Rainy day politics
An instrumental variables approach to the effect of parties on political outcomes *

Jo Thori Lind†

Friday 16th June, 2017

Abstract

To disentangle the effect of political parties on policy outcomes, I use the differential reaction to election day rainfall on electoral turnout among potential supporters of different parties. Rainfall on election day leads to a one percentage point reduction of the vote share of left wing parties. This provides an exogenous source of variation, and hence an instrument for the party composition of the municipal council. Stronger left wing parties in the council increases total spending and shifts spending from education to kindergartens. Other causal effects of political composition are weak.

*I am grateful for useful and constructive comments from Felix Arnold, Rikhil Bhavnani, Harald Dale-Olsen, Andy Eggers, Henning Finseraas, Jon Fiva, Tarjei Havnes, Hans Hvide, Krisztina Kis-Katos, Andreas Kotsadam, Simen Markussen, Per Pettersson-Lidbom, Niklas Potrafke, David Strömberg, and seminar participants at the University of Bergen, the Frisch center, the Geilo seminar, the Silvaplana workshop, the Empirical Political Economics and Political Science workshop in Helsinki, the 8th Norwegian-German Seminar on Public Economics, the 2013 meeting of the Norwegian Economic Association, the 2015 meeting of the EPCS, the 11th World Congress of the Econometric Society, the 15th Journées Louis-André Gérard-Varet, and the 2016 EPSA meeting. I also got invaluable help with the meteorological data from Ole Einar Tveito. While carrying out this research I have been associated with the center Equality, Social Organization, and Performance (ESOP) at the Department of Economics at the University of Oslo. ESOP is supported by the Research Council of Norway through its Centres of Excellence funding scheme, project number 179552.

†Department of Economics, University of Oslo, PB 1095 Blindern, 0317 Oslo, Norway. Email: j.t.lind@econ.uio.no. Tel. (+47) 22 84 40 27.

1 Introduction

It seems obvious that political parties affect politics. But politicians also listen to their voters, and may follow their own beliefs and preferences. Knowing whether political parties really matter is important to gain a proper understanding of policy making in democratic societies. A society where voters get their preferred outcome independently of which party is in power is a different society from one where policy is perfectly determined by the party in power. The former corresponds more to a consensual approach to policymaking where one can also expect policies to be fairly stable over time.

Theory provides no simple answer to this question. In theorizing about the formation of policies, one is easily led to the conclusion that to gain the largest support possible, parties converge to some common platform.[1] One could also imagine the other opposite. Particularly if politicians are unable to commit to platforms, the politician might chose his policy himself once elected.[2] An intermediate case may be the most reasonable.[3]

Empirically, it is not trivial to determine the extent to which policies depend on politician characteristics or which party is in power. Simply comparing politics in constituencies run by politicians with different ideological basis is likely to give biased results. The main reason is that although currently elected politicians chose the policy, they also care about past electoral promises and future popularity. Hence voter preferences are going to matter, and we have a classical omitted variable problem.

Two main approaches have been followed in the literature. The first is essentially of ignoring the problem or using a large set of control variables.[4] This approach can yield valuable insights, but the results should be treated with caution. The other main approach is to focus on close elections using regression discontinuity designs. Although this approach has clear merits, some points remain unresolved: Particularly, it is not random when elections are close, and the possibility to generalize from such elections to politics in general is debatable. Second, it has been argued that in some cases, even close elections are not random.

To complement these approaches, I suggest an instrumental variables technique to identify the causal effect of parties on policies. If an instrument for election outcomes were available, estimation would be straightforward. But as most factors affecting electoral outcomes also affect political decisions, such instruments are not abundant. It may be more fruitful to look for an instrument for electoral turnout. An exogenous factor that has heterogeneous effect of electoral turnout of different groups could be used as an instrument for

[1] In median voter models this would be the median preference whereas a point closer to the preferred point of the average voter would prevail in a world with probabilistic voting.

[2] See particularly the class of citizen candidate models (Besley and Coate, 1997; Osborne and Slivinski, 1996).

[3] A seminal paper in modeling such an intermediate case is Wittman (1983).

[4] Such approaches have a long tradition though. See Erikson et al. (1989) and the references therein for some approaches along these lines and Sørensen (1995) and Borge and Sørensen (2002) for studies on Norwegian data. Besley and Case (2003) survey the literature on the US and Blais et al. (1993) the cross-country evidence. Generally, they find fairly weak effects of parties on policies.

political outcomes.

One exogenous factor that is believed to affect turnout is the weather. There are at least two channels through which this may happen: On the one hand, when it's raining it is more unpleasant to get to the polling station, indicating a negative relationship between rain and turnout. On the other hand, rain may also affect the utility of alternative activities, and hence increasing turnout by reducing the opportunity cost. As some voters react to the first effect and others to the other, as well as reacting with differentiated magnitudes, the weather is then a possible instrument for electoral outcomes.

Several recent papers document a relationship between the weather[5] and electoral turnout using high quality data.[6] A seminal paper is Gomez et al.'s (2007) study of the effect of rain and snow on US electoral turnout. They find that precipitation negatively affects turnout. This approach was further elaborated by Hansford and Gomez (2010) and Fraga and Hersh (2011), and similar results are found in Japanese, Dutch, Italian, Spanish, and German data (Horiuchi and Saito, 2009; Eisinga et al., 2012b; Sforza, 2013; Artés, 2014; Lo Prete and Revelli, 2014; Arnold and Freier, 2016). For Sweden, however, Persson et al. (2014) find no robust relationship between turnout and the weather.[7]

In my study, I look at Norwegian municipal elections in the period 1971 to 2007. I find that rain on election day has a positive impact on turnout, indicating that the opportunity cost effect dominates the unpleasant to vote-effect. Electoral day rain increases average turnout by about 0.7 percentage points. Rain on election day changes the composition of voters so the share of left wing voters go down by about one percentage point. This is comparable to findings from Spain and Italy (Artés, 2014; Sforza, 2013). A positive shock to the left wing share shifts expenditures from education to child care, as there is a clear negative effect of election day rainfall on spending on child care and a positive effect on spending on schooling.[8] Spending on other categories seems mostly unaffected by election day weather and hence a shock to the political composition of the municipal council. There is also evidence that a shock to the share of left wing parties leads to increased expenditures and some measures of tax burdens.

The paper is related to several stands of literature. First, it complements the literature using varieties of regression discontinuity designs, pioneered by Lee et al. (2004) and

[5]A massive literature studying the effect of the weather on a range of economic outcomes such as agricultural and industrial output, health, and conflict has also appeared in recent years. See Dell et al. (2014) for a survey.

[6]Some older studies based on less comprehensive data include Knack (1994) and Shachar and Nalebuff (1999). The findings are less clear-cut.

[7]Weather has also been used to instrument for participation in other political events. Collins and Margo (2007) use rainfall in April 1968 to instrument for participation in the 1960s riots. Madestam et al. (2013) use rainfall to instrument for participation in Tea Party rallies and find that higher participation led to more conservative policies. Along similar lines, Kurrild-Klitgaard (2013) looks at temperature and participation in May day demonstrations. See Lind (2015) and the references therein for further studies of daily and short-term weather fluctuations.

[8]This is in accordance with Sørensen's (1995) finding that municipal representatives from the Labor and Socialist parties are more in favor on spending on kindergartens and less on school than other representatives.

Pettersson-Lidbom (2008). Lee et al. (2004) use narrow elections to the US House. They argue that when elections are sufficiently narrow, the outcome is almost random. With this approach, they find that voters have an impact on who are elected but little influence on politics beyond that. Ferreira and Gyourko (2009) study US cities with a similar design and find little effect of party affiliation. They explain this by a higher level of homogeneity at the local level than the national level. With a similar design on Swedish data, Pettersson-Lidbom (2008) find that municipalities controlled by left leaning politicians have both higher levels of spending and taxation. Sweden, as many other countries, has a multi-party system, so it is not clear how we should define a "close election". Petterson-Lidbom solves the problem by grouping parties, hence forming an artificial two party system. Folke (2014) is critical to the validity of his findings for two reasons: First, he estimates the effect of getting a majority which may differ from actually getting the power. Second, he may miss some ways in which parties may affect politics. Instead, Folke advocates a procedure where he uses the randomness in close races between any two parties for any seat in the council. He finds that party composition has a major impact on environmental and immigration policy in Sweden, but only a small effect on tax policy. Fiva et al. (2017) use a similar technique to analyze Norwegian data. They find that a larger left-wing block leads to more property taxation, higher child care spending and less elderly care spending. Other approaches to handle multi party systems have also been suggested by Freier and Odendahl (2015) and Kotakorpi et al. (2016), although the latter with somewhat different objectives in mind.[9]

A second approach to identifying causal effect of political composition is varieties of natural experiments. Chattopadhyay and Duflo (2004) use the random allocation of seat reservation in Indian Gram Panchayats to identify the effect on politician gender, whereas Fujiwara (2015) use a random phase-in of electronic voting technology in Brazil to show the effect of increased political power to poor voters. In a similar vein, Montalvo (2011) employ the 2004 terrorist attacks on Madrid as a random shock to the elections. He argues that this helped the socialist party and had an impact on subsequent policies. There are furthermore attempts at using randomized trials, particularly to study the determinants of turnout (Green et al., 2012; DellaVigna et al., 2015).

Both approaches have limitations, though. The approaches based on natural experiments are interesting, but suitable natural experiments are not always at hand, making these approaches less generally applicable. Regarding regression discontinuity designs, it seems plausible that the outcomes of close elections are almost random. Still, there are signs of systematic sorting. First, Snyder (2005) found that in very close elections, the incumbent was most likely to win. Caughey and Sekhon (2011) confirm that the winners of close elections systematically were the predicted winners, and that the winners had financial,

[9]Regression discontinuity approaches have also been used to study other features of political outcomes. Lee (2008) uses it to study the effect of incumbency advantages, and Ade and Freier (2013) to study the the externalities from incumbency. Clots Figueras (2011; 2012) use this method to identify the effect of politician gender on political outcomes. Eggers and Hainmueller (2009), Willumsen (2011), Lundqvist (2011), and Kotakorpi et al. (2016) use the technique to study the economic returns from political office.

experience, and incumbency advantages over their opponents in US elections. Snyder et al. (2015) argue that these findings are likely to occur in a model where one party has a structural advantage, but where the electoral outcome is almost even due to preference shocks drawn from a unimodal distribution. Vogl (2014) find that in mayoral elections between black and white candidates, black victories are more common than black losses in the US South. Moreover, Grimmer et al. (2011) argue that elections that are predicted to be close draw more resources, so winners in these elections are different form other electoral winners. They also provide empirical evidence of structurally advantaged candidates being more likely to win US House elections. This is also supported by Galasso and Nannicini (2011), who find that parties tend to allocate better politicians to closer races. Finally, as typically few elections are very close it is necessary to use a wider window to get an appropriate sample. Then the randomness of the outcome is jeopardized. The critique is contested, though, and parts of it has been refuted by Eggers et al. (2015). In particular, they show that the although incumbency advantage is present in close elections to the US House, the same effect is not found in a vast number of elections to other US bodies and in other countries. Also, Snyder et al. (2015) argue that the bias from the imbalance may be removed by standard regression discontinuity techniques. Still, it may be less random in which constituencies elections are narrow, so findings from such analyses may not generalize to politics in general.[10] Studies based on regression discontinuities have an irrefutable merit. However, as they have been subject to serious criticism, it is valuable to study alternative techniques to validate the findings. This is the objective of this paper.

Finally, there is a literature studying whether changes in electoral turnout has an effect in itself on politics. Mueller and Stratmann (2003) show that increased participation leads to a more even distribution of income, but at the expense of reduced growth rates, and Fumagalli and Narciso (2012) show that higher voter participation tends to increase government expenditure, total revenues, welfare state spending, and budget deficits. Neither of these papers have clean identification strategies, though. Godefroy and Henry (2016) use the prevalence of seasonal infections to instrument for turnout and find that increased turnout lowers the quality of elected officials. In a related paper, Lo Prete and Revelli (2014) argue that the the share of informed voters declines with turnout, so the quality of elected candidates is lower with high turnout. Instrumenting turnout with rainfall and staggered elections, they find this relationship in Italian data.

[10] The validity of regression discontinuity design studies also depend crucially on a correct specification of the bandwidth and the specification of the forcing variable. Hyytinen et al. (2017) find that although a properly specified model does give correct inference, a number of popular models yield stronger results than warranted.

2 Weather and political outcomes

The weather may affect political outcomes in several ways. The most important link is probably the effect the weather has on turnout, which influences turnout rates of different voter segments. There could also be cases where the weather on election day has a direct impact on voters' political preferences and party choices. Meier et al. (2016), for instance, find that voters are more status quo biased in referenda on rainy days.[11] Although I won't try to go into any exact mechanisms, we may easily imagine that the weather could have an impact on voters' mood and hence how they cast their vote. Extreme weather conditions could maybe also make voters more aware of questions of climate change and shift their vote toward parties with a greener agenda.

2.1 Weather and electoral turnout

There is a vast literature on the determinants of turnout. Most of the literature on rational participation in elections, going at least back to the seminal work of Downs (1957), starts with the assumption that a voter votes whenever

$$pB - C > D \tag{1}$$

In this equation, p is the probability of own voting changing the outcome of the election, B the utility of changing the outcome of the election in own favor, C costs of voting, and D the pleasure from voting beyond its impact on electoral outcomes.

The effect of weather on turnout can mostly be explain by its impact on the cost of voting C. One part of this cost is the effort of going to the polling station. When it is raining or the weather is unpleasant in other ways, this task is more daunting, which may decrease turnout. An equally important, albeit less famous cost is the opportunity cost of voting. Voting takes time, and the more valuable ones time is, the higher the cost is. When the weather is "nice", the opportunity costs is then higher: Most importantly, the recreational value of the time is higher. In Norway, which I study in this paper, elections take place in early September. In this period, some of the last days of pleasant weather before the winter arrives usually occur. On such days, going voting may not be the top priority of all voters. A dry day in early September may also be one of few opportunities for farmers to harvest their crops.

Hence, it is likely that the weather has an impact on electoral turnout, but it is not trivial which sign such a relationship should have. Below, I find that the opportunity cost effect dominates in the case of Norway.

[11]See Dell et al. (2014) and Lind (2015) for more complete overviews of the effects of rain in the medium and short term.

2.2 Turnout and electoral outcomes

There is a large literature on the relationship between turnout and electoral outcomes. One line of reasoning that can be traced back to Campbell et al. (1960) and Burnham (1965) argues that some groups of voters are more likely to vote than others. In the US case, Democratic support is higher in the groups that are less inclined to vote, so an increase in turnout is typically thought to benefit the Democrats. DeNardo (1980) challenges this view by pointing out that peripheral voters are both more likely to be affected by the campaign and "jump on the bandwagon" of the winning candidate.

In the classical explanation, prospective left wing voters would have higher Cs or lower Ds in equation (1) and hence only vote if external conditions, such as the weather, make them do so. Right wing voters, however, have sufficiently low Cs or high Ds that minor shocks to C have no impact on their voting decisions. Econometrically, this heterogeneous effect would lead to a local average treatment type situation.

The empirical literature on the relationship between turnout and electoral outcomes finds mixed results, depending on period, type of elections, closeness of elections, and country. Tóka (2004) finds that the relationship between turnout and partisan advantages vary between countries. Kasara and Suryanarayan (2015) argue that the relationship between turnout and voter income depends on the conflict patterns, and a strong positive pattern is mostly found when political conflicts are focused on questions of levels of taxation.

The literature on the effects of turnout in Norway is scant. Pettersen and Rose (2007) study parliamentary elections and find that the effect of turnout on the Labor party's vote share is "marginal at best". Saglie et al. (2012) study local elections and also find weak support for a link between turnout and support for the Labor party.

A fundamental problem with most of this literature is that electoral turnout is an intrinsically endogenous variable that may be affected by many of the factors also determining electoral outcomes. To solve this problem, Gomez et al. (2007) and Hansford and Gomez (2010) instrument turnout with precipitation on election day. Then they find a consistent positive effect of turnout on the Democratic vote share. Eisinga et al. (2012a) find a similar relationship in Dutch data. Finseraas and Vernby (2014) use a reform in the regulations on early voting to instrument for participation rates, and find a positive causal effect of participation on support for the Labor party in Norway.

