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Incumbent behavior and clarity of political responsibility

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Abstract: Elections provide a check on incumbent politicians by making continued service contingent on providing political results which are acceptable to the electorate. However, electoral accountability is weaker in contexts where it is harder for the electorate to determine whether incumbents are actually responsible for these political results. Arguably, an implication of this is that incumbents have fewer electoral incentives to provide results which are popular with the electorate in these contexts. In this article, we examine the empirical viability of this argument by studying tax setting in Danish municipalities, hypothesizing that when it is easy for voters to assign political responsibility for tax setting, municipal mayors will be less likely to raise taxes. To estimate the causal effect of clarity of political responsibility on tax setting we compare municipalities where the mayoral party narrowly gained a majority of the seats in the city council, allowing the mayor to govern without coalescing with other parties, with municipalities where the mayoral party fell just short of a majority. Our findings suggest that gaining a majority does lead to lower taxes.

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> "One of the weightiest objections to a plurality in the Executive [...] is, that it tends to conceal faults and destroy responsibility. [Blame] is shifted from one to another with so much dexterity, and under such plausible appearances, that the public opinion is left in suspense about the real author."
>
> Alexander Hamilton, *Federalist 70*.

Elections provide a check on incumbent politicians by making sure that incumbents who will not or cannot adhere to the will of the people do not stay in power (Ferejohn, 1986; Alesina and Rosenthal, 1995; Besley and Case, 1995*a*; Besley, 2006; Ashworth, 2012). We know this because voters are more likely to reelect incumbents who provide outcomes that voters like (Kramer, 1971; Fiorina, 1981; Duch and Stevenson, 2008; Healy and Malhotra, 2013), and because incumbents who have or will face the voters in an election are more likely to provide favorable outcomes than incumbents who will not (Besley and Case, 1995*a*; Ferraz and Finan, 2011; Alt, De Mesquita and Rose, 2011).

Some elections, however, seem to provide a much better check on incumbents than others. In some elections it is pretty clear that the incumbent is responsible for any divergence between what voters prefer and the political reality, while in other elections it might be quite difficult for voters to find out who is responsible for any such divergence. If, for instance, the incumbent is a prime minister in a coalition government, it is more difficult for voters to know to what extend the policies enacted and outcomes realized under this incumbent is the responsibility of the prime minister's party and to what extent it is the responsibility of the coalition partners. Such diffusion of political responsibility challenges the effectiveness of electoral control, because if voters do not know whether the incumbent is responsible for the quality of the outcomes they are interested in, it does not make sense for voters to hold politicians accountable for the quality of these outcomes (Duch and Stevenson, 2008). This argument has motivated a number of studies of how voters react to differences in clarity of political responsibility. Broadly speaking, these studies find that in countries where economic and political institutions disperse political responsibility, voters are much less likely to hold incumbents electorally accountable for how their country is doing (Powell Jr and Whitten, 1993; Whitten and Palmer, 1999; Anderson, 2000; Tavits, 2007; Hobolt, Tilley and Banducci, 2013).

An interesting implication of this pattern in voting behavior is that in elections where clarity of responsibility is low, electoral incentives for incumbents to provide the type of outcomes voters prefer are going to correspondingly low. As such even if an incumbent manages to secure the kind of outcomes voters want, they will not reap an electoral reward, because the electorate will not be able to recognize that it was the incumbent who was responsible for attaining these outcomes. This is po-

tentially important for how elections affect incumbent behavior, because it suggests that the strength of the accountability mechanism, which is usually used to explain the link between elections and incumbent behavior varies systematically across election. Yet, in spite of this, extant literature has largely overlooked this question, focusing either on how clarity of responsibility affect voters (Healy and Malhotra, 2013, 301), or assuming that all elections have more or less the same power to discipline incumbents (Alt, De Mesquita and Rose, 2011, cf.). In this study, we amend thus, by exploring whether clarity of political responsibility does in fact influence incumbent behavior, in particular, we explore whether low levels of clarity of political responsibility leads incumbents to adopt policies which are unpopular among their constituents.

To do this, we zooms in on tax-setting in Danish municipalities. In Danish municipalities the majority in the city council can set the local income tax. The tax is substantial in magnitude, very broad based and therefore highly salient to local voters. Further, raising municipal income taxes in Denmark have been found to carry, on average, an electoral penalty (Bhatti, Hansen and Olsen, 2012). Examining income taxes in this context thus allows us to investigate whether an unpopular policy (i.e. raising the income tax), is more likely to be adopted in contexts where clarity of responsibility for tax-setting is more diffuse.

We examine differences in clarity of responsibility for tax setting by taking advantage of the fact that if the mayoral party gains a majority of the seats in the city council, this party can set the tax rate without coalescing with other parties, creating a discontinuity in the clarity of political responsibility. We use a close-elections regression discontinuity design, identifying the causal effect of gaining a single party majority on tax setting by comparing tax levels in municipalities where the largest party narrowly gained an absolute majority of the seats in the city council with tax levels in municipalities where the mayoral party fell just short of an absolute majority.

Following the literature on how elections discipline incumbents, we explore two potential mechanisms through which clarity of responsibility might influence tax setting (Duch and Stevenson, 2008; Alt, De Mesquita and Rose, 2011). A sanctioning - or moral hazard - mechanism which suggests that mayors with an absolute majority refrain from raising taxes to avoid getting punished by the voters. A selection - or adverse selection - mechanism which suggests that only the type of incumbents who keep taxes low will get reelected, increasing the number mayors who are able and willing to lower taxes. Studying the effects of gaining a single majority on tax policy choices, we find robust evidence for the selection mechanism, but no evidence for the sanctioning mechanism. As such, we find that having a single party majority does lead to lower taxes, but this is not because the incumbent adjust his behavior in anticipation of being held more accountable for tax policy, but because

the clarity of political responsibility allows voters get rid of incumbents who are not willing or able to keep income taxes relatively low.

This study broadens the scope of the literature on clarity of political responsibility by showing that dispersion of political responsibility is not just important for how voters act but also for which policies incumbents adopt. Furthermore, using a close-elections regression discontinuity design, the study sidesteps many of the apparent problems with identifying the effect that different types of electoral contexts have on economic policy (Besley and Case, 2000; Aghion, Alesina and Trebbi, 2004), in a literature which is typically observational (Larsen, 2015). By demonstrating that dispersion of political responsibility leads to the adoption of policies which are unpopular among the electorate, this study also re-emphasizes that elections will not always serve as an effective check on incumbents (see also Healy and Malhotra, 2009; Huber, Hill and Lenz, 2012; Healy and Lenz, 2014). Finally, the study also contributes to the small literature which explores nuances in the type of electoral control different political systems offer (Snyder Jr and Strömberg, 2010; Besley, Persson and Sturm, 2010). In particular, our results suggest that the potential effect of elections on incumbent behaviour is conditional on a certain degree of clarity of responsibility.

Clarity of Responsibility and Electoral Accountability

One of the most widely replicated findings in political science is that voters looks back at how incumbent politicians have performed while in office when deciding whether to reelect them (Key, 1966; Kramer, 1971; Fiorina, 1981; Lewis-Beck, 1990; Van der Brug, Van der Eijk and Franklin, 2007). However, while this type of retrospective voting is a widespread phenomenon, it is more pronounced in some elections than it is in others (Duch and Stevenson, 2008; Nadeau, Niemi and Yoshinaka, 2002). One popular explanation for why the extent of retrospective voting varies, is that electoral contexts vary in whether they assign clear responsibility for political performance to the incumbent government. In particular, this clarity of responsibility explanation suggests that " voter's assignment of responsibility to the government [...] will strongly reflect the nature of policymaking in the society and the coherence and control the government can exert over that policy"(Powell Jr and Whitten, 1993, 398). This explanation has been empirically powerful, with studies showing that factors like coalition governments (Nadeau, Niemi and Yoshinaka, 2002; Hobolt, Tilley and Banducci, 2013) and federalism (Arceneaux, 2006; Anderson, 2006; León, 2011) moderates retrospective voting by dispersing responsibility for policy-making across multiple actors (Ebeid and Rodden, 2006). Similarly, other studies have found that, more broadly, an incumbent's ability to influence the welfare of their electorate moderates the extent of retrospective voting (e.g. Hellwig,

2001; Hellwig and Samuels, 2007; Alcañiz and Hellwig, 2011; Hobolt and Tilley, 2013).

An implication of the clarity of responsibility literature is that in some elections voters are very responsive to the policies the incumbent government enacts and the consequence of these policies, whereas in other elections voters are less responsive (Anderson, 2007). Not because the voters do not always care about political performance, but because they are not always certain about whether the incumbent is actually responsible for this performance (cf. Duch and Stevenson, 2010). If there are such differences in responsiveness, how might this affect incumbents behavior?

To answer this question, we need to look at the literature on how elections affect incumbent behavior. To study the effect of elections, this literature have usually compared incumbents who are term-limited, and thus not up for reelection, with incumbents who are not term-limited. Using this method, studies have found that elections make incumbents less likely to engage in corruption (Ferraz and Finan, 2011), more likely to enact popular economic policies (Besley and Case, 1995*b*) and, overall, lead incumbents to provide better social and economic conditions for their electorate (Alt, De Mesquita and Rose, 2011; De Janvry, Finan and Sadoulet, 2012). That is, broadly speaking, incumbents are more likely to do what voters want, to be responsive, when they have been or are going to be up for reelection (Ashworth, 2012). Why does elections have this effect on incumbent behavior? Previous research presents us with two reasons. First, incumbents are motivated to perform well if they are up for reelection, because they know voters will not retain their services if they perform badly; what is conventionally called a sanctioning effect. Second, to the extent that incumbents do not perform well, they will not be reelected, leaving only high-performers in office; what is conventionally called a selection effect.[1]

Previous literature has generally implicitly assumed that all elections have the same capacity to influence incumbent behavior. This is a perfectly reasonable analytic starting point for studying the effect of elections, but given the discussion of the clarity of responsibility literature, it might be worthwhile to adjust this assumption. As such,it seems reasonable to assert that if electorates vary in the extent to which they hold governments electorally accountable for political performance, then elections should be less effective in disciplining incumbent behavior. This leads us to our key argument: incumbents will be more likely to perform in accordance with the wishes of the electorate if clarity of responsibility is high. That is, if it is obvious for voters that it is the incumbent who is responsible for a certain policy or a certain political outcome, then the type of policy or the state of this outcome will align itself more closely with voters preferences.

[1]The terminology used here is from Duch and Stevenson (2008), but the division into these two types of effects of elections are widely used (Alt, De Mesquita and Rose, 2011; Ashworth, 2012, e.g.)

