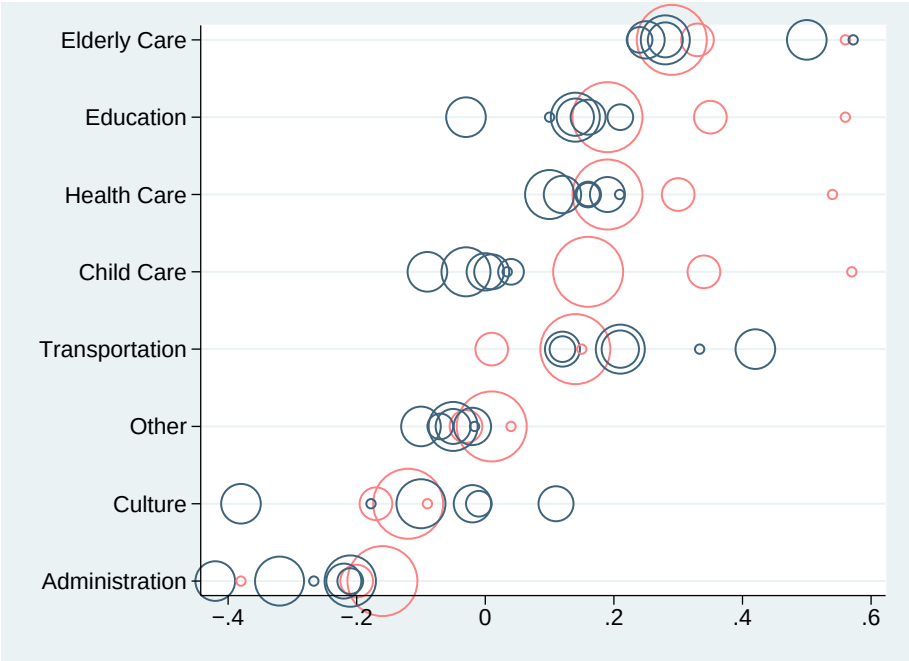
[13]For the major political parties we observe the following between municipality standard deviations on the 10-point left-right axis: Red Electoral Alliance: 0.54; Socialist Left Party: 0.80; Labor Party: 0.98; Center Party: 0.76; Christian Peoples' Party: 0.87; Liberal Party: 1.06; Conservative Party: 0.71; Progress Party: 0.70.

Figure 2: Left-right placement, tax and user charge preferences of local council members (party average score on index)



Note: Average score on the share of council members who want to introduce, maintain, or increase property taxes. Coding of property tax preferences: 1, if the respondent wanted to introduce, maintain, or increase existing property taxes; 0 if the respondent preferred not to introduce property taxes, or alternatively, to abolish or reduce existing property taxes. Coding of preferences of user charges: -1, if the respondent wants to reduce user charges; 0, if the respondent wants to maintain user charges at the present level; 1, if the respondent wants to increase user charges. The responses include answers to questions about three service sectors: water, sewage, and garbage collection and disposal. The sizes of the circles are proportional to parties' average seat share. Red circles are used for parties in the left-wing camp (RV, SV and DNA); blue for parties in the right-wing camp (SP, KRF, H, FRP and PP).

Figure 3: The spending preferences of local council members (party average score on index)



Note: The spending preferences of local councilors are measured by survey questions related to individual spending items. The circle indicates the national average response of a particular party to the following: "We ask you to state whether you believe the municipality should spend much less (i.e. 5% or more), somewhat less (i.e. 1-5%), about the same as in the previous year, somewhat more (i.e. 1-5%), or much more (i.e. 5% or more). Remember that an increase in one spending area usually means cutbacks in other areas." We use the following coding: Much less:-1; somewhat less:-0.5; about the same:0; somewhat more:+0.5; much more:+1. The sizes of the circles are proportional to parties' average seat share. Red circles are used for parties in the left-wing camp (RV, SV and DNA); blue for parties in the right-wing camp (SP, KRF, H, FRP and PP).

etc.) are significant, but do not match the left-right pattern. Progress Party members prefer small allocations to culture, while the representatives of Conservative Party want to raise spending considerably.

Overall, party representatives appear to disagree more strongly on welfare spending, than on local public goods. We therefore expect stronger party effects for welfare services than for local public goods.

3.4 Average Policy Position

The micro-data analysis suggests that the party label is a strong predictor of policy preferences. More importantly though, for a given party affiliation, we observe only very modest variations over time and across municipalities. For a given political party (p), we therefore define the policy positions Q_p^j on fiscal policy j (spending on various items, property taxation, user charges and left-right placement) as invariant over time and space. Let s_{pit} denote the share of representatives of party p in municipality i in election period t, the policy index is defined as follows:

$$I_{it}^j = \sum_{p=1}^{p=P} Q_p^j \cdot s_{pit}, p = 1, 2, ..., 9 \tag{1}$$

In Appendix Table A.2 we provide descriptive statistics for the average policy position.

3.5 Fiscal Policy Data

Table 1 offers descriptive statistics on our dependent variables; a dummy for property taxation, user charges for infrastructure per capita and percent spending on various public services.[14]

We are not able to separate residential from commercial property taxation for most of the period for which we have data. We therefore rely on an indicator variable equal

[14]The dataset is available online (cf. Fiva, Halse and Natvik 2012).

Table 1: Descriptive Statistics: Fiscal Policy

	Mean	Std. Dev.	Min.	Max.
Taxation				
Property taxation (dummy)	0.643	0.479	0	1
User charges (NOK 1000 per capita)	2.913	1.311	0	16.469
Welfare Services				
Percent spending on child care	7.991	2.666	2.914	19.311
Percent spending on education	24.188	4.246	10.507	40.359
Percent spending on elderly care	27.736	5.067	9.797	52.190
Percent spending on health and social care	11.347	2.388	4.416	24.069
Local Public Goods				
Percent spending on culture	5.056	2.271	1.869	20.176
Percent spending on transport	2.736	1.370	0.594	17.581
Percent spending on central administration	9.326	2.746	2.721	21.330
Percent spending on other purposes	11.621	3.360	3.432	38.222

Note: The sample is restricted as in baseline estimations below (N=1132). Data from Fiva, Halse and Natvik (2012).

to 1 if the municipality has some income from property taxation, and zero otherwise. 64 percent of the observations do indicate some form of property taxation.

User charges for infrastructure services (water supply, sewage treatment, and garbage collection) vary considerably across municipalities. The average is NOK 2,913 per capita (deflated to 2007 NOK). As emphasized in previous papers, user charges are an important source of revenue for Norwegian municipalities (Borge, 1995, 2000, Blom-Hansen, Monkerud and Sørensen, 2006).

The welfare services for which local governments are responsible (child care, education, elderly care and health and social services) account for about 71 percent of total spending. The remaining 31 percent is spent on local public goods. Spending shares display substantial cross-sectional variation.

4 Identification Strategy

In this section we describe the identification strategies for estimating the causal effect of political representation on policy. As explained above, we estimate party effects stemming both from variation in the policy position of the average council member, I, and variation in the party bloc with the majority of seats. Before we move on to the actual identification strategies, we describe the general identification problem we address.

4.1 The Identification Problem

Political representation can be considered an equilibrium determined by the interaction of political elites and citizens. It is, therefore, not straightforward to isolate the causal impact of political representation on policy. If parties' platforms are fixed, shifts in voter preferences may change the representation of political parties, which will likely affect fiscal policies. The resulting correlation between party representation and policies is caused by voters not parties.

The identification problem is accentuated by a classical omitted variable problem. Districts where left-wing parties enjoy high support are likely to be systematically different from districts offering little support. An electorate supporting left-wing parties is likely, for example, to earn less than an electorate where the majority supports right-wing parties. It is hard to disentangle the policy effects of political representation from these other characteristics of the municipalities.

A third problem is the possible direct effect of voting on policy outcomes. The parties could use election outcomes to keep themselves informed of voter preferences. A final problem is that of reverse causality, which means policy outcomes can influence voting outcomes and thus the allocation of political power can influence voting outcomes.

Due to their complex nature it is virtually impossible to solve all of these identification problems with a control-variable-driven identification strategy, such as matching. In this paper we use two different regression discontinuity designs based on the mechanics of the

electoral system, to isolate exogenous shifts in the power of parties.

4.2 Exogenous Variation in the Average Policy Position

To generate an as good as random variation we use an intuitively simple two stage least squares (2SLS) approach, the basic idea being that political representation is as good as random when we are sufficiently close to seat allocation thresholds. The identifying assumption is that observations close to either side of a seat threshold are (on average) equal in all relevant respects, except in the allocation of seats. This is the same basic identifying assumption of any electoral RD design. However, there are several methodical challenges due to the characteristics of proportional election systems that need to be solved, most importantly correctly defining the proximity of a party to a seat threshold.

