Does the Size of the Legislature Affect the Size of Government? Evidence from Two Natural Experiments*

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Abstract

This paper makes use of regression discontinuity designs to estimate the effect of the number of legislators on the size of government. The results indicate a negative effect, i.e., the larger the size of the legislature the smaller is the size of government. This runs counter to conventional wisdom. One potential explanation is that more legislators can better control a budget maximizing bureaucracy. I present evidence that is consistent with the proposed mechanism.

Key words: government spending, legislature size, legislative policy-making, distributive politics, regression-discontinuity design, panel data

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1. Introduction

Legislative policy-making has received considerable attention by economists and political scientists alike. One institutional feature of legislative policy-making which has attracted particular interest is legislature size and its relation to government size or government spending.[1] In a seminal paper, Weingast et al. (1981) argued that legislators will try to benefit their constituents at the expense of the general community through pork barrel spending and other distributive policies. This would give rise to excessive government spending because each legislator will internalize all the benefits from spending but only a fraction of the costs.

A number of empirical studies find support for this hypothesis but it is questionable whether they have identified a causal relationship since they have not properly addressed the endogeneity of legislature size.[2] For example, there may be a problem with reversed causality since a large public sector may require a large number of legislators to participate in the budget process due to the increased complexity of budget matters.[3]

Another potential concern is that previous studies conflate data from countries with very different election systems (e.g., Bradbury Crain 2001, Perotti and Kontpoulos 2002), or that they combine data with both multi-member (i.e., at large election system) and single-member districts (e.g., Baqir 2002 and Gilligan and Matsusaka 1995, 2001), despite the fact that the theoretical prediction of a positive relationship between legislature size and government size is solely based on plurality rule and single member districts.[4] Nonetheless, all previous studies use the model by Weingast et al. (1981) to

[1] Legislature size is also of perennial interest to policy makers. For example, one of the earliest discussions of legislature size appears in the Federalist Papers. The debate about the appropriate size is still ongoing in many countries. In England, for example, there is a current research project on council size and democracy on behalf of the Electoral Commission, which is an independent body set up by the UK Parliament. The outcome of this research is intended to provide the Boundary Committee for England with a robust basis for what might be the appropriate council size.

[2] Baqir (2002), Bradbury and Crain (2001), Gilligan and Matsusaka (1995, 2001) and Perotti and Kontpoulos (2002) all find a positive effect.

[3] There might also be an omitted variable problem due to unmeasured voter preferences since political institutions (legislature size) that are no longer preferred by a majority of voters will be overturned and therefore these institutions will simply reflect the preferences of the electorate.

[4] For example, in Baqir's (2002) study, more than 85 percent of the US cities have at large electoral systems, where candidates for office are elected from the entire jurisdiction. In the studies on US States by

motivate their findings. Moreover, even the conventional wisdom based on the Weingast et al. model can be questioned. In fact, Primo and Snyder (2008) show theoretically that the relationship between legislature size and government spending could be negative even under plurality rule and with single member districts. This type of theoretical ambiguity can only be solved empirically.

The main contribution of this paper is to estimate the causal effect of council size on government spending for jurisdictions with an identical electoral system. Naturally, the challenge of estimating a causal effect is to find some credible exogenous source of variation in legislature size. Generally, it is very difficult to find such variation since it is the policymakers themselves that decide on both size and policy, which makes legislature size endogenous to policy. Nonetheless, the national laws regulating the council-size in Finnish and Swedish local governments provide an unusually credible source of exogenous variations in legislature size. In Finland, the council size is a deterministic and discontinuous function of population size while in Sweden council size is a discontinuous but not deterministic function of the number of eligible voters. The Finnish council-size law thus fits with a sharp regression-discontinuity (RD) design while the Swedish law fits with a fuzzy RD design.

Results from both Finland and Sweden indicate a negative effect, i.e., the larger the size of the legislature, the smaller the size of government. The fact that this finding holds in two independent data sets and at multiple discontinuity points lends considerable credibility to the results being both internally and externally valid.

At first sight, a negative effect seems counterintuitive, at least if the explanation is based on the logic put forward in the model by Weingast et al. (1981) where policy decisions create benefits for well-defined groups (e.g., voters in an electoral district or ward) and with the costs dispersed in society at large. However, a negative relationship might arise, for example if there is a conflict between the legislature and the bureaucracy about the level of spending. Bureaucrats are often assumed to maximize their budgets (e.g., Niskanen 1971) while policymakers cater to the voters, and voters are often characterized as being fiscally conservative (e.g., Peltzman 1992, Besley and Case 1995).

Gilligan and Matsusaka (1995, 2001), many U.S. State Legislatures also have multimember districts. For example, as of 1998, 13 states still had multimember districts in at least one of their legislative bodies.

As a result, bureaucrats are therefore likely to prefer larger levels of spending than politicians.

The basic idea behind the agency problem is that elected legislators cannot make all policy decisions themselves since time constraints suggest that they must delegate some of their decision-making power to administrative officials (e.g., Weingast and Moran 1983). Politicians therefore seek ways of monitoring and controlling how bureaucrats exercise this authority but monitoring and influencing bureaucrats' behavior also takes time. Thus, increasing the number of legislators may lead to a better monitoring and control of the public administration, in particular if politicians are severely time-constrained. Consequently, aggregate spending may be reduced if there is an agency problem between the legislature and the bureaucracy.