Artés (2014) finds that high turnout induced by absence of rain in Spanish data hurts the left wing parties. The beneficiary, however, is rather small parties than the main conservative party. His explanation for this effect is that there are two different effects of turnout changes – one volatile affected by weather shocks and another structural effect affected by economic fundamentals. Sforza (2013) also finds that high turnout induced by the weather in Italy was beneficial for the Five Star Movement at the expense of the established parties.

However, it is not clear that any of these strategies are warranted in all cases, or whether it is at all meaningful to attempt to find a general causal effect of turnout on the support for a political party. As discussed above, one can find random shocks to turnout. But such shocks have different impacts on different groups of voters, and different shock have different patterns of heterogeneity.[12] When it affect voters in an heterogeneous way, we can at best hope to get LATE effects. In the case of election day weather, the shock may affect some groups of voters positively and some groups negatively. Then we both have compliers and defectors, hence breaking the monotonicity assumption of Imbens and Angrist (1994). Actually, the IV estimator of the effect of turnout on support for a party can take on any value on the real line.[13]

For the purposes of this paper, however, these issues are unproblematic. It is still plausible that rain on election day has an effect on the support of different parties, which is all that is needed for a valid first stage.

2.3 Is weather a valid instrument?

Election day weather is clearly exogenous to both political and economic outcomes in the sense that the latter cannot cause the former. For the weather to be a valid instrument to investigate the effect of political composition of the municipal council on political outcomes, however, we also need to make sure that rain has no impact on other determinants of political outcomes.

One issue could be that rain might have an impact on voter preferences. There could for instance be good reasons why floods could change preferences for say infrastructure spending. Also, as noted above, rain may affect electoral outcomes in other ways that through turnout, for instance by changing voters' mood. This is unproblematic, though, as the objective is to study the effect of political composition and not the effect of turnout.

Similarly, rain is more common in some areas than others. In the case of Norway, there is more rain in the western part of the country than the eastern part. This could again be correlated with differences in both turnout, support for different parties, and actual spending patterns. Still neither of these issues challenge my empirical strategy, as I use rain on the specific day the election takes place and control for municipality fixed effects (and hence implicitly also for the average level of precipitation on election days). To believe that rain on one specific day has any real impacts beyond its effect on the electoral process is hard to imagine. Fujiwara et al. (2016) raise the issue of habit formation, providing evidence that a shock to turnout at one election has an impact on consecutive elections. This leads to auto correlated data, but does not pose any additional challenges to the exogenity of precipitation as an instrument.

A final challenge is that increased turnout caused by weather effects may have an inde-

[12]See also Fowler (2015) for a discussion of this issue.

[13]To see this, consider a case with two groups of voters, Conservatives and Socialists. The Labor party gets no votes among Conservatives and all votes from the Socialists. In case of no rain, only Socialists vote, in case of rain only Conservatives rain. Then the estimated effect of turnout is $\frac{1}{2\theta-1}$ where $\theta \in [0,1]$ is the share of the population being Socialist. This fraction can take any value on the real line.

pendent effect on politician behavior beyond the composition of the council. It is widely believed that politicians are more responsive to voters who turn out at elections and generally more responsive then turnout is high. However, this challenge could be tested by comparing municipalities with high versus low turnout for other reasons. It turns out that in the case of Norwegian municipalities, they are homogeneous.

If there is an empirical relationship between election day weather and electoral results, rainfall is hence a valid instrument. However, the effect is not going to be very large in most cases. This means that we have a random shock that may shift small number in favor of some parties. Consequently, what we are going to identify is rather the effect of a marginal increase in power than the effect of a complete shift of the block in power.

3 Institutional background, data, and estimation

3.1 Institutional background

To test the causal effect of parties on policies, I use a panel of Norwegian municipalities measured between 1972 and 2010. In 2010, there was a total of 430 municipalities, but due to municipal mergers a total of 478 municipalities occur in the data.[14] Many municipalities are small – the median municipality had about 4500 inhabitants although the mean population is about 11 000.

Municipal elections take place every fourth year on a Monday in the first half of September. Some municipalities also allow for voting on the preceding Sunday. Elections to the regional council are organized at the same day, but parliamentary elections are not.

With a few exceptions, politics is dominated by the national parties. Although there is a degree of pragmatism in smaller municipalities, parties do differ substantially ideologically. Particularly, there is a clear cleavage between the left wing and right wing parties. The left wing block is dominated by the Labor party (DNA), but the Socialist leftist party (SV) and Red (Rødt) also have representatives in a number of municipalities. The right wing block is usually dominated by the Conservative party (H), and encompasses the Centre party[15] (Sp), the Christian popular party (Krf), the Liberal party (V) and the Progress party (FrP). There are also a number of local parties in many municipalities. In most municipalities these are small – the local parties got above 10 % of the vote in only 27 % of municipality-years studied.[16]

The municipal council, whose number of members range from 11 to 85, is the supreme body of the municipality. The council elects the mayor who is chairing the council meetings,

[14] Whenever two municipalities merge, I introduce a separate fixed effect for the new entity. As the three entities are potentially correlated, I treat them as on cluster when clustering standard errors.

[15] In recent years the Centre party has moved towards the left and was part of the Centre-Left coalition governing Norway 2005-2012. But this is a recent phenomenon and the party has often been more right wing at the local level.

[16] There are still municipalities where they are very important. An extreme case is the tiny municipality of Modalen where only local parties have been running for elections for the whole period I study.

as well as an executive board where large parties are all represented. As the system is not parliamentary, crossing the 50 % vote share line does not have any particular impact on policies. Rather, politics are quite consensus based, but where larger blocks have more power to shape policies. In the current paper, I study the effect of a marginal shift in this balance of power.

Municipal incomes are largely given: although municipalities in theory have some discretion on tax levels, all municipalities have chosen the highest allowed tax rate. Municipalities can increase their incomes through user charges and property taxation, but for most municipalities this accounts for modest shares of incomes. Consequently, the size of the budget carries little interest. Municipalities have larger discretion regarding spending pattern, although there are some limitations due to national standards, matching grants for childcare, and central government "action plans", designed to get councils to prioritize particular services.

3.2 Data

The meteorological data used in this project were created by the Norwegian Meteorological Institute (met.no). The data are constructed from daily observations of precipitation at all 421 measurement stations in Norway. They are then spatial interpolated, which is a challenging task for a country like Norway. In some parts of the country mean annual precipitation varies between less than 300 and more than 3000 mm within a few kilometers (Jansson et al., 2007). To solve this, a residual kriging approach is applied (Tveito and Førland, 1999). First, each observation is regressed on a number of geographic properties to separate between a deterministic and a stochastic part. The residuals are then interpolated using kriging and combined with deterministic parts to obtain a grid of 1×1 km cells for Norway. See Mohr (2008) for further details on how the data are computed. Average precipitation values on election days are shown in Figure 1. As one would expect, average rainfall is larger along the west coast and in parts of the north.

I combine these data with GIS data on municipal boundaries to construct data on average precipitation by municipality for each election year. One challenge is that municipal boundaries have changed over time, mostly due to merging of municipalities. GIS data on past municipal borders are essentially non-existent. To solve this I map municipalities that no longer exist into their current municipality and use weather data from the present day municipality. Although this removes some variation in the data, the spatial correlation in daily meteorological data is so high that this effect is negligible.

Data on electoral turnout and outcomes as well as on political outcomes are taken from the recent collection of Norwegian municipal data made available by Fiva et al. (2012), originating from Statistics Norway and the Norwegian Social Science Data Services. Their voting data include the vote share and seat share of each party as well as the turnout rate. I have supplemented their voting data with data on advance voting from Statistics Norway

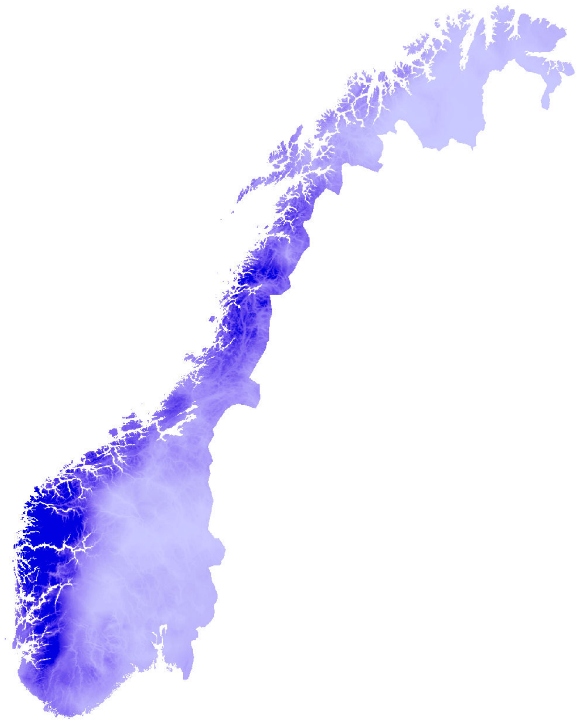
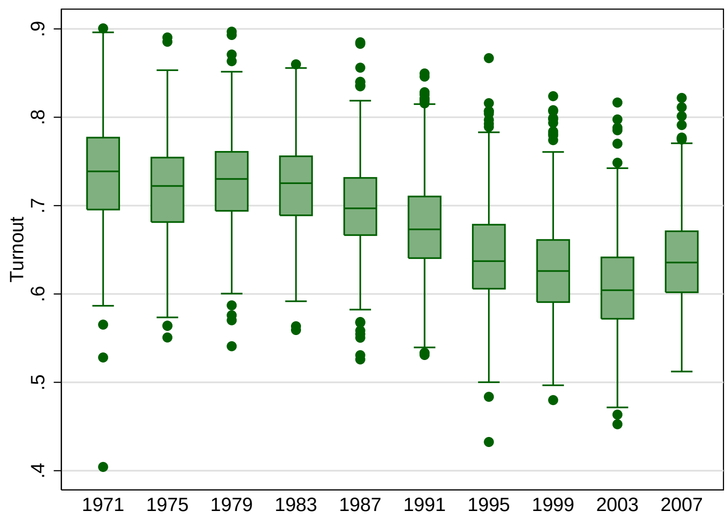


Figure 1: Average rainfall on election day

Figure 2: Evolution of turnout over time



Notes: The figure shows the distribution of turnout per municipality for each election year.

(2011). Data on political outcomes were collected from the Norwegian Social Science Data Services by Fiva et al. (2012), and comprise annual spending on eight categories taken from municipal budgets. Descriptive statistics on rainfall, turnout, electoral outcomes, and policy outcomes are found in Appendix A.1.

From Figure 2, we see that there is a clear downward trend in turnout over time. Figure 3 shows the geographical distribution of turnout. We see from Panel (a) that there is no clear pattern in average turnout across space. Panel (b) shows the municipality specific trends in turnout in a two ways fixed effects model, i.e. the parameter δ_i in a regression of the type

$$Turnout_{it} = \alpha_i + \tau_t + \delta_i t + \epsilon_{it}.$$

The map shows that there is a clear negative trend in the southeastern part of the country, whereas there is a positive trend in the western and northern part. Testing formally for a spatial pattern in the trends, Moran's I statistic yields $I = 0.456$ and the Moran test for no spatial dependency rejects with a p-value of 2.2×10^{-16}. As the weather also necessarily has spatial dependence, failing to account for these spatial trends yields a high danger of spurious correlation between turnout and rain: In Lind (2015) I show formally that when a dependent variables with a spatial or spatio-temporal trend is regressed on dependent variable with spatial dependence, OLS estimates may be inconsistent. In a set of Monte Carlo analyses, true null hypotheses of no relationship are highly over-rejected. Hence relying on ordinary two way fixed effects is likely to not handle unobserved heterogeneity in a sufficiently good way.

3.3 Estimation

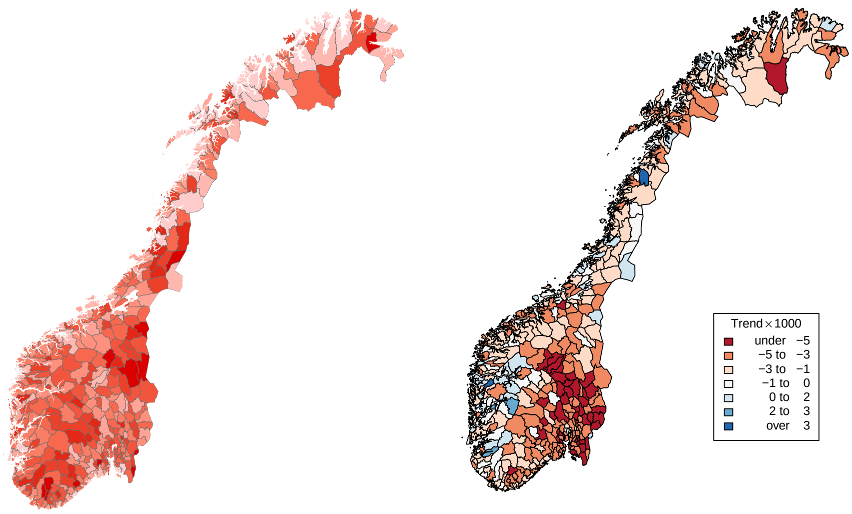
There are obvious differences between municipalities and over time, all of which are trivially handled by two way fixed effects. Moreover, all regressions include a time varying measure of the likelihood of rain in September when elections take place. Specifically, I use a five-year moving average of the likelihood of rain on any day in September.

To handle the problem of spatio-temporal trends, one way would be to include region specific trends. But there are no reasons to believe that trends are common within regions and have discontinuities at regional boundaries.[17] Instead, I control for a spatio-temporal trend $\delta_i t$ modeled as a polynomial trend surface – a technique dating at least back to Krumbein (1959) and Tobler (1969) and advocated in a similar context by Fujiwara et al. (2016).[18] Here the trend δ_i depends on municipality i's geographic location, modeled by a two dimensional polynomial in location. Specifically, I specify δ_i as a tensor product of

[17] An exception would be unobserved differences in policy between regions that affect turnout, but this is unlikely to occur in the present context.

[18] Controlling for regional time trends yields similar results. *[See Unpublished Tables B-14 and B-15.]*

Figure 3: Turnout across space



(a) Geographical distribution of turnout

(b) Geographical trends in turnout

Notes: Panel (a) show average turnout over the period 1971-2007 by municipality. Darker colors mean higher turnout.
Panel (b) shows the municipality wise trends in turnout over the period 1971-2007 by municipality. Red means negative trend, blue positive.

