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# Responsiveness in Municipal Government

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*Abstract:* Municipal governments supposedly empower citizens, giving them the ability to shape the political organization of their local community. In spite of this, we know little about whether municipal governments are in fact responsive to the policy views of municipal electorates. In this study, we look at whether the policy implemented by local politicians actually respond to changes in the public mood. To do this, we compile a unique and comprehensive dataset of local fiscal policy, which we use to construct municipal-level estimates of fiscal policy conservatism. This detailed policy data is then linked to several measures of local ideological sentiment. We find strong evidence for dynamic responsiveness: if public opinion in a municipality changes, then public policy responds. We also look at whether single party control of the city council affects the level of responsiveness. We identify this effect using a close elections regression discontinuity design, comparing the responsiveness of city councils where the largest party narrowly won a majority of the seats with city councils where the largest party narrowly lost.

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## Introduction

In most developed countries municipal governments are an essential cog in the machinery of representative government. While they work within the framework of a national constitution and are generally subordinate to the central government, municipalities are, on average, responsible for a third of all public spending and, in most countries, they are able to levy taxes on income or property with little or no oversight (OECD, 2016). In this way, municipalities play a central part in the quintessential political act of deciding who gets what, when and how. Yet until recently, we knew little about the extent to which municipal governments are democratically responsive to the views of their citizens.

Tausanovitch and Warshaw's (2014) recent influential study was the first comprehensive examination of the responsiveness of city policy. In this study, the authors used Multilevel Regression with Poststratification (MRP) to estimate the policy preferences of citizens in a cross section of US cities with a population size of above 20,000. They found a strong and robust correlation between these preferences and city policy. Since then, two other studies have directly examined municipal responsiveness. The first of these are Einstein and Kogan (2016). Here, the authors also identify a strong correlation between citizen preferences, measured as support for the Democratic party at presidential elections, and city policy in 2,000 midsize US cities. Apart from replicating the findings from Tausanovitch and Warshaw, Einstein and Kogan are also able to identify the use of intergovernmental grants as a key mechanism underlying responsiveness (i.e., conservative cities are able to implement policies that differ from liberal cities because of these grants). They also offer a stronger identification strategy by examining responsiveness in a panel of cities from two US states using a lagged dependent variable approach. In an unpublished study, Sances (2017a) expands on existing work using a panel of 3,000 US counties spanning 50 years. Linking changes in Democratic vote share to county-level policy, Sances finds that as counties grow more Democratic they tend to spend more and to collect more own-source revenues. This is even true within states, suggesting that the link between voter preferences and public policy is driven by local rather than state governments.

Aside from these three studies, different strands of research have presented *indirect* evidence that city policy might be responsive. For one, a number of studies have shown that

voters tend to (re-)elect local politicians based on their actions in office (Arnold and Carnes, 2012; Burnett and Kogan, 2017) and that voters tend to vote for conservative (liberal) mayors if they themselves hold conservative (liberal) policy views (Sances, 2017b; Boudreau et al., 2015; Hopkins and Pettingill, 2017). Furthermore, a number of studies have found that it matters for city policy whether a conservative or liberal party controls the mayoralty and/or the city council (Fiva et al., 2016; Folke, 2014; Blom-Hansen et al., 2006; de Benedictis-Kessner and Warshaw, 2016).

All in all, research in the area of municipal responsiveness has made impressive progress in the past few years, presenting us with strong evidence suggesting that municipal governments are responsive to the concerns of their citizens. Even so, the existing evidence remains limited in different important ways.

For one, most previous studies, and *all* studies which examine municipal responsiveness directly, focus on US municipalities. This puts into question whether voters are able to affect municipal policies in other contexts. In relation to this, the existing studies all look at relatively large municipalities (Einstein and Kogan have the smallest average municipal size with 40,000 inhabitants), making it unclear whether smaller municipalities, where politics is probably less professionalized Lewis (2011), and where it is hard to have a truly local media marked Snyder Jr and Strömberg (2010), are responsive as well.

Furthermore, there seems to be a trade-off in the existing work between having good measures of city policy and voter preferences (cf. Tausanovitch and Warshaw, 2014) and having a stronger identification strategy (cf. Sances, 2017a). This is potentially problematic, as the ability to draw strong inferences about the extent of municipal responsiveness relies on both high-quality measures and a convincing design.

Finally, existing work has primarily focused on identifying whether and when municipal responsiveness exists. As such, there is almost no causally persuasive work on whether certain municipal-level institutions can help promote (or depress) responsiveness.<sup>3</sup>

In this study, we address these limitations related to context, design and data sources by

<sup>3</sup>Tausanovitch and Warshaw (2014) examine some interactions between different institutions and responsiveness, however, as they themselves recognize, these analyses suffer from substantial problems related to endogeneity.

studying responsiveness in Danish municipalities. Danish municipalities are radically different from US counties and cities. They are small (average size 16,000), organized in general rather than special purpose governments (Berry, 2009), with a multi party, PR system where turnout is relatively high. If it is possible to identify responsiveness in this context as well (as in the US), we can be pretty sure that municipal responsiveness is a relatively general phenomenon.

In order to identify municipal responsiveness, we develop an annual measure of municipal policy conservatism based on 14 fiscal policy indicators (1978-2006). A measure which is much more comprehensive in terms of its granularity, and the time period covered, than the city policy measures used in previous studies. Similar to previous studies, we use net support for conservative (right-wing) parties as a proxy for policy views, but unlike previous studies, which had to rely on electoral support measured at national or regional elections, we are able to look at electoral support at *local* elections dating back to 1970. (In a future iteration we will also use MRP estimates of citizen conservatism based on the Danish National Election Studies, however, we have not been able to do this yet.) These uniquely comprehensive data sources makes it possible to go beyond the trade-off between good measurement and a strong design, which has characterized existing work.

The paper proceeds as follows. We begin by describing the empirical context of our study, Danish Municipalities, in more detail. Next we describe how we measure municipal policy conservatism and citizens preferences over municipal policy. Then we try to estimate the level of responsiveness using a difference in difference model. Finally, we look at whether municipalities are more or less responsive when a single party controls the majority of the seats in the city council.

## Empirical Context: 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, which is more

than half of all public spending.<sup>4</sup>

There have been two large reforms of local politics in the last 50 years. The first was conducted in 1970 as the Danish welfare state started to expand. Here the number of municipalities were reduced from more than 1000 to 275 (Ingvartsen, 1991). (Although it was 277 the first two years.) The second reform was conducted in 2007 and further reduced the number of municipalities from 275 to 98. Once again, the increasing complexity of public service provision was a key argument for the reform (Christiansen and Klitgaard, 2008). Since both of these reforms were comprehensive in terms of amalgamations and changes to the relative power of national ctr. local government, we let them be the bookends of our analysis, examining the relationship between citizens policy views and the ideological flavor of municipal policy between the two reforms.<sup>5</sup> Because of data availability we further limit our study period, so that it goes from 1978 and 2008.