In effect, we thus argue that a certain degree of clarity of responsibility is necessary for elections to provide a check on incumbents. Accordingly, our argument has the same structure as arguments advanced by Berry and Howell (2005) or Snyder Jr and Strömberg (2010), in that they argue that electoral accountability for an outcome is contingent on the extent of media scrutiny of the outcome and the incumbent, and we argue that electoral accountability for an outcome is contingent on the clarity of responsibility the incumbent has for this outcome.

In the next section we look at whether this argument can help explain how a specific type of incumbent acts with respect to a specific policy: how municipal mayors in Denmark set tax policy.

Empirical context: Tax Setting in Danish Municipalities

To examine the empirical tractability of our theoretical argument we zoom in on tax policy in Danish municipalities. Denmark is a decentralized welfare state where municipalities can affect their local revenue and set a yearly budget. Municipal tasks and services include the core welfare services of the Danish welfare state and municipal spending amounts to 35 percent of GDP or more than half of all public spending.[2]

We focus on this context as it provides us with three things, which is needed in order to explore the relationship between clarity of responsibility and incumbent behavior. The first thing this context provides is a policy, namely municipal income taxes, which is controlled by the local city council and which is unpopular among the average voter. The second is meaningful variation in clarity of responsibility for tax policy across elections. Specifically, we take advantage of the fact that the largest party in the municipal city council sometimes holds a majority of the seats and sometimes only holds a plurality. This means that sometimes the incumbent party can set taxes on their own, leaving them clearly responsible for tax setting, sometimes they need to negotiate with other parties, making responsibility for tax setting more murky. The third, and perhaps most important thing, which this context provides is a way to identify the causal effect of gaining a single party majority on tax setting. In particular, we are able to use a close-election regression discontinuity design, comparing the tax setting in municipalities where the largest party fell just short of a majority of the seats with municipalities where the largest party narrowly won a majority.

Below we go into more detail in describing this context, detailing the process of tax setting and the difference between single party majorities and pluralities. Based

[2]The tasks include primary education, child care and care for elderly people, libraries, local sports facilities and other cultural activities, granting and payment of cash assistance, anticipatory pension and certain other social benefits, job activation and employment projects for non-insured unemployed persons, public utilities, environmental measures and emergency services.

on the theoretical argument laid out above about the relationship between clarity of responsibility and tax setting, we then derive some specific hypotheses about how single party majorities relate to tax setting. Finally, we detail how we test these hypotheses using the close elections regression discontinuity design sketched out above.

Local Income Taxes

The local income tax levied by Danish municipalities is an interesting type of policy to study in the context of clarity of responsbility and incumbent behavior. There are a few reasons for this.

First, income taxes affects and are salient for practically all voters. The municipal tax rate is the same for all levels of income, and the municipality cannot levy different tax rates depending on the income bracket. The income is also substantial, amounting to approximately 50 percent of total income in the municipalities,[3]. In terms of salience, all citizens are informed about the tax rate via their early tax returns, and the media will also frequently report on tax rate changes and compare tax rates between municipalities.[4]

Second, local governments enjoy a large degree of income tax discretion. The local income tax rate is determined by the city council in connection with the yearly budget negotiations, which come to a vote in the fall of each year (Blom-Hansen, 2002). In theory they are allowed to set the tax rate at any level. Formally, tax discretion is limited by national agreements between the central government and the association of local governments. They reach a common non-binding agreement about how much the average tax rate across all municipalities is allowed to increase. However, in practice, these agreements have had little impact on the tax level in each individual municipality (Pedersen, 2004).

Third, raising the income taxes is quite unpopular. As such, unlike in the international literature, where there is mixed evidence regarding a relationship between local income taxation and support for local incumbents (Niemi, Stanley and Vogel, 1995; Besley, 2006; Boyne et al., 2009), the Danish literature on this topic has consistently found that municipal income taxes carry an electoral penalty for the mayoral party (Frandsen, 1998; Bhatti, Hansen and Olsen, 2012).

In sum, local income taxes are set by the city council, they are salient to voters, raising them is unpopular and carries a penalty with the voters. With this in mind income tax setting in the Danish municipalities represents an interesting type of

[3]In terms of other revenue Danish municipalities rely on a mix of direct and indirect taxes, operating and investment income (from public and private buyers), refunds (percentage grants), general grants and special grants, net interest income and loans.

[4]The tax returns explicitly states the municipal tax rate and how much one has paid in yearly municipal taxes.

incumbent behavior, because we can index the extent to which incumbents are responsive to their electorates preferences for low taxes, by examining whether they do, in fact, keep income taxes low.

So how has tax setting in the Danish municipalities developed over time? To answer this question, we obtained the income tax levels from the Danish national statistics bureau (Statistics Denmark) on the 273 primary Danish municipalities between 1972 and 2006. In 1970 a municipal reform was introduced which dramatically reduced the number of municipalities. In 2007 the local level experienced yet another major reform which reduced the number of municipalities once again. These two reforms bookend our data, and we have a strongly balanced panel of taxes going from 1972 to 2006.

Figure 1 shows the development of the tax rates for all municipalities in the time period under study. Ironically, given how unpopular the income taxes are, we can see that taxes were rising sharply in the 1970s and 1980s. In this period the average tax rate rose from around 14 percent to about 20 percent. The primary explanation for the uniform increase in taxes in this period is that the Danish welfare state is being expanded in this period, leaving the municipalities with a lot of new tasks, which needs to be financed. This might also explain why lower taxes was generally preferred by the average voter (cf. the electoral penalty described above), as differences in tax-rates did not necessarily signal a trade-off between different levels of public goods provision, but rather whether government mandated tasks were implemented efficiently.

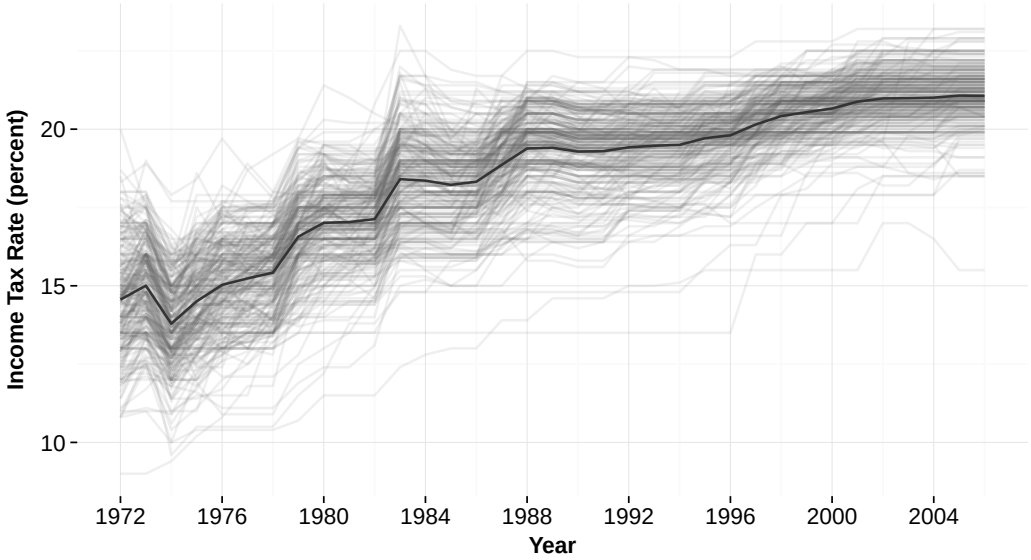

Figure 1: Municipal Income Tax Rate (1972-2006). Black line indicate average for all municipalities. Grey lines show taxes rates for individual municipalities

Single party majorities

The city council is the primary from of local government in Denmark, and members are elected at proportional single district elections. Elections are fixed to take place every fourth year and are usually not coinciding with other elections at the national or EU level. Turnout is high with an average of around 70 percent. The size of the city councils varies from 9 seats to 55 seats.

After each election the mayor is appointed by a majority in the city council. This means that after some elections the mayor will be appointed by just one party, a single party majority, whereas sometimes several parties have to agree on a mayor. Usually the mayor appointed will come from the party which has a plurality of the seats. Getting the mayoralty is important, as the mayor is the only full time paid politician in the municipality, she has a number of formal obligations, and she is by far most visible politician in the local media (Kjær, 2002). In particular, the mayor is responsible for the day-to-day business of the administration and chairs the economic committee. Just as important for the present context, however, is that when a party gets a single party majority they can set taxes without coalescing with other parties, increasing how clearly they are responsible for tax policy.

Even in municipalities with a single party majority, however, the practical politics of Danish local government is often highly consensual (Houlberg and Pedersen, 2015). As such, oversized coalitions are common practice in the municipalities with no single party majority and even single party majorities will often form long-term agreements with other parties (Serritzlew, Skjæveland and Blom-Hansen, 2008). This being said, by winning a majority of the seats, a party will fill the all important posts in the city council, and will generally be the dominant political force in the municipality (Olsen, 2013). Further, while there has been very little research on the effect of a single party majority in a Danish context, (Serritzlew, 2005) concludes that "if the mayor's party has an absolute majority, the need for compromise is limited, and implementation will not be challenged politically" (p. 422), which is consistent with our argument that gaining a single party majority enhances clarity of political responsibility.

Taken together, we thus think that single party majority status is a valid indicator of clarity of responsibility. This is further corroborated by the fact that using differences in whether a party can enact policies without coalition partners or support from other parties in the legislative body is a typical component of clarity of responsibility (Powell Jr and Whitten, 1993; Nadeau, Niemi and Yoshinaka, 2002; Hobolt, Tilley and Banducci, 2013).

How many municipalities have single party majorities? In figure 2 below plot show the share of single party majorities across all municipalities for all elections. 24 percent of all elections result in a single party majority. Across time this share

varies from 15 percent in the 1985 election to 35 percent in the 2001 election.

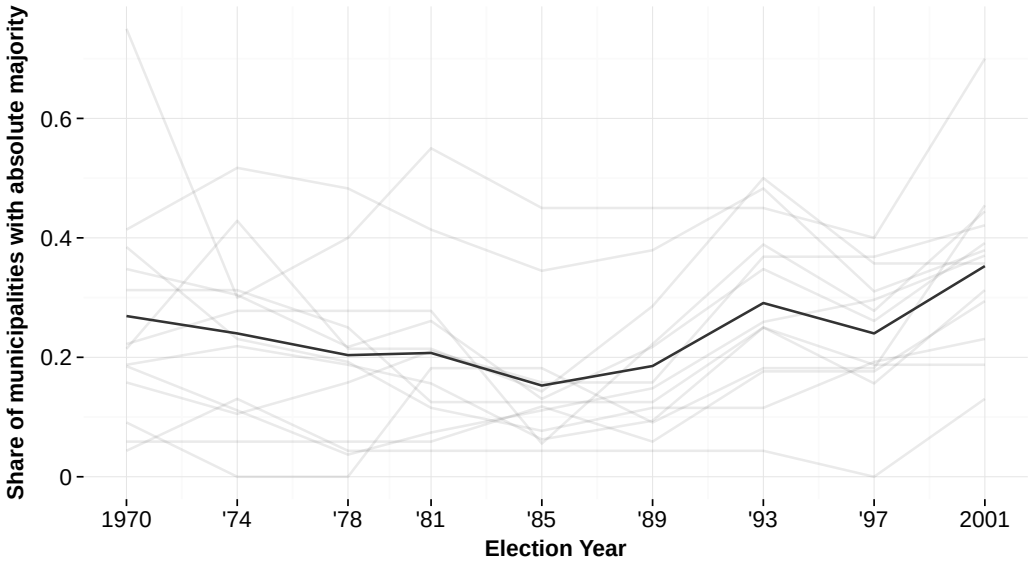

Figure 2: The share of municipalities with an absolute majority across all elections (1970 to 2001). The black line indicates the mean across all municipalities. The grey lines are the shares for each of the 14 Danish regions.