In Figure 1, above, we show a simple case in which three seats are allocated to two parties based on a PR system. This yields three thresholds that deterministically determine the seat allocation. With more than two parties, it becomes more complicated. The seat thresholds in a party's vote share are determined by the vote share of all the parties. Thus, a party may experience a seat change while its vote share remains constant. Consequently, distance to a seat change cannot be measured simply by using the vote share of an individual party.

We follow Folke (2011) and define the distance to a seat threshold as the minimum total vote change across all parties that would be required for a party to experience a seat change. We define an observation as being close enough to a seat threshold if the minimal distance to a seat change is less than a cutoff point, denoted by λ. Throughout the paper we will follow Folke (2011) and define $\lambda = 0.25$ percentage points.[15]

The lack of predetermined seat thresholds not only poses a methodological challenge, it also strengthens the identifying assumption. That the exact seat thresholds in a party's vote share are not realized until after the election makes it essentially impossible for a party to know ex-ante if an election will be close or not. Thus, the type of electoral sorting

[15]For a more detailed description of the identification strategy we refer the reader to Folke (2011).

found by Caughey and Sekhon (2011), which study the U.S. House of Representatives, are of little concern.

To implement the RD design with proportional representation we need two sets of indicator variables. One set of variables indicate whether a party is close to a threshold. These are control variables. The other set indicates whether a party is close to and above or below the threshold. These are the treatment variables.

Formally, we define binary indicator variables for each party, c_{pit}, each taking the value of one for all observations where the party is within distance λ from a threshold, that is, for observations close to a threshold. The set of treatment variables, t_{pit}, is equal to $-\frac{1}{2}$ if party p is close to and below a threshold, $\frac{1}{2}$ if p is close to and above a threshold, and zero otherwise.[16] Since the policy index is calculated on the basis of seat shares, s_{pit}, rather than the absolute number of seats, we divide the treatment and control variable by the total number of seats in the council, S_{it}. Without this transformation the first stage would not be valid.

The first stage specification used here is of the form

$$I_{it}^{j} = \alpha_0^j + \alpha_1^j \frac{c_{1it}}{S_{it}} + \alpha_2^j \frac{c_{2it}}{S_{it}} + \alpha_3^j \frac{t_{1it}}{S_{it}} + \alpha_4^j \frac{t_{2it}}{S_{it}} + \varepsilon_{it}^j. \tag{2}$$

This specification illustrates a three-party setting where party 3 is left out as the reference party.[17]

The second stage setup is simple; here we simply use the fitted value of the policy position index from the first stage to estimate the effect of the seat allocation among parties on the council. This gives us the following specification

[16] The reason for using $-\frac{1}{2}$ and $\frac{1}{2}$, rather than 0 and 1, is that we need to define the negative treatment in seat shares. This would not be possible if we used 0 when the party ends up on the left side of the seat discontinuity.

[17] Since we use constant party positions to calculate the policy indexes there is no need to put any additional weights on the treatment variables. However, if we used policy positions that varied across either election periods or municipalities we would have had to take this into account by weighting the treatment variables accordingly.

$$Y_{it}^{j} = \beta_0^j + \beta_1^j \widehat{I_{it}^j} + \beta_2^j \frac{c_{1it}}{S_{it}} + \beta_3^j \frac{c_{2it}}{S_{it}} + \epsilon_{it}^j, \tag{3}$$

where $\widehat{I_{it}^j}$ is the fitted valued from the first stage regressions for municipality i in election period t. The parameter of interest, β_1^j, measures how the policy position of the local council on policy issue j affects implemented policy, Y^j. We take the average of yearly observations within election period t, but do not address the dynamics of budget-making explicitly (cf. Alt and Lowry (2000)). Both Y^j and I^j are scaled by the relevant standard deviation. As robustness checks we include a vector of demographic control variables (D_{it}), election period fixed effects, and a control function of the vote shares of all parties $g(\mathbf{V}_{pit})$.

4.3 Exogenous Variation in Seat Majority

To estimate the impact of a shift in bloc majority in the local council we use a generalization of the RD approach described above. Looking at Figure 1 again, it is obvious that a vote share threshold of 0.5 would imply a seat majority in the case of two parties. With more than two parties it gets more complicated. The thresholds would depend on the vote shares of all parties, and not all thresholds will flip the majority among the party blocs. Whether an additional seat to the Labor Party, for example, would flip the seat majority in favor of the left-wing bloc will depend on a) whether the additional Labor Party seat means a loss to the right-wing bloc or to the other parties comprising the left-wing bloc, and b) whether the additional left-wing seat flips the seat majority in favor of the left-wing bloc. Therefore, a smaller vote change would be required to gain a seat majority if the votes are favorably allocated in the coalition than when they are not.

In the simulation procedure described in detail in Appendix B, we identify changes in electoral support that are likely to result in a change of seat majority. More specifically, for each municipality, at every election, we identify the change in electoral support for the

left-wing bloc that would have been sufficient to change the seat majority in at least half of the simulations.[18] With this variable, denoted $ThresholdDistance$, we can implement standard RD design used in a two-party majoritarian setting, using specifications of the type:

$$Y_{it}^{j} = \delta_0^j + \delta_1^j LeftMaj_{it} + \rho^j(ThresholdDistance_{it}) + \xi_{it}^j, \tag{4}$$

where $LeftMaj_{it}$ is an indicator variable equal to one if the left-wing bloc holds a majority of seats in the local council, and zero otherwise. δ_1^j captures the effect of a left-wing majority on fiscal policy j, and is the parameter of interest. We limit the sample to cases where the left-wing parties were close to winning, or losing, a seat majority and add a linear control function of the distance to the majority threshold on each side of the discontinuity, $\rho^j(ThresholdDistance_{it})$.[19] For a detailed description of the setup for this type of RD design we refer the reader to the excellent review by Lee and Lemieux (2010). We present results both and without demographic control variables (D_{it}) and election period fixed effects.

[18] In Appendix B we explain how using either the bloc seat shares or bloc vote shares as forcing variables for seat bloc majority would invalidate standard RD designs. It could lead to inefficient and misleading results. That being the case, we believe our simulation-based empirical strategy is an improvement on the seminal contribution of Pettersson-Lidbom (2008). Pettersson-Lidbom (2008) do not explicitly consider the vote changes that would lead to a change in seat majority. Another key difference to Pettersson-Lidbom (2008) is in how the treatment effect is interpreted. Pettersson-Lidbom interprets the treatment effect as the impact of being in power. He relies on the strong assumption that the left-right division in Sweden determines who rules the municipality. If the assumption of a two-bloc model is not valid in 100 percent of the councils we cannot interpret the treatment effect as that of being in power, but rather as the effect of gaining a seat majority.

[19] We use a window of a win/lose margin of 10, 5 and 2.5 percentage points of the distance to the majority threshold.

5 Results

5.1 Estimates Based on Variation in the Council Average Policy Position

In Table 2 we document how political representation, measured by the policy index, affects tax policies, welfare policies, and the provision of local public goods.

Column (1) is a simple OLS regression including demographic control variables and election period fixed effects. These estimates are useful as a comparison to our main analysis, which is presented in columns (2), (3), and (4). The OLS estimates indicate a strong association between political representation and the decision to levy property taxation, in line with previous studies (Fiva and Rattsø, 2007). For the other fiscal policies the point estimates are quite close to zero and mostly statistically insignificant. Schooling is an exception where the point estimate has the 'wrong sign': An increase in the education index is associated with lower educational spending.

Our baseline RDD specification is reported in Column (2). Here, all point estimates take the expected positive signs, indicating that a higher value of the policy index pushes policy in the expected direction. The effects are, however, statistically significant at the 10 percent level (or higher) only for property taxation, user charges, child care, and education spending. The point estimates are relatively large. For child care spending, a one standard deviation increase in the policy index increases spending on child care by about 0.4 of a standard deviation. The effects are of similar magnitude for the two sources of taxation. A one standard deviation increase in the tax policy indexes increases the probability of having property taxation and user charges by about 0.4 and 0.3 standard deviations, respectively.[20] For local public goods the estimates are generally smaller than for welfare services, and none of them are statistically significant. This corroborates the hypothesis that local public goods are less controversial than redistributive services

[20]Property taxation is a dummy variable with a standard deviation of 0.48. The coefficient of about 0.4 therefore implies that the probability of having property taxation is reduced by about 20 percentage points as a result of a one standard deviation increase in property tax index.