In the period we study, Danish municipalities are governed by small city councils (between 9 and 29 members) which are elected at proportional elections and with a multi-party system which, to a large extent, mirrors the party system at the national level (Blom-Hansen et al., 2009). Elections are fixed to take place every four years and do not usually coincide with elections at the national or EU level.<sup>6</sup> Turnout is high with an average of around 70 percent since 1970. The work in the city council is structured by a number of committees. The number and size of the committees is determined by the council. Committee membership is allocated proportionality between the political parties which means that there is broad political representation in all committees. The committees can decide on matters in their area and the administrative responsibility across areas is therefore essentially divided.

Following each municipal election, a majority in the city council elects a mayor, and the chairmen of the various committees (Serritzlew et al., 2008). Mayors are the only full time professional politicians in the city councils and have a number of formal obligations (Kjaer,

<sup>4</sup>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 unemployed persons (unemployment services), public utilities, environmental measures and emergency services.

<sup>5</sup>In this study, we exclude the municipality of Copenhagen and Frederiksberg, as these were governed in a different way.

<sup>6</sup>There was only three years between the elections of 1981 and 1978

2015). Mayors are also responsible for the day-to-day business of the administration and chairs the important economic committee which sets taxes and the budget.

Overall, is this a context which is amenable or hostile to municipal responsiveness? It is hard to say. On the one hand, the committee structure coupled with the proportional electoral system should make it possible for local government to internalize small changes in the electorate's preferences. On the other hand, the link between voter preferences and policy might be attenuated by the very same structures, because they create additional distance between the preferences of the average voter and the policies implemented by the municipality.

## An Annual Measure of Municipal Fiscal Policy Conservatism

To measure fiscal policy conservatism in Danish municipalities we rely on 14 different indicators relating to either tax policy (3 indicators), spending policy (2), organization of public service delivery (3), co-payment for public services (4) or the extent of public services (2). Variables measured in DKKs are adjusted for inflation. While spending and tax variables are commonly used in the literature, we are the first to include other types of variables in a panel set-up. An overview of the policy indicators are presented in Table 1.

The included policies had to meet the following criteria: (1) The policy should be directly set by the city council.<sup>7</sup> (2) It had to be a policy and not the outcome of a policy (i.e., we did not include unemployment). (3) Data on the policy had to be available for at least five years between 1978 and 2016. All policy information was retrieved from Statistics Denmark or the Danish Ministry for Economic Affairs and the Interior.

It should be noted that for most of our variables, data is only available after 1993, however, they still shape our estimates of municipal fiscal policy conservatism across the entire period, because of the Bayesian latent variable technique we use (more on this below). Even so, variables with missing values supply less information to our measure in periods, where we have no data on them. Accordingly, our measure of measure fiscal policy conservatism for the period 1978-1992 primarily relies on the measures of income tax, property tax and spending

<sup>7</sup>It was included even if it was set in collaboration between the city council and some other (set of) actor(s).

pr. capita.<sup>8</sup>

**Table 1:** Indicators of Fiscal Policy Conservatism

Policy	Availability (number of years)	Do Higher or Lower Values Imply Conservatism?
<i>Tax policy</i>		
Income tax (pct.)	29	Lower
Property tax (per mille)	29	Lower
Commercial real estate tax (per mille)	14	Lower
<i>Spending policy</i>		
Spending pr. capita (DKK)	29	Lower
Spending pr. pupil in school (DKK)	7	Lower
<i>Organization of public service delivery</i>		
Public Employees (pr. 1,000 citizens)	9	Lower
Privately operated services (pct.)	14	Higher
Purchases with a private supplier (pct.)	14	Higher
<i>Co-payment for public services</i>		
Average cost of day care (DKK)	16	Higher
Price of relief stay (DKK)	7	Higher
Food delivery for the elderly (DKK)	7	Higher
Stay in nursing home (DKK)	7	Higher
<i>Extent of Public Services</i>		
Public housing (pct.)	14	Lower
Class size in public schools	14	Lower

## Estimating Fiscal Policy Conservatism

Inspired by Caughey and Warshaw (2016) analysis of US states, we conceptualize fiscal conservatism as a latent trait driving municipal policies, and rely on a Bayesian latent variable technique to estimate it. In particular, we parameterize fiscal conservatism using the following measurement model, which allows us to estimate it across time and space:

$$F_{itk} \sim N(F_{itk}^*, \phi)$$

$$F_{itk}^* = \beta_k C_{it} - \alpha_k$$

Where  $F$  is the level of the observed fiscal policy variable  $k$  in municipality  $i$  at time  $t$ . the

<sup>8</sup>To make sure that our results are not driven by the inclusion of different items at various points in time, we have run all models using only these three variables. This does not change our results substantively.

distribution of each of these observed variables is drawn from a normally distributed latent variable  $F^*$ , which has variance  $\phi$ .  $C$  is the quantity of most interest – the latent fiscal conservatism in that municipality.  $\beta$  is the discrimination parameter, which captures how strongly each observed policy variable loads onto the latent dimension. Finally,  $\alpha$  represents each item's difficulty parameter, which measures how fiscally conservative a municipality is, if it were to score 0 on the policy variable  $k$ .<sup>9</sup>

This parameterization is in many ways similar to frequentist factor analysis. However, a major advantage to using Bayesian techniques when making inferences about the latent trait is that the simulations will impute missing data during the estimation, which allows us to include items with different numbers of observations in the model – the variables with missing observations will simply supply less information to the estimation. Furthermore, we can use the Bayesian priors to introduce dynamics into the model, thus allowing quantities to not only vary across time, but also directly model temporal autocorrelation. Additionally, the estimation is simulation based, which allows us to directly estimate uncertainty around all model parameters. Finally, constraining prior distributions offers a flexible way of identifying the policy space. More on this final point later.

We include the 14 policy variables listed in table 1 in the model. Before we do so, all variables are rescaled to have mean zero and variance one. Furthermore, all variables where higher values imply a more left-wing fiscal policy are reversed. This implies that when estimating policy conservatism, higher values on all variables indicate a more conservative policy.<sup>10</sup>

To identify the direction of the policy space, we constrain the  $\beta$ 's to be positive, so that municipalities scoring higher on our observed policy variables will be estimated to be more conservative. Location and scale is identified by placing standard normal priors on the distributions of all model parameters. All precision parameters are estimated using uninformative gamma priors.