The grey line is the shares for each of the 14 Danish regions and show great geographical variation in single party majority status. Regarding the geographical spread of single party majorities, many municipalities around Copenhagen have absolute majorities obtained by either the Social Democrats or the Conservative Peoples Party. In western and northern Jutland there is a large percentage of municipalities with a Liberal Party absolute majority.

Empirical hypotheses

So what are our expectations with regards to the relationship between single party majorities and income taxes in Danish Municipalities? We have argued that the largest party's responsibility for setting income taxes increase substantially if the party obtains a majority of seats in the city council. Following our discussion above of how clarity of responsibility might shape incumbent (i.e. the largest party's) behavior, this leads us to expect that if a party gains a single party majority this will lead the municipality to lower income taxes.

> *General hypothesis:* If a party obtains a majority of seats in the city council, then the city council will adopt lower income taxes.

The logic underlying this hypothesis is, as discussed above, that elections will provide a stronger check on incumbents if it is clear who is responsible, making it more likely that incumbents deliver what the voters want. Since, as we argued

above, voters in Danish local elections are generally interested in lower income taxes, higher clarity of responsibility should lead to incumbents delivering lower income taxes.

This hypothesis, however, is quite general. In particular, based on the previous literature on how elections affect incumbent behavior, which we discussed above, one can imagine two distinct ways in which a party obtaining a majority of the seats can lead to lower taxes.

One is that gaining a majority of the seats leads the party to pursue lower taxes, because the party know that voters are interested in lower taxes, and that this party is now clearly responsible for tax setting.

> *Specific hypothesis 1*: If a party obtains a majority of seats in the city council, then the city council will adopt lower income taxes *before* the next election.

Following our discussion above, we can call this a sanctioning effect, because fear of sanctioning is driving incumbent behavior (see Ferejohn, 1986, for an example of a sanctioning model). The sanctioning effect is premised the idea that it generally takes effort for incumbents to do what voters want. In this context this means that it takes effort to lower, or refrain from raising, taxes. Accordingly, incumbents need to be provided with an electoral incentive to exert this effort. If a party obtains a majority they get more responsibility for tax policy, leading voters to hold this party more electorally accountable for tax setting, which, in turn, should increase electoral incentives to lower taxes. As such, gaining a single party majority should lead this party to exert more effort towards lowering taxes before the next election.

The other way that a single party majority can lead to lower taxes is by voters taking advantage of the fact that the incumbent at the following election is going to be more responsible for the tax level. That is, voters will be able to draw stronger inferences about the single party majority incumbent's ability and willingness to keep taxes low, and accordingly they make their support contingent on these factors. This will change the composition of the city council in the direction of being more willing and able to lower taxes, which should, in turn, lead the city council to lower taxes.

> *Specific hypothesis 2*: If a party obtains a majority of seats in the city council, then the city council will adopt lower income taxes *after* the next election.

Following our discussion above, we can call this a selection effect, because voters selection of specific types are driving incumbent behavior (see Duch and Stevenson, 2008, for an example of a selection model). The selection effect is premised on

the idea that some parties are low-tax types, interested in keeping income taxes low, whereas others are high-tax types, not interested in keeping taxes low. Voters prefer low-types, and are therefore interested in finding out whether the parties in the city council are low-tax or high-tax types, however, the type of any one party is difficult to determine when the parties have to share policymaking responsibility with other parties. However, if a party gains the majority of seats at an election, clarity of responsibility for tax policy increases, making it easier for voters to identify whether the single party majority incumbent is a low-tax or high tax type based on the tax policy this party enacted. Since it becomes easier for voters to identify whether this party is the preferred low-tax types, low tax-types will get more electoral support in the following election and high-tax types will get less support. Accordingly, the selection effect does not kick-in immediately, rather, it works by making it more likely that parties interested in lowering taxes will get more seats in an election featuring a singe party majority incumbent-

Before we turn to testing these hypotheses, a couple of points are important to clarify. First, we will not do an independent test of the general hypotheses, instead we will examine it by testing the two specific hypotheses. Second, the two specific hypotheses are not mutually exclusive. On the contrary, one can easily imagine both selection and sanctioning effects operating simultaneously (for a model which integrates sanctioning and selection effects see Alt, De Mesquita and Rose, 2011). Third, the only difference between the specific hypotheses lies in when they expect the effect of single party majorities to occur. In particular, if we imagine a municipality which elects a city council with a single party majority at $t = 0$, then the first hypothesis posits that this municipality will have lower taxes at $t = 1$, the next election, whereas the second hypothesis posits, that this municipality will have lower taxes at $t = 2$, two elections after the one where the single party majority incumbent was elected.

Research design: A Close Elections Regression Discontinuity

In order to test our hypotheses we need to be able to identify the effect of obtaining a single party majority on tax-setting. However, like all political institutions, assignment of single party majority status is endogenous to the political and socioeconomic makeup of the municipality (Besley and Case, 2000; Aghion, Alesina and Trebbi, 2004). For instance, gaining a single party majority will be easier in smaller, rural municipalities, where the electorate is more homogeneous, and in these municipalities voters are also likely to be more conservative, and thus a stronger preference for lower taxes. This poses a challenge to causal inference, as we might conflate the effect of single party majorities with the effect of the underlying factors which make single party majorities more likely.

To sidestep these inferential issues, and to estimate an unbiased causal effect of gaining a single party majority on tax setting, we use a close election regression discontinuity (RD) design. That is, we compare tax-setting in municipalities where the mayoral party narrowly won a majority of the seats in the city council with municipalities where the mayoral party narrowly lost a majority. This means focusing on municipalities where only a few votes were pivotal in assigning the single party majority status.

By focusing on these elections where the persuasion of a small number of voters determined the election results, we can reasonably assume that it is as-if random whether the largest party won a majority of the seats (Lee, 2008; Eggers et al., 2015; Skovron and Titiunik, 2015), This as-if random assignment of single party majority status makes it possible to causally attribute differences in tax-setting to the presence or absence of a single party majority (Dunning, 2012).

Below we describe our research design in more detail, explicating how we identified how close a party was to winning or losing a single party majority, and how we measured the different variables used to compare incumbent behavior across these elections.

Identifying closeness of the elections

We identify close elections in a two-step process. In the first step, we single out municipal elections from 1970 to 2001 where the largest party in the city-council held either a one-seat majority or was one seat short of obtaining a majority. This leaves us with 839 out of a total of 2475 elections. Figure 3 illustrates this selection process.

In the second step, we index the 839 close elections according to exactly *how* close they were. In particular, we create a forcing variable which can tell us how many votes the largest party would have needed to get (lose) in order to have won (lost) the majority of the seats in the city council.

Having such a forcing variable, which determines how close the observations were to changing treatment status, is necessary, as we want to attach special significance to those elections where treatment assignment was the result of a small number of votes. Creating this forcing variable, however, is complicated by the fact that there is no joint electoral cut-off (e.g. 50 pct.), at which mayors are assigned a majority of the seats. This is not to say that there is no exact cut-off at which majority is assigned in each election, the cut-off simply moves around across election. Specifically, it depends on how votes are distributed among the other parties. As a result, sometimes the mayor might need 45 pct. of the vote to secure a majority, other times 42 pct. or 48 pct.

This changing cut-off is a product of two features of the electoral system in the

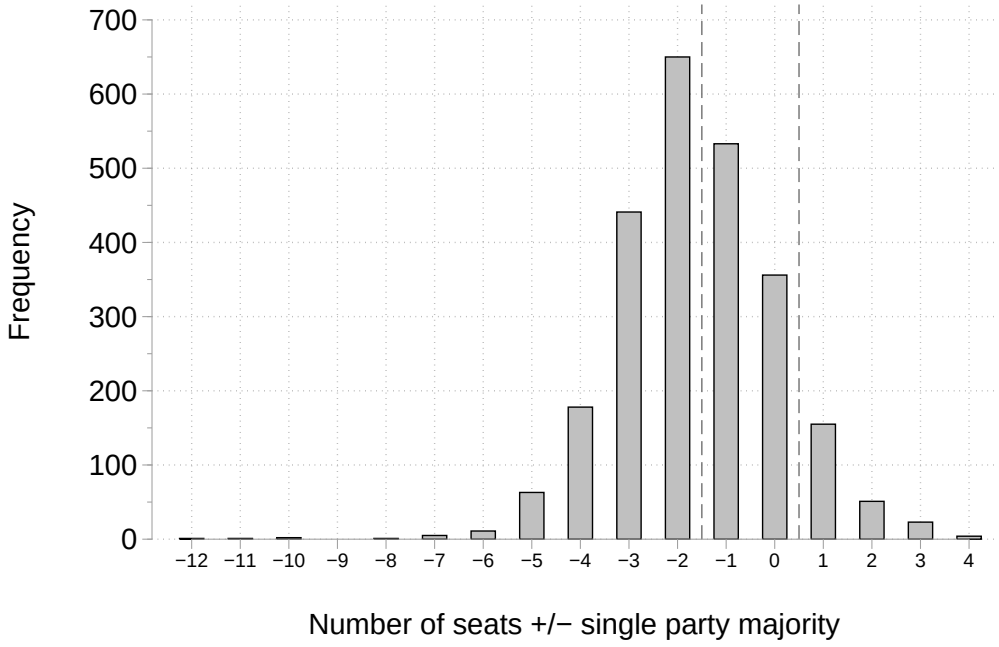

Figure 3: Histogram of elections across how close the largest party was to gaining an absolute majority in the city council. Only elections within the two dashed lines are used in the analysis of tax setting.