Legendre polynomials[19] (see e.g. Judd (1998, Ch. 6) for details) in municipality i's location, measured by the geographical coordinates x_i, y_i of the center of the municipality, i.e.

$$\delta_i = \sum_{k=0}^{K} \sum_{\ell=0}^{L} \theta_{k\ell} P_k(x_i) P_\ell(y_i) \tag{2}$$

This provides a flexible non-parametric estimate of the spatial pattern of the trend, but can at the same time be included as linear terms in standard regression models. To determine the number of terms K and L I estimated the model

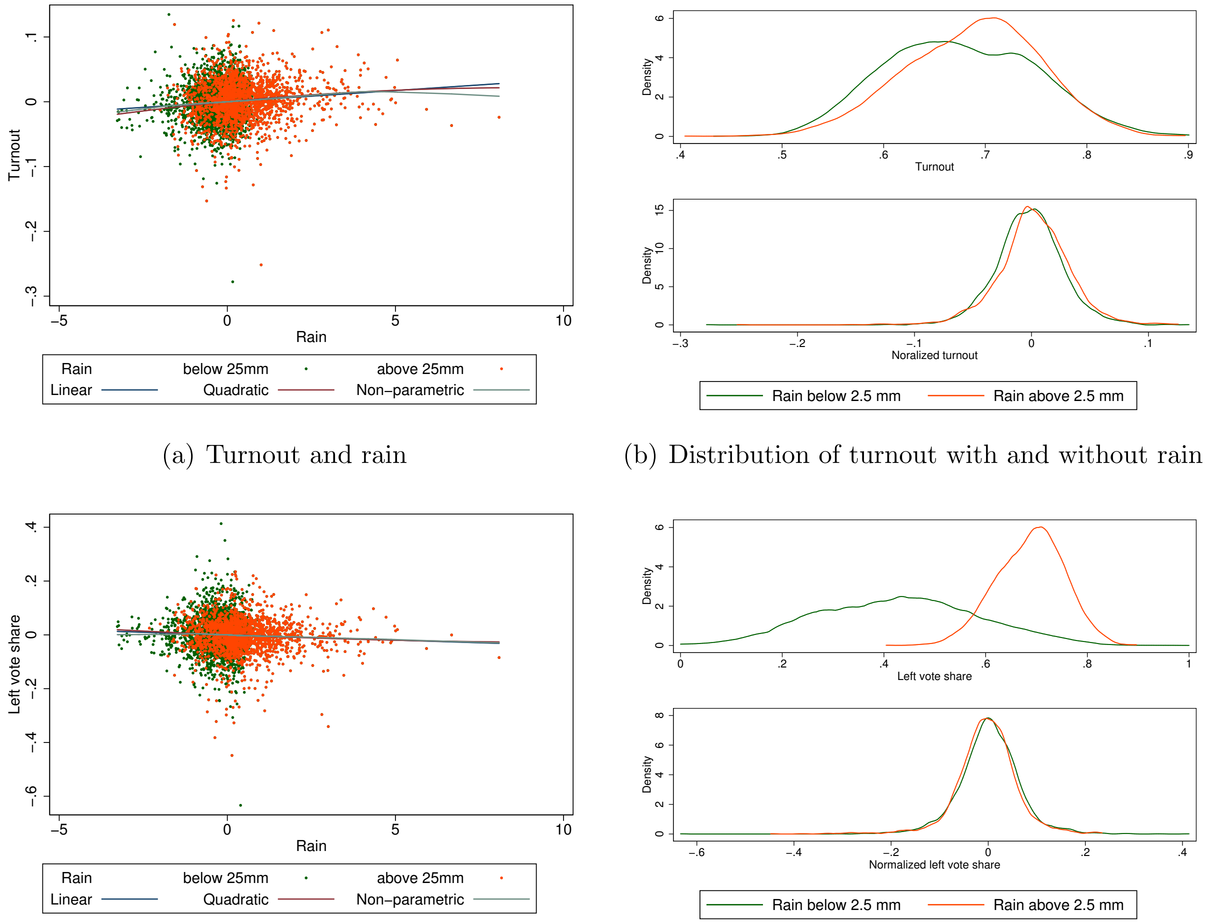
$$Turnout_{it} = \alpha_i + \tau_t + \sum_{k=0}^{K} \sum_{\ell=0}^{L} \theta_{k\ell} P_k(x_i) P_\ell(y_i) t + \epsilon_{it}.$$

for different choices of polynomial lengths and compared the fit of different specifications. I concentrate on combinations of K and L that maximize $R^2 - \lambda[(K+1)(L+1) - 1]$ for different values of the penalty λ; see Lind (2015) for further details on the procedure. A reasonable fit was found with a first degree polynomial in the longitude and a sixth degree polynomial in the latitude, using 13 terms and increasing the fit as measured by R^2 by 0.083. The total possible increase in R^2 seems to be around 0.11.[20]

[19]Other polynomial bases have been tried, and yield very similar results.

[20]This is a conservative number of terms. Minimizing the AIC or BIC, for instance, would result in $K = 9$ and $L = 8$, i.e. 89 terms. Results are very similar using this criterion. *[See Unpublished Tables B-12 and*

Figure 4: Turnout, the left vote share, and precipitation



(a) Turnout and rain

(b) Distribution of turnout with and without rain

(c) Vote share left and rain

(d) Distribution of the left vote share with and without rain

Notes: Panel (a) shows residuals of turnout and rainfall regressed on year and municipality dummies and spatio-temporal trends. The figure also include linear, quadratic, and non-parametric LOWESS fit of the data.
Panel (b) shows the distribution of turnout and normalized turnout, i.e. regressed on two way fixed effects and spatio-temporal trends.
Panels (c) and (d) show the same relationships for the left vote share versus rainfall.

4 Weather and electoral turnout

Panels (a) and (b) of Figure 4 shows the relationship between precipitation and turnout. Panel (a) is a simple scatter plot of municipality-year turnout versus amount of rain where municipality and year effects and spatio-temporal trends have been partialed out. There is a clear positive relationship and no signs of non-linearities in the data. Throughout the paper I concentrate on a dummy variable for substantial rain, defined as more than 2.5 mm (1/10 inch) of rain over the 24 hour cycle. This is a somewhat arbitrary cut-off, but cuts the sample approximately in half and seems to work well. Also, results are robust to

B-13]

other values. Panel (b) of Figure 4 shows the distribution of turnout for municipality-years above and below the threshold, with and without controlling for two way fixed effects and spatio-temporal trends. In both cases, we see that turnout is clearly on average higher for municipality-years above the 2.5 mm threshold.

This pattern is confirmed in Table 1.[21] Column (1) shows the linear relationship between amount of precipitation and turnout, and Columns (2) and (3) using dummies for any rain and substantial rain. Election day rainfall increases aggregate turnout by between .5 and .75 percentage point. In Column (4) I have a linear function where I allow for a jump at 2.5 mm. There are some indications of such a jump. In all four cases, it is clear that rain increases turnout.

To see whether the relationship is stable over time, I interact the measure of precipitation with a time trend (Column (5)) and a dummy for being after 1990, i.e. in the second half of the sample (Column (6)). There are no signs of significant changes over time.

Finally, Columns (7) and (8) allow for a non-linear effect of precipitation. There are some signs of the marginal effect of rain going down when the amount of rain is very high, but for all reasonable values of precipitation, the relationship is increasing. Hence in Norwegian municipal elections, there is robust evidence that rain has a positive and monotone effect on turnout. This is contrary to findings from most countries, but findings from Sweden go somewhat in the same direction (Persson et al., 2014), maybe indicating that the rainfall–turnout relationship is different in Scandinavia than in other Western countries. It may also be that turnout behavior for local election is different from national elections.

As discussed in Section 2.2, it is likely that there is a relationship between electoral turnout of different groups of society and electoral outcomes. As different groups are affected differently by rain, and as the election day weather might affecting voters voting behavior directly, say through changing their mood, it is probably not a valid instrument for turnout in a regression of electoral outcomes on turnout.[22] But this does not invalidate weather as an instrument for electoral outcomes, which I explore below.

Panels (c) and (d) of Figure 4 shows the relationship between rainfall and the share of seats in the municipal council obtained by the left wing parties. Generally, rainfall on election day decreases the seat share of the left wing parties. Panel (c) reveals a clear negative relationship between rainfall and the left seat share with few signs of nonlinearities. Panel (d) shows the distribution of the left wing seat share for elections with and without substantial rain on election day. Rain on the day of election shifts the whole distribution of seat shares to the left, keeping the shape essentially unchanged.

Table 2 shows more formally the effect of precipitation on the left wing seat share. There is a statistically significant negative effect of rainfall on the left seat share both using

[21] The small sample size in Tables 1 and 2 occurs because only election years are included in the tables.

[22] For comparison with previous work, results from an IV estimation of the effect of turnout on electoral outcomes, instrumenting turnout with election day weather can be found in Appendix Table A-5. The estimated effects are large, which may indicate the limitations of this strategy.

Table 1: Turnout and precipitation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rain (in cm)	0.00346***			0.00286***	0.00333***	0.00321***	0.00497***	0.0101***
	(5.99)			(4.06)	(6.18)	(4.38)	(4.93)	(4.37)
Rain positive		0.00770***						
		(5.56)						
Rain above 2.5 mm			0.00570***	0.00243*				
			(5.59)	(1.92)				
Rain×Year					-0.000215			
					(-0.92)			
Rain×After 1990						0.000744		
						(0.79)		
$Rain^2$							-0.000285	-0.00410***
							(-1.64)	(-2.74)
$Rain^3$								0.000783***
								(2.60)
$Rain^4$								-0.0000463**
								(-2.52)
Mean dep. var	0.681	0.681	0.681	0.681	0.681	0.681	0.681	0.681
Obs	4417	4417	4417	4417	4417	4417	4417	4417
R^2	0.699	0.698	0.698	0.699	0.699	0.699	0.699	0.700

Notes: Outcome variable is the proportion of turnout. All estimations control for two way fixed effects,spatio-temporal trends, and average September rainfall. Standard errors are clustered at the municipality level (using 2010 structure).
*t-values in parentheses,and *, **, and *** denotes significant at the 10%, 5%, and 1% levels.*

Table 2: Precipitation and the left seat share

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rain (in cm)	-0.00390***			-0.00236**	-0.00376***	-0.00379***	-0.00511**	-0.0126**
	(-3.88)			(-2.05)	(-3.50)	(-3.32)	(-2.46)	(-2.20)
Rain positive		-0.00637**						
		(-2.10)						
Rain above 2.5 mm			-0.00887***	-0.00616**				
			(-3.68)	(-2.21)				
Rain×Year					0.000217			
					(0.45)			
Rain×After 1990						-0.000340		
						(-0.17)		
$Rain^2$							0.000229	0.00520
							(0.69)	(1.47)
$Rain^3$								-0.000917
								(-1.28)
$Rain^4$								0.0000491
								(1.11)
Mean dep. var	0.405	0.405	0.405	0.405	0.405	0.405	0.405	0.405
Obs	4417	4417	4417	4417	4417	4417	4417	4417
R^2	0.261	0.259	0.261	0.261	0.261	0.261	0.261	0.261

Notes: Outcome variable is the seat share of the left wing parties. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Standard errors are clustered at the municipality level (using 2010 structure).
*t-values in parentheses,and *, **, and *** denotes significant at the 10%, 5%, and 1% levels.*

a continuous measure of rain and dummies for any rain or substantial rain. A substantial amount of rain on the day of election reduces the seat share of the left wing parties by about .9 percentage point or 12 % of a within municipality standard deviation. This is not a large effect, so the IV strategy employing specification (3) as the first stage is going to estimate local effects of a increasing power of the left wing parties. Columns (5) and (6) of Table 2 show that the estimated coefficient varies little over time, and Columns (7) and (8) show no significant non-linearities in the relationship.

5 The effect of political parties

5.1 Expenditure shares

Norwegian municipalities have limited discretion over the size of their budgets as most taxes are given at the national level. There is more scope for politicians to effect spending policies, so this is where we may expect to find the most important effects. In Table 3, I study the determinants of spending on a decomposition of municipal expenditures into eight categories. The outcome is the share of total expenditures going to each sector.[23] The explanatory variable of interest is the seat share of the left wing block. We could equally well have used the vote shares as in Table 2 as the two have a correlation coefficient of .99, but the seat share is a more correct measure of power within the municipal council. s many decisions are consensus bases or based on forming super majorities, any change in a block's size may matter for outcomes, not merely changing from a minority to a majority.

Panel A of Table 3 shows results from a standard two way fixed effects OLS estimation, with and without a set of demographic controls. From Column (1), we see that the vote share of left wing parties is correlated with a higher expenditure share on child care, a category which mostly encompass expenses on kindergartens. From the reduced form regressions reported in Panel B, we also see that rain on election day, measured as rain above 2.5 mm,[24] decreases the expenditure share on kindergartens in the following electoral term by 0.1 percentage points. This may appear small, but as the average expenditure share on child care was 9.7 % in 2010, it is still noticeable. For a municipality med median total expenditures[25], this means that rainfall on election day reduces spending on kindergartens by NOK 313 000. Moreover, this is a clear indication that a random shock to voting patterns on election day has an effect on municipal policies. Finally, in the 2SLS results reported in Panel C, we see that there is a positive effect of the seat share of left wing parties on the expenditure share on child care, although the effect is not significant in one of the specifications. The specification without controls indicates that a 1 percentage point increase

[23]Appendix Table A-6 shows the same results for absolute spending. As absolute spending depends on incomes as well as how resources are allocated, this table is less straightforward to interpret.

[24]Using a continuous measure of rain yields similar results. *[See Unpublished Appendix Tables B-1 and B-2.]*

[25]The median total expenditure was NOK 337 million in 2010, where 1 USD was NOK 5.77 as of 1.1.2010.

Table 3: Political composition and expenditure patterns: Shares

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.00680*	-0.0274**	0.0288**	-0.00786	-0.00221	-0.00465	0.00123	0.00525
	(1.89)	(-2.21)	(2.29)	(-0.79)	(-0.46)	(-0.87)	(0.21)	(0.35)
R^2	0.805	0.356	0.744	0.218	0.0820	0.219	0.274	0.723
With controls								
Seat share left	0.00126	-0.0390***	0.0257**	-0.00556	0.000556	-0.00522	0.00307	0.0192
	(0.39)	(-3.52)	(2.06)	(-0.55)	(0.12)	(-0.98)	(0.54)	(1.30)
R^2	0.829	0.409	0.748	0.222	0.0880	0.222	0.280	0.733

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain	-0.000931**	0.00316***	-0.00140	-0.00191	0.000116	0.000335	-0.000101	0.000722
	(-2.21)	(2.74)	(-1.14)	(-1.50)	(0.18)	(0.55)	(-0.16)	(0.42)
R^2	0.805	0.356	0.744	0.218	0.0820	0.219	0.274	0.723
With controls								
Rain	-0.000533	0.00260**	-0.000931	-0.00177	-0.0000905	0.000388	-0.000125	0.000462
	(-1.36)	(2.43)	(-0.75)	(-1.40)	(-0.14)	(0.64)	(-0.20)	(0.27)
R^2	0.829	0.407	0.748	0.222	0.0880	0.222	0.280	0.733

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.0970**	-0.330**	0.146	0.199	-0.0121	-0.0349	0.0106	-0.0753
	(2.00)	(-2.28)	(1.11)	(1.44)	(-0.19)	(-0.55)	(0.16)	(-0.42)
R^2	0.774	0.236	0.738	0.134	0.0842	0.215	0.276	0.721
Cragg-Donald F	65.53	65.53	65.53	65.53	65.53	65.53	65.53	65.53
With controls								
Seat share left	0.0584	-0.285**	0.102	0.194	0.00990	-0.0424	0.0137	-0.0506
	(1.29)	(-2.12)	(0.74)	(1.35)	(0.14)	(-0.63)	(0.20)	(-0.27)
R^2	0.817	0.331	0.746	0.145	0.0905	0.215	0.282	0.732
Cragg-Donald F	59.75	59.75	59.75	59.75	59.75	59.75	59.75	59.75
Obs	17069	17069	17069	17069	17069	17069	17069	17069
Mean dep. var	0.0446	0.258	0.189	0.111	0.0503	0.0368	0.0756	0.235

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects, spatio-temporal trends, , and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

in the left seat share would lead to an increase in the expenditure share on kindergartens by .097 percentage points or about 1 % of the average childcare budget in 2010. In monetary terms, this corresponds to NOK 130 567 for the median municipality.

Column (2) shows the effect on the expenditure share on education, which is mostly primary and lower secondary schooling. The OLS regressions reported in Panel A reveal that expenditures on schooling are negatively correlated with the left wing seat share. From Panel B, we see that election day rain increases the education budget share by 0.35 percentage points. Again, the effect is substantial: Rain on election day makes the median municipality spend NOK 1 064 000 more on eduction. The IV estimates indicate that a 10 percentage point increase in the left seat share increases the budget share by about 3 percentage point or about 13 % of the average 2010 education budget (which was 23 % of the total budget).

Expenditures on elderly care, reported in Column (3), are positively correlated with the left seat share, but from Panels B and C there are few indications of this relationship being causal. Finally, Columns (4) to (8), reporting the expenditure shares on health and social, culture, transportation, administration, and other expenditures, do not seem to be related to the political composition of the municipal council at all when we control for two way fixed effects and spatio-temporal trends.

In all specifications, the eight coefficients add to zero as the sum of expenditure shares add to unity. The clearest results from these estimations is that a positive shock to the left wing vote share increases spending on child care, and this seems to mostly come at the expense of educational spending.