Estimation is done by initiating a random walk over the parameter space defined by the

<sup>9</sup>Note that the only time-varying parameter is the latent conservatism. In future iterations, we will work on allowing  $\alpha$  to vary across time capturing that what was a highly conservative fiscal policy stance in 1978 is not necessarily as conservative in 2006. Because we have a lot of missing data prior to the 1990s, this is not currently possible

<sup>10</sup>This is strictly speaking not necessary, but it makes interpretation of the model parameters simpler.

model using the Gibbs sampler. We run 25,000 iterations of the model, where the first 2,500 are burn in. We run three parallel chains. To reduce autocorrelation within the chains of sampled values and improve convergence, we set a thinning interval of five, meaning that we only retained every fifth sampled value. Together, this specification ensured convergence of the model and provided well-behaved, normal posterior distributions.

Figure 1 presents some descriptive features of the annual measure of fiscal policy conservatism. In particular, it looks at how the measure is distributed across time and space, revealing some interesting patterns in municipal fiscal policy.

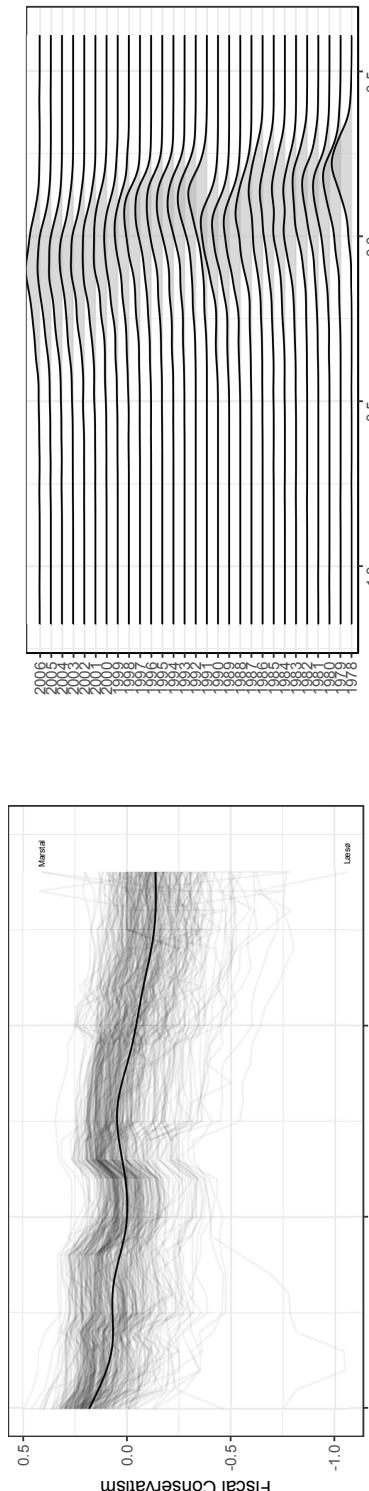
Fiscal policy conservatism dropped slightly in the period. The drops are located in '78 to 81 and from 93 to 2000: periods where the Social Democratic Party was in power nationally. This makes sense as liberal national fiscal policies are likely to spill over into local politics through intergovernmental grants etc.

Aside from the national trends, however, the most notable feature of the time series seems to be the large variation we identify in fiscal policy. Some municipalities are, apparently, very fiscally conservative while others are very liberal. Although the within-differences are less dramatic, we also see some municipalities start out more conservative and then become more liberal and vice versa.

Further, the geographic spread of fiscal conservatism matches what most observers of Danish politics would expect. The most conservative municipalities are in Western Jutland and North of Copenhagen whereas the most Liberal (or Socialist) municipalities are west of Copenhagen and in and around the other large cities (Aalborg, Aarhus, Odense). Figure 2 presents an overview of the most and the least conservative municipalities across the entire period.

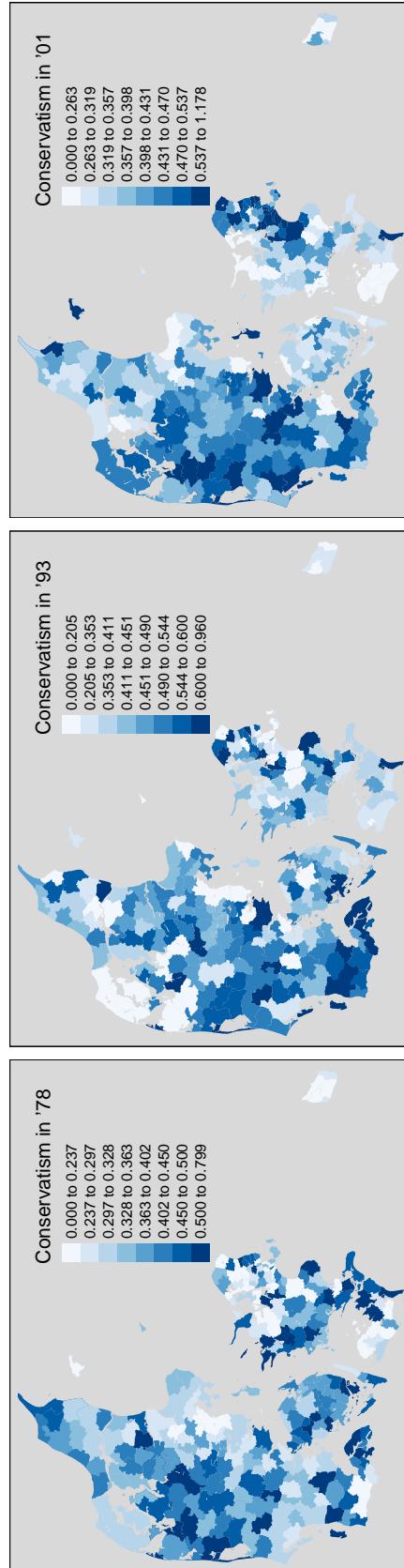
## Measuring Local Policy Preferences

In order to find out whether municipal fiscal policy conservatism responds to the preferences of the electorate, we need to develop a measure of local policy preferences. In line with previous work on municipal responsiveness (e.g., Sances, 2017b; Einstein and Kogan, 2016), we measure local policy preferences indirectly by examining the net difference in electoral support for right-wing and left-wing parties in the municipality, inferring that municipal electorates which