Danish municipalities. The first feature is that assignment of seats is based on a proportional divisor method (D'Hondt). As a consequence, the number seats assigned to the largest party depends on the exact configuration of votes given to the other parties up for election (Fiva, Folke and Sørensen, 2013; Folke, 2014; Freier and Odendahl, 2015). The second feature is that parties can form electoral coalitions (O'Leary, Grofman and Elklit, 2005). If parties decide to form an electoral coalition, which they often do, then seats are first assigned to this coalition, and then to the individual parties. In this case the number of seats assigned to each party depends on the configuration of electoral coalitions, the votes given to the different electoral coalitions and the votes given to the different parties within each coalition.

To develop a forcing variable which takes these particularities of the electoral system into account, we first specified the exact distribution of votes across parties and electoral coalitions for each of the 839 close elections using election reports from Statistics Denmark. Next, we wrote a program which recreated the electoral system, and then ran simulated elections to determine the number of votes (+/- 10) the largest party would have needed to lose/win one seat, thereby securing/losing the majority in the city council, holding the electoral support for the other parties

constant.[5]

Based on this we create two variables which measure the number of votes and the proportion of the votes cast which the largest party in the city council would have needed in order to win or lose the majority of the seats in the city council. Figure shows how these forcing variables are distributed, that is, exactly how close the 839 close elections were. As can be seen from the figure there are a large number of elections close to the cut-off (0). In the analyses below, we use the proportion of votes cast as our forcing variable.

Indicators

Turning to indicators, the key dependent variable we use is income taxes. Because there is substantial temporal and municipality-specific differences in the tax level (cf. figure 1), we analyze a benchmarked version of the the tax variable, which makes it easier to compare tax setting across municipalities and across different time periods (i.e. it increases efficiency). Specifically, we adjust the income tax implemented in a given year by a given municipality, $level$, by subtracting the average tax level across all years for that municipality, $munilevel$, and subtracting the difference between the average tax level all municipalities have implemented in this year and the average tax level across all years, $yearlevel$.[6] Equation (1) demonstrates how the tax variable, tax, is calculated.[7]

$$tax_{it} = level_{it} - munilevel_i - yearlevel_t \tag{1}$$

We also use a number of other variables in the analysis. To index the demographics of the municipalities, we look at the population size and the area of the municipality in square kilometers. Both of these are log-transformed to deal with outliers and skewness in the distribution. We also look at turnout, measured as the proportion of the voting age population which decided to vote at the municipal election. To index the political persuasion of the municipalities, we also measure

[5]In particular, the program added or subtracted 10 votes from the actual vote total of the largest party, and then calculated the number of seats the largest party would have gotten given the electoral coalitions and the votes cast for other parties. It performed this calculation until the number of seats assigned to the largest party changed, and then reported how many times it had to add or subtract 10 votes before this change had happened. To write this program we used the `electools` package in Stata (Jaime-Castillo, 2008).

[6]Note that the variables $munilevel$ and $yearlevel$ is going to be balanced for the subset of close elections which we use to identify the effect of single party majority status on income taxes. Accordingly, this transformation is not used to get an unbiased estimate, instead, the transformation provides us with a more efficient comparison across time and space.

[7]Say a municipality implements a 20 pct. income tax in 1980, and say that the average level of taxes this municipality has levied from 1970 till 2005 is 18, and that in 1980 municipalities sat taxes two percent lower than the average across all years. Then our benchmarked measure of tax-setting equals $20 - 18 - (-2) = 4$. As such, the city council have implemented a tax level which is 4 pct. higher than we would expect given which municipality it is and what year it is.

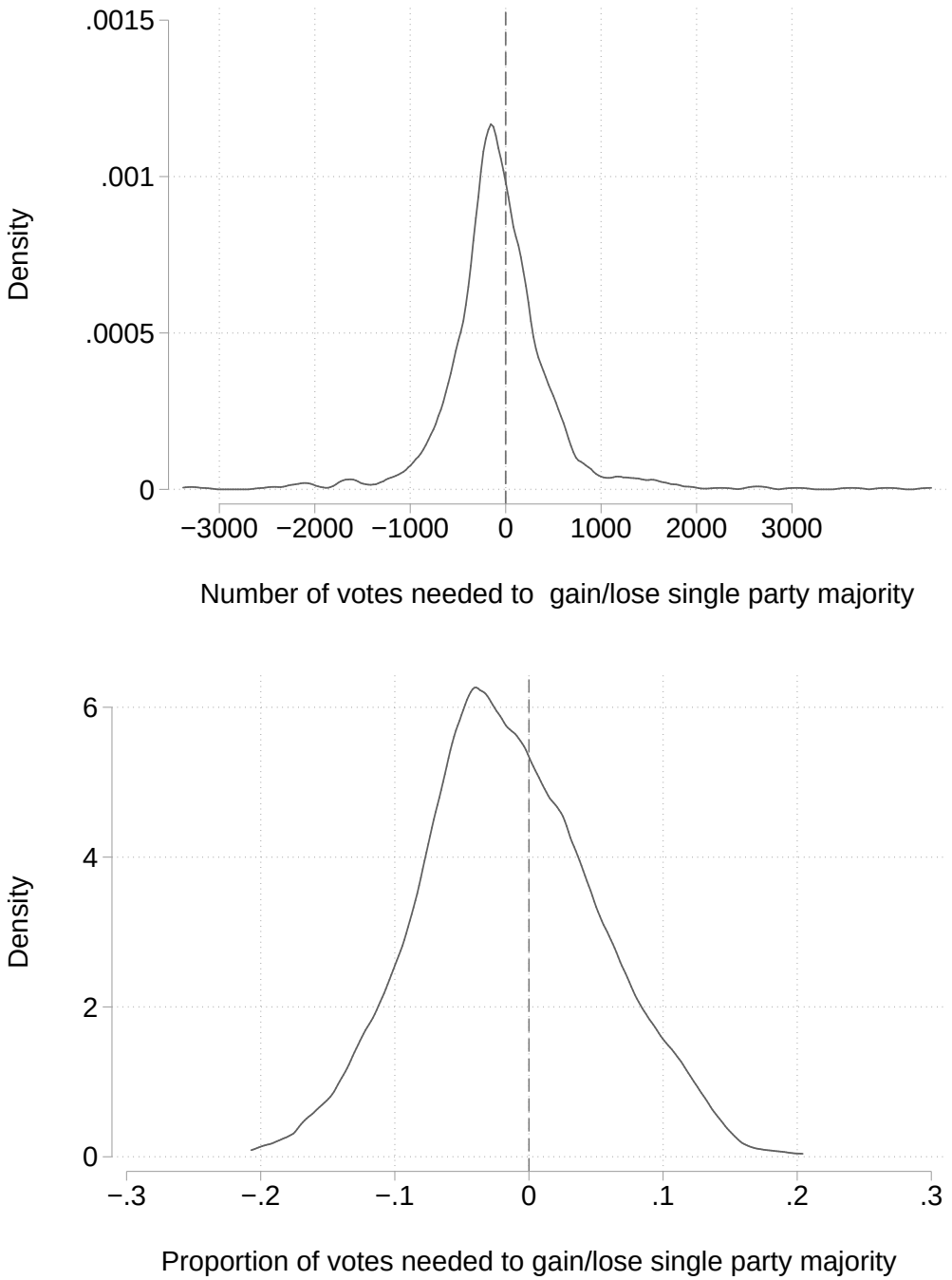

Figure 4: Density of forcing variable measured in number of votes and proportion of electorate. Only calculated for the 839 close elections.

the proportion of voters who voted for national right-wing parties (The Conservative paty and the Liberal party) in the last municipal election as well as the party of the mayor. The mayor's party is measured using a set of dummy variables for the Social Democratic party, the Social Liberal party, The Conservative party, The Liberal party and a dummy other parties (this accounts for about 10 pct. of the case). Finally, we also measure the vote share of the largest party in the next election (see appendix I for descriptive statistics on these variables for both the close elections and all elections).

Results: The effect of single party majority on tax setting

We begin our analysis of the relationship between tax setting and single party majority status by plotting tax levels against the forcing variable, which measures how large a proportion of the electorate who would have needed to (not) vote for the largest party for it to get (lose) a majority of the seats in the city council (i.e. the forcing variable described above). We do this in figure 5, and we do it for tax setting at two different points in time . Following hypothesis 1, which suggested that having a single party majority would make incumbents lower taxes before the next election, we plot the tax level at the time of the next election, $t = 1$, in the top panel. Following hypothesis 2, which suggested that having a single party majority incumbent up for election would lead to a city-council which lowered taxes, we plot the tax level at the election following the one which featured an incumbent who either narrowly won or lost a majority of the seats in the city council, $t = 2$.

Examining the graphs, there does not appear to be any differences in tax levels at $t = 1$ around the cut-off for assignment of single party majority, suggesting that there is no effect of single party majority status on tax setting. However, there does appear to be a difference in tax-levels at $t = 2$, with the expected tax level in municipalities where the largest party fell just short of a single party majority being about half a percentage point higher than in the municipalities where the largest party won a single party majority. In particular, there seem to be very few municipalities with a single party majority, which have an adjusted tax level of above 1 at $t = 2$. This suggests that a city council elected at an election with a single party majority incumbent will generally set taxes lower than if the city council had been elected in an election where no party had a majority of the seats.

Having examined the data graphically, we now try to estimate the effect of single party majority status on tax setting in a statistical model. Specifically, we use the `rdrobust` package developed by Calonico et al. (2014) to do local polynomial point estimation of the effect. This entails fitting weighted least squares (WLS) regression of the forcing variable on tax levels above and below the cut-off, using the difference in model expectations of the WLS model estimates at the cut-off as the