5.2 Other outcomes

Table 4 reports similar estimation results studying a number of other outcomes. In Column (1), I study total expenditures. This is mainly financed by municipal income taxation whose rate is determined at the national level. Still municipalities have some ways to vary their expenditures both through smaller taxes and loan funding. In the OLS regressions, there does not seem to be any relationship between the seat share of the left parties and total expenditures and estimates seem to depend on the inclusion of control variables. However, the reduced form gives significant negative effects of rain on election day on total expenditure, indicating that the left wing parties increase total municipal expenditures. This is also reflected in the 2SLS estimates, where I find that there is a positive causal effect on total expenditures from a positive shock to the share of left wing representatives.

It is sometimes believed that left wing parties have a larger focus on public consumption but invests less than right wing parties. In Column (2) I investigate this claim by studying the share of municipal expenditures going to investments. These data are only available until year 2000 as the accounting system was changed after this date. The hypothesis is not supported by the estimates – if anything it goes the other way. Another claim that is sometimes made is that right wing parties sell off public property to finance tax cuts.

Table 4: Political composition and various political outcomes

A: OLS estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	-2.449	-0.0141	2.247	0.00107	0.0314	-0.0579	0.103
	(-0.54)	(-0.80)	(1.21)	(0.02)	(0.37)	(-0.18)	(0.74)
R^2	0.784	0.281	0.0641	0.725	0.145	0.316	0.0144
With controls							
Seat share left	-0.0488	-0.0162	2.116	0.0149	0.0231	0.422	0.110
	(-0.01)	(-0.93)	(1.15)	(0.32)	(0.27)	(1.46)	(0.77)
R^2	0.789	0.284	0.0639	0.726	0.150	0.396	0.0210

B: Reduced form estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Rain	-0.893***	-0.00171	-0.372*	-0.0123**	0.00655	-0.0718**	-0.00474
	(-2.65)	(-0.93)	(-1.73)	(-2.55)	(0.62)	(-2.57)	(-0.40)
R^2	0.784	0.281	0.0642	0.725	0.145	0.317	0.0142
With controls							
Rain	-0.963***	-0.00205	-0.371*	-0.0119**	0.00658	-0.0508*	0.000525
	(-2.91)	(-1.10)	(-1.75)	(-2.48)	(0.62)	(-1.87)	(0.04)
R^2	0.790	0.284	0.0640	0.726	0.150	0.396	0.0207

C: IV estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	92.73**	0.275	60.31	1.261**	-0.777	35.48	0.286
	(2.13)	(0.86)	(1.51)	(2.13)	(-0.61)	(0.70)	(0.40)
Obs	0.745	0.243	-0.0368	0.696	0.112	-5.155	0.0186
R^2	65.94	23.91	23.67	68.82	23.03	2.042	37.30
With controls							
Seat share left	105.0**	0.344	62.52	1.279**	-0.826	20.91	-0.0310
	(2.30)	(1.00)	(1.50)	(2.07)	(-0.61)	(0.81)	(-0.04)
R^2	0.743	0.224	-0.0444	0.698	0.114	-1.386	0.0266
Cragg-Donald F	60.18	22.07	21.93	62.96	20.77	2.989	38.85
Obs	17071	12779	12828	17619	8650	11821	5161
Mean dep. var	83.41	0.143	2.604	0.634	0.543	2.753	0.00597

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). Total expenditures, total sales, and user charges are deflated to 2011 prices using the CPI. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

This is investigated in Columns (3) and (4) where I look at total income from sales as well as a dummy for any sales in the current period (sales are reported in about 63 % of municipality-years). Again, the hypothesis is not confirmed. Both the reduced form and the 2SLS estimates indicate that it is more likely to sell of municipal property when the left wing is stronger. Although the total sales also seem to increase, this effect is not precisely estimated.

Municipalities have principally two means of increasing their tax incomes, residential property taxation and user charger for infrastructure services (sewage, water supply, and collection and management of garbage). Data for the two variables are available from 1991 and 1984 respectively. In Column (5) I study whether municipalities have introduced property taxation. An increased left share reduces the probability of having property taxation, but the coefficient is not always significant. From Column (6) we see that there is essentially no effect of political composition on the size of user charges.

Finally, it could be interesting to have an overall measure of the business climate in the municipality. It is not trivial to compare profitability across municipality. But we can get some indications using growth in employment. If employment is growing it would usually indicate that business is expanding. In Column (7) I look at annual growth in industrial employment. There is a slight tendency for this to be higher when the share of left wing politicians is higher, but the effect is far from significance at conventional levels. Hence, it seems that there are no major differences in business friendliness as the share of left wing politicians varies.

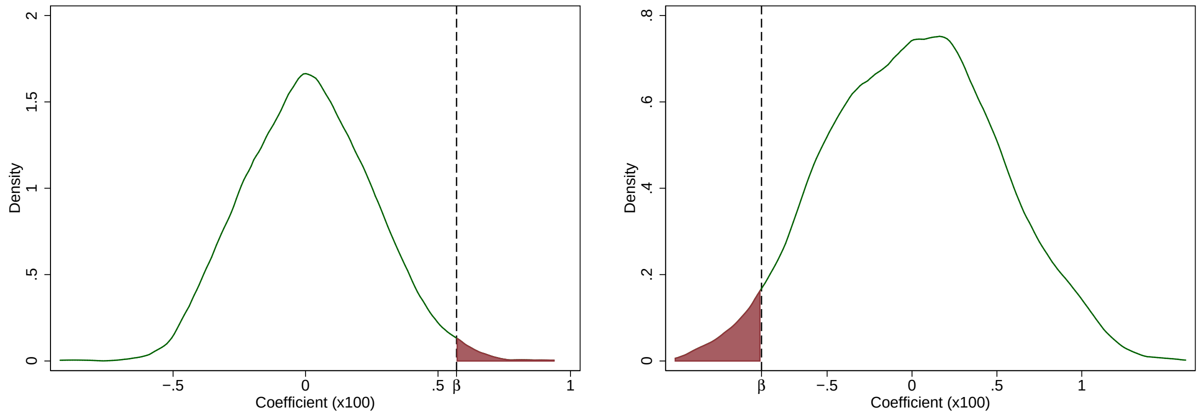
6 Robustness

6.1 A placebo study

As discussed above, rainfall is necessarily spatially correlated and there may be spatially dependent trends in the outcomes. Then it is crucial to check that there are no other spatially correlated processes that interfere (Lind, 2015). Daily rainfall is uncorrelated with most other outcomes of interest, but may have spatio-temporal patterns that makes it correlate with other variables with spatio-temporal trends. To check the validity of the instrument, I replicate the analysis from Table 1 using rainfall on all days from 600 days before election day to 600 days after election day. The distributions of the resulting estimates are shown in Figure 5. Panel (a) shows results from regressing electoral turnout on the dummy for substantial rain whereas Panel (b) shows the results on the seat share obtained by the the left wing parties.

Although extreme estimates occur on some days, the effect observed on election day is unusually strong. Only 1 % of the placebo estimates are above the effect of rainfall on turnout observed on the actual election day, whereas 3 % are below the coefficient observed on the election day in the regressions on the vote share of the left wing parties. Hence the

Figure 5: Distribution of parameter estimates



(a) Turnout

(b) Left seat share

Notes: The graph shows the distribution of estimated coefficients regressing electoral turnout and the left seat share on rainfall on 600 days before and after the election. Specifications control for municipal and year fixed effects, spatio-temporal trends, and average September rainfall. β denotes the coefficient on the day of election.

estimates of rain on election day are much stronger than the results of rain on a random day. This indicates that the effect studied is a true effect of rain on turnout and not simply a random coincidence.

6.2 Advance voting

Another placebo can be obtained by looking at advance voting. Since 1920, it has been possible to vote before the election day for individuals who were not able to vote on that day. As rain on election day does not affect turnout ahead of the election,[26] we should not see any relationship between the two and this works as a placebo to verify the validity of rain on election day.

Early voting is possible from August 10 (July 1 for individuals living abroad) until the last Friday before election day, which is a Monday. Until 1979, a justification for early voting had to be given and approved by the local electoral commission. For most of the period, early voting took place in locations designated by the local electoral commission, typically the town hall. In the 1999 election, early votes too place in post offices.[27]

Digitized data on advance voting is only available from 1975. Table 5 shows results of rain on election day on the share of the eligible population voting before election day using the same specifications as Table 1. As we would expect, rain has very little effect on early voting both regarding magnitudes and statistical significance. This strengthens the belief

[26] There could be a minor effect: If extreme weather is predicted for the election day several days ahead, this could affect early voting on the last allowed days. Still, this effect should be weak.

[27] This system was abandoned in 2003 due to the declining number of post offices.

that the findings reported above actually stem from rain affecting the turnout decision.

6.3 Heterogeneity

To see whether rain has a uniform impact on political outcomes throughout the country, Table 6 estimates separate regression coefficients for each of the five regions of the country. Column (1) shows the effect of rain on turnout. Although there is a positive effect of rain on turnout in all regions, the coefficient is only statistically significant in the eastern and the western parts of the country. However, as the east has among the lowest amount of rain and the west clearly the largest amounts, finding comparable numbers in these two regions is reassuring. Column (2) shifts the focus to the effect of rain on the vote share going to the left wing parties. There is a negative effect in all regions but the south. The effect is significant in the east and the west as well as in the north.

Columns (3) to (10) decompose the effect on all the policy outcomes. These estimates correspond to the reduced form estimates shown in Panel B of Table 3. Effects are not perfectly homogeneous – the F-test for homogeneity is rejected in almost all specifications. But most of the significant effects of rain tend to go in the same direction for each outcome. However, it seems that although the effect of rain on turnout and the left share is fairly homogeneous, the effect of the left share on policy outcomes is more heterogeneous.

Another potential source of heterogeneity could be that in municipalities with more rain, voters react differently. We could for instance imagine that they react less to rainfall. In Panel A of Table 7, I split municipalities into one two equally sized groups based on their number of days with substantial rain (above 2.5 mm) per year.[28] The driest municipality had 16 % of rainy days whereas the wettest had rain 55 % of days. The cut off was at 38 % rainy days. In Panel B, I interact rainfall with the share of days with substantial rain.

First, we notice that turnout is somewhat less affected by rainfall in more rainy municipalities. However, the difference is not large. The left share is almost equally affected, but actually somewhat more in municipalities with more rain. The negative effect on child care and positive effect on school expenditures becomes less significant, but the signs of estimates persist and do not appear to be very different. By splitting the sample by other criteria, significance becomes stronger.[29] There are no clear conclusions to be drawn from the policy outcomes. Although some coefficients are statistically significantly different, they tend to have the same sign.

6.4 Close elections

In an idealized two party systems, a party matters if and only if it has at least 50 % of the vote. Even in real world two party systems, this conclusion has to be moderated in many

[28] Results remain essentially unchanged if we instead use share of days with positive rain or the amount of rain, or look at September averages instead of annual averages *[See Unpublished Tables B-3 to B-7]*.

[29] Results available upon request *[See Unpublished Tables B-3 to B-7]*.

Table 5: Advance voting in elections 1975-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rain (in cm)	0.000203			0.000616	0.000213	0.000384	0.000300	-0.00403*
	(0.65)			(1.63)	(0.61)	(0.91)	(0.35)	(-1.74)
Rain positive		-0.000799						
		(-0.95)						
Rain above 2.5 mm			-0.000869	-0.00161*				
			(-1.10)	(-1.68)				
Rain×Year					0.0000197			
					(0.14)			
Rain×After 1990						-0.000500		
						(-0.62)		
Rain squared							-0.0000183	0.00221
							(-0.14)	(1.63)
Rain cubed								-0.000287
								(-1.18)
Rain quart								0.00000887
								(0.63)
Mean dep. var	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651
Obs	3972	3972	3972	3972	3972	3972	3972	3972
R^2	0.585	0.585	0.585	0.585	0.585	0.585	0.585	0.587

Notes: Outcome variable is the proportion of turnout. All specifications include municipal and year fixed effects. Standard errors are clustered at the municipality level (using 2010 structure).
*t-values in parentheses,and *, **, and *** denotes significant at the 10%, 5%, and 1% levels.*

Table 6: Decomposition of the effect of rain by region

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Rain×East	0.00600***	-0.0147***	-0.000466	0.00227	-0.00176	-0.00819***	-0.000420	0.000234	0.000148	0.00818***
	(3.15)	(-3.85)	(-0.64)	(1.14)	(-0.75)	(-3.75)	(-0.43)	(0.26)	(0.14)	(2.59)
Rain×South	0.00124	0.00477	-0.00228	0.0121***	0.0102*	-0.000157	-0.00150	0.00202	0.00308	-0.0235***
	(0.40)	(0.70)	(-1.33)	(2.93)	(1.89)	(-0.03)	(-0.47)	(1.48)	(1.18)	(-4.31)
Rain×West	0.00855***	-0.00708*	0.000624	0.0000843	-0.00671***	0.00477**	0.00100	0.000524	-0.00153	0.00123
	(4.29)	(-1.81)	(0.75)	(0.04)	(-3.32)	(2.46)	(0.76)	(0.42)	(-1.38)	(0.47)
Rain×Center	0.00498*	-0.000374	-0.000578	0.00123	-0.00416	0.00460	0.00147	0.00121	-0.000331	-0.00344
	(1.92)	(-0.06)	(-0.46)	(0.35)	(-1.22)	(1.45)	(1.00)	(0.72)	(-0.17)	(-0.65)
Rain×North	0.00362	-0.0134*	-0.00410***	0.00545*	0.00368	-0.00594*	-0.000388	-0.00138	0.000126	0.00256
	(1.28)	(-1.71)	(-3.25)	(1.80)	(1.38)	(-1.83)	(-0.22)	(-0.76)	(0.07)	(0.79)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.241	0.806	0.357	0.744	0.221	0.082	0.220	0.273	0.723
F	7.49***	5.20***	3.14***	2.71**	3.93***	4.89***	0.35***	0.72	0.64	5.76***
	[0.000]	[0.000]	[0.009]	[0.020]	[0.002]	[0.000]	[0.883]	[0.608]	[0.672]	[0.000]

Notes: Columns (3) to (10) are expenditure shares. All coefficients are from regression on rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table 7: Decomposition of the effect of rain by average number of rainy days

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain×Below median rain	0.00548***	-0.0104***	-0.00174***	0.000893	-0.000379	-0.00399**	-0.000227	0.000397	-0.000519	0.00557**
	(3.83)	(-3.36)	(-2.84)	(0.54)	(-0.20)	(-2.21)	(-0.26)	(0.52)	(-0.53)	(2.24)
Rain×Above median rain	0.00595***	-0.00722**	-0.000136	0.00532***	-0.00230	0.0000886	0.000422	0.000262	0.000382	-0.00404*
	(3.51)	(-2.00)	(-0.20)	(3.01)	(-1.32)	(0.05)	(0.39)	(0.27)	(0.39)	(-1.80)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.357	0.744	0.218	0.082	0.220	0.273	0.722
F	15.69***	8.36***	4.21**	4.87***	0.94	2.46*	0.09	0.17	0.19	4.35**
	[0.000]	[0.000]	[0.016]	[0.008]	[0.391]	[0.086]	[0.910]	[0.841]	[0.823]	[0.014]
Panel B										
Rain	0.00168	-0.0215**	-0.00564***	-0.00656	0.00204	-0.0147***	-0.00352	-0.0000214	-0.000719	0.0291***
	(0.33)	(-2.02)	(-3.03)	(-1.27)	(0.36)	(-2.62)	(-1.15)	(-0.01)	(-0.24)	(3.91)
Rain×Share rainy days	0.0110	0.0344	0.0127**	0.0260*	-0.00907	0.0343**	0.00976	0.000956	0.00173	-0.0763***
	(0.79)	(1.18)	(2.50)	(1.91)	(-0.62)	(2.29)	(1.15)	(0.13)	(0.22)	(-4.03)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.357	0.744	0.219	0.082	0.220	0.273	0.723

Notes: The dependent variables in Columns (3) to (10) are expenditure shares. Rain denotes a dummy for substantial rain (above 2.5 mm). In Panel A the variable is interacted with dummies for a municipality having above or below median number of days with substantial rain, in Panel B with the share of days with substantial rain. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table 8: Results by closeness of elections

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
A: Left vote share below 45%								
SeatShareLeft	0.0858	-0.321*	0.336*	0.0465	-0.112	-0.100	-0.0504	0.115
	(1.39)	(-1.83)	(1.85)	(0.26)	(-1.23)	(-1.31)	(-0.56)	(0.48)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10721	10721	10721	10721	10721	10721	10721	10721
R^2	0.778	0.291	0.707	0.209	0.0181	0.170	0.242	0.710
B: Left vote share between 45% and 55%								
SeatShareLeft	0.0169	-0.625	-0.516	1.832	0.290	-0.317	-0.171	-0.509
	(0.07)	(-0.60)	(-0.51)	(0.90)	(0.60)	(-0.61)	(-0.32)	(-0.31)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.813	0.239	0.696	-1.298	0.0247	0.0897	0.197	0.644
C: Left vote share above 55%								
SeatShareLeft	-0.0925	0.709	0.897	0.492	-0.149	0.284	0.337	-2.478
	(-0.41)	(0.70)	(0.69)	(0.62)	(-0.48)	(0.61)	(0.81)	(-0.87)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.757	0.153	0.485	0.138	0.0978	-0.0178	0.0287	-0.496

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

cases, and in multi party systems like Norway the 50 % threshold is at best a soft threshold. Still, we might expect that the effect of an increase in a block's vote share to be largest around the point where it acquires a majority. To study this, I split the sample in three in Table 8. Panel A studies elections where the left wing parties have a clear minority, Panel B elections close to a tie, and Panel C elections where the left wing parties have a majority. I only report reduced forms of the regressions. Conclusions are quite similar in the other specifications.[30]

We notice that there is some tendency for effects to be stronger in the elections close to ties, but the effect is far from clear. This indicated that an increase in the vote share has an effect even if the party is far from flipping between being in and out of majority, probably through an increased bargaining power in the municipal council. This also reveals the dangers of reducing a real world multi-party system to an idealized two party system analyzable through standard regression discontinuity approaches.