Table 2: Estimated effects of policy index on policy outcomes

	(1) OLS	(2) 2SLS Baseline	(3) 2SLS Controls I	(4) 2SLS Controls II
Taxation				
Property Taxation	0.32***	0.42**	0.38**	0.08
	(0.04)	(0.19)	(0.17)	(0.40)
User Charges	0.05	0.28*	0.29*	0.46
	(0.05)	(0.16)	(0.15)	(0.32)
Welfare Services				
Child care	0.01	0.42*	0.27***	0.50**
	(0.02)	(0.22)	(0.10)	(0.22)
Education	-0.08***	0.36*	0.17	0.06
	(0.03)	(0.21)	(0.15)	(0.32)
Elderly care	0.03	0.60	0.62	0.25
	(0.05)	(0.47)	(0.42)	(0.43)
Health and social care	0.07*	0.16	0.08	-0.11
	(0.04)	(0.16)	(0.15)	(0.31)
Local Public Goods				
Culture	0.02	0.27	-0.02	-0.02
	(0.05)	(0.29)	(0.30)	(0.41)
Transportation	0.03	0.17	0.12	-0.10
	(0.05)	(0.27)	(0.22)	(0.45)
Central administration	-0.02	0.17	0.08	0.37
	(0.03)	(0.21)	(0.16)	(0.38)
Other purposes	0.09*	0.18	0.18	0.57
	(0.05)	(0.25)	(0.25)	(0.53)
N	1132	1132	1132	1132
Time fixed effects	Yes	No	Yes	Yes
Control variables	Yes	No	Yes	Yes
Vote share control function	No	No	No	Yes

*Note: Each cell represents coefficients from regressions for each fiscal policy measure on the policy index. All dependent variables (dummy for property taxation; user charges per capita; percent spending in various sectors) are scaled by the relevant standard deviation (from Table 1). The parameter estimates measure standard deviation changes in fiscal policy of a one standard deviation increase in the policy index. The policy index is instrumented with the treatment variables ($\frac{t_p}{S}$) in a 2SLS framework. Standard errors clustered at the local government level in parentheses, * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.*

(Ferreira and Gyourko, 2009). Given that child care is the sector on which parties disagree most, it comes as no surprise to find the most robust party effects precisely in this sector (see Figure 3).

In column (3) we see that the point estimates are relatively insensitive to the inclusion of election period fixed effects and demographic controls[21]. Including demographic controls reduces residual variation and therefore increases precision for the variables of interest. The standard error for the estimate of the child care index is, for example, more than halved.

In column (4) we add the vote share control function. Despite the considerable explanatory power of this variable (and consequent reduction of residual variation), its inclusion causes an increase in standard errors. This because of the very high correlation between policy indexes and vote share control functions (about 0.99). In this specification, the only statistically significant effect is the one on child care. The effect of the property tax index is very imprecisely estimated to zero.

The OLS estimates for child care spending seem to be downward biased. This could occur because voter behavior is affected by implemented policy. For example, if voters respond to low spending on child care by voting for 'child care parties' (or vice versa), then naively regressing child care policy on the policy index would exhibit a negative bias. The RD estimates, which in a flexible way control for voter preferences, would not be contaminated by this effect.

5.2 Estimates Based on Variation in the Council Position on the Left-Right Scale

In Table 3 we replace the specific policy indexes with the single left-right index. This largely reproduces the pattern from our main analysis: political representation appears to impact property taxes, user charges, and some welfare services, but not local public

[21]Note that it is not obvious that the demographic controls should be included in the analysis, since they may be endogenous due to Tiebout sorting

goods.

A negative effect for property taxation and user charges of around -0.25 indicates that a one standard deviation move to the right on the left-right scale reduces taxation by around 0.25 standard deviations.[22]

5.3 Estimates Based on Variation in Seat Majority

The estimates presented so far capture an average causal effect of changes in political representation. In Table 4 we present estimates for the effect of the left-wing bloc winning a seat majority

Specification (1) provides the standard OLS estimates, which are useful as a comparison. In specification (2) we restrict the analysis to observations where the left-wing bloc won, or lost, the seat majority by a less than 10 percentage point margin. We also include a separate linear control in the forcing variable on each side of the discontinuity. In specification (3) we add election period fixed effect and demographic control variables. In specification (4) and (5) we narrow the bandwidth to 5 and 2.5 percentage points respectively.

In both the OLS specification and all RDD specifications we find strong majority effects on the probability of levying property taxation. An estimate of 0.6 implies a change in the probability of levying property taxation at the 50 percent threshold of about 28 percentage points. This is a very large effect which is, moreover, visible in the raw data, see Figure 4. The RDD estimates on user charges and most of the spending sectors are small compared to the corresponding estimates in Tables 2 and 3, and not statistically significant.[23] For welfare spending, the OLS analyses exhibit considerable omitted variable bias and give completely misleading results.[24]

[22]The coefficient of about -0.25 implies a 12 percentage point fall in the probability of having property taxation as a result of a one standard deviation increase in the left-right index.

[23]For the narrower windows around the 50 percent threshold, flipping the majority there appears to have an effect on transportation spending too. We do not emphasize this because the effect is very sensitive to the choice of bandwidth (see also Figure 4) and the estimate indicates an effect with the opposite sign of what the survey data suggest.

[24]As a robustness check, we assign the Center Party to the left-wing bloc, and reestimate the models

Table 3: Estimated effects of left right index on policy outcomes

	(1) OLS	(2) 2SLS Baseline	(3) 2SLS Controls I	(4) 2SLS Controls II
Taxation				
Property Taxation	-0.25***	-0.29*	-0.27*	-0.16
	(0.03)	(0.15)	(0.14)	(0.33)
User Charges	-0.04	-0.26**	-0.21**	-0.38
	(0.03)	(0.12)	(0.10)	(0.26)
Welfare Services				
Child care	0.01	-0.30	-0.20**	-0.50**
	(0.02)	(0.19)	(0.09)	(0.20)
Education	0.05**	-0.17	-0.10	0.18
	(0.02)	(0.16)	(0.11)	(0.29)
Elderly care	0.04	0.42**	0.31**	0.50*
	(0.03)	(0.21)	(0.15)	(0.30)
Health and social care	-0.06*	0.06	0.04	0.28
	(0.03)	(0.15)	(0.12)	(0.29)
Local Public Goods				
Culture	-0.04	-0.14	-0.10	-0.28
	(0.03)	(0.14)	(0.12)	(0.30)
Transportation	0.06*	0.16	0.13	-0.09
	(0.04)	(0.19)	(0.16)	(0.41)
Central administration	-0.03	-0.04	-0.07	-0.21
	(0.02)	(0.16)	(0.11)	(0.25)
Other purposes	-0.07**	-0.15	-0.13	-0.39
	(0.03)	(0.14)	(0.13)	(0.30)
N	1132	1132	1132	1132
Time fixed effects	Yes	No	Yes	Yes
Control variables	Yes	No	Yes	Yes
Vote share control function	No	No	No	Yes

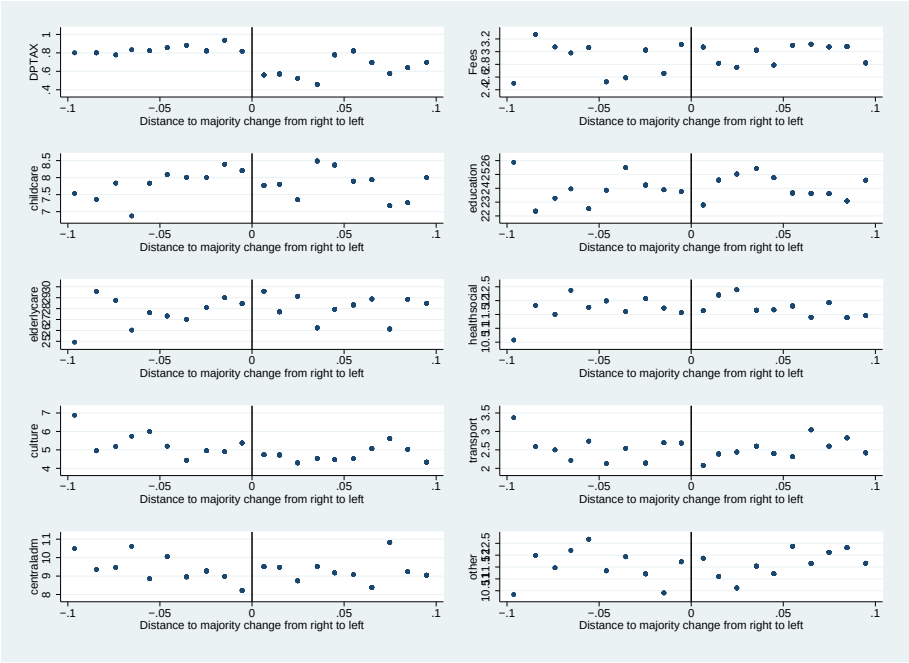
*Note: Each cell represents coefficients from regressions for each fiscal policy measure on the left-right index. All dependent variables (dummy for property taxation; user charges per capita; percent spending in various sectors) are scaled by the relevant standard deviation (from Table 1). The parameter estimates measure standard deviation changes in fiscal policy of a one standard deviation increase in the left-right index. The left-right index is instrumented with the treatment variables ($\frac{t_p}{S}$) in a 2SLS framework. Standard errors clustered at the local government level in parentheses, * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.*