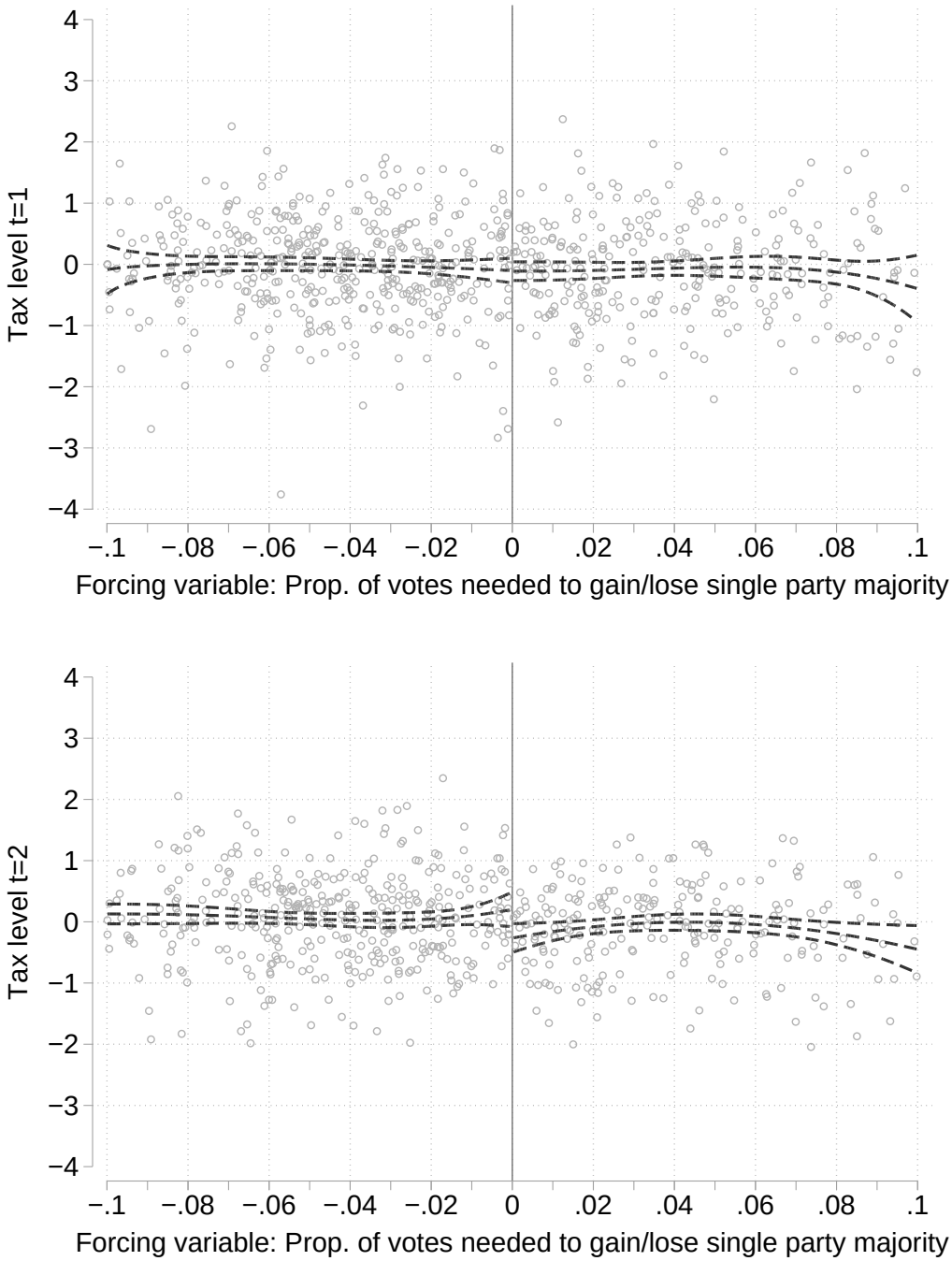

Figure 5: Relationship between forcing variable and adjusted tax-levels for close elections in which single party majority status was determined by less than ten pct. of the vote. Dots are election-year tax levels at t=1 (top panel) or t=2 (bottom panel). Solid line is prediction of tax levels estimated from fractal polynomials of the forcing variable above and below the cut-off. Dashed lines are 95 pct. confidence intervals of this prediction. n=706 in top panel, n=616 in bottom panel.

effect estimator. We need to choose a bandwidth around the cut-off within in which we can fit these models. Following the advice of Skovron and Titiunik (2015), we use the CCT MSE-optimal bandwidth which can be estimated using the `rdrobust` package. To estimate the WLS models we also need to select a weight structure, here we use a triangular kernel putting more weight on observations close to the cut off. We estimate the WLS regressions using both a first order (local-linear) and a second order polynomial (local-quadratic).

The key estimates from this local polynomial point estimation are presented in table 1, where we present estimates from models of tax levels at both $t = 1$ and $t = 2$. The most important estimate presented in this table is the point estimator, which corresponds to the estimated effect of gaining a single party majority on tax levels.

Table 1: Does single party majority status affect tax setting?

Dependent Variable	Effect - Point Estimator	Robust p-value	Bandwidth	Polynomial	n
Tax level, t=1	-0.04	0.942	0.06	1	384
Tax level, t=1	0.40	0.528	0.06	2	414
Tax level, t=2	-0.55	0.336	0.06	1	400
Tax level, t=2	-0.29	0.807	0.06	2	400

Estimated using the CCT MSE-optimal bandwidth.

As can be seen from table 1, the results line up nicely with what we found when examining the data graphically. There is essentially no effect of gaining a single party majority on tax levels at $t = 1$, but there is an effect of about -0.4 on tax levels at $t = 2$. To examine the statistical significance of these effects, we can look at the robust p-value associated with the point estimator which is also reported in table 1 (see Calonico et al., 2014, for description of robust p-value). While the estimated effects on tax levels at $t = 1$ are statistically indistinguishable from zero, the effects on tax levels at $t = 2$ are statistically significant for both the model with a first order and the model with a second order polynomial ($p < 0.05$).

Taken together, the evidence presented here is consistent with hypothesis 2, the selection effect, but not with hypothesis 1, the sanctioning effect. Accordingly, when the largest party in the city council gets a single party majority, increasing this parties clarity of responsibility for tax policy, there is no evidence that this motivates the party to lower, or to refrain from raising, taxes. The evidence does suggest, however, that the type of city-council which gets reelected when a single party majority incumbent is up for election is more prone to lower taxes.

Robustness and design checks

Above we laid out evidence which suggests that gaining a single party majority does not have an effect on tax setting in the first election after the single party ma-

jority status is assigned, inconsistent with the expectations laid out in our hypothesis 1. We found, however, that gaining a single party majority did have an effect in the next election, consistent with our hypothesis 2. In this section we examine our data in more detail, determining how robust this pattern is and whether the assumptions underlying the research design seem reasonable. For brevity several of the results described below is not reported in the paper, but they are reported in the appendix.

Long term effects: Our two hypotheses only made predictions about tax-levels at $t = 1$ and $t = 2$, but what is the complete temporal profile of the single party majority effect? We explore this in figure 6, estimating the effect of single party majority on tax setting at each of the four elections following assignment of single party majority. Here we can see that the effect does not kick in until $t = 2$, as we found above, then the effect drops somewhat at $t = 3$ and then essentially drops to zero at $t = 4$. A temporary effect is consistent with the selection explanation underlying hypothesis 2. In particular, there is no reason that the selection effect of having a single party majority incumbent up for election at $t = 1$ should have an effect beyond period $t = 2$. As such, in future election periods, the informativeness of tax policy with respect to the incumbents type will not depend on single party majority status in period 1.

Multiple comparisons: A potential critique of the statistical evidence for the effect at $t = 2$ is that it should not be considered in isolation, but in conjunction with hypothesis 1. This presents a multiple comparisons problem (Gelman, Hill and Yajima, 2012), because there is a greater chance of getting a statistical significant result when testing for effects on two variables (i.e. tax levels at $t = 1$ and $t = 2$). However, even if one takes this into account the statistical evidence for an effect at $t = 2$ is pretty strong. As such, if one does a simple bonferroni correction of the robust p-value presented in table 1, the estimated effect remains statistically significant at the five percent level for the model with a first order polynomial, and at the ten percent level for the second order polynomial.

Sensitivity to different bandwidths: Above we only used data within the CCT MSE-optimal bandwidth following advice laid out in Skovron and Titiunik (2015). All decisions about the size of the bandwidth, however, rely on a trade-off between bias and efficiency, and therefore it is always interesting to see whether one's results change substantially depending on which trade-off is used. In appendix A we examine whether the results obtained in table 1 are sensitive to bandwidth choice. We find that the point estimators of the effects are not sensitive to the choice of bandwidth, however, the effect of single party majority on tax setting at $t = 2$ is statistically insignificant at the smallest bandwidths. This not surprising, as these include less than a hundred observations.

Alternative estimation methods: Above we used local polynomial point esti-

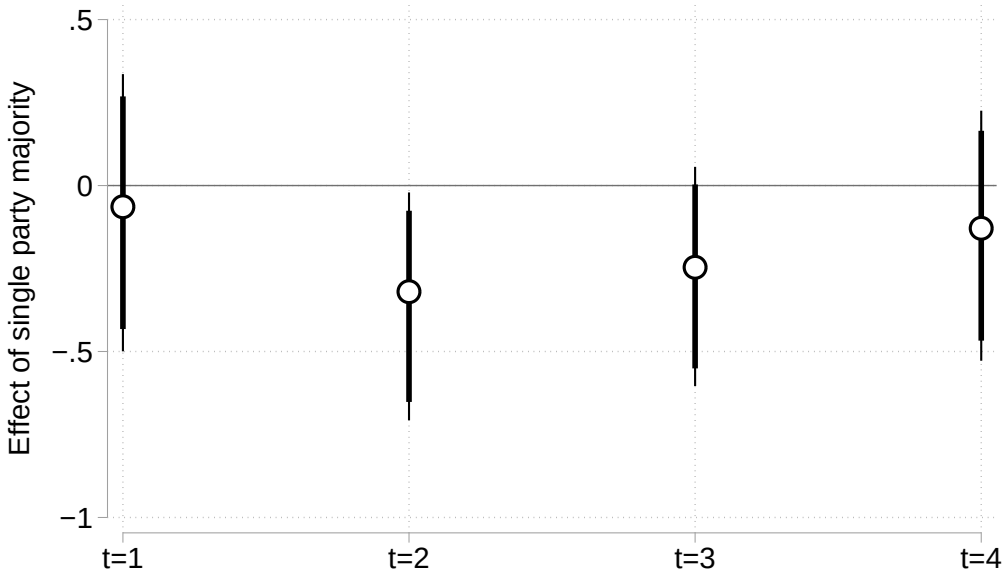

Figure 6: Effect of obtaining a single party majority on adjusted tax levels at t=1,2,3,4. Spikes are 90 pct. (thick) and 95 pct. (thin) confidence Intervals. Effects estimated using local polynomial point estimation with a first order polynomial, a triangular kernel and the CCT MSE-optimal bandwidth. Confidence intervals calculated using robust inference.

mation. While this method is recommended by political methodologists (Skovron and Titiunik, 2015; Calonico, Cattaneo and Titiunik, 2014), it is still rather new. Accordingly, some might find it interesting to see whether the results are sensitive to using this estimation method, or whether more traditional estimation methods uncover similar results. We look at this in appendix B, where we estimate the effect of single party majority status using OLS regression. The results we find are similar in magnitude and in their statistical significance.

Different specification of the dependent variable: We only look at the tax rate in the election year, however, it is not obvious that the effects of single party majority should only manifest itself in election years. As such, voters might, arguably, be more interested in the average tax rate across the election period. We investigate whether the results are only detectable for the election year in appendix C. Specifically, we re-estimate the models in table 1 using the average tax-levels across the election periods in $t = 1$ and $t = 2$ as the dependent variables, rather than the tax-levels in the election years. The estimated effects on the average tax rate is slightly smaller at $t = 2$ (≈ 0.3), but otherwise the patterns are similar to those found above.