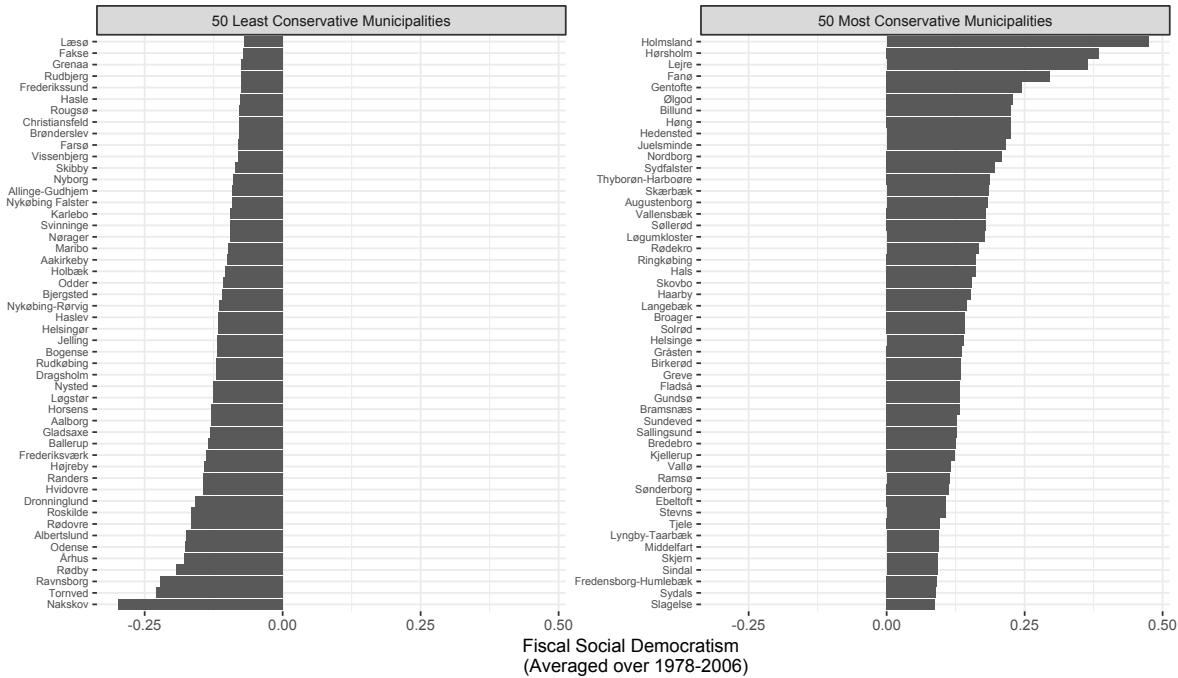
(a) Average Municipal Fiscal Policy Conservatism (dark line) and Municipal Fiscal Policy Conservatism for Individual Municipalities (grey lines) from 1978 to 2006.

(b) Distribution of Municipal Fiscal Policy Conservatism from 1978 to 2006 (densities).



(c) The Geographic Distribution of Municipal Fiscal Policy Conservatism at Three Points in Time.

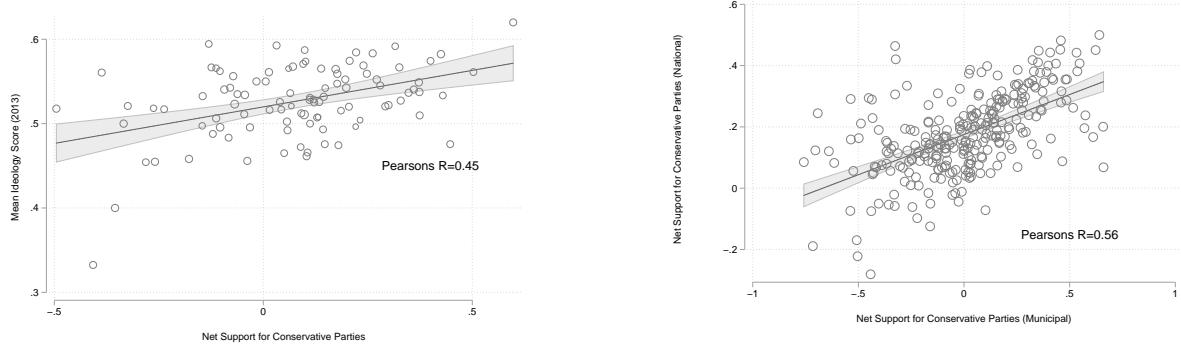
**Figure 1:** How has Municipal Fiscal Policy Conservatism Developed from 1978 to 2006?



**Figure 2:** The Most and Least Conservative Municipalities

prefer conservative parties also prefer conservative fiscal policies. In particular, we look at the difference between support for Venstre, Det Konservative Folkeparti, Fremskridstpartiet and Dansk Folkeparti (the major center-right parties as well as the right wing populist parties) and Socialdemokratiet, Radikale Venstre, Socialistisk Folkeparti, Venstresocialisterne, and Enhedslisten (the major center-left parties as well as the socialist parties) at all municipal elections in the period under study. This gives us an estimate of local policy preferences in the years 1974, 1978, 1981, 1985, 1989, 1993, 1997 and 2001.

How well does this electoral measure capture voters underlying preferences? To get an indication of this, we look at the 2013 Danish Municipal Election Survey Elklit et al. (2017). In this survey, more than 30 respondents (avg. 46) from each municipality were asked to place themselves on an eleven point ideology scale going from left to right. We calculate the municipality-specific mean of these responses and correlate these with the municipality-specific net support for conservative parties in the 2013 municipal election. As can be seen from figure 3a, the two are strongly correlated, which suggests that we are in fact tapping into relevant variation in policy views, when we measure citizens preferences over parties. Further, its important to note that the correlation is biased downwards, because we have random



**(a)** Does the electorate's preference over parties reflect preferences over policy? Data from the 2013 municipal election.

**(b)** How strongly correlated are the electorate's preferences at municipal and national elections? Data from the 2005 municipal and national elections.