Table 4: Estimated effects of a left-wing majority in seats on policy outcomes

	(1) OLS	(2) RDD 10p.p.	(3) RDD 10p.p.	(4) RDD 5p.p.	(5) RDD 2.5p.p.
Taxation					
Property Taxation	0.45***	0.63***	0.57***	0.71***	0.84**
	(0.08)	(0.18)	(0.17)	(0.25)	(0.36)
User Charges	0.16*	-0.04	-0.15	0.01	0.04
	(0.09)	(0.15)	(0.13)	(0.19)	(0.28)
Welfare Services					
Child care	-0.13*	0.14	-0.08	-0.04	-0.11
	(0.07)	(0.18)	(0.11)	(0.15)	(0.23)
Education	-0.22**	-0.01	0.09	0.09	-0.14
	(0.09)	(0.19)	(0.17)	(0.24)	(0.34)
Elderly care	0.00	-0.00	0.04	0.04	-0.03
	(0.09)	(0.21)	(0.20)	(0.30)	(0.41)
Health and social care	0.25***	-0.11	-0.05	-0.13	0.40
	(0.09)	(0.21)	(0.19)	(0.24)	(0.33)
Local Public Goods					
Culture	0.16*	0.14	-0.03	0.06	0.22
	(0.09)	(0.15)	(0.13)	(0.18)	(0.31)
Transportation	-0.03	0.10	0.06	0.36**	0.69***
	(0.09)	(0.13)	(0.13)	(0.18)	(0.26)
Central administration	0.06	-0.23	-0.11	-0.26	-0.34
	(0.10)	(0.20)	(0.15)	(0.20)	(0.24)
Other purposes	0.05	0.03	-0.00	-0.01	-0.12
	(0.09)	(0.16)	(0.16)	(0.24)	(0.33)
N	1132	416	416	222	118
Time fixed effects	No	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes
Lin. control fn.	No	Yes	Yes	Yes	Yes
Bandwidth	-	10	10	5	2.5

*Note: Each cell represents coefficients from regressions for each fiscal policy measure on left wing majority. All dependent variables (dummy for property taxation; user charges per capita; percent spending in various sectors) are scaled by the relevant standard deviation (from Table 1). The parameter estimates measure standard deviation changes in fiscal policy of changing the majority from the right to the left wing bloc. Standard errors clustered at the local government level in parentheses, * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.*

Figure 4: Averages on the dependent variable as a function of the distance to majority change.



Note: The figure shows the relation between fiscal policies and the distance to majority change from right to left. The width of the intervals is one percentage point.

5.4 Sensitivity

Under proportional representation the number of seats of a party is affected by the votes of all parties. This makes it essentially impossible for a party to know ex-ante where the seat thresholds are going to be. We nevertheless conducted a battery of standard sensitivity checks to check the validity of our RD design.

We saw that the RDD estimates do not change much with the introduction of control variables. This indicates that the effects reported in the baseline specification should be given a causal interpretation and that the RDD is successful in isolating 'as good as random variation'. This is further supported by the analysis of how predetermined variables are affected by exogenous changes in the left-right index (reported in Appendix Table A.3). The strong association between the left-right index and demographic characteristics vanishes when we instrument the index with the treatment variables.

We also note the apparent absence of any jump in the parties' vote share at the threshold for a seat change (Appendix Figure A.4), nor bunching of observations around the threshold for a seat change (Appendix Figure A.5). Both of these placebo analyses lend further support to the identifying assumption. Most importantly they confirm that concerns raised by Caughey and Sekhon (2011) are of little consequence in this setting.

Our data set covers three waves of municipal elections. As mentioned above, a D'Hondt seat allocation formula was used in the 1999 elections, replaced for the 2003 and 2007 elections with a Modified Sainte-Laguë approach. Both seat allocation methods are within the class of highest average methods. They do, however, use different divisor series, which results in different seat allocations. A natural placebo test is therefore to use the counterfactual seat allocation method to generate the treatment variables. If a placebo analysis produced similar results as our baseline analysis it would cast serious doubts on the research design used in this paper. We do not, however, find any systematic relationship between placebo shifts in the policy indexes on actual policy (see

with the modified classification. These estimates display no substantial or significant results.

Appendix Table A.4).[25]

5.5 Discussion

The defining component of left-right politics is the preferred position on the government's role in society. The left-wing parties want redistribution by means of a large public sector, whereas the right-wing parties want less redistribution and a smaller public sector (see, for example, Blais, Blake and Dion (1993) p. 43). All model specifications presented here indicate a causal effect of party representation on property tax collection, with the left-wing parties more inclined to apply these taxes. The left-wing parties collect higher levels of government revenue, and therefore offer larger amounts of public services. This result corroborates Pettersson-Lidbom (2008) study of Swedish municipalities, but deviates from the results by Ferreira and Gyourko (2009) for U.S. cities.[26] A possible explanation is that parties matter when taxation is used to finance welfare services (Norway and Sweden), but not local public goods (U.S. cities).

User charges are levied at a fixed sum per household, and have a regressive redistributive impact. In the Norwegian case, however, low user charges (lower than unit costs) means that infrastructure services must be financed by other revenue, which means lower spending on welfare services. This explains why a more left-leaning local council appears to set higher user charges than a right-wing council (Tables 2 and 3).

Political representation also affects allocation spending between young and old. As far as we know, previous research has not found causal effects of parties' left-right positions on public spending allocations. According to Table 3, the estimated effect for child care is negative, and elderly care is positive. These partisan effects are quite large, and statistically significant in five out of six model specifications. Similar to other policy issues (Knutsen (1995)), the conflict between young and old has been 'absorbed' by the

[25]Only two out of thirty placebo effects are statistically significant at the 10 percent level, which is less than what we would expect to get by pure chance.

[26]Ferreira and Gyourko (2009) find no evidence that whether the mayor is a Democrat or a Republican affect the size of government, the allocation of local public spending, or crime rates.

left-right dimension.

It is primarily the extreme right-wing party (the Progress Party) and the extreme left-leaning party (the Socialist Left Party) that articulate the demands of the elderly and young (see Figure 3). These parties are never the median parties on local councils.[27] This may explain why we find no evidence that shifting from a left-wing to a right-wing majority (Table 4) matters for the relative spending allocation. Rather, it appears, the extreme parties are able to sway relative spending allocations depending on their representation within the party blocs.[28] This result echoes Folke's (2011) finding in which the representation of small special interest parties does influence environmental and immigration policies.

Finally, Ferreira and Gyourko (2009) suggest that Tiebout-migration explains why parties have such a small impact on fiscal policies in the U.S. One might therefore conjecture that migration is related to the supply of local public goods, not the supply of welfare services. We believe the available evidence speaks against this interpretation. A large body of literature documents the influence of welfare service supply on migration decisions.[29] We believe further research is required to establish whether partisan effects are diluted by Tiebout-migration or not.

[27]Based on parties' seat shares and the left-right ordering of political parties we can identify the median party in each municipality. A frequency count yields the following result: Labor Party (18.9%), Center Party (34.9%), Liberal Party (9.6%), Christian People's Party (12.5%), joint lists of right-wing parties (1.8%), Conservative Party (5.0%), and Pensioners' Party (0.8%). In the other cases, the median involved various local lists.

[28]We have also estimated the causal effect of shifting seat shares between individual parties. Estimates generally have the expected sign on spending on child care and elderly care, but are quite imprecise. Interestingly, we find that an increase in the representation of the extreme left-wing party (Socialist Left Party) at the expense of the Labor Party leads to a statistically significant increase in spending on child care.

[29]Recent Norwegian studies find, for example, that migration decisions are partly motivated by access to generous social benefits (Fiva, 2009), and proximity to high-quality schooling (Machin and Salvanes, 2010, Fiva and Kirkebøen, 2011).