Alternative dependent variable: So far we have only looked at income taxes, however, municipalities can also levy a property tax. There are several reasons why we do not use these taxes in the main analysis: they are not as salient, they constitute a much smaller fraction of the income, they are only directly paid by those who own their own home, and it is not clear that there is an electoral incentive to lower them (Blom-Hansen, Monkerud and Sørensen, 2006). However, in spite of this, it is interesting to examine this tax. As such, by examining property taxes it becomes possible to find out whether single party majority status does in fact lead to a lower over-all tax level, or whether the tax mix simply changes from income to property taxes. In appendix D we analyze these property taxes. We do not find evidence of tax-mixing, if anything, these property taxes seem to drop as well in $t = 2$, however, the identified effect on property taxes is not statistically significant.

Balance tests: The primary assumption underlying the RD design is that close to the cut-off, assignment to single party majority is as-if random. We cannot test this assumption directly, but we can look for indirect evidence which might suggest that this is the case. Specifically, we look at whether there are any systematic differences between the type of municipalities where parties narrowly win majorities and the type of municipalities where parties narrowly lose majorities. In appendix E we show that there are no differences near the cut-off which assigns single party majority status in the municipalities' demographic or political make-up. This lends credibility to the assumption that, close to the cut-off, there are no systematic differences in the municipalities which is assigned to single party majority status.

Sorting: Another way to probe the as-if randomn assumption is to examine the density of the forcing variable. As such, if we find a large number of observations

just below or above the cut-off which assigns single party majority status, this might suggest that the party or the electorate was able to decide whether they ended up with a single party majority in these close elections. However, if one inspects figure , which plots the density of the forcing variable, there does not seem to be any evidence of this type of sorting. This is supported by the fact that a formal McCrary test of a discontinuity in the density at the cut-off comes out insignificant ($p > 0.8$;see appendix E for details). Given the context of the present RD design, it is not entirely surprising that we find no signs of sorting. As mentioned above, the exact cutoff is different from election to election, and depends on the exact vote totals of the other parties. Even if parties or municipal electorates could select into exact vote shares for the largest party, they would be hard pressed to know exactly how many votes this party would need to get a majority of the seats in the city council, This as the exact number of votes needed depends on the complete distribution of votes across parties, which is, naturally, not revealed before the election.

Other robustness checks: In appendix F we look at whether there is *only* an identifiable effect on tax-levels at the cut-off where a single party majority is assigned. We do this by examining placebo cut-offs along the forcing variable. There is no evidence of tax-levels being affected at the alternative cut-offs which we examine. In appendix F we look at whether the results are sensitive to restricting the analyses in table 1 to cover the same elections. This does not affect the results.

Additional evidence for the selection mechanism

The key mechanism driving the selection effect identified above is that voters are more sensitive to tax setting if the largest party has a majority rather than a plurality of the seats in city council. To see this, imagine that voters were not more likely to vote for a party based on their tax policy if they had a single party majority. Then how should the city council elected when such a party is up for election be different from a city council elected when such a party is not up for election? And how should the city council become more prone to adopt lower taxes? Put differently, if voters mode of incumbent selection is not effected by the presence of a single party majority in the city council, then there is no "selection" effect.

In spite of this, we have not directly tested whether voters mode of selection depends on whether the largest party controls a majority of the seats in the city council. Instead, because such an effect follows from the literature on clarity of responsibility (cf. the introduction), we have simply assumed that there must be such an effect in this context. However, since it is so essential to the findings laid out above, it is interesting to investigate whether this mechanism is at work here as well.

To investigate whether voters mode of selection changes as a result of single

party majority status, we examine the correlation between tax-setting and electoral support for the incumbent party. If there is an effect of single party majority status on mode of selection, we would expect this correlation to differ depending on whether the incumbent party controls a majority of the seats in the city council. Specifically, we estimate a set of linear models, which sets the support for the incumbent party as a function of our adjusted income tax measure, a dummy for single party majority status and an interaction between the two. We also control for the incumbent party's electoral support at the previous election. The interaction is the interesting feature of the model as it signifies the difference in the correlation between taxes and support for the incumbent across single party majorities and pluralities.

In estimating this interaction we initially depart from the RD set-up by including all elections. While the RD design has advantages when it comes to identifying the main effect of single party majorities, it is not obvious that an RD would be preferable to a simple panel model when it comes to estimating an interaction between tax levels and single party majority.

Figure 7 presents the estimated marginal effects of income taxes on support for the incumbent across single party majorities and pluralities from four different version of the linear model described above. In the first model we simply look at the interaction effect across all elections using municipality clustered standard errors. Then we add different variables in the next three models. In the second model, we include a small battery of controls (population, area, turnout, percent right-wing voters, mayoral party dummies), and in the third model we include year fixed effects.

The estimates from models 1 through 4 all show that the estimated negative effect of tax levels on support for the incumbent is statistically significant and negative for incumbents with a single party majority, but close to zero and insignificant for those with a plurality. This signifies that voters are more likely to punish (reward) incumbent mayors for raising (lowering) taxes by refusing to support them *if* the incumbent mayor has a single party majority.

We also report estimates from a fifth model in figure 7. Here we try to estimate the interaction between taxes and single party majority in an RD setting. As such, we only focus on close elections and add our forcing variable as a control. In this model, which only features incumbents who narrowly won or lost a single party majority, we also find comparable effect estimates.[8]

Consistent with previous literature on how clarity of responsibility affects voters, tax policy seems to be more important for how the electorate behaves if the incumbent up for reelection has a single party majority in the city council. This

[8] As can be seen from the full model in appendix H, the differences in the marginal effects across majority and plurality municipalities are statistically significant.

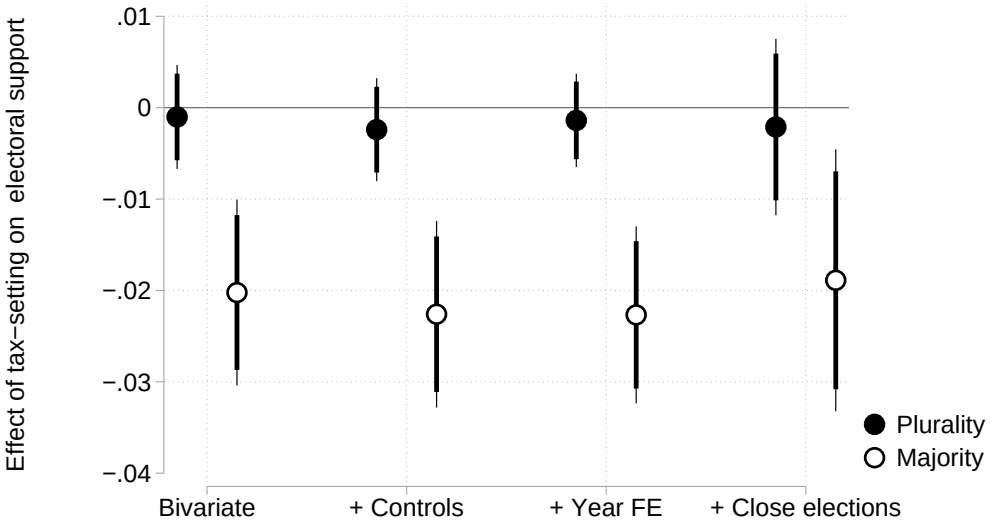

Figure 7: Marginal effects of tax setting on mayoral party vote share in municipalities where the mayoral party has a plurality (dark dots) or a majority (light dots) of the seats in the city council. Spikes are 90 (wide) and 95 (thin) pct. confidence intervals. Marginal effects are derived from OLS regression of mayoral party vote share using the mayoral party's vote share at the previous election, adjusted income taxes, a dummy for single party majority and an interaction between the two as the independent variables. Categories on x-axis describe which additional controls have been added to the model (e.g Year FE includes year fixed effects and controls). The controls are population, area, turnout, percent right-wing voters, mayoral party. The category 'close elections' signifies that only the 836 close elections are used to estimate this model. See appendix H for the full model.

suggests that the selection mechanism used to derive our hypothesis 2 is at work in the present context, which, in turn, further corroborates that the reason we find taxes are lower following an election which featured a single party majority incumbent, is that it is easier for voters to identify whether single party majorities are really interested in pursuing lower taxes.

Conclusion and Discussion

This article aimed to understand how clarity of responsibility affects incumbent behavior. Following previous literature we argued that if clarity of responsibility is high, voters are more likely to punish or reward incumbents for the extent to which they provide the type of political results voters prefer. Further, we argued that an unexplored implication of this is that electoral incentives for incumbents to provide favorable outcomes and policies increase with clarity of responsibility, and, to the extent that incumbents are governed by electoral incentives, this should lead incumbents to provide these policies.

To explore the explanatory potential of this argument, we zoomed in on Danish municipalities. Specifically, we looked at how an indicator of clarity of responsibility, gaining a single party majority, affected the extent to which incumbents pursued a policy which was unpopular with the voters, low income taxes. Using a regression discontinuity design we were able to compare municipalities where the largest party narrowly obtained an absolute majority with those in which the largest party fell just short of such majority.

Our analyses of this context revealed that obtaining a single party majority did lead to lower taxes. However, the effect did not materialize immediately. Instead, when a party got a single party majority, increasing its clarity of responsibility for tax setting, this did not seem to motivate the party to lower or refrain from raising taxes. Instead, our analyses suggest that the type of city-council which got reelected when a single party majority was up for election was more prone to lower taxes. As such, the effect of clarity of political responsibility on incumbent behavior identified in this setting was a selection effect, in the sense clarity of responsibility did not change the incumbents behavior directly, rather, it changed the type of incumbent which were elected. In particular, the type which was elected was more likely to pursue policies, such as low taxes, which the voters wanted. We provided a number of robustness tests of this main results, which generally corroborated this pattern.

It is interesting that we did not find any evidence of a sanctioning effect. As such, what we found seems to suggest, that when a party gains a single party majority it will face an electoral penalty for not keeping taxes low (cf. the last section), but in spite of this, the party will not enact lower taxes. There can be several rea-

sons for this. Perhaps the party cares more about policy than about the electoral consequences. Perhaps the local parties vary in their capacity to keep taxes low, and those who are not able to lower taxes cannot, even when faced with an extra incentive. However, it is difficult to know exactly why we fail to identify such an effect.