**Figure 3:** How does our measure of local policy preferences perform?

measurement error in our sample based measure of policy views.<sup>11</sup>

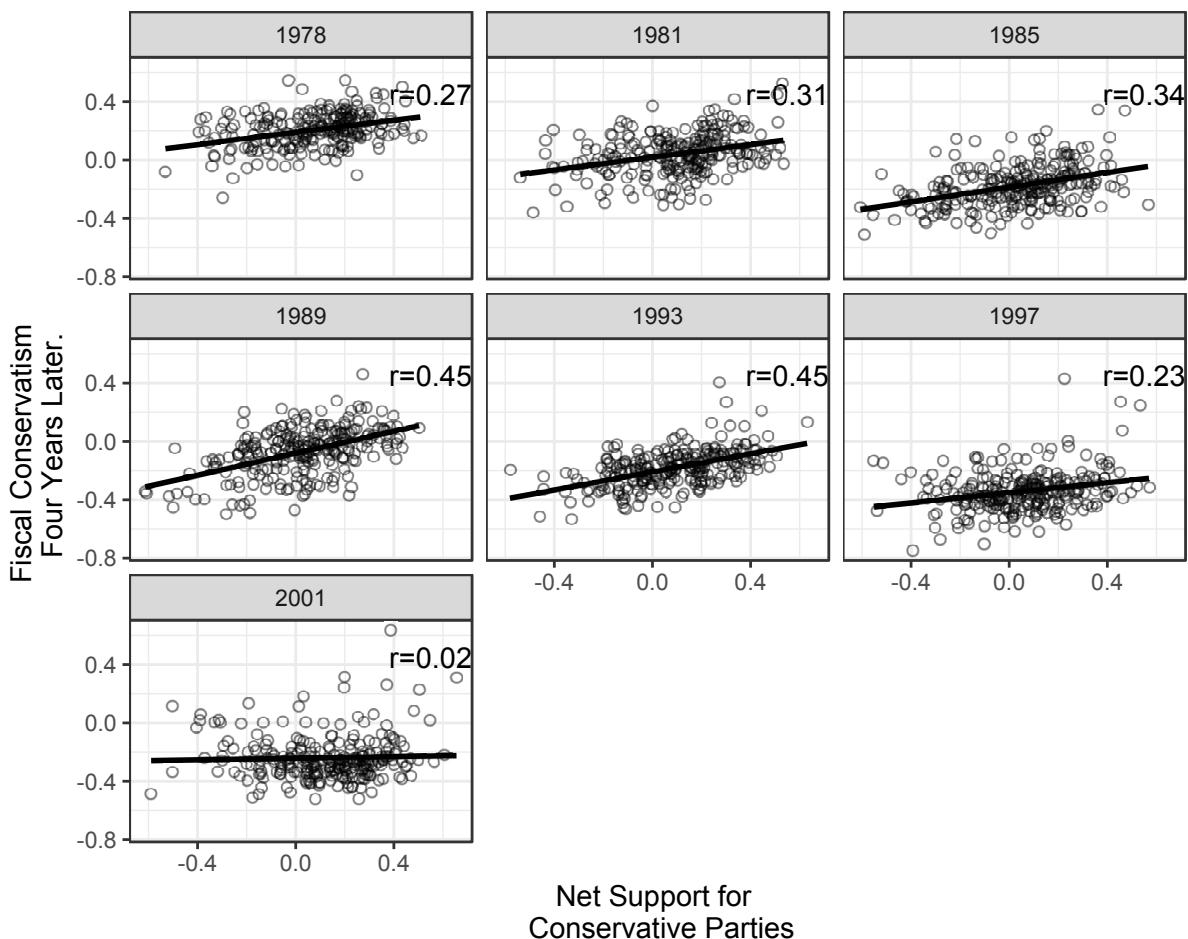
Our measure of local policy preferences do not simply reflect the overall ideological mood in the municipality, but the ideological mood expressed by the electorate at municipal elections. This is potentially significant, because unlike previous research, which relies on electoral data from national or regional elections, we do not risk misidentifying electorates who might differ in their policy views across domains (i.e., who want more liberal fiscal policies locally and more conservative policies nationally). Why might there be a divergence between the electorate's preferences at a local and at a national election? For one, the electorate at municipal elections might be differently composed than electorates in national elections, as different types of people participate in different types of elections (Anscombe and Schaffner, 2015; Hansen, 2017). In addition to this, voters might have preferences over which levels of government should be smaller or larger.

In figure 3b, we try to gauge the extent to which it matters that our measure relies on data from municipal rather than national elections. To do this, we correlate municipal-level net support for conservative parties at the 2005 municipal election with municipal-level net support for the same conservative parties at a national election held six months earlier. This analysis reveals a strong, but in no way deterministic, correlation of 0.56. Accordingly, we might miss meaningful variation, if we used election returns from national, rather than local, elections to

<sup>11</sup>The reader should also note that due to the municipal reform of 2006 (cf. the section on empirical context) we can only have 98 observations corresponding to the 98 (amalgamated) municipalities.

estimate local policy preferences.

How does our measure of local policy preferences relate to our measure of municipal fiscal policy conservatism? We explore this in figure 4, which plots fiscal conservatism four years into the future against net support for conservative parties. The two quantities are strongly related from 1978 to 1993, but become more independent of each other in 1997 and especially in 2001. It is notable that we find the weakest over-all relationship in the latter periods, because this is arguably where we have the best measure of municipal fiscal conservatism (i.e., a measure which rely on more data).



**Figure 4:** Correlation between net support for conservative parties and municipal fiscal conservatism four years later. The dots represent individual municipalities. The line is a linear fit. The  $r$  is Pearson's R.  $n = 273$  in each year.

## Are the Municipalities Responsive?

We estimate the level of municipal responsiveness using the model:

$$C_{it+h} = \beta V_{it} + \gamma_i + \pi_t + \theta POP_{it} + \epsilon_{it},$$

where  $C_{it+h}$  is municipal fiscal policy conservatism in municipality  $i$  at time  $t + h$ .  $V_{it}$  is net support for conservative parties at time  $t$ ,  $\gamma_i$  and  $\pi_t$  represent municipality and time fixed effects,  $POP_{it}$  is the logged population size and  $\epsilon_{it}$  is the error term.

Since the model includes both unit and time fixed effects, it can be interpreted as a generalized difference-in-difference model (DiD). One advantage of using such a DiD model is its identifying assumption (i.e., parallel trends). In particular, we can bolster our causal claim by inspecting whether areas where voter preferences became more conservative had a different trend in policy conservatism than areas where voter preferences became less conservative *before* preferences changed.

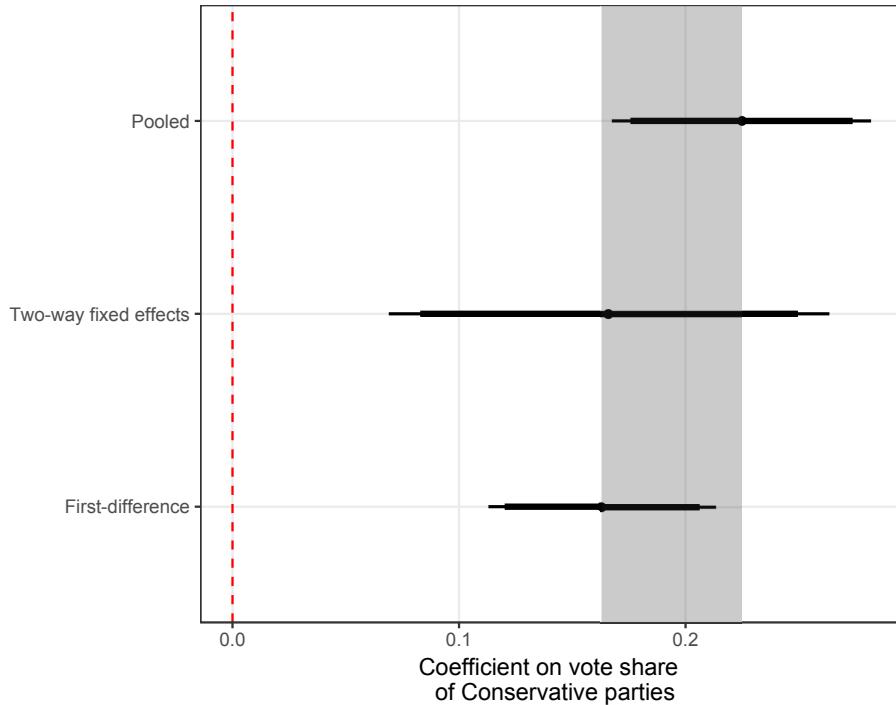
The estimate of interest in this model is  $\beta$  which signifies the marginal effect of the electorate's policy preferences on municipal policy. That is, whether policy becomes more conservative in municipalities where voters become more conservative.