6 Conclusion

In this paper we document that exogenous shifts in political representation affects fiscal policy. The overall picture is that local party representation has surprisingly large causal effects. Left-right party politics permeates local tax-setting, levels of user charges, and allocation on welfare spending; local public goods, on the other hand, appear to be a non-partisan issue.

The use of proper methodology has been crucial in the estimation of these causal effects. Four points should be emphasized. First, relying on simple OLS estimates would have produced misleading conclusions. In particular, we would have overlooked the importance of parties to spending allocations. Second, the conventional RD approach used to analyze two-party majoritarian systems should not directly be applied in proportional representation systems. We propose a novel research design that is tailor-made to proportional systems. This methodology is an important improvement in analyses of the policy impact of individual parties as well as majority coalitions. Third, a causal analysis based on the assumption of two-party blocs would have generated indeterminate estimates. Without an analysis that allowed individual political parties to influence fiscal policies we would have overlooked the influence of parties on spending allocations for the young and elderly respectively. Finally, the validity of our interpretations does not rely on ad hoc assumptions about party preferences. The stated preferences of party representatives correspond nicely to implemented fiscal policies.

The core finding is that the supply side matters in democratic politics. This has two implications for the ordinary citizen. First, when party competition is a close race, who becomes the winner is essentially random. The winner of the last seat sways fiscal policies even in situations where voter preferences are constant. This is the supply side effect. Second, we observe that political representation impinges on fiscal policies even in relatively small and homogeneous local authorities. This means that the marginal vote is potentially decisive providing citizens incentives to turn out in elections.

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Appendix A: Supplementary Tables and Figures

Table A.1: Descriptive Statistics: Seat Shares in the Local Council

	Mean	**Std. Dev.**	**Min.**	**Max.**
Left-Wing Parties				
Red Electoral Alliance (RV)	0.004	0.015	0	0.148
Socialist Left Party (SV)	0.061	0.060	0	0.471
Labor Party (DNA)	0.304	0.126	0	0.762
Green Party (MDG)	0.000	0.004	0	0.061
Joint lists	0.002	0.024	0	0.440
Right-Wing Parties				
Liberal Party (V)	0.045	0.058	0	0.471
Centre Party (SP)	0.168	0.135	0	0.667
Christian Democratic Party (KrF)	0.079	0.081	0	0.560
Conservative Party (H)	0.140	0.104	0	0.529
Progress Party (FrP)	0.099	0.090	0	0.486
Pensioners' Party (PP)	0.003	0.011	0	0.152
Joint lists	0.016	0.077	0	0.636
Party independent lists	0.079	0.150	0	1.000

Note: Descriptives based on municipal elections in 1999, 2003 and 2007. The sample is restricted as in main analysis (n=1132). Data from Fiva, Halse and Natvik (2012).

Table A.2: Descriptive Statistics: Policy Indexes

	Mean	**Std. Dev.**	**Min.**	**Max.**
Left-right				
Left-right index	5.164	0.584	0.711	6.922
Taxation				
Property taxation index	0.432	0.076	0.130	0.747
User charges index	-0.096	0.038	-0.238	-0.003
Welfare Services				
Child care index	0.121	0.027	0.038	0.260
Education index	0.178	0.025	0.043	0.285
Elderly care index	0.278	0.024	0.055	0.363
Health and social care index	0.183	0.016	0.042	0.257
Local Public Goods				
Culture index	-0.099	0.036	-0.211	0.016
Transport index	0.263	0.029	0.042	0.371
Central administration index	-0.238	0.028	-0.333	-0.034
Other purposes index	-0.020	0.011	-0.050	0.010

Note: The sample is restricted as in main analysis (N=1132). For details on the survey data, see Figure 1 and 2. The indexes give the average policy position of the local council.

Table A.3: Estimated effects of left-right index on demographic control variables

	(1) OLS	(2) 2SLS	(3) 2SLS
Log population	0.24***	0.07	0.12
	(0.04)	(0.19)	(0.35)
Share of population living in rural areas (percent)	-47.15***	-36.81	-1.67
	(9.57)	(45.71)	(89.64)
Fraction of children (1-5) (percentage points)	0.33***	0.01	-0.16
	(0.03)	(0.17)	(0.34)
Fraction of young (6-15) (percentage points)	0.33***	-0.11	-0.47
	(0.04)	(0.22)	(0.44)
Fraction of elderly (81+) (percentage points)	-1.02***	0.22	-0.07
	(0.11)	(0.54)	(1.15)
Unemployment rate (percent)	-0.11***	0.24*	0.40
	(0.03)	(0.14)	(0.25)
Historical town status (dummy)	0.03**	0.04	-0.03
	(0.01)	(0.07)	(0.13)
N	1132	1132	1132
Interval	-	0.25	0.25
Vote share control function	No	No	Yes
Time fixed effects	Yes	No	Yes

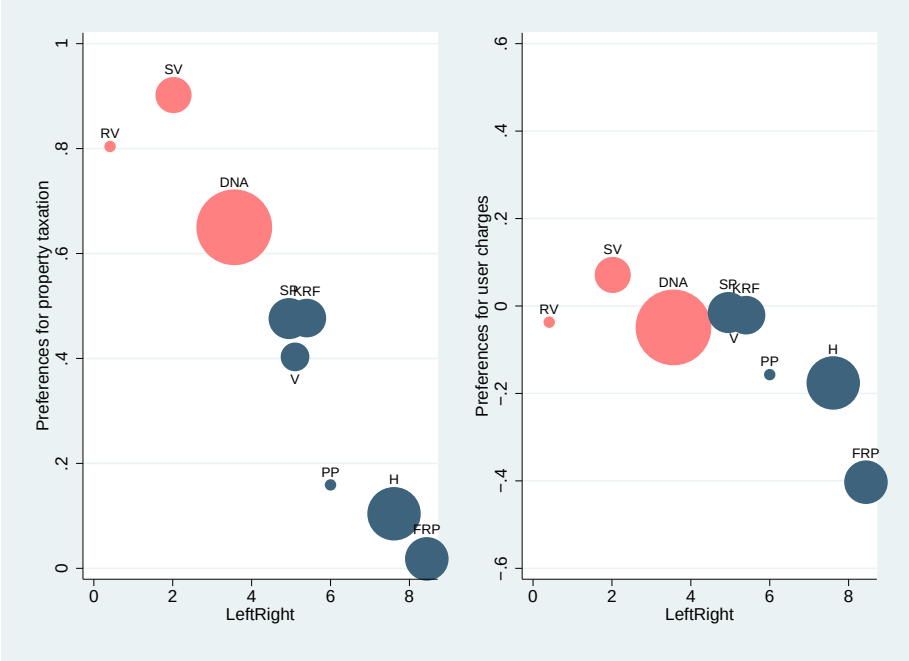
*Note: Each cell represents coefficients from regressions on predetermined characteristics on the left-right index. The left-right index is instrumented with the treatment variables ($\frac{t_p}{S}$) in a 2SLS framework. Standard errors clustered at the local government level in parentheses, * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.*

Table A.4: Placebo analysis using counterfactual seat allocation method

	(2) 2SLS Baseline	(3) 2SLS Controls I	(4) 2SLS Controls II
Taxation			
Property Taxation	-0.34	-0.38	0.91
	(0.24)	(0.25)	(0.78)
User Charges	0.21	0.05	0.89
	(0.20)	(0.18)	(0.59)
Welfare Services			
Child care	0.39*	0.16	-0.03
	(0.23)	(0.14)	(0.46)
Education	-0.12	-0.13	-0.57
	(0.24)	(0.21)	(0.68)
Elderly care	-0.19	-0.02	-0.63
	(0.24)	(0.28)	(0.81)
Health and social care	0.03	-0.08	0.01
	(0.22)	(0.22)	(1.02)
Local Public Goods			
Culture	0.21	0.16	1.09
	(0.25)	(0.24)	(0.67)
Transportation	-0.07	-0.01	-0.65
	(0.21)	(0.22)	(0.63)
Central administration	-0.03	0.06	1.15*
	(0.24)	(0.20)	(0.68)
Other purposes	0.02	-0.03	0.26
	(0.19)	(0.21)	(0.69)
N	1132	1132	1132
Time fixed effects	No	Yes	Yes
Control variables	No	Yes	Yes
Vote share control function	No	No	Yes