We do find a selection effect, and it is therefore interesting to ask: how generalizable is this effect? Since we used a regression discontinuity design, we can only generalize directly to types of municipalities where the largest party was close to either winning or losing a single party majority (Lee, 2008). Fortunately, because the exact cut-off for assignment of single party majority varies substantially across municipalities and across elections this is not confined to a small number of municipalities. In fact, 235 out of the 273 different municipalities appear in our dataset of close elections at least once. As such, we believe that the effects identified above can be generalized to practically all Danish municipality. The more interesting scope of inference, however, is political systems in general. It is incredibly hard to say whether these findings will generalize to other contexts, however, it is important to note that we find evidence of the importance of clarity of responsibility in a context with a strong consensual culture and with a committee system which forces parties to work together – even if a single party controls a majority of the seats. In other contexts, where differences in clarity of responsibility are more dramatic, the effect might be even larger.

Turning to implications, the most important one seems to be that incumbents will become more responsive to the electorate if clarity of responsibility is high. To the extent that democratic quality can be measured in terms of responsiveness to the electorate (e.g. Lax and Phillips, 2012), this seems to suggest that a certain degree clarity of responsibility is a desirable feature of a political system. This was also the point that Alexander Hamilton made in the quote which introduced the paper. However, as Hamilton knew very well, responsiveness to the electorate is not necessarily a force for good. As such, the electorate may deviate from the population at large, twisting the incentives of politicians away from the people they are meant to serve (Sances, 2016), or the preferences of the electorate may be ill informed, leading to bad decision making if politicians are forced to follow these too closely (Bartels, 2005).

Regardless of whether clarity is a force for good, our findings suggests that in a representative democracy, clarity of political responsibility, and the centralization of power which is its cause, does carry an apparent benefit to an electorate which wants to steer the action of its political leaders: it means that it will be easier for voters to identify what type of political leaders they have at the present, and, as we have shown in this paper, to keep those political leaders who are willing and able to do their bidding in power.

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Supplementary material

Appendix A: Sensitivity to bandwidth choice

In figure 8 we look at whether the effect-estimates vary depending on which bandwidth is chosen. The figure reveals little variation in the effect sizes, suggesting that the results are not a product of choosing a specific bandwidth.

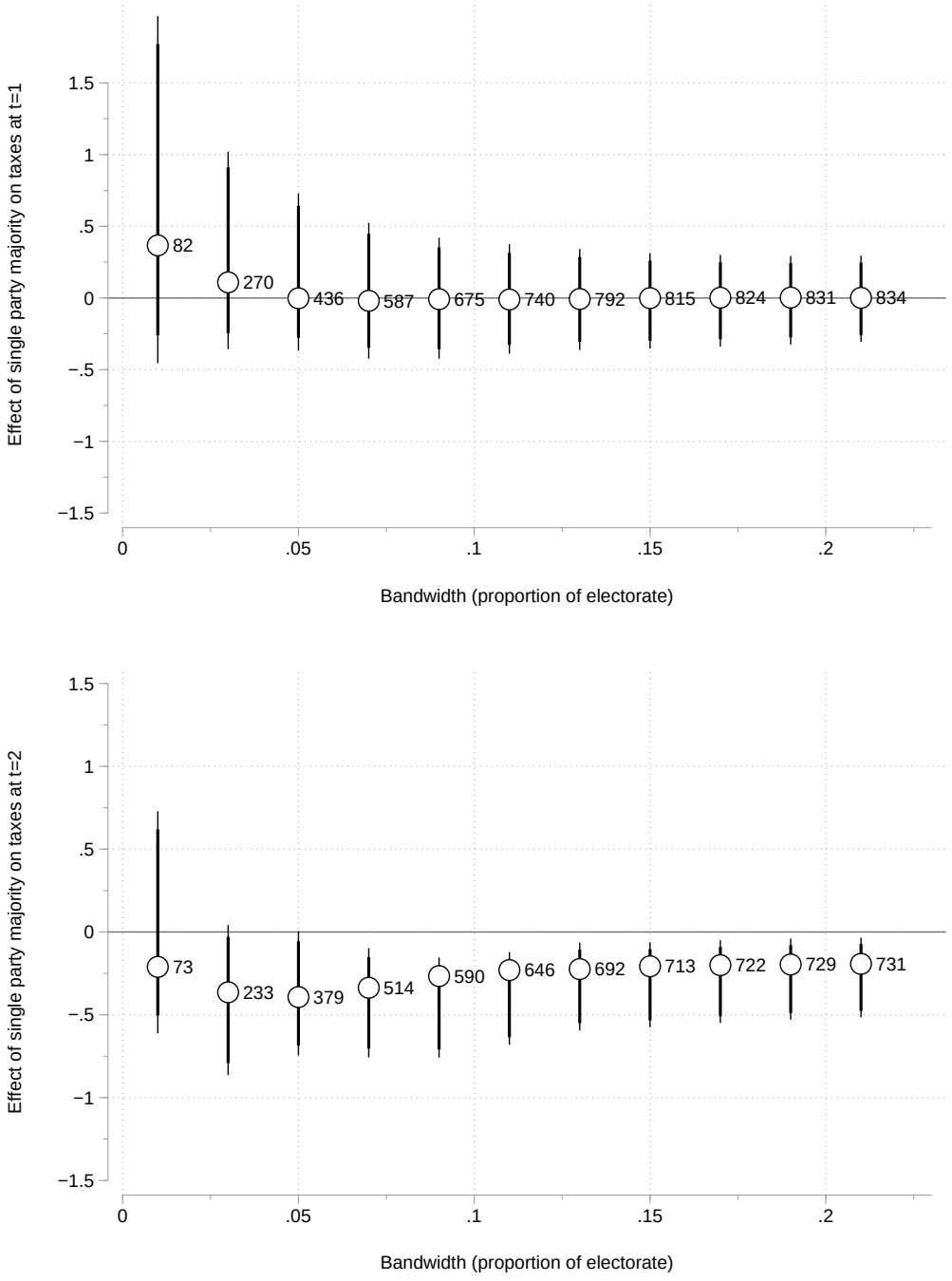

Figure 8: How sensitive are the results to changes in bandwidth? Dots signify estimated effects of one-party majority with different bandwidths along with 90 pct. (thick) and 95 pct. (thin) confidence intervals. The effects and their variance were estimated using the same method as those in table. The numbers next to the dots are the number of observations used to estimate regression which produced this effect estimate.

Appendix B: Alternative estimation methods

To estimate the effect of obtaining a one party majority on tax policy, we run two different sets of models. Following hypothesis 1a, which expected that having a one party majority would make incumbents lower taxes before the next election. the first set of models looks at the effect of gaining a one party majority incumbent at the last election $t = 0$, on the tax level at the time of the present election $t = 1$ (i.e. the election year tax rate). Following hypothesis 1b, which expected that having a one party majority incumbent up for reelection would lead to a city-council which lowered taxes, the second set of models look at the effect of having an absolute majority incumbent up for reelection at $t = 1$ on the tax level at the following election $t = 2$. Like the analyses above, the present analyses only focus on close elections. Specifically, we start out with our dataset elections in which one party majority was assigned by one seat, and then further censor this dataset using our forcing variable, so that only mayors within five percentage points of losing or winning a one-party majority is included.

For each of the two dependent variables we run six linear models, which we estimate using an OLS regression with robust standard errors. In the first model we include a one party majority dummy and our forcing variable, in the second model we also include a quadratic version of our forcing variable, and in the third model we substitute the quadratic term for an interaction between the forcing variable and the one party majority dummy. In the fourth, fifth and sixth models we include a small battery of controls and otherwise run the same specifications as in models one through three. The key estimates from these models are presented in tables 2 and 3.

Table 2: Estimating effect of gaining a one-party majority on tax levels at t=1

	(1)	(2)	(3)	(4)	(5)	(6)
Single party majority	-0.08	-0.07	-0.07	-0.07	-0.07	-0.07
	(0.17)	(0.17)	(0.16)	(0.15)	(0.15)	(0.15)
Forcing variable	1.05	0.93	1.47	1.47	1.34	1.99
	(2.83)	(2.85)	(3.93)	(2.73)	(2.75)	(3.82)
Forcing variable × Forcing variable		-16.01			-19.00	
		(52.31)			(52.76)	
Single party majority × Forcing variable			-0.98			-1.19
			(5.63)			(5.55)
Controls				✓	✓	✓
Observations	436	436	436	424	424	424
R squared	0.00	0.00	0.00	0.05	0.05	0.05
RMSE	0.82	0.82	0.82	0.79	0.79	0.79

Standard errors in parentheses
Estimated using a bandwidth of 0.05 pct.
Controls: Population, area, turnout, percent right-wing voters, mayoral party.
$^{+}$ $p < 0.1$, * $p < 0.05$

Table 3: Estimating effect of gaining a one-party majority on tax levels at t=2

	(1)	(2)	(3)	(4)	(5)	(6)
Single party majority	-0.40*	-0.41*	-0.41*	-0.36*	-0.37*	-0.37*
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Forcing variable	5.75*	6.08*	3.79	4.99*	5.19*	3.45
	(2.43)	(2.45)	(3.27)	(2.49)	(2.52)	(3.41)
Forcing variable × Forcing variable		48.93			35.80	
		(48.81)			(50.96)	
Single party majority × Forcing variable			4.55			3.43
			(4.89)			(5.12)
Controls				✓	✓	✓
Observations	379	379	379	367	367	367
R squared	0.02	0.02	0.02	0.04	0.05	0.05
RMSE	0.72	0.72	0.72	0.71	0.71	0.71

Standard errors in parentheses
Estimated using a bandwidth of 0.05 pct.
Controls: Population, area, turnout, percent right-wing voters, mayoral party.
$^{+}$ $p < 0.1$, * $p < 0.05$

Appendix C: Alternative specification of the dependent variable

In table 4 we estimate the same set of models as in 1 using a different specification of the dependent variable. Instead of using the election year tax rate as the dependent variable, we use the average tax rate which the city council implemented in the entire election period. The results are practically identical across the two different dependent variables. As such, the effects identified above does not seem to be tied only to the election year.

Table 4: Robust estimation of the one-party majority effects on tax setting

Variable	Point Estimator	p-value	Bandwidth	Polynomial	n
Tax level, t=1	-0.06	0.701	0.05	1	474
Tax level, t=1	-0.06	0.817	0.08	2	627
Tax level, t=2	-0.32	0.038	0.05	1	356
Tax level, t=2	-0.34	0.102	0.07	2	504

Estimated using the CCT MSE-optimal bandwidth.

Appendix D: Alternative dependent variable

In table 5 we estimate the same set of models as in 1 using property taxes as the dependent variable. The property taxes are measured in tenths of a percent.

Table 5: Does single party majority status affect property tax setting?

Dependent Variable	Effect - Point Estimator	Robust p-value	Bandwidth	Polynomial	n
Tax level, t=1	-0.04	0.942	0.06	1	384
Tax level, t=1	0.40	0.528	0.06	2	414
Tax level, t=2	-0.55	0.336	0.06	1	400
Tax level, t=2	-0.29	0.807	0.06	2	400

Estimated using the CCT MSE-optimal bandwidth.