There is a dynamic aspect to the model in that we do not expect the electorate's preferences do not have an instantaneous impact. Rather, we expect that changes in voters preferences at time  $t$  will affect policy at  $t + h$ , where  $h$  is the time horizon. The logic behind this is that it takes time for changes in preferences to affect policy. In our baseline estimates, we look at effects four years later, as this corresponds to the election period in Danish municipalities. The causal model underlying the statistical specification is thus that once a municipality grows more conservative, this affects the fraction of conservatives in the city council, and this in turns affects the policy the city council will have implemented at the time of the next election.

## Results

Figure 5 plots the key estimate (i.e., the effect of changes in local policy preferences;  $\hat{\beta}$ ) from our (1) difference in difference model, (2) a pooled model which excludes time and year fixed effects, (3) a first difference model which substitutes the dependent variable for a first difference of the policy indicator and drops the unit fixed effects. Across all three models we find a statistically significant and positive effect.

In our preferred model (the DiD model), we estimate the effect to be 0.18 this means that if net support for right-wing parties increases with 10 percentage points, then policy becomes 0.02 more conservative. If we only look at within municipality variation in policy conservatism, then this corresponds to 10 pct. of a standard deviation.

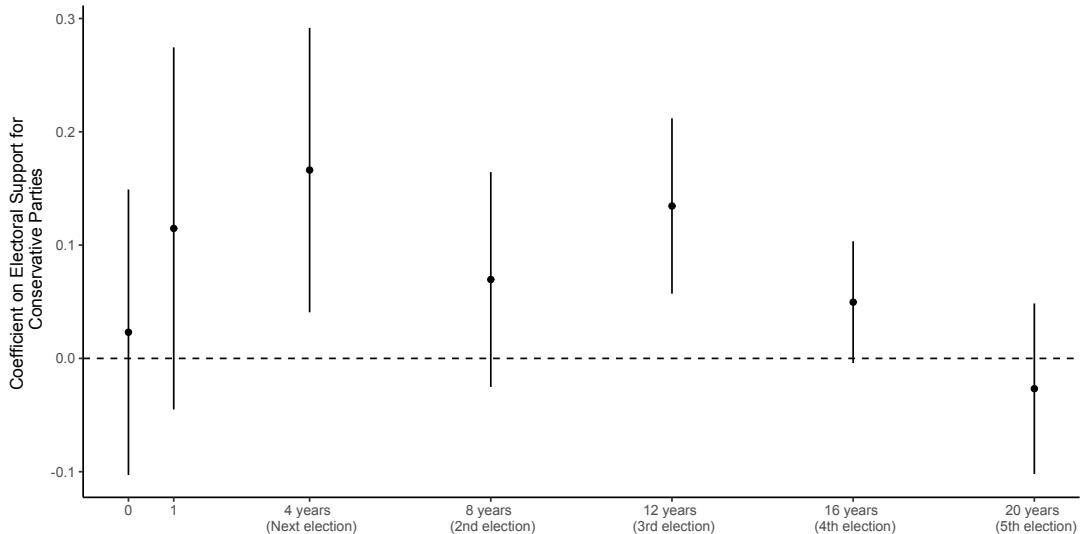


**Figure 5:** Effect of Electoral Support for Right-wing Parties with a 4-year Lead. Points are unstandardized OLS coefficients. Lines are 90 pct. (thick) and 95 pct. (thin) confidence intervals computed using Arellano-White robust standard errors clustered at the municipality level.

To examine the temporal dynamics of this effect, figure 6 reports plots the estimated effect of local policy preferences at time  $t$  on policy preferences at different points in time. In particular, it is plotted at  $t = 0$ , one year after  $t = 0$ ,  $t = 1$  (corresponding to four years after  $t = 0$ ),  $t = 2$  (eight years),  $t = 3$  (16 years) and  $t = 4$  (20 years). This figure reveals that, as expected, it takes some time for policy to respond. There is only a small effect one year after local policy preferences change and the largest effect is after four years. After this the effects seem to have some staying power, however, the estimates do become smaller over time.

Figure 6 also shows that estimated effects of local policy preferences on policy conservatism at  $t = 0$  and  $t = -4$  are statistically insignificant and close to zero. If voters became *more conservative* as a result of changes in policy (cf. Lenz, 2013; Slothuus, 2010), and this was what was driving our result, then we would expect our estimate to be positive and statistically

significant. Instead, changes in local policy preference appear to be independent of current trends in policy conservatism. This is notable, because it suggests that the key identifying assumption of our DiD model holds, namely, that there are parallel trends in the dependent variable (policy) before the independent variable (preferences) change.



**Figure 6:** Effects of Local Policy Preferences Over Time. Black points represent the effect of net electoral support for conservative parties with different leads. Black lines are 95 pct. confidence intervals based on Arellano-White robust standard errors with clustering at the municipal level.

## The Effect of Governing Alone: A Discontinuity in Policy Control

As a final part of our analysis we are interested in examining whether single party majority status affects the level of responsiveness.

When a party gets a single party majority in the city council, they can set policy without coalescing with other parties, increasing clarity of responsibility for policy. About one in four elections result in a single party majority. On the one hand, we might expect single party majority status to hurt responsiveness, since the largest party will then be free to set policy independent of other parties in the city council (parties which also represent parts of the municipal electorate). On the other hand, there might be an accountability effect, where the largest party exerts more effort to align municipal policy with what the electorate prefers if it has a sin-

gle party majority and thus, in the eyes of the voters, become solely responsible for municipal policy.