7 Conclusion

Parties are selected non-randomly into power. As voter preferences affect electoral outcomes, political platforms, and politician behavior, it is unsatisfactory to study the effect of political composition of assemblies by simply comparing composition and political outcomes. To identify the effect of political composition, I instrument the political composition of the assembly using election day precipitation. The dominant causal chain is that precipitation affects different voters' turn out decisions differently, leading to an effect of rain on electoral outcomes.

In Norwegian data on municipal elections, the effect of precipitation on electoral turnout is on average found to be positive: When the weather is nice on election day, the opportunity cost of voting is higher and voters abstain. Rain seems to harm parties on the left the most: On rainy election days, the left wing block gets its support reduced on average by one percentage point.

There is a statistically significant association between election day precipitation and political outcomes over the electoral period. This demonstrates clearly that there is an effect of the composition of parties in the municipal council beyond what is given by the preferences of the voters. The effect is mainly that a positive shock to the share of left wing representatives increases spending on kindergartens at the expense of primary school spending.

The first finding of the paper that can be generalized beyond Norwegian municipal policies is hence that parties matter for politics, that is, voter preferences are not the sole drivers of policies. As Norway is largely a consensus-based society, this may seem surprising. However, ideological cleavages are relatively strong, albeit less straightforward at the local

[30] *[Results available in Unpublished Tables B-8 to B-10.]*

level than at the national level. In this respect, it reflects the studies on Swedish politics (Pettersson-Lidbom, 2008; Folke, 2014). Swedish municipalities do however have stronger discretion with regard to the size of the budget. This can explain why my findings seem to be smaller in magnitude.

Other approaches to estimate the causal effect of parties and politicians have been proposed in the literature, of which those based on regression discontinuity designs are dominant. The validity of this approach has recently been criticized. As my approach based on weather shocks is not susceptible to those criticisms, it can also help judge the validity of existing approaches. Reassuringly, my findings are closely in line with the findings of Fiva et al. (2017) who use a regression discontinuity approach on similar data as mine. This indicates that the criticism of regression discontinuity designs do not seem to apply, a conclusion that is likely t hold beyond my institutional setting.

Finally, the effects of party composition I find are moderate. This is in line with Ferreira and Gyourko's (2009) finding from US cities. This may also indicate that in consensus-based political systems, most parties go to great lengths to accommodate the preferences of a large fraction of the electorate, reducing the importance of parties.

References

Ade, F. and R. Freier (2013): "Divided government versus incumbency externality effect – Quasi-experimental evidence on multiple voting decisions," *European Economic Review*, 64, 1–20.

Arnold, F. and R. Freier (2016): "Only conservatives are voting in the rain: Evidence from German local and state elections," *Electoral Studies*, 41, 216 – 221.

Artés, J. (2014): "The rain in Spain: Turnout and partisan voting in Spanish elections," *European Journal of Political Economy*, 34, 126 – 141.

Besley, T. and A. Case (2003): "Political Institutions and Policy Choices: Evidence from the United States," *Journal of Economic Literature*, 41, 7–73.

Besley, T. and S. Coate (1997): "An Economic Model of Representative Democracy," *The Quarterly Journal of Economics*, 112, 85–114.

Blais, A., D. Blake, and S. Dion (1993): "Do Parties Make a Difference? Parties and the Size of Government in Liberal Democracies," *American Journal of Political Science*, 37, pp. 40–62.

Borge, L.-E. and R. Sørensen (2002): "Aggregating Spending Preferences: An Empirical Analysis of Party Preferences in Norwegian Local Governments," *Public Choice*, 110, 225–243.

Burnham, W. D. (1965): "The Changing Shape of the American Political Universe," *The American Political Science Review*, 59, pp. 7–28.

Campbell, A., P. E. Converse, W. E. Miller, and D. E. Stokes (1960): *The American Voter*, New York: Wiley.

Caughey, D. and J. S. Sekhon (2011): "Elections and the Regression Discontinuity Design: Lessons from Close U.S. House Races, 1942-2008," *Political Analysis*, 19, 385–408.

Chattopadhyay, R. and E. Duflo (2004): "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India," *Econometrica*, 72, 1409–1443.

Clots-Figueras, I. (2011): "Women in politics: Evidence from the Indian States," *Journal of Public Economics*, 95, 664–690.

——— (2012): "Are Female Leaders Good for Education? Evidence from India," *American Economic Journal: Applied Economics*, 4, 212–44.

Collins, W. J. and R. A. Margo (2007): "The Economic Aftermath of the 1960s Riots in American Cities: Evidence from Property Values," *The Journal of Economic History*, 67, 849–883.

Dell, M., B. F. Jones, and B. A. Olken (2014): "What Do We Learn from the Weather? The New Climate-Economy Literature," *Journal of Economic Literature*, Forthcoming.

DellaVigna, S., J. List, U. Malmendier, and G. Rao (2015): "Voting to Tell Others," Mimeo, Berkeley (http://eml.berkeley.edu/ ulrike/Papers/Turnout15-01-09.pdf).

DeNardo, J. (1980): "Turnout and the Vote: The Joke's on the Democrats," *The American Political Science Review*, 74, pp. 406–420.

Downs, A. (1957): *An Economic Theory of Democracy*, Boston: Addison-Wesley.

Eggers, A. C., A. Fowler, J. Hainmueller, A. B. Hall, and J. M. Snyder (2015): "On the Validity of the Regression Discontinuity Design for Estimating Electoral Effects: New Evidence from Over 40,000 Close Races," *American Journal of Political Science*, 59, 259–274.

Eggers, A. C. and J. Hainmueller (2009): "MPs For Sale: Returns to Office in Post-War British Politics," *American Political Science Review*, 103, 1–21.

Eisinga, R., M. Grotenhuis, and B. Pelzer (2012a): "Weather conditions and political party vote share in Dutch national parliament elections, 1971-2010," *International Journal of Biometeorology*, 56, 1161–1165.

——— (2012b): "Weather conditions and voter turnout in Dutch national parliament elections, 1971-2010," *International Journal of Biometeorology*, 56, 783–786.

Erikson, R. S., J. Wright, Gerald C., and J. P. McIver (1989): "Political Parties, Public Opinion, and State Policy in the United States," *The American Political Science Review*, 83, pp. 729–750.

Ferreira, F. and J. Gyourko (2009): "Do Political Parties Matter? Evidence from U.S. Cities," *The Quarterly Journal of Economics*, 124, 399–422.

Finseraas, H. and K. Vernby (2014): "A mixed blessing for the left? Early voting, turnout and election outcomes in Norway," *Electoral Studies*, 33, 278 – 291.

Fiva, J. H., O. Folke, and R. J. Sørensen (2017): "The Power of Parties: Evidence from Close Municipal Elections in Norway," *The Scandinavian Journal of Economics*, Forthcoming.

Fiva, J. H., A. Halse, and G. J. Natvik (2012): "Local Government Dataset," Dataset available from http://www.jon.fiva.no/data/FivaHalseNatvik2015.zip.

Folke, O. (2014): "Shades of Brown and Green: Party effects in Proportional Election Systems," *Journal of the European Economic Association*, 12, 1361–95.

Fowler, A. (2015): "Regular Voters, Marginal Voters and the Electoral Effects of Turnout," *Political Science Research and Methods*, 3, 205–219.

Fraga, B. and E. Hersh (2011): "Voting Costs and Voter Turnout in Competitive Elections," *Quarterly Journal of Political Science*, 5, 339–356.

Freier, R. and C. Odendahl (2015): "Do parties matter? Estimating the effect of political power in multi-party systems," *European Economic Review*, 80, 310 – 328.

Fujiwara, T. (2015): "Voting Technology, Political Responsiveness, and Infant Health: Evidence from Brazil," *Econometrica*, 83, 423–464.

Fujiwara, T., K. C. Meng, and T. Vogl (2016): "Habit Formation in Voting: Evidence from Rainy Elections," *American Economic Journal: Applied Economic*, Forthcoming.

Fumagalli, E. and G. Narciso (2012): "Political institutions, voter turnout, and policy outcomes," *European Journal of Political Economy*, 28, 162–173.

Galasso, V. and T. Nannicini (2011): "Competing on Good Politicians," *American Political Science Review*, 105, 79–99.

Godefroy, R. and E. Henry (2016): "Voter turnout and fiscal policy," *European Economic Review*, 89, 389–406.

Gomez, B. T., T. G. Hansford, and G. A. Krause (2007): "The Republicans Should Pray for Rain: Weather, Turnout, and Voting in U.S. Presidential Elections," *The Journal of Politics*, 69, 649–663.

Green, D. P., P. M. Aronow, and M. C. McGrath (2012): "Field Experiments and the Study of Voter Turnout," Forthcoming in *Journal of Elections, Public Opinion & Parties.*

Grimmer, J., E. Hersh, B. Feinstein, and D. Carpenter (2011): "Are Close Elections Random?" Mimeo, Stanford (http://stanford.edu/ jgrimmer/cef2.pdf).

Hansford, T. G. and B. T. Gomez (2010): "Estimating the Electoral Effects of Voter Turnout," *American Political Science Review*, 104, 268–288.

Horiuchi, Y. and J. Saito (2009): "Rain, Election, and Money: The Impact of Voter Turnout on Distributive Policy Outcomes," Mimeo, Yale (http://ssrn.com/abstract=1906951).

Hyytinen, A., J. Meriläinen, T. Saarimaa, O. Toivanen, and J. Tukiainen (2017): "Wehen does Regression Discontinuity Design Work? Evidence from Random Election Outcomes," Mimeo, VATT.

Imbens, G. W. and J. D. Angrist (1994): "Identification and Estimation of Local Average Treatment Effects," *Econometrica*, 62, 467–475.

Jansson, A., O. E. Tveito, P. Pirinen, and M. Scharling (2007): "NORDGRID -a preliminary investigation on the potential for creation of a joint Nordic gridded climate dataset," Tech. rep., met.no report no. 03/2007.

Judd, K. L. (1998): *Numerical methods in economics*, MIT Press.

Kasara, K. and P. Suryanarayan (2015): "When do the Rich Vote Less than the Poor and Why? Explaining Turnout Inequality across the World," *American Journal of Political Science*, 59, 613–27.

Knack, S. (1994): "Does rain help the Republicans? Theory and evidence on turnout and the vote," *Public Choice*, 79, 187–209.

Kotakorpi, K., P. Poutvaara, and M. Terviö (2016): "Returns to Office in National and Local Politics," IZA Discussion Paper No. 10003.

Krumbein, W. C. (1959): "Trend surface analysis of contour-type maps with irregular control-point spacing," *Journal of Geophysical Research*, 64, 823–834.

Kurrild-Klitgaard, P. (2013): "It's the weather, stupid! Individual participation in collective May Day demonstrations," *Public Choice*, 155, 251–271.

Lee, D. S. (2008): "Randomized experiments from non-random selection in U.S. House elections," *Journal of Econometrics*, 142, 675 – 697.

Lee, D. S., E. Moretti, and M. J. Butler (2004): "Do Voters Affect or Elect Policies? Evidence from the U. S. House," *Quarterly Journal of Economics*, 119, 807–859.

Lind, J. T. (2015): "Spurious weather effects," CESifo Working Paper 5365.

Lo Prete, A. and F. Revelli (2014): "Voter Turnout and City Performance," SIEP Working Paper 10 (http://www.siepweb.it/siep/images/joomd/1415351423LoPrete_Revelli_WP_SIEP_676.pdf).

Lundqvist, H. (2011): "Is It Worth It? On the Returns to Holding Political Office?" Mimeo, University of Stockholm (http://www.ne.su.se/polopoly_fs/1.102970.1349261098!/menu/standard/file/IsItWorthIt.pdf).

Madestam, A., D. Shoag, S. Veuger, and D. Yanagizawa-Drott (2013): "Do Political Protests Matter? Evidence from the Tea Party Movement," *Quarterly Journal of Economics*, 128, 1633–85.

Meier, A. N., L. D. Schmid, and A. Stutzer (2016): "Rain, Emotions and Voting for the Status Quo," IZA Discussion Papers 10350.

Mohr, M. (2008): "New Routines for Gridding of Temperature and Precipitation Observations for "seNorge.no"," Tech. rep., met.no note 08/2008.

Montalvo, J. G. (2011): "Voting after the Bombings: A Natural Experiment on the Effect of Terrorist Attacks on Democratic Elections," *Review of Economics and Statistics*, 93, 1146–1154.

Mueller, D. C. and T. Stratmann (2003): "The economic effects of democratic participation," *Journal of Public Economics*, 87, 2129–2155.

Osborne, M. J. and A. Slivinski (1996): "A Model of Political Competition with Citizen-Candidates," *Quarterly Journal of Economics*, 111, 65–96.

Persson, M., A. Sundell, and R. Öhrvall (2014): "Does Election Day weather affect voter turnout? Evidence from Swedish elections," *Electoral Studies*, 33, 335–342.

Pettersen, P. A. and L. E. Rose (2007): "The dog that didn't bark: Would increased electoral turnout make a difference?" *Electoral Studies*, 26, 574–588.

Pettersson-Lidbom, P. (2008): "Do Parties Matter For Economic Outcomes? A Regression-discontinuity Approach," *Journal of the European Economic Association*, 6, 1037–1056.

Saglie, J., J. Bergh, and T. Bjørklund (2012): "Do Labour Parties Suffer from Declining Turnout? Evidence from Norwegian Local Elections," *Local Government Studies*, 38, 249–270.

Sforza, A. (2013): "The Weather Effect: Estimating the effect of voter turnout on electoral outcomes in Italy," Mimeo, London School of Economics and Political Sciences (http://www.bportugal.pt/pt-PT/BdP

Shachar, R. and B. Nalebuff (1999): "Follow the Leader: Theory and Evidence on Political Participation," *American Economic Review*, 89, 525–547.

Snyder, J. (2005): "Detecting Manipulation In U.S. House Elections," Unpublished manuscript, University of California, Berkeley (http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.335.6505&rep=rep1&type=pdf).

Snyder, J. M., O. Folke, and S. Hirano (2015): "Partisan Imbalance in Regression Discontinuity Studies Based on Electoral Thresholds," *Political Science Research and Methods*, 3, 169–186.

Sørensen, R. J. (1995): "The demand for local government goods," *European Journal of Political Research*, 27, 119–141.