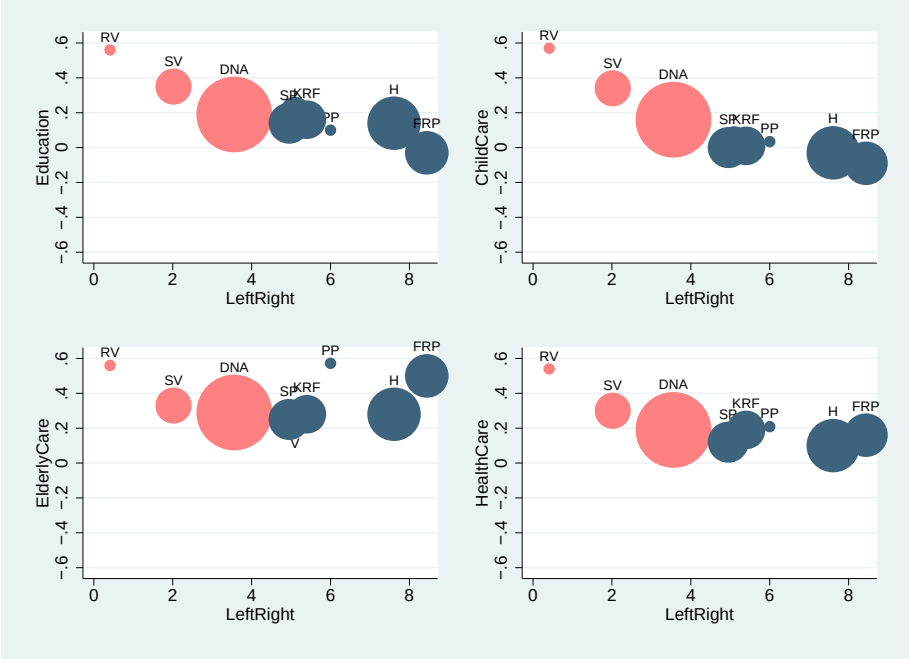
Note: Each cell represents coefficients from regressions for each fiscal policy measure on the left-right index. All dependent variables (dummy for property taxation; user charges per capita; percent spending in various sectors) are scaled by the relevant standard deviation (from Table 1). The left-right index is instrumented with the treatment variables ($\frac{t_p}{S}$) in a 2SLS framework using ***the counterfactual seat allocation method****. The parameter estimates measure standard deviation changes in fiscal policy of a one standard deviation increase in the left right index. Standard errors clustered at the local government level in parentheses, * $p < 0.10$,** $p < 0.05$, *** $p < 0.01$.*

Figure A.1: Tax Preferences and Left-Right Placement



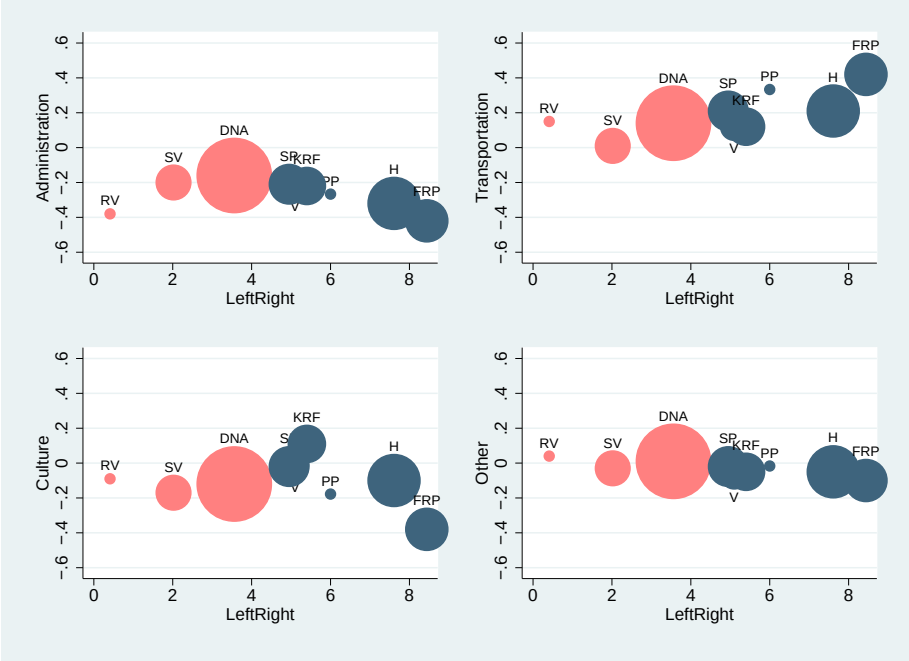
Note: For explanatory details see Figures 2 and 3.

Figure A.2: Welfare Spending Preferences and Left-Right Placement



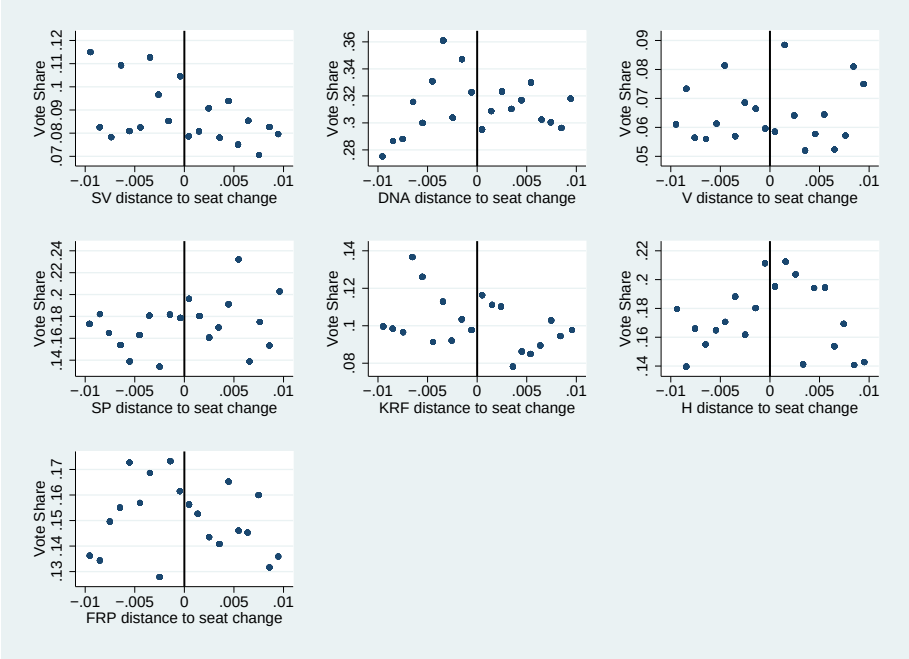
Note: For explanatory details see Figures 2 and 3.

Figure A.3: Local Public Goods Spending Preferences and Left-Right Placement



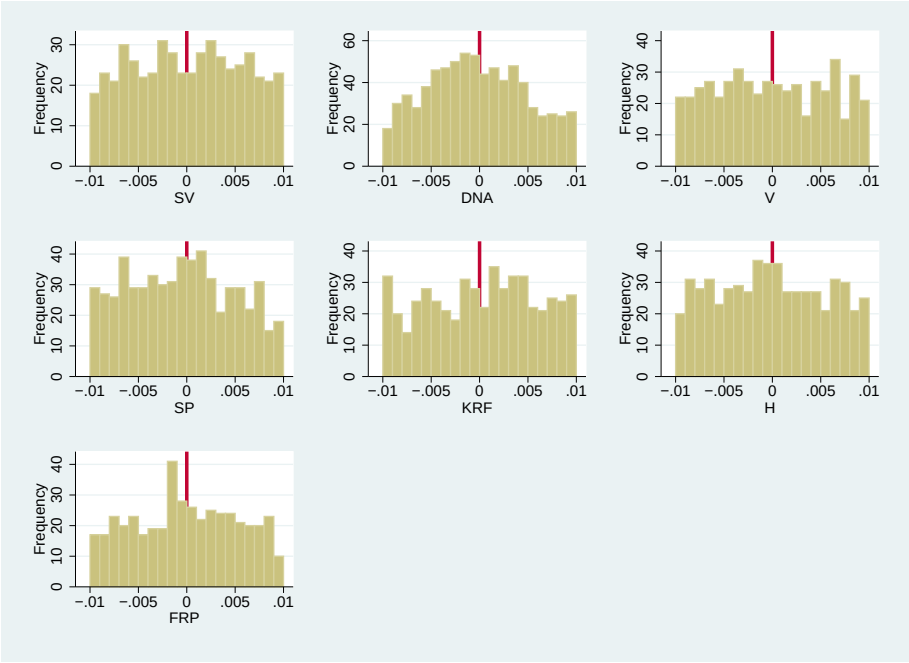
Note: For explanatory details see Figures 2 and 3.