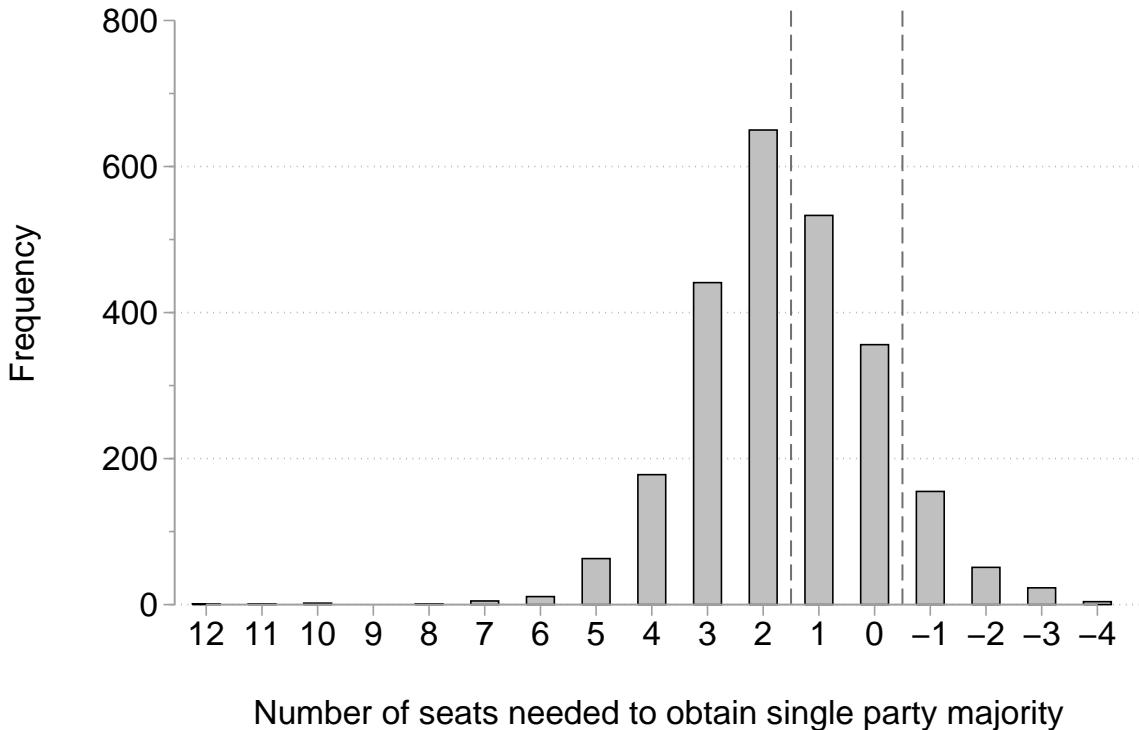
We use an RD design to estimate the effect of municipal policy conservatism, comparing the level of responsiveness in municipalities where the largest party narrowly won a majority of the seats in the city council with responsiveness in municipalities where the largest party narrowly lost a majority of the seats. This means focusing on municipal elections where only a few votes were pivotal for giving the largest party a majority of the seats. This as-if random assignment of single party majority status makes it possible to causally attribute differences in responsiveness to the presence or absence of a single party majority (Lee, 2008; Skovron and Titiunik, 2015). Below, we describe this design in more detail.

## Identifying close elections

We identify close elections in a two-step process. In the first step, we single out municipal elections held between 1970 and 2001 where the largest party in the city-council ended up having a one-seat majority or was one seat short of obtaining a majority. This leaves us with 839 close elections out of a pool of 2,475 elections. Figure 7 illustrates this selection process. In the second step, we index the 839 close elections according to *how* close they actually were. That is, we create a forcing variable that can tell us how many additional votes the largest party would have needed to win (lose) in order to have won (lost) the pivotal seat in the city council.

Creating the forcing variable, however, is complicated by the fact that there is no joint electoral cut-off at which the largest party is always assigned a majority of the seats in the city council (e.g., 50 pct.). 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 from election to election. Sometimes it might be 42 pct. and sometimes it might be 45 or 48 pct.

The varying cut-off is a product of two features of the electoral system in the Danish municipalities. The first feature is that assignment of seats is based on a proportional divisor method. As a consequence, the number seats assigned to the largest party depends on the exact configuration of votes cast for the other parties up for election (Fiva et al., 2016; Folke, 2014; Freier and Odendahl, 2015). The second feature is that parties can form electoral coalitions (Cox,



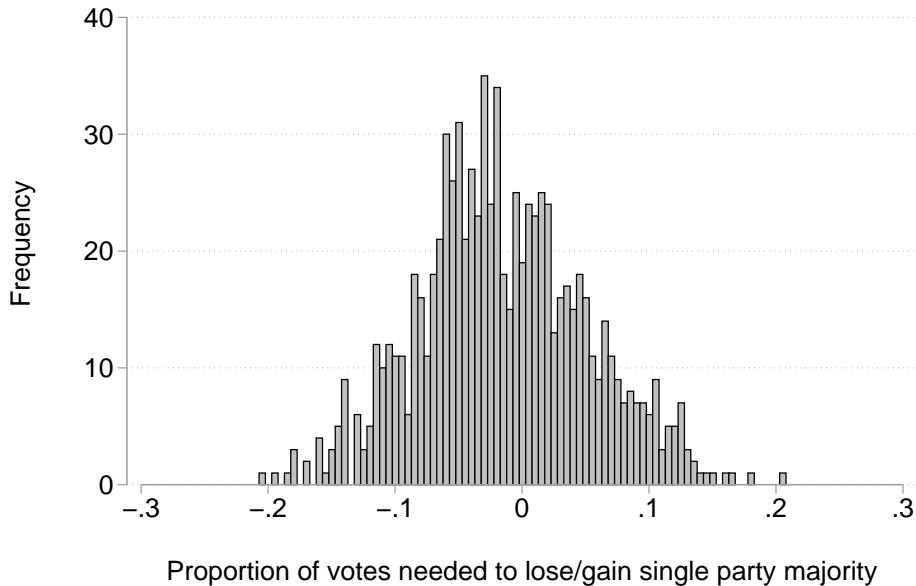
**Figure 7:** How many additional seats did the largest party need to obtain a majority? Only elections within the two dashed lines are used in our RD analyses.

1997). 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. As a result, the number of seats assigned to each party depends on the configuration of electoral coalitions, the votes cast for the different electoral coalitions, and the votes cast for 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 that ran simulated elections to determine the number of votes (+/- 10) the largest party would have needed to either win/lose one seat (and thereby secure/lose their majority in the city council).<sup>12</sup> Based on this, we measured the number of votes and the proportion of votes that the largest party in the city council would have needed to either win a majority or

<sup>12</sup>In particular, the program added or subtracted 10 votes from the actual vote total of the largest party, while holding the electoral support for the other parties constant, 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).

lose their majority. Figure 8 shows how the forcing variable is distributed, that is, exactly how close the 839 close elections were. As can be seen from this figure, there are a large number of elections close to the cut-off (0) in our dataset. In the analyses below, we use the proportional measure as our forcing variable.



**Figure 8:** Density of forcing variable measured as proportion of votes. Only calculated for the 839 elections where single party majority status would be reassigned if the largest party either won or lost a single seat.

## A Measure of Responsiveness at the Level of Each Municipality

To use the RD design we need a measure of municipal-level responsiveness. That is, a measure of whether a specific municipality moves closer to or further away from the electorate's.