A potential agency problem between politicians and the public administration is likely to be particularly stark in Finland and Sweden for a number of reasons. For example, the local government sector is huge in both countries. It constitutes about 20 percent of GDP and employs nearly 20 percent of the total working population. Elected local politicians are also typically nonprofessionals that perform their duty in addition to their normal jobs. Thus, local politicians are likely to be severely-time constrained. Moreover, civil servants of local governments have strong positions with extensive decision-making powers in a number of policy areas.

One way of testing the proposed mechanism—the lack of political control of the bureaucracy—is to analyze outcomes that are more directly under the influence of the bureaucrats, such as public employment and operating expenditures, since the conflict of interest between the legislature and the public administration is likely to be particularly visible in areas where the administration has an extensive decision-making authority. I find evidence of local public employment and operating expenditures being negatively related to the size of the legislature.[5]

[5] An anonymous referee suggested the following alternative interpretation of the results. "If the councils are ultimately appropriating monies, then bureaucracies can't spend more than is appropriated. So the mechanism might be slightly different. When legislatures are smaller, monitoring is not quite as effective, so bureaucrats can more easily argue that more employees and more funds are required to accomplish a given task. As a result, the councils approve more spending, and bureaucrats devote it to areas like employment over which they have more control."

In sharp contrast to the Weingast et al. (1981) prediction about the oversupply of public projects, I find little evidence that capital expenditure is affected by council size. This suggests that there is probably not much of pork-barrel politics in this type of settings.[6] Nonetheless, it is important to stress that the estimated council-size effect for aggregate spending still takes into account that some other sort of concentrated benefits/dispersed costs policies could emerge in multi-member districts. In other words, the RD design provides reduced form estimates of the impacts of the treatment-council size. However, if there is any non-geographic pork-barrel politics at play, this would make it even harder to detect a negative council-size effect.

The result of this paper has a number of important implications for the literature on legislature size and the size of government. First, the negative council-size effect suggests that political context is of importance and therefore it casts some doubt on the validity of using the Weingast el al. model (1981) as a theoretical benchmark in political systems with at large elections and proportional representations. Second, all significant actors that can potentially affect economic policy must be brought into the analysis in order to understand how the size of the legislature affects economic policy. Specifically, previous research has neglected the role of the government administration in shaping the details of economic policy.[7] Finally, the results of this paper suggest that much more work is needed, both theoretical and empirical, to reconcile the conflicting findings in the current literature.[8]

More generally, this paper contributes to the literature on estimating the effects of political institutions on economic policy by exploiting unusually credible sources of variations in political institutions (e.g., Besley and Case 2003, and Persson and Tabellini 2003).[9] Specifically, this paper also adds to the recent work on regression-discontinuity

[6] Council members in both Swedish and Finnish local governments are elected at large, that is, a council member represents all residents in a local government. The logic of the Weingast et al. model (1981) does not seem to apply in these settings which is based on the fact that politicians are elected from single-member districts. As result, the incentive for policymakers to overspend due to a common pool problem is likely to be more or less absent.

[7] Curiously, the standard reference in political economics, Persson and Tabellini (2000), does not deal with the bureaucracy as discussed in the introduction to their book.

[8] Ting (2010) develops a theory of bureaucratic influence on distributive politics.

[9] This literature faces very difficult identification problems as discussed by Besley and Case (2003) and Persson and Tabellini (2003). Acemoglu (2005), for example, "questions whether this research has successfully uncovered causal effects".

designs in political economics that implements RD designs.[10] In fact, this paper is the first study to exploit population thresholds as an RD strategy at the local government level.[11] In many other countries such as Italy, Brazil, Germany, France, Sweden, Finland and Norway, the population size of a local government determines specific "treatments" or political institutions that can be used for the identification of key relationships in political economics.

The rest of the paper is structured as follows. Section 2 describes and analyzes the local government data set from Finland. Section 3 describes and analyzes the Swedish local governments. Section 4 provides suggestive evidence of the mechanism underlying the negative relationship between council size and spending while Section 5 concludes the paper.

2. Finland

2.1 Background

This section describes the local governments in Finland with a particular focus on the council-size laws of local governments that provide the exogenous sources of variations in council size.

Local governments play an extremely significant role in Finnish society. They are, for example, responsible for the provision of day care, education, care of the elderly and social welfare services.[12] As a result, their spending as a share of GDP is about 18 percent and they employ roughly 20 percent of the total workforce. They also have the constitutional right of self-government. For example, they can set their own proportional income tax rate. In 2008, the range in the proportional income tax rate was between 16 to 21 percent. They have no balanced budget requirements and no restrictions on borrowing. Moreover, central government transfers account for less than one-fifth of all local government revenues.

[10] For example, Pettersson-Lidbom (2001a, 2008) were the first studies that exploited close elections as an RD strategy to answer whether parties matter for policy choices while Lee (2008) was the first to use them to estimate the incumbency advantage.

[11] Pettersson-Lidbom (2001b, 2004) were the first two studies exploiting treatment rules based on local governments' population sizes. This literature includes later work by, e.g., Bordignon et al. (2009), Brollo et al. (2009), Chamon et al. (2008), Ferraz and Finan (2009), Fujiwara (2008, 2010), Gagliarducci et al. (2008), Gagliarducci and Nannicini (2009) and Litschig et al. (2009).

[12] 48 % of total spending are on social welfare and health care and 24 % on education and culture.

The local election schedule is fixed and elections are held simultaneously across all local governments every fourth year (e.g., 1976, 1980, etc.) on the fourth Sunday in October. The election system is proportional representation (PR) in multi-seat constituencies. The PR system is an open and unordered list system. In Finland, this means that a voter only casts her vote on an individual candidate and not directly on a party, and that the central election committee compiles