Figure A.4: The vote share by the distance to a seat change, measured in percentage points of the vote share



Note: The width of the intervals is 0.1 percentage points.

Figure A.5: Frequency of observations as a function of the distance to the threshold



Note: The width of the intervals is 0.1 percentage points.

Appendix B: Methods

We want to estimate the causal effect of seat majorities in elected assemblies. RD designs can be applied in different situations.

One is majoritarian election with two political parties (or candidates) in one election district. This is the setting where almost all RD designs have been implemented so far (cf. Eggers and Hainmueller (2009), Ferreira and Gyourko (2009), Folke and Snyder (2012), Boas and Hidalgo (2011), Gerber and Hopkins (2011) and Lee, Moretti and Butler (2004)). In this case, the seat-majority threshold (commonly winning a single seat) is 50 percent of the votes. The treatment variable is sharply defined by the vote share of one of the parties, facilitating a straightforward implementation of standard RD designs. The implementation of an RD design is simple in this setting due to two factors. First, the treatment variable is sharply defined by having 50 percent of the votes. Second, the forcing variable is continuous.

Seat share as forcing variable

The setting which we are interested in - having a seat majority in a legislative assembly in a proportional election system - is much more complicated and has so far only been examined in one published paper (Pettersson-Lidbom (2008)). The challenges we face are the same as when we implement an RD design for having a seat majority in a legislative assembly in a majoritarian election system. This means that both the issues we address are relevant for this setting as well. The treatment status in this (these) case(s) will be defined by crossing the threshold for having 50 percent of the seats. In this setting, the forcing variable, the seat share of the left-wing political bloc, is a discrete variable for which the size of the discrete jumps will depend on the size of the legislature. This feature makes it impossible to implement the standard RD design. The issues arising from a discrete forcing variable in RD designs are described and addressed in Lee and Card (2008). However, their RD design is only valid for forcing variables with a constant

size of the discrete jumps in the forcing variable.

There are two main concerns of having a discrete forcing variable with different magnitudes in the jumps, such as the seat share, neither of which are addressed by Lee and Card (2008). Both are related to the fact that there is a lower density in observations as we approach the seat-majority threshold .[30] This fact is illustrated in Figure B.1, where we show the density of observations in our data set as a function of the seat share of the left-wing bloc. Only two observations are less than one percentage point away from crossing the 50 percent threshold in seat shares. Conducting an RD design based on a sample of very close elections in terms of seat shares will therefore result in a sample selected on legislature size. Also, it is not necessarily true that elections that are close in terms of seats are actually close.[31] For the RD designs that use seperate control functions on either side of the discontinuity the end points of the functions will have very few observations, which means the control functions will adjust to these points. The control functions will also capture some of the relationship between council size and outcome variable. These two issues have the implication that we will not be able to use the standard regression discontinuity designs with the seat share as the forcing variable.

Vote share as forcing variable

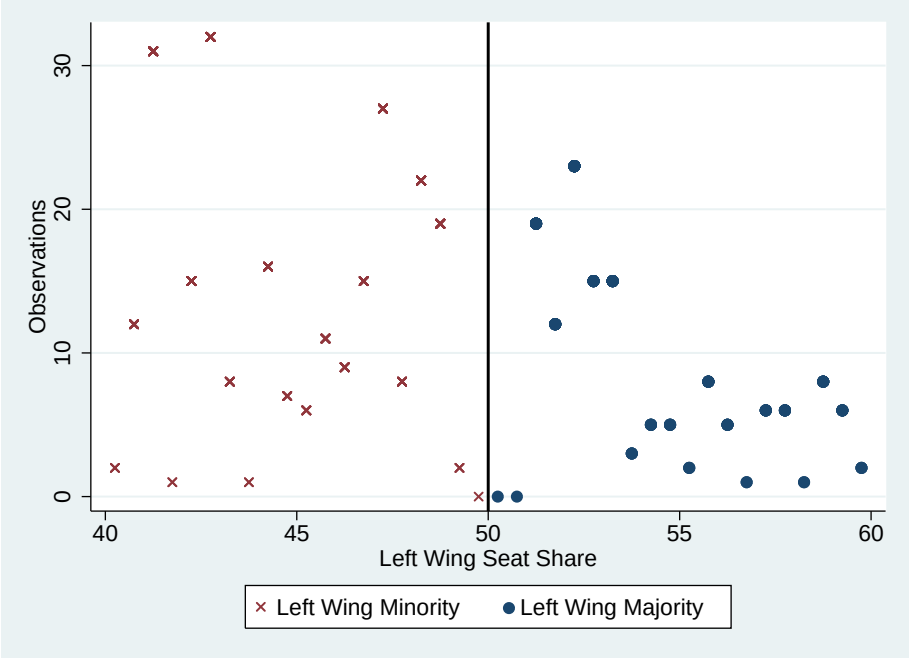
Pettersson-Lidbom (2008) defines treatment according to having a seat majority, but uses the vote share to define the forcing variable. This violates the basic idea of the RD design, whereby the treatment status should be determined entirely by the forcing variable.[32] The design of Pettersson-Lidbom (2008) could still yield unbiased estimates as long as the global vote share control function captures the relationship between the true forcing variable, i.e. seat share, and the relevant unobservable factors. Designs using a

[30]For example, when there are 51 seats you will not be able to get closer than 1 percentage point and when there are 25 seats you cannot get closer than 2 percentage points.

[31]This is especially problematic in majoritarian legislatures where there is scope for gerrymandering and strong parties can target key districts.

[32]The standard approach, which is the one recommended by Lee and Lemieux (2010), is to use split polynomials. This is not, however, possible in this setting since it would have decreased the density of observations as we approached the threshold.

Figure B.1: Frequency of observations and seat share of the left wing bloc



Note: The figure shows the number of observations as a function of the seat share of the left-wing bloc. Each bin is for an interval of 0.5 percentage points.

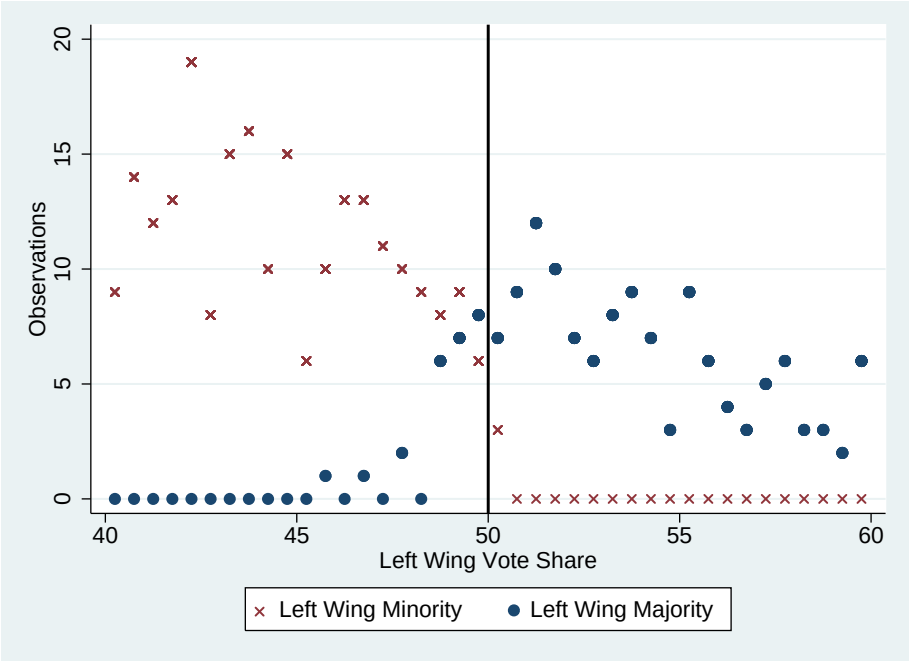
separate control function on either side of the threshold wouldn't work due to the lack of an actual margin of victory/loss that can be defined according to the vote share. Figure B.2 illustrates this by showing the number of observations as a function of the vote share of the left-wing bloc independently for the cases on either side of the seat discontinuity. As we see, for some vote shares the coalition can be either in the minority or majority. Also, we have a low density of observations in the tails.