Appendix E: Balance and McCrary test

In table 6 we use local polynomial point estimation to estimate whether there is an identifiable effect of getting a one party majority on a set of pre-treatment variables. We use the CCT MSE-optimal bandwidth, a triangular kernel and a first order polynomial. If we identify an effect on these variable this means that it is unlikely that the assignment to one party majority was as-if random close to the cut-off.

As the results of the robust RD estimation reveal, there are no signs of a statistically significant difference close to the cut-off for any of the different variables we look at.

Table 6: Estimating effect of gaining a majority on predetermined variables

Variable	Point Estimator	p-value	Bandwidth	n
Population (log)	0.29	0.14	0.03	299
Area (log)	-0.30	0.13	0.06	493
Size of city council	0.08	0.75	0.04	349
Proportion right-wing voters	-0.02	0.65	0.05	471
Turnout	-0.02	0.15	0.04	357
Social Liberal mayor (ref: Social democratic)	-0.02	0.30	0.05	465
Conservative mayor	-0.10	0.17	0.05	451
Liberal mayor	-0.14	0.26	0.05	461
Other	-0.02	0.56	0.06	531
Tax level, t=0	-0.08	0.59	0.06	483

Estimated using the CCT MSE-optimal bandwidth. Local-linear specification.

There was no evidence of sorting, cf. the McCrary test reported in figure 9.

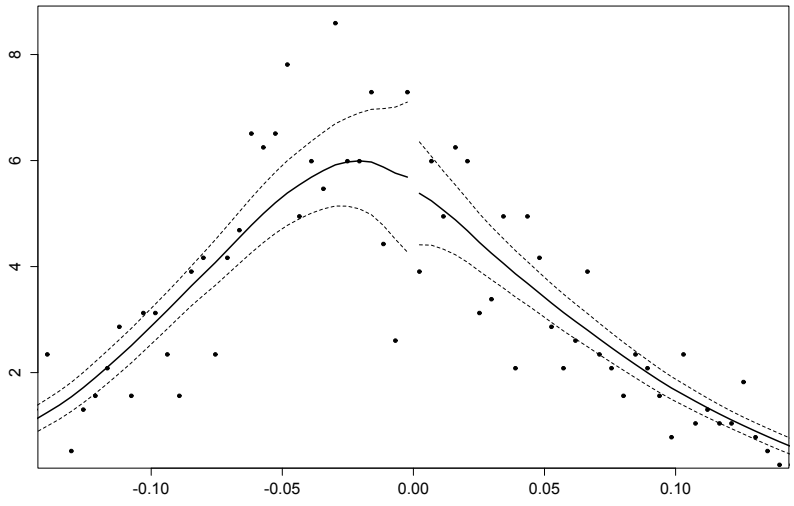

Figure 9: Density around the cut-off (McCrary test). Plot produced using package `rdd` in R. There is no evidence of sorting around the cut-off ($p \approx 0.8$).

Appendix F: Placebo test and balanced panel

In table 7 we use local polynomial point estimation to estimate the effect of being above or below a so-called placebo cut-off. That is, the effect of being above or below a cut-off at which nothing happens. In particular we look at placebo cut-offs one standard error below the actual cut-off (i.e. the standard error of the forcing variable for elections below the cut-off, -0.041) and one standard error above (i.e. the standard error of the forcing variable for elections above the cut-off, 0.031). We estimate the effect of being above this cut-off for taxes at $t = 1$ and $t = 2$. In our estimation we use the CCT MSE-optimal bandwidth, a triangular kernel and a first order polynomial.

We do not identify a statistically significant effect at neither cut-off for either of the two variables. This suggest that there is only a statistically significant effect at the actual cut-off where assignment to a one party majority happens.

Table 7: Placebo Cut-offs for tax setting at t=1,2

Variable	Cut-off	Point Estimator	p-value	Bandwidth	n
Tax level, t=1	-0.041	0.20	0.23	0.03	327
Tax level, t=1	0.038	0.08	0.76	0.04	287
Tax level, t=2	-0.041	-0.21	0.23	0.03	293
Tax level, t=2	0.038	0.19	0.36	0.05	268

Estimated using the CCT MSE-optimal bandwidth. Local-linear specification.

In table 8 we replicate table **??** excluding the year 2001, which was not included for the original analyses of taxes at $t = 2$, because we do not have tax levels at the election in 2009.

Table 8: Robust estimation of the one-party majority effects on tax setting (excluding 2001)

Variable	Point Estimator	p-value	Bandwidth	Polynomial	n
Tax level, t=1	-0.06	0.841	0.05	1	388
Tax level, t=1	0.00	0.870	0.07	2	508
Tax level, t=2	-0.39	0.016	0.04	1	317
Tax level, t=2	-0.42	0.035	0.06	2	478

Estimated using the CCT MSE-optimal bandwidth.

Appendix G: An incumbency effect

In this appendix we examine whether there is an "incumbency effect" of gaining a one party majority, in the sense that there is an effect of gaining a one party majority on obtaining one at next election. This is interesting, because if there is such an effect, the differences in tax-levels following an election which features a one-party majority incumbent might simply be a result of this incumbent staying in office.

To investigate this we estimate a set of linear probability models, which looked at the effect of gaining a one party majority on obtaining a one party majority at the next election. We estimate six different models using an OLS regression with robust standard errors. The different models specifications mirror those used for the tax data. The important estimates from these models are reported in table 9.

Table 9: Effect of gaining single party majority on obtaining one at next election

	(1)	(2)	(3)	(4)	(5)	(6)
Single party majority	-0.08	-0.07	-0.07	-0.07	-0.07	-0.07
	(0.17)	(0.17)	(0.16)	(0.15)	(0.15)	(0.15)
Forcing variable	1.05	0.93	1.47	1.47	1.34	1.99
	(2.83)	(2.85)	(3.93)	(2.73)	(2.75)	(3.82)
Forcing variable × Forcing variable		-16.01			-19.00	
		(52.31)			(52.76)	
Single party majority × Forcing variable			-0.98			-1.19
			(5.63)			(5.55)
Controls				✓	✓	✓
Observations	436	436	436	424	424	424
R squared	0.00	0.00	0.00	0.05	0.05	0.05
RMSE	0.82	0.82	0.82	0.79	0.79	0.79

Standard errors in parentheses
Estimated using a bandwidth of 0.05 pct.
Controls: Population, area, turnout, percent right-wing voters, mayoral party.
$^{+}$ $p < 0.1$, * $p < 0.05$

Parties which gain a one party majority do seem more likely to obtain a one party majority at the next election as well. However, the estimated effect is not statistically significant and, importantly, it is not very big, 0.1. As such, while there does seem to be slightly more incumbents with a one party majority following elections which features a one-party majority, the difference does not seem large enough to explain the differences in tax-setting.

Appendix H: Full model

Table 10 presents the model behind figure 7.

Table 10: OLS regression of largest party vote share at t=1

	(1)	(2)	(3)	(4)
Single party majority	0.032*	0.034*	0.031*	-0.006
	(0.008)	(0.008)	(0.007)	(0.013)
Tax level, t=1	-0.001	-0.002	-0.001	-0.002
	(0.003)	(0.003)	(0.003)	(0.005)
Single party majority × Tax level, t=1	-0.019*	-0.020*	-0.021*	-0.017*
	(0.006)	(0.006)	(0.006)	(0.008)
Controls		✓	✓	✓
Year FE			✓	✓
Only close elections				✓
Observations	1721	1721	1721	635
R squared	0.27	0.29	0.41	0.28
RMSE	0.10	0.10	0.09	0.09

Standard errors in parentheses
Controls: Population, area, turnout, percent right-wing voters, mayoral party.
$^{+}$ $p < 0.1$, * $p < 0.05$

Appendix I: Descriptive statistics

Tables 11 and 12 report descriptive statistics on the variables used in the analysis for the close elections and for all elections.

Table 11: Descriptive statistics (close elections)

	Mean	SD	Min	Max	n
Year	1985.62	10.13	1970.00	2001.00	839
Seats needed to lose majority	-0.61	0.49	-1.00	0.00	839
Tax level, t=1	-0.04	0.83	-3.76	2.37	834
Tax level, t=2	-0.00	0.75	-2.32	2.35	731
Average tax level, t=1	-0.04	0.79	-3.38	2.86	833
Average tax level, t=2	0.00	0.71	-1.97	2.88	731
Absolute tax level, t=1	17.96	2.68	9.40	23.20	735
One party majority, t=1	0.30	0.46	0.00	1.00	839
Population (log)	9.33	0.74	7.90	12.12	839
Area (log)	4.70	0.80	2.17	6.29	839
Members of city council	16.52	3.27	9.00	29.00	839
Proportion of right wing voters	0.49	0.17	0.00	0.84	839
Turnout	0.75	0.06	0.55	0.95	839
Social Liberal mayor	0.00	0.03	0.00	1.00	820
Conservative mayor	0.07	0.26	0.00	1.00	820
Liberal mayor	0.43	0.50	0.00	1.00	820
Other mayor	0.05	0.22	0.00	1.00	820
One party majority	0.39	0.49	0.00	1.00	839
Forcing variable	-0.02	0.07	-0.21	0.20	839
Forcing variable, absolute value	0.06	0.04	0.00	0.21	839
Tax level, t=0	-0.02	0.85	-3.76	3.53	741

Table 12: Descriptive statistics (all elections)

	Mean	SD	Min	Max	n
Year	1987.54	11.13	1970.00	2005.00	2820
Seats needed to lose majority	-1.61	1.67	-12.00	4.00	2475
Tax level, t=1	-0.00	0.84	-3.94	3.53	2452
Tax level, t=2	0.00	0.77	-3.63	3.28	2179
Average tax level, t=1	-0.00	0.80	-3.73	2.88	2450
Average tax level, t=2	0.00	0.74	-3.73	2.88	2179
Absolute tax level, t=1	18.05	2.63	9.40	23.20	2185
One party majority, t=1	0.17	0.37	0.00	1.00	2820
Population (log)	9.37	0.79	7.73	13.35	2475
Area (log)	4.81	0.77	2.17	6.33	2475
Members of city council	17.16	4.13	9.00	55.00	2475
Proportion of right wing voters	0.48	0.17	0.00	0.84	2475
Turnout	0.75	0.06	0.47	0.95	2475
Social Liberal mayor	0.02	0.13	0.00	1.00	2394
Conservative mayor	0.09	0.29	0.00	1.00	2394
Liberal mayor	0.45	0.50	0.00	1.00	2394
Other mayor	0.09	0.29	0.00	1.00	2394
One party majority	0.24	0.43	0.00	1.00	2475
Tax level, t=0	-0.00	0.84	-3.94	3.53	2452