Statistics Norway (2011): "Municipal and county council election," Web resource available at `http://www.ssb.no/en/table/01177`.

Tobler, W. R. (1969): "Geographical Filters and their Inverses," *Geographical Analysis*, 1, 234–253.

Tóka, G. (2004): "The Impact of Turnout on Election Outcomes in a Cross-national Perspective," Paper presented at the14th International Conference of Europeanists, Chicago, IL, 11-13 March 2004 (http://www.personal.ceu.hu/staff/Gabor_Toka/Papers/Toka04Chicago.pdf).

Tveito, O. E. and E. J. Førland (1999): "Mapping temperatures in Norway applying terrain information, geostatistics and GIS," *Norwegian Journal of Geography*, 53, 202–212.

Vogl, T. S. (2014): "Race and the politics of close elections," *Journal of Public Economics*, 109, 101–13.

Willumsen, F. (2011): "The value of political experience: Evidence from a regression discontinuity design," Mimeo, University of Oslo (https://sites.google.com/site/fredrikwillumsen/politicians.pdf).

Wittman, D. (1983): "Candidate Motivation: A Synthesis of Alternative Theories," *The American Political Science Review*, 77, pp. 142–157.

A Additional estimation results

A.1 Descriptive statistics

Table A-1: Descriptive statistics: Rainfall

	N	Mean	Std. dev.	Max value
Rainfall (mm)	4458	7.14	12.53	106.68
Rain positive	4458	0.86	0.35	1
Rain above 2.5 mm	4458	0.42	0.49	1

Table A-2: Descriptive statistics: Electoral behavior

	Overall	No rain	Rain	Difference
Turnout	0.681	0.676	0.688	-0.012***
	(0.071)	(0.074)	(0.067)	[0.000]
Vote share left	0.396	0.418	0.366	0.052***
	(0.154)	(0.149)	(0.155)	[0.000]
Vote share DNA	0.338	0.353	0.317	0.036***
	(0.134)	(0.131)	(0.135)	[0.000]
Vote share SV	0.050	0.055	0.043	0.012***
	(0.053)	(0.053)	(0.052)	[0.000]
Vote share Rødt	0.004	0.004	0.003	0.001***
	(0.012)	(0.012)	(0.011)	[0.004]
Vote share right	0.528	0.518	0.542	-0.024***
	(0.171)	(0.163)	(0.180)	[0.000]
Vote share Sp	0.162	0.159	0.167	-0.008**
	(0.124)	(0.125)	(0.123)	[0.026]
Vote share H	0.151	0.153	0.147	0.006**
	(0.099)	(0.099)	(0.099)	[0.036]
Vote share KrF	0.093	0.085	0.105	-0.020***
	(0.076)	(0.073)	(0.078)	[0.000]
Vote share V	0.050	0.046	0.055	-0.009***
	(0.054)	(0.053)	(0.056)	[0.000]
Vote share FrP	0.045	0.048	0.041	0.007***
	(0.070)	(0.072)	(0.068)	[0.001]
Vote share other	0.076	0.064	0.092	-0.028***
	(0.148)	(0.127)	(0.173)	[0.000]
Observations	4417	2569	1848	

Notes: The table shows means for electoral turnout and voter shares of parties and party groups. The sample is also split between municipality-years with and without substantial rain (above 2.5 mm), and a t-test on the difference between the two.

*Standard deviations are provided in parentheses and p-values for the t-test in square brackets. *, **, and *** denotes significant at the 10%, 5%, and 1% levels.*

Table A-3: Descriptive statistics: Outcomes

	Overall	No rain	Rain	Difference
Expenditure shares				
Child care	0.045	0.049	0.039	0.010***
	(0.034)	(0.034)	(0.033)	[0.000]
Education	0.258	0.253	0.265	-0.013***
	(0.067)	(0.062)	(0.072)	[0.000]
Elderly care	0.189	0.198	0.176	0.022***
	(0.100)	(0.099)	(0.101)	[0.000]
Health and social	0.111	0.112	0.109	0.003***
	(0.051)	(0.049)	(0.053)	[0.000]
Culture	0.050	0.051	0.049	0.002***
	(0.028)	(0.028)	(0.027)	[0.000]
Transport	0.037	0.034	0.041	-0.008***
	(0.028)	(0.026)	(0.030)	[0.000]
Central adm	0.076	0.078	0.073	0.005***
	(0.034)	(0.033)	(0.034)	[0.000]
Other	0.235	0.226	0.248	-0.022***
	(0.116)	(0.116)	(0.114)	[0.000]
Other outcomes				
Expenditures	83.406	81.632	85.831	-4.198***
	(37.292)	(35.674)	(39.270)	[0.000]
Investment share	0.143	0.138	0.149	-0.011***
	(0.083)	(0.082)	(0.084)	[0.000]
Total sales	2.604	3.068	2.035	1.033***
	(10.158)	(12.630)	(5.791)	[0.000]
Has sales	0.634	0.598	0.683	-0.085***
	(0.482)	(0.490)	(0.465)	[0.000]
Has property tax	0.543	0.533	0.561	-0.028**
	(0.498)	(0.499)	(0.496)	[0.013]
User charges	2.753	2.859	2.584	0.275***
	(1.325)	(1.365)	(1.240)	[0.000]
Growth in industrial empl.	0.006	0.005	0.007	-0.002
	(0.347)	(0.383)	(0.253)	[0.809]

Notes: The table shows means for the outcomes. The sample is also split between municipality-years with and without substantial rain (above 2.5 mm), and a t-test on the difference between the two.
Standard deviations are provided in parentheses and p-values for the t-test in square brackets.
, **, and * denotes significant at the 10%, 5%, and 1% levels.*

Table A-4: Descriptive statistics: Control variables

	Overall	No rain	Rain	Difference
Log population	8.466	8.516	8.397	0.119***
	(1.045)	(1.065)	(1.012)	[0.000]
Share women	0.495	0.495	0.494	0.002***
	(0.012)	(0.012)	(0.012)	[0.000]
Unemployment share	0.021	0.021	0.021	0.001***
	(0.014)	(0.014)	(0.013)	[0.000]
Share children aged 0-6	0.089	0.086	0.092	-0.006***
	(0.020)	(0.019)	(0.021)	[0.000]
Share children aged 7-15	0.137	0.135	0.140	-0.005***
	(0.020)	(0.019)	(0.020)	[0.000]
Share aged 66 and higher	0.157	0.156	0.158	-0.002***
	(0.039)	(0.040)	(0.038)	[0.006]
Observations	17676	10275	7401	

Notes: The table shows means for the control variables. The sample is also split between municipality-years with and without substantial rain (above 2.5 mm), and a t-test on the difference between the two.
Standard deviations are provided in parentheses and p-values for the t-test in square brackets.
, **, and * denotes significant at the 10%, 5%, and 1% levels.*

A.2 Individual parties

Table A-5: Effect of turnout on individual parties

	Vote share		Seat share	
Left	-0.00893***	(-3.97)	-0.00887***	(-3.68)
RV	-0.000399	(-1.45)	-0.000233	(-0.92)
SV	-0.00466***	(-4.16)	-0.00469***	(-3.95)
DNA	-0.00317	(-1.50)	-0.00332	(-1.44)
Right	-0.00975***	(-3.04)	-0.00935***	(-2.83)
V	-0.00333**	(-2.49)	-0.00251*	(-1.80)
SP	-0.000221	(-0.12)	-0.000250	(-0.12)
KRF	-0.00421***	(-3.89)	-0.00521***	(-4.64)
H	-0.00199	(-1.13)	-0.00136	(-0.74)
FRP	0.00498***	(3.60)	0.00526***	(3.74)
Other	0.0187***	(5.09)	0.0182***	(4.93)

Notes: The table shows the effect of election day rainfall on the vote and seat shares of each party. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Standard errors are clustered at the municipality level (using 2010 structure).
*t-values in parentheses,and *, **, and *** denotes significant at the 10%, 5%, and 1% levels.*

A.3 Absolute expenditure by sector

Table A-6: Political composition and expenditure patterns: Totals

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other	(9) Total
Without controls									
Seat share left	0.611**	0.207	0.651	-0.227	-0.0504	-0.363	0.0809	-0.0846	0.837
	(2.53)	(0.22)	(0.73)	(-0.40)	(-0.13)	(-1.16)	(0.14)	(-0.09)	(0.32)
R^2	0.831	0.585	0.815	0.492	0.219	0.0354	0.567	0.171	0.782
With controls									
Seat share left	0.510**	0.429	1.839**	0.237	0.239	-0.306	0.650	0.658	4.291*
	(2.11)	(0.47)	(2.32)	(0.42)	(0.66)	(-0.97)	(1.28)	(0.62)	(1.74)
R^2	0.838	0.596	0.839	0.507	0.233	0.0386	0.604	0.200	0.810

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other	(9) Total
Without controls									
Rain	-0.0615***	-0.0320	0.0680	-0.162**	-0.0899*	-0.00472	-0.0260	-0.262**	-0.601***
	(-2.63)	(-0.57)	(0.93)	(-2.46)	(-1.82)	(-0.13)	(-0.75)	(-2.52)	(-2.83)
R^2	0.831	0.585	0.815	0.493	0.219	0.0352	0.567	0.172	0.782
With controls									
Rain	-0.0557**	-0.0939*	-0.00686	-0.178***	-0.114**	-0.0115	-0.0628**	-0.286***	-0.840***
	(-2.37)	(-1.68)	(-0.10)	(-2.72)	(-2.20)	(-0.32)	(-1.97)	(-2.75)	(-4.05)
R^2	0.838	0.596	0.838	0.507	0.234	0.0385	0.604	0.201	0.810

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other	(9) Total
Without controls									
Seat share left	6.416**	3.331	-7.060	16.75**	9.347*	0.488	2.699	27.19**	62.48**
	(2.24)	(0.56)	(-0.93)	(2.13)	(1.66)	(0.13)	(0.74)	(2.05)	(2.20)
R^2	0.804	0.583	0.810	0.346	0.131	0.0371	0.564	-0.0113	0.730
Cragg-Donald F	65.96	66.37	66.37	66.65	66.28	67.07	66.28	66.45	65.94
With controls									
Seat share left	6.086**	10.22	0.746	19.29**	12.42*	1.244	6.848*	31.10**	91.57***
	(2.03)	(1.49)	(0.10)	(2.31)	(1.93)	(0.32)	(1.78)	(2.20)	(2.73)
R^2	0.814	0.573	0.839	0.324	0.0859	0.0379	0.581	-0.0253	0.705
Cragg-Donald F	60.33	60.78	60.88	60.96	60.63	61.40	60.55	60.83	60.18
Obs	17148	17154	17145	17144	17148	17154	17145	17145	17071
Mean dep. var	2.332	10.80	9.332	4.873	2.309	1.577	3.641	9.391	44.28

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.

*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

B Further estimation results
Not intended for final publication

In this Appendix, I include the following additional estimation results and robustness checks which are not intended for final publication:

1. Estimates with a continuous measure of ran (Tables B-1 and B-1)
2. Further decompositions by the average amount of rain in the municipality (Tables B-3 to B-7)
3. Full estimation results when decomposing by the left vote share (Tables B-8 to B-10)
4. Estimates with a high dimensional polynomial in the spatio-temporal trend (Tables B-12 and B-13)
5. Estimation with regional time trends instead of spatio-temporal trends (Tables B-14 and B-15)

Table B-1: Expenditure shares: Continuous measures of rain

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.00680*	-0.0274**	0.0288**	-0.00786	-0.00221	-0.00465	0.00123	0.00525
	(1.89)	(-2.21)	(2.29)	(-0.79)	(-0.46)	(-0.87)	(0.21)	(0.35)
R^2	0.805	0.356	0.744	0.218	0.0820	0.219	0.274	0.723
With controls								
Seat share left	0.00126	-0.0390***	0.0257**	-0.00556	0.000556	-0.00522	0.00307	0.0192
	(0.39)	(-3.52)	(2.06)	(-0.55)	(0.12)	(-0.98)	(0.54)	(1.30)
R^2	0.829	0.409	0.748	0.222	0.0880	0.222	0.280	0.733

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain	-0.0407**	0.129**	-0.0935	-0.00694	0.0415*	-0.0273	0.0486	-0.0501
	(-2.39)	(2.29)	(-1.59)	(-0.12)	(1.71)	(-0.86)	(1.40)	(-0.63)
R^2	0.805	0.356	0.744	0.218	0.0823	0.219	0.275	0.723
With controls								
Rain	-0.0355**	0.112**	-0.0886	0.00274	0.0381	-0.0271	0.0507	-0.0520
	(-2.16)	(2.17)	(-1.50)	(0.05)	(1.58)	(-0.86)	(1.48)	(-0.68)
R^2	0.829	0.407	0.748	0.222	0.0882	0.222	0.280	0.733

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.0958**	-0.302**	0.220	0.0163	-0.0977	0.0643	-0.114	0.118
	(2.14)	(-2.07)	(1.50)	(0.12)	(-1.55)	(0.83)	(-1.37)	(0.63)
R^2	0.775	0.257	0.727	0.219	0.0194	0.188	0.212	0.719
Cragg-Donald F	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00
With controls								
Seat share left	0.0843*	-0.265**	0.210	-0.00650	-0.0903	0.0642	-0.120	0.123
	(1.96)	(-1.99)	(1.42)	(-0.05)	(-1.44)	(0.83)	(-1.46)	(0.68)
R^2	0.803	0.344	0.732	0.224	0.0325	0.191	0.210	0.730
Cragg-Donald F	60.47	60.47	60.47	60.47	60.47	60.47	60.47	60.47
Obs	17069	17069	17069	17069	17069	17069	17069	17069
Mean dep. var	0.0446	0.258	0.189	0.111	0.0503	0.0368	0.0756	0.235

*Notes: Rain measure is amount of rain (in m) All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed. Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-2: Other political outcomes: Continuous measures of rain

A: OLS estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	-2.449	-0.0141	2.247	0.00107	0.0314	-0.0579	0.103
	(-0.54)	(-0.80)	(1.21)	(0.02)	(0.37)	(-0.18)	(0.74)
R^2	0.784	0.281	0.0641	0.725	0.145	0.316	0.0144
With controls							
Seat share left	-0.0488	-0.0162	2.116	0.0149	0.0231	0.422	0.110
	(-0.01)	(-0.93)	(1.15)	(0.32)	(0.27)	(1.46)	(0.77)
R^2	0.789	0.284	0.0639	0.726	0.150	0.396	0.0210

B: Reduced form estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Rain	14.62	-0.0443	-22.64**	-0.110	-0.803*	-3.436**	0.0632
	(0.61)	(-0.43)	(-2.25)	(-0.49)	(-1.77)	(-2.40)	(0.14)
R^2	0.784	0.281	0.0644	0.725	0.146	0.317	0.0141
With controls							
Rain	13.53	-0.0649	-23.07**	-0.0956	-0.779*	-2.365*	0.228
	(0.58)	(-0.64)	(-2.32)	(-0.44)	(-1.74)	(-1.77)	(0.49)
R^2	0.789	0.284	0.0642	0.726	0.150	0.396	0.0207

C: IV estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	-34.23	0.179	91.60*	0.252	1.578	16.21	-0.150
	(-0.62)	(0.42)	(1.70)	(0.49)	(1.54)	(1.40)	(-0.14)
Obs	0.780	0.266	-0.179	0.725	0.0140	-0.829	0.0178
R^2	61.58	19.74	19.60	63.95	32.29	9.014	12.73
With controls							
Seat share left	-31.91	0.255	90.79*	0.220	1.565	9.462	-0.530
	(-0.59)	(0.60)	(1.75)	(0.43)	(1.52)	(1.38)	(-0.45)
R^2	0.786	0.251	-0.174	0.727	0.0218	0.0512	0.0173
Cragg-Donald F	61.09	20.68	20.72	64.02	31.26	12.71	13.26
Obs	17071	12779	12828	17619	8650	11821	5161
Mean dep. var	83.41	0.143	2.604	0.634	0.543	2.753	0.00597

*Notes: Rain measure is amount of rain (in m) All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed. Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-3: Decomposition by average rain: Positive rain annually