Threshold distance as a forcing variable

For a given bloc-wise vote allocation we can get many different seat allocations, both within, and across, the blocs. In Figure B.3, which shows a scatter plot of the relationship between the vote share and seat share, we can see that, for any given vote share, there is a large deviation in the seat share.[33] We could observe changes in majority status as a

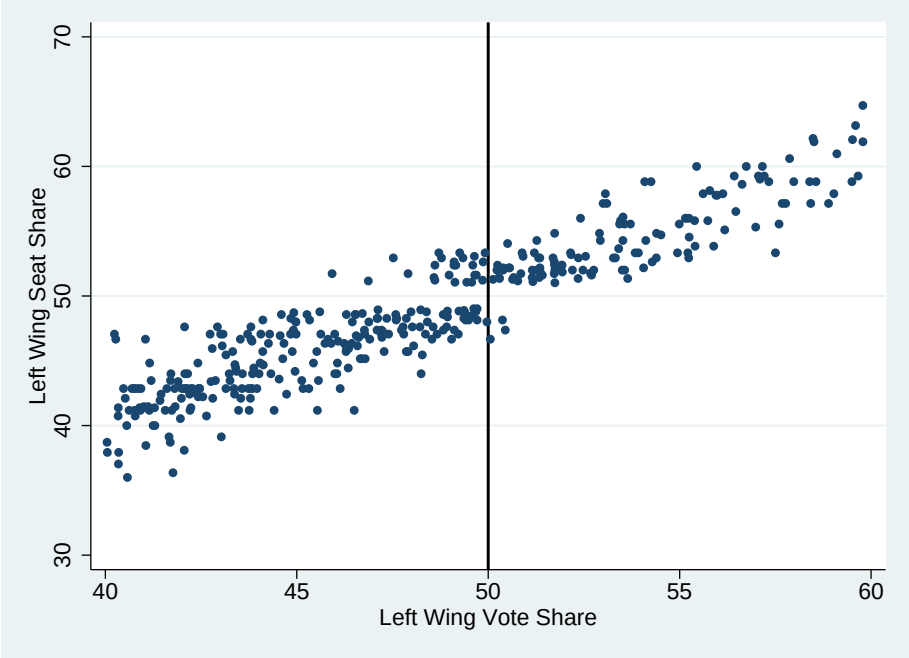
[33]There is an advantage for the left-wing bloc in the seat allocation which leads frequently to its having a seat majority without a vote majority. This is because they are advantaged in the seat allocation due

Figure B.2: Frequency of observations and vote share of the left-wing bloc



Note: The figure shows the number of observations as a function of the vote share of the left-wing bloc. The observation numbers are shown independently of whether the left-wing bloc has a seat majority or not. Each bin is for an interval of 0.5 percentage points.

Figure B.3: Vote Share vs. Seat Share



Note: The figure shows the relationship between seat shares and vote shares of the left-wing bloc.

consequence of changes in the allocation of votes within the blocs. Furthermore, a given vote change could in some instances lead to a change in majority status, while in others it won't.

In our RD design we define treatment status in the same manner as Pettersson-Lidbom (2008), i.e, treatment status is defined by having a seat majority or not. The difference is that rather than relying on vote share as the forcing variable, we identify changes in electoral support that are likely to result in a change of seat majority in a simulation procedure. The forcing variable is defined as the vote change (across political blocs) that would have been sufficient to change the seat majority in at least half of the simulations. The properties of this forcing variable are such that it will allow us to implement all of the standard RD designs, as in Equation (4). To measure the change in votes that could be expected to lead to a change in majority status, we use the following procedure. For each vote change, defined in 0.1 percentage points intervals) that could possibly lead to a

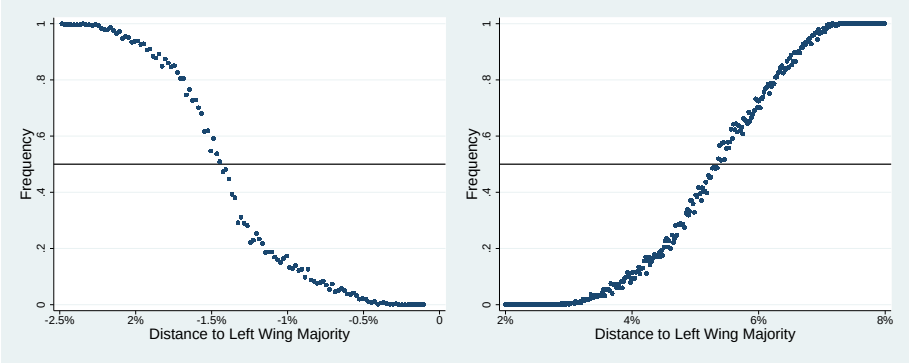
to the vote distribution within the coalition.

change in majority status, we run a large number of simulations (at least 2000) in which we randomly allocate the votes gained or lost by the blocs as a whole between the parties in each respective bloc.[34] For each vote change, we then measure the share of simulations for which we have a change in majority status. Based on this we define the distance to a seat threshold as the minimum vote change for which we have a change in majority status in at least half of the simulations. We illustrate this approach in Figure B.4, in which we show the share of simulations with a change in majority status as a function of the vote change. In the left hand side of the graph, we show the simulations for the 2003 election in *Os in Hedmark*. In this municipality the left-wing bloc held a majority with 49 percent of the votes and 52 percent of the seats. As we move to the left the left-wing bloc loses more of its vote share. At a vote loss gain of about 1.45 percentage points, the left-wing bloc will lose its seat majority in half of the simulations. We therefore define the margin of the left-wing majority as 1.45 percentage points of the vote share. On the right hand side of the graph, we show the simulations for the 2007 election in the municipality of *Selbu*. Here, the left-wing bloc was in minority with 44 percent of the seats and 46 percent of the votes. Here we increase the vote gain for the left-wing bloc as we move to the right. When the vote share rises by about 5.2 percentage points, we cross the seat-majority threshold in at least half of the simulations, making this the distance to the threshold.

In Figure B.5 we plot the density of observations for our forcing variable as a function of the distance to the threshold for obtaining a left-wing majority. As we see in the figure, although there is some variation in the density across the bin there is no decrease in the density of observations as we approach the threshold. We will therefore avoid the problems of using the seat share, or the vote share, as a forcing variable. Using this forcing variable we can therefore implement the standard RD designs.

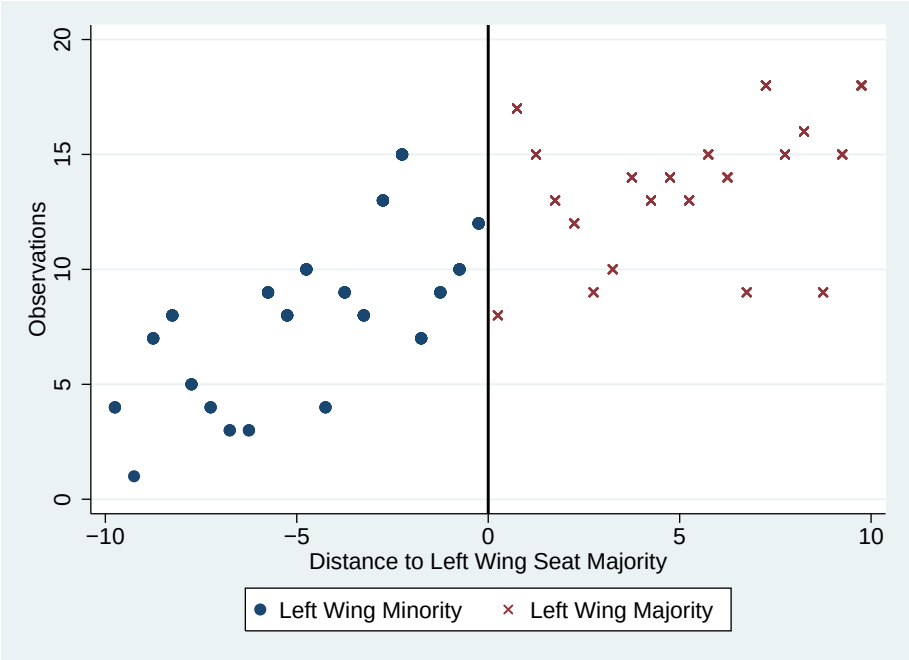
[34]Changes in vote shares are simply uniformly distributed across the parties with the changes weighted according to the relative size of the parties within the blocs.

Figure B.4: Vote share change vs. majority change



Note: The figure shows the share of simulations in which there is a change of majority status as a function of the aggregate vote change for the left-wing bloc. The left panel shows simulation results for the 2003 election in Os in Hedmark. *The right panel shows simulation results for the 2007 election in* Selbu.

Figure B.5: Frequency of observations as a function of the distance to the majority threshold



Note: The figure shows the number of observations as a function of the distance to the threshold for a left-wing majority. Each bin is for an interval of 0.5 percentage points. When there are no observations the bin is coded as missing.