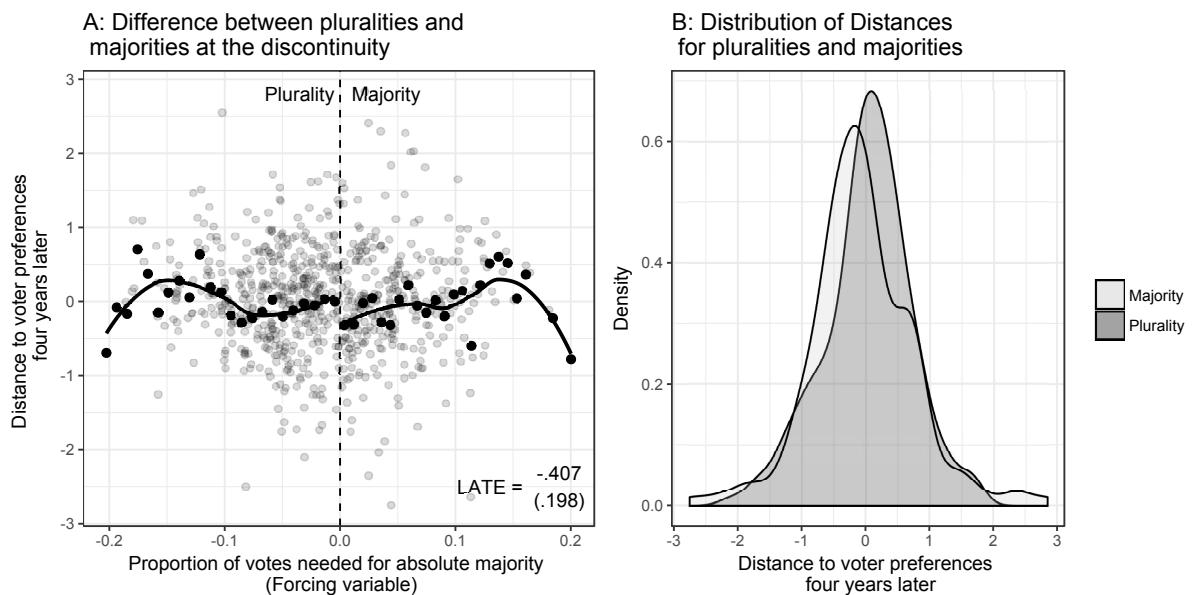
In order to develop such a measure of the ideological distance between policy and policy preferences, we re-estimate municipal fiscal policy conservatism using a standardized version of our local policy preference measure as a strong prior in the simulation. This allows the electorates preferences to identify the direction, location and scale of our measure of fiscal policy conservatism, which makes the two measures directly comparable. Calculating the difference between voter preferences and fiscal conservatism leaves us with a measure of the deviation between where we would expect policy to be given local policy preferences and where the policy items suggest that the municipality is. Thus, a higher score implies a larger deviation between

policy and voter preferences, implying low municipal responsiveness.

When using the measure in the analysis we time de-mean it (i.e., remove any year specific trends in the distance between policy and preferences).

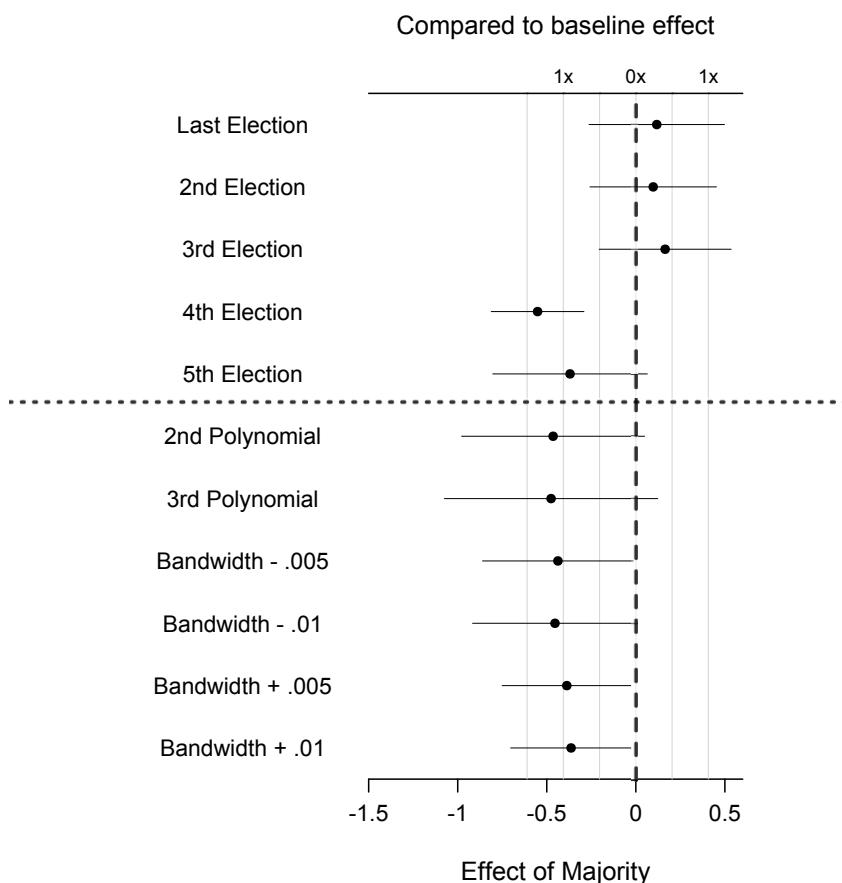
## Results

Figure 9 displays the key result from our RD analysis. As can be seen from both graphs, single party majority status seems to have a modest negative effect on the distance between policy preferences and policy, suggesting that there is an accountability effect, in that city councils run by a single party works harder to align policy output with voter preferences.



**Figure 9:** Does Single Party Majority Status affect the Distance Between Local Policy Preferences and Local Fiscal Policy? Comparing the distance at the election where single party majority is assigned with the distance four years later. Left: The light dots are municipalities, the dark dots are local averages generated within each percentile of the forcing variable. The dark line is a lowess fit (estimated separately above and below the cut-off). The LATE estimate and standard error is calculated using the `rdrobust` package Calonico et al. (2015). In particular, we use a local-linear model, within the CCT optimal bandwidth, and with a triangular kernel. Right: Densities estimated using all observations within the CCT optimal bandwidth.

Figure 10 looks at the robustness of this result in different ways.



**Figure 10:** How Robust is the Effect? All estimates and standard errors are calculated using the `rdrobust` package Calonico et al. (2015). In particular, we use a local-linear model (unless otherwise specified), within the CCT optimal bandwidth (unless otherwise specified), and with a triangular kernel.

## Conclusion

This the beginning of a project we hope to extend in various ways. In particular, we are currently pondering some of the following questions.

1. Are we missing some important policy items? Is it possible to get better coverage for some of the variables? Is it necessary?
2. What controls should we have? They need to have good coverage (span all municipalities across many years).
3. Should we look at a second country? We might be able to do a scaled down version of this in Norway.
4. Should we get a better measure of local policy preferences? We think that we will be able to get municipal level ideological estimates by using MRP to model the left-right question in the Danish National Election Studies.
5. Should we look more into the general responsiveness analysis or more into the RDD? What is the most interesting?

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