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain×Below median rain	0.00549***	-0.0133***	-0.000974*	0.00204	-0.00191	-0.00142	0.000472	-0.000760	-0.00106	0.00360
	(3.95)	(-4.65)	(-1.74)	(1.24)	(-1.06)	(-0.79)	(0.56)	(-0.93)	(-1.11)	(1.49)
Rain×Above median rain	0.00594***	-0.00381	-0.000954	0.00416**	-0.000647	-0.00268	-0.000343	0.00156*	0.00101	-0.00211
	(3.64)	(-1.09)	(-1.41)	(2.40)	(-0.38)	(-1.39)	(-0.34)	(1.67)	(1.09)	(-0.92)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.356	0.744	0.218	0.082	0.220	0.273	0.722
F	15.64***	11.31***	2.68*	3.86**	0.65	1.37	0.21	1.77	1.11	1.65
	[0.000]	[0.000]	[0.070]	[0.022]	[0.524]	[0.255]	[0.814]	[0.171]	[0.330]	[0.194]
Panel B										
Rain	0.0160	-0.100***	-0.00740	-0.0138	-0.0127	-0.0190	0.00730	-0.00642	-0.00561	0.0577***
	(1.28)	(-3.99)	(-1.47)	(-1.02)	(-0.92)	(-1.30)	(0.95)	(-0.91)	(-0.69)	(2.89)
Rain×Share rainy days	-0.0136	0.121***	0.00848	0.0222	0.0150	0.0224	-0.00950	0.00890	0.00728	-0.0748***
	(-0.82)	(3.60)	(1.26)	(1.24)	(0.83)	(1.16)	(-0.93)	(0.96)	(0.68)	(-2.87)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.242	0.806	0.356	0.744	0.218	0.082	0.220	0.273	0.722

Notes: The dependent variables in Columns (3) to (10) are expenditure shares. Rain denotes a dummy for substantial rain (above 2.5 mm). In Panel A the variable is interacted with dummies for a municipality having above or below median number of days with positive rain annually, in Panel B with the share of days with positive rain annually. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table B-4: Decomposition by average rain: Substantial rain annually

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain×Below median rain	0.00462***	-0.00861***	-0.00178***	0.00213	-0.000159	-0.00253	-0.000771	-0.000431	0.0000141	0.00352
	(2.95)	(-2.62)	(-2.92)	(1.28)	(-0.08)	(-1.35)	(-0.88)	(-0.45)	(0.01)	(1.42)
Rain×Above median rain	0.00691***	-0.00928**	-0.000113	0.00399**	-0.00252	-0.00147	0.000989	0.00113	-0.000182	-0.00183
	(4.16)	(-2.58)	(-0.16)	(2.26)	(-1.42)	(-0.77)	(0.86)	(1.22)	(-0.20)	(-0.78)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.239	0.806	0.356	0.744	0.218	0.082	0.220	0.273	0.722
F	16.09***	7.87***	4.43**	3.69***	1.06	1.34	0.60	0.77	0.02	1.34
	[0.000]	[0.000]	[0.012]	[0.026]	[0.348]	[0.264]	[0.547]	[0.462]	[0.981]	[0.263]
Panel B										
Rain	0.00313	-0.0194**	-0.00474***	-0.00272	0.00250	-0.0139***	-0.00359	-0.000207	0.000568	0.0221***
	(0.70)	(-2.04)	(-2.76)	(-0.59)	(0.48)	(-2.79)	(-1.36)	(-0.09)	(0.21)	(3.27)
Rain×Share rainy days	0.00621	0.0255	0.00904**	0.0138	-0.00912	0.0285**	0.00880	0.00129	-0.00156	-0.0507***
	(0.58)	(1.11)	(2.20)	(1.28)	(-0.78)	(2.45)	(1.36)	(0.24)	(-0.25)	(-3.37)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.356	0.744	0.219	0.082	0.220	0.273	0.722

Notes: The dependent variables in Columns (3) to (10) are expenditure shares. Rain denotes a dummy for substantial rain (above 2.5 mm). In Panel A the variable is interacted with dummies for a municipality having above or below median number of days with substantial rain annually, in Panel B with the share of days with substantial rain annually. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table B-5: Decomposition by average rain: Positive rain in September

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain×Below median rain	0.00492***	-0.0121***	-0.00113**	0.00295*	-0.000871	-0.00249	0.0000372	-0.000278	-0.0000959	0.00187
	(3.52)	(-3.86)	(-2.01)	(1.86)	(-0.47)	(-1.45)	(0.04)	(-0.32)	(-0.11)	(0.78)
Rain×Above median rain	0.00660***	-0.00526	-0.000779	0.00314*	-0.00181	-0.00148	0.000145	0.00101	-0.0000661	-0.000165
	(4.02)	(-1.54)	(-1.19)	(1.80)	(-1.09)	(-0.77)	(0.16)	(1.11)	(-0.07)	(-0.07)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.356	0.744	0.218	0.082	0.220	0.273	0.722
F	15.59***	8.96***	2.83*	3.47**	0.73	1.38	0.01	0.65	0.01	0.31
	[0.000]	[0.000]	[0.060]	[0.032]	[0.484]	[0.251]	[0.986]	[0.525]	[0.992]	[0.732]
Panel B										
Rain	0.00806	-0.0908***	-0.00860*	-0.00900	-0.0116	-0.0255*	0.00439	-0.00533	0.0000711	0.0556***
	(0.72)	(-4.30)	(-1.96)	(-0.75)	(-0.93)	(-1.90)	(0.67)	(-0.74)	(0.01)	(3.02)
Rain×Share rainy days	-0.00281	0.0976***	0.00907*	0.0143	0.0122	0.0280*	-0.00511	0.00672	-0.000182	-0.0650***
	(-0.21)	(3.88)	(1.72)	(0.99)	(0.83)	(1.74)	(-0.65)	(0.80)	(-0.02)	(-3.00)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.242	0.806	0.356	0.744	0.218	0.082	0.220	0.273	0.722

Notes: The dependent variables in Columns (3) to (10) are expenditure shares. Rain denotes a dummy for substantial rain (above 2.5 mm). In Panel A the variable is interacted with dummies for a municipality having above or below median number of days with positive rain in September, in Panel B with the share of days with positive rain in September. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table B-6: Decomposition by average rain: Amount of rain annually

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain×Below median rain	0.00439***	-0.0113***	-0.00133**	0.00185	0.000142	-0.00514***	-0.000457	-0.00121	-0.000881	0.00702***
	(2.95)	(-3.55)	(-2.29)	(1.13)	(0.08)	(-2.89)	(-0.54)	(-1.27)	(-0.92)	(2.86)
Rain×Above median rain	0.00708***	-0.00647*	-0.000604	0.00422**	-0.00276	0.00109	0.000628	0.00186**	0.000711	-0.00515**
	(4.43)	(-1.95)	(-0.96)	(2.43)	(-1.57)	(0.58)	(0.64)	(2.21)	(0.76)	(-2.35)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.356	0.744	0.219	0.082	0.220	0.273	0.723
F	16.02***	8.50***	3.15**	3.78**	1.23	4.24**	0.33	3.00*	0.66	7.43***
	[0.000]	[0.000]	[0.044]	[0.024]	[0.292]	[0.015]	[0.722]	[0.051]	[0.519]	[0.001]
Panel B										
Rain	0.00326	-0.0139***	-0.00281***	-0.00124	0.00179	-0.00769***	-0.00126	0.000572	-0.00136	0.0120***
	(1.03)	(-2.70)	(-2.89)	(-0.46)	(0.63)	(-2.69)	(-0.88)	(0.34)	(-0.88)	(3.12)
Rain×Share rainy days	0.0000518	0.000105	0.0000388**	0.0000896*	-0.0000649	0.000119**	0.0000281	-0.00000503	0.0000268	-0.000232***
	(0.78)	(1.10)	(2.13)	(1.82)	(-1.27)	(2.19)	(0.97)	(-0.15)	(0.93)	(-3.47)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.357	0.744	0.219	0.082	0.220	0.273	0.722

Notes: The dependent variables in Columns (3) to (10) are expenditure shares. Rain denotes a dummy for substantial rain (above 2.5 mm). In Panel A the variable is interacted with dummies for a municipality having above or below median number of days with amount of rain annually, in Panel B with the share of days with amount of rain annually. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table B-7: Decomposition by average rain: Amount of rain annually

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain×Below median rain	0.00472***	-0.0112***	-0.00103*	0.00185	0.000336	-0.00524***	-0.000980	-0.000758	-0.000608	0.00643***
	(3.13)	(-3.58)	(-1.73)	(1.10)	(0.18)	(-2.91)	(-1.20)	(-0.80)	(-0.64)	(2.62)
Rain×Above median rain	0.00673***	-0.00649*	-0.000896	0.00422**	-0.00294*	0.00118	0.00115	0.00141	0.000439	-0.00456**
	(4.19)	(-1.91)	(-1.45)	(2.44)	(-1.70)	(0.63)	(1.11)	(1.63)	(0.47)	(-2.04)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.356	0.744	0.219	0.082	0.220	0.273	0.723
F	15.81***	8.64***	2.66***	3.83**	1.44	4.34**	1.22	1.54	0.29	5.92***
	[0.000]	[0.000]	[0.071]	[0.022]	[0.238]	[0.014]	[0.295]	[0.217]	[0.746]	[0.003]
Panel B										
Rain	0.00220	-0.0123**	-0.00260***	0.000590	0.00296	-0.00817***	-0.00179	0.000822	-0.000926	0.00911**
	(0.77)	(-2.42)	(-2.82)	(0.24)	(1.11)	(-3.14)	(-1.42)	(0.52)	(-0.63)	(2.57)
Rain×Share rainy days	0.0000598	0.0000571	0.0000275**	0.0000412	-0.0000719*	0.000104***	0.0000316	-0.00000826	0.0000142	-0.000138***
	(1.26)	(0.76)	(2.05)	(1.14)	(-1.95)	(2.77)	(1.61)	(-0.32)	(0.67)	(-2.89)
Mean dep. var	0.6809	0.3961	0.0445	0.2582	0.1885	0.1104	0.0503	0.0369	0.0756	0.2356
Obs	4417	4417	17126	17126	17126	17126	17126	17126	17126	17126
R^2	0.696	0.240	0.806	0.356	0.744	0.219	0.082	0.220	0.273	0.722

Notes: The dependent variables in Columns (3) to (10) are expenditure shares. Rain denotes a dummy for substantial rain (above 2.5 mm). In Panel A the variable is interacted with dummies for a municipality having above or below median number of days with amount of rain annually, in Panel B with the share of days with amount of rain annually. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. The F-test is a test for no regional heterogeneity with p-values in square brackets. * significant at 10%; ** at 5%; *** at 1%.*

Table B-8: Political composition and expenditure patterns: Left vote share below 45 %

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
SeatShareLeft	0.00275	-0.0505***	0.0595***	-0.00773	-0.00609	-0.0136*	0.00756	0.00815
	(0.55)	(-3.48)	(3.53)	(-0.53)	(-0.77)	(-1.76)	(0.78)	(0.30)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10722	10722	10722	10722	10722	10722	10722	10722
R^2	0.795	0.357	0.734	0.210	0.0684	0.201	0.249	0.711
With controls								
SeatShareLeft	0.00275	-0.0505***	0.0595***	-0.00773	-0.00609	-0.0136*	0.00756	0.00815
	(0.55)	(-3.48)	(3.53)	(-0.53)	(-0.77)	(-1.76)	(0.78)	(0.30)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10722	10722	10722	10722	10722	10722	10722	10722
R^2	0.795	0.357	0.734	0.210	0.0684	0.201	0.249	0.711

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain above 2.5 mm	-0.000821	0.00306**	-0.00321**	-0.000444	0.00107	0.000960	0.000481	-0.00110
	(-1.43)	(2.07)	(-2.00)	(-0.26)	(1.24)	(1.37)	(0.57)	(-0.49)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10722	10722	10722	10722	10722	10722	10722	10722
R^2	0.795	0.355	0.733	0.209	0.0685	0.201	0.249	0.711
With controls								
Rain above 2.5 mm	-0.000821	0.00306**	-0.00321**	-0.000444	0.00107	0.000960	0.000481	-0.00110
	(-1.43)	(2.07)	(-2.00)	(-0.26)	(1.24)	(1.37)	(0.57)	(-0.49)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10722	10722	10722	10722	10722	10722	10722	10722
R^2	0.795	0.355	0.733	0.209	0.0685	0.201	0.249	0.711

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
SeatShareLeft	0.0858	-0.321*	0.336*	0.0465	-0.112	-0.100	-0.0504	0.115
	(1.39)	(-1.83)	(1.84)	(0.26)	(-1.23)	(-1.31)	(-0.56)	(0.48)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10721	10721	10721	10721	10721	10721	10721	10721
R^2	0.778	0.291	0.707	0.209	0.0181	0.170	0.242	0.710
Cragg-Donald F	55.04	55.04	55.04	55.04	55.04	55.04	55.04	55.04
With controls								
SeatShareLeft	0.0858	-0.321*	0.336*	0.0465	-0.112	-0.100	-0.0504	0.115
	(1.39)	(-1.83)	(1.84)	(0.26)	(-1.23)	(-1.31)	(-0.56)	(0.49)
Mean dep. var	0.0466	0.263	0.196	0.107	0.0492	0.0366	0.0770	0.224
Obs	10721	10721	10721	10721	10721	10721	10721	10721
R^2	0.778	0.291	0.707	0.209	0.0181	0.170	0.242	0.710
Cragg-Donald F	55.04	55.04	55.04	55.04	55.04	55.04	55.04	55.04

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). Outcome variables are expenditure shares. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.

*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-9: Political composition and expenditure patterns: Left vote share between 45 and 55 %

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
SeatShareLeft	0.0382**	0.0190	-0.0297	-0.0343	0.0267	-0.0135	0.0228	-0.0292
	(2.43)	(0.42)	(-0.61)	(-0.81)	(1.49)	(-0.74)	(1.01)	(-0.47)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.810	0.348	0.721	0.237	0.127	0.254	0.221	0.661
With controls								
SeatShareLeft	0.0382**	0.0190	-0.0297	-0.0343	0.0267	-0.0135	0.0228	-0.0292
	(2.43)	(0.42)	(-0.61)	(-0.81)	(1.49)	(-0.74)	(1.01)	(-0.47)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.810	0.348	0.721	0.237	0.127	0.254	0.221	0.661

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain above 2.5 mm	-0.0000379	0.00216	0.00159	-0.00611**	-0.000909	0.00105	0.000619	0.00164
	(-0.04)	(0.72)	(0.49)	(-2.16)	(-0.68)	(0.82)	(0.38)	(0.33)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.808	0.348	0.721	0.240	0.126	0.254	0.220	0.660
With controls								
Rain above 2.5 mm	-0.0000379	0.00216	0.00159	-0.00611**	-0.000909	0.00105	0.000619	0.00164
	(-0.04)	(0.72)	(0.49)	(-2.16)	(-0.68)	(0.82)	(0.38)	(0.33)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.808	0.348	0.721	0.240	0.126	0.254	0.220	0.660

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
SeatShareLeft	0.0169	-0.625	-0.516	1.832	0.290	-0.317	-0.171	-0.509
	(0.06)	(-0.60)	(-0.51)	(0.90)	(0.60)	(-0.61)	(-0.32)	(-0.31)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.813	0.239	0.696	-1.298	0.0247	0.0897	0.197	0.644
Cragg-Donald F	6.491	6.491	6.491	6.491	6.491	6.491	6.491	6.491
With controls								
SeatShareLeft	0.0169	-0.625	-0.516	1.832	0.290	-0.317	-0.171	-0.509
	(0.07)	(-0.60)	(-0.51)	(0.90)	(0.60)	(-0.61)	(-0.32)	(-0.31)
Mean dep. var	0.0446	0.253	0.187	0.116	0.0503	0.0351	0.0738	0.240
Obs	3531	3531	3531	3531	3531	3531	3531	3531
R^2	0.813	0.239	0.696	-1.298	0.0247	0.0897	0.197	0.644
Cragg-Donald F	6.491	6.491	6.491	6.491	6.491	6.491	6.491	6.491

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). Outcome variables are expenditure shares. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-10: Political composition and expenditure patterns: Left vote share above 55 %

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
SeatShareLeft	-0.0104	0.0226	-0.0482	0.0408	-0.00983	0.0122	0.00841	-0.0156
	(-1.10)	(0.56)	(-1.35)	(1.30)	(-0.75)	(0.87)	(0.47)	(-0.34)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.771	0.415	0.706	0.289	0.134	0.204	0.303	0.651
With controls								
SeatShareLeft	-0.0104	0.0226	-0.0482	0.0408	-0.00983	0.0122	0.00841	-0.0156
	(-1.10)	(0.56)	(-1.35)	(1.30)	(-0.75)	(0.87)	(0.47)	(-0.34)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.771	0.415	0.706	0.289	0.134	0.204	0.303	0.651

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain above 2.5 mm	0.000547	-0.00320	-0.00440	-0.00278	0.000622	-0.00178	-0.00168	0.0127**
	(0.51)	(-0.99)	(-1.25)	(-0.70)	(0.44)	(-1.02)	(-1.15)	(2.22)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.771	0.415	0.706	0.288	0.134	0.204	0.304	0.654
With controls								
Rain above 2.5 mm	0.000547	-0.00320	-0.00440	-0.00278	0.000622	-0.00178	-0.00168	0.0127**
	(0.51)	(-0.99)	(-1.25)	(-0.70)	(0.44)	(-1.02)	(-1.15)	(2.22)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.771	0.415	0.706	0.288	0.134	0.204	0.304	0.654

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
SeatShareLeft	-0.0925	0.709	0.897	0.492	-0.149	0.284	0.337	-2.478
	(-0.41)	(0.70)	(0.69)	(0.62)	(-0.48)	(0.61)	(0.81)	(-0.87)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.757	0.153	0.485	0.138	0.0978	-0.0178	0.0287	-0.496
Cragg-Donald F	6.230	6.230	6.230	6.230	6.230	6.230	6.230	6.230
With controls								
SeatShareLeft	-0.0925	0.709	0.897	0.492	-0.149	0.284	0.337	-2.478
	(-0.41)	(0.70)	(0.69)	(0.62)	(-0.48)	(0.61)	(0.81)	(-0.87)
Mean dep. var	0.0373	0.244	0.163	0.117	0.0546	0.0400	0.0726	0.272
Obs	2816	2816	2816	2816	2816	2816	2816	2816
R^2	0.757	0.153	0.485	0.138	0.0978	-0.0178	0.0287	-0.496
Cragg-Donald F	6.230	6.230	6.230	6.230	6.230	6.230	6.230	6.230

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). Outcome variables are expenditure shares. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-11: Incumbency effects

	(1) Turnout	(2) Left share	(3) Child care	(4) Education	(5) Elderly care	(6) Health, social	(7) Culture	(8) Transport	(9) Central adm	(10) Other
Panel A										
Rain	0.00561*	-0.00243	0.000480	0.00343	-0.00484	0.00195	0.00187	-0.00130	0.00156	-0.00315
	(1.75)	(-0.36)	(0.42)	(1.12)	(-1.35)	(0.54)	(1.11)	(-0.81)	(0.85)	(-0.74)
Lagged Vote Share Left	0.00628	0.391***	0.0131***	-0.0265*	0.0212	-0.0272**	0.00694	0.000110	0.00622	0.00606
	(0.47)	(14.81)	(2.75)	(-1.66)	(1.29)	(-2.08)	(1.05)	(0.02)	(0.66)	(0.24)
Rain×Lagged VSL	0.000878	-0.00822	-0.00256	-0.00337	0.00945	-0.00624	-0.00573	0.00313	-0.00401	0.00934
	(0.11)	(-0.50)	(-0.96)	(-0.49)	(1.12)	(-0.74)	(-1.51)	(0.85)	(-0.96)	(0.93)
Mean dep. var	0.6748	0.3930	0.0496	0.2533	0.2027	0.1086	0.0520	0.0352	0.0787	0.2200
Obs	3941	3941	15171	15171	15171	15171	15171	15171	15171	15171
R^2	0.70	0.35	0.77	0.34	0.71	0.23	0.05	0.21	0.23	0.70
Panel B										
Rain	0.00567***	-0.00644**	-0.000334	0.00179	-0.00105	-0.000271	-0.0000377	-0.000110	0.0000628	-0.0000434
	(5.01)	(-2.54)	(-0.69)	(1.37)	(-0.74)	(-0.19)	(-0.05)	(-0.16)	(0.08)	(-0.02)
Lagged Left majority	-0.00178	0.0450***	0.00238**	-0.00580**	0.000940	-0.000909	0.00316***	-0.0000160	0.000874	-0.000637
	(-0.76)	(8.52)	(2.57)	(-2.16)	(0.29)	(-0.33)	(2.68)	(-0.02)	(0.56)	(-0.19)
Rain×Lagged Left maj.	0.000963	-0.00215	-0.000937	0.00151	-0.000616	-0.000448	-0.00140	0.000154	-0.000440	0.00217
	(0.42)	(-0.40)	(-0.98)	(0.65)	(-0.20)	(-0.15)	(-1.11)	(0.13)	(-0.32)	(0.59)
Mean dep. var	0.6748	0.3930	0.0496	0.2533	0.2027	0.1086	0.0520	0.0352	0.0787	0.2200
Obs	3941	3941	15171	15171	15171	15171	15171	15171	15171	15171
R^2	0.70	0.27	0.77	0.34	0.71	0.23	0.05	0.21	0.23	0.70

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). Lagged means measured in the previous electoral period. Outcome variables in Columns (3) to (10) are expenditure shares. All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-12: Expenditure shares: High-dimensional controls

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.00419	-0.0372***	0.0217*	-0.00474	0.000293	-0.00411	0.00180	0.0180
	(1.17)	(-3.21)	(1.92)	(-0.47)	(0.06)	(-0.76)	(0.33)	(1.36)
R^2	0.814	0.383	0.753	0.242	0.0950	0.233	0.287	0.737
With controls								
Seat share left	0.000335	-0.0439***	0.0210*	-0.00396	0.00167	-0.00461	0.00312	0.0264**
	(0.10)	(-4.25)	(1.88)	(-0.39)	(0.34)	(-0.87)	(0.59)	(2.03)
R^2	0.832	0.425	0.757	0.246	0.0979	0.236	0.291	0.744

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain	-0.00106***	0.00327***	-0.00221*	-0.00227*	0.000264	0.000162	0.000115	0.00173
	(-2.60)	(2.88)	(-1.82)	(-1.77)	(0.43)	(0.27)	(0.18)	(1.01)
R^2	0.814	0.381	0.753	0.242	0.0951	0.233	0.287	0.737
With controls								
Rain	-0.000575	0.00272**	-0.00192	-0.00201	0.000121	0.000261	0.0000452	0.00135
	(-1.49)	(2.55)	(-1.55)	(-1.57)	(0.20)	(0.44)	(0.07)	(0.79)
R^2	0.832	0.423	0.757	0.246	0.0979	0.236	0.291	0.744

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.110**	-0.366**	0.246*	0.241*	-0.0247	-0.0197	-0.0169	-0.171
	(2.01)	(-2.43)	(1.75)	(1.68)	(-0.38)	(-0.29)	(-0.24)	(-0.96)
R^2	0.777	0.258	0.733	0.139	0.0981	0.239	0.292	0.729
Cragg-Donald F	66.31	66.31	66.31	66.31	66.31	66.31	66.31	66.31
With controls								
Seat share left	0.0659	-0.322**	0.226	0.228	-0.0106	-0.0323	-0.0122	-0.143
	(1.45)	(-2.09)	(1.39)	(1.49)	(-0.15)	(-0.48)	(-0.17)	(-0.72)
R^2	0.818	0.339	0.740	0.157	0.104	0.239	0.296	0.738
Cragg-Donald F	59.40	59.40	59.40	59.40	59.40	59.40	59.40	59.40
Obs	17069	17069	17069	17069	17069	17069	17069	17069
Mean dep. var	0.0446	0.258	0.189	0.111	0.0503	0.0368	0.0756	0.235

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. The number of terms in the spatio-temporal trend is chosen to minimize BIC. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-13: Other political outcomes: High-dimensional controls

A: OLS estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	2.541	-0.00999	1.848	0.00183	0.0308	0.0426	0.0778
	(0.61)	(-0.57)	(0.99)	(0.04)	(0.37)	(0.16)	(0.64)
R^2	0.792	0.286	0.0674	0.730	0.197	0.439	0.0309
With controls							
Seat share left	3.645	-0.0111	1.838	0.0159	0.0292	0.242	0.0856
	(0.84)	(-0.63)	(0.99)	(0.34)	(0.35)	(0.95)	(0.70)
R^2	0.796	0.289	0.0673	0.731	0.201	0.473	0.0379

B: Reduced form estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Rain	-0.890***	-0.000588	-0.390*	-0.0118**	0.000771	-0.00226	-0.00697
	(-2.65)	(-0.31)	(-1.82)	(-2.45)	(0.08)	(-0.10)	(-0.53)
R^2	0.792	0.285	0.0676	0.730	0.197	0.439	0.0287
With controls							
Rain	-0.930***	-0.000999	-0.399*	-0.0122**	0.00182	-0.00106	-0.000278
	(-2.78)	(-0.53)	(-1.86)	(-2.53)	(0.18)	(-0.05)	(-0.02)
R^2	0.796	0.289	0.0675	0.731	0.201	0.472	0.0365

C: IV estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	97.52**	0.109	64.97	1.250**	-0.273	-1.212	0.797
	(2.17)	(0.31)	(1.47)	(2.08)	(-0.17)	(-0.12)	(0.79)
Obs	0.758	0.286	-0.0390	0.705	0.204	0.449	0.0484
R^2	66.89	19.99	20.25	67.57	13.69	6.329	20.31
With controls							
Seat share left	106.8**	0.187	67.16	1.333**	-0.359	-1.367	0.324
	(2.14)	(0.49)	(1.31)	(2.02)	(-0.22)	(-0.16)	(0.35)
R^2	0.755	0.279	-0.0458	0.703	0.204	0.476	0.0676
Cragg-Donald F	59.98	19.10	19.51	60.49	12.75	5.981	20.24
Obs	17071	12779	12828	17619	8650	11821	5161
Mean dep. var	83.41	0.143	2.604	0.634	0.543	2.753	0.00597

Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects, spatio-temporal trends, and average September rainfall. The number of terms in the spatio-temporal trend is chosen to minimize BIC. Estimates with controls also control for the population share of children, young, elderly, women and unemployed.
*Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-14: Expenditure shares: Regional time trends

A: OLS estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.00236	-0.0422***	0.0169	0.00246	0.000820	-0.00482	0.00169	0.0227
	(0.67)	(-3.48)	(1.37)	(0.25)	(0.17)	(-0.84)	(0.28)	(1.58)
R^2	0.808	0.358	0.746	0.230	0.0816	0.220	0.273	0.728
With controls								
Seat share left	-0.000411	-0.0478***	0.0137	0.00337	0.00290	-0.00534	0.00280	0.0308**
	(-0.13)	(-4.31)	(1.12)	(0.34)	(0.60)	(-0.94)	(0.49)	(2.17)
R^2	0.830	0.407	0.750	0.234	0.0885	0.223	0.280	0.738

B: Reduced form estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Rain	-0.000791*	0.00392***	-0.00174	-0.00197	0.0000995	0.000210	-0.000140	0.000409
	(-1.93)	(3.42)	(-1.43)	(-1.57)	(0.16)	(0.35)	(-0.22)	(0.24)
R^2	0.808	0.357	0.746	0.230	0.0816	0.220	0.273	0.728
With controls								
Rain	-0.000508	0.00312***	-0.00125	-0.00183	-0.0000881	0.000274	-0.000137	0.000416
	(-1.31)	(2.92)	(-1.02)	(-1.46)	(-0.14)	(0.45)	(-0.22)	(0.24)
R^2	0.830	0.405	0.750	0.234	0.0885	0.223	0.280	0.738

C: IV estimates

	(1) Child care	(2) Education	(3) Elderly care	(4) Health, social	(5) Culture	(6) Transport	(7) Central adm	(8) Other
Without controls								
Seat share left	0.0777*	-0.385***	0.171	0.194	-0.00978	-0.0206	0.0138	-0.0402
	(1.79)	(-2.68)	(1.37)	(1.51)	(-0.16)	(-0.35)	(0.22)	(-0.24)
R^2	0.787	0.203	0.735	0.159	0.0839	0.221	0.275	0.728
Cragg-Donald F	73.92	73.92	73.92	73.92	73.92	73.92	73.92	73.92
With controls								
Seat share left	0.0516	-0.316**	0.127	0.185	0.00893	-0.0278	0.0139	-0.0422
	(1.26)	(-2.45)	(1.00)	(1.42)	(0.14)	(-0.45)	(0.22)	(-0.25)
R^2	0.820	0.314	0.744	0.171	0.0917	0.222	0.283	0.737
Cragg-Donald F	69.42	69.42	69.42	69.42	69.42	69.42	69.42	69.42
Obs	17069	17069	17069	17069	17069	17069	17069	17069
Mean dep. var	0.0446	0.258	0.189	0.111	0.0503	0.0368	0.0756	0.235

*Notes: Rain measured as a dummy for substantial rain (above 2.5 mm). All estimations control for two way fixed effects and region specific time trends. Estimates with controls also control for the population share of children, young, elderly, women and unemployed. Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*

Table B-15: Other political outcomes: Regional time trends

A: OLS estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	2.332	-0.0160	2.460	-0.00435	0.0278	0.358	0.120
	(0.53)	(-0.89)	(1.34)	(-0.09)	(0.33)	(1.10)	(0.79)
R^2	0.796	0.282	0.0649	0.724	0.167	0.339	0.0144
With controls							
Seat share left	3.248	-0.0169	2.366	0.00394	0.0282	0.588**	0.122
	(0.72)	(-0.95)	(1.31)	(0.08)	(0.33)	(2.04)	(0.80)
R^2	0.799	0.285	0.0647	0.726	0.171	0.415	0.0220

B: Reduced form estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Rain	-1.105***	-0.000742	-0.385*	-0.0124**	0.00634	-0.00968	-0.00462
	(-3.28)	(-0.40)	(-1.82)	(-2.52)	(0.58)	(-0.40)	(-0.41)
R^2	0.796	0.282	0.0649	0.724	0.168	0.338	0.0141
With controls							
Rain	-1.108***	-0.000956	-0.386*	-0.0118**	0.00629	-0.00859	0.00250
	(-3.34)	(-0.51)	(-1.84)	(-2.41)	(0.57)	(-0.37)	(0.23)
R^2	0.799	0.285	0.0648	0.726	0.171	0.413	0.0217

C: IV estimates

	(1) Expenditures	(2) Invest. share	(3) Total sales	(4) Has sales	(5) Has prop. tax	(6) User charges	(7) Growth ind. empl.
Without controls							
Seat share left	108.3**	0.142	74.91	1.195**	-0.627	2.604	0.312
	(2.50)	(0.39)	(1.47)	(2.16)	(-0.57)	(0.40)	(0.41)
Obs	0.748	0.273	-0.0940	0.698	0.147	0.320	0.0195
R^2	74.29	16.51	15.99	78.31	33.99	6.862	29.34
With controls							
Seat share left	111.9**	0.186	76.46	1.165**	-0.653	2.501	-0.172
	(2.56)	(0.49)	(1.47)	(2.07)	(-0.57)	(0.36)	(-0.23)
R^2	0.749	0.268	-0.100	0.702	0.149	0.402	0.0270
Cragg-Donald F	69.85	15.89	15.43	73.90	31.18	5.890	28.03
Obs	17071	12779	12828	17619	8650	11821	5161
Mean dep. var	83.41	0.143	2.604	0.634	0.543	2.753	0.00597

*Notes: Rain measured as a dummy for substantial rain (above 2.5 mm).All estimations control for two way fixed effects and region specific time trends. Estimates with controls also control for the population share of children, young, elderly, women and unemployed. Standard errors are clustered at the present day municipality level. * significant at 10%; ** at 5%; *** at 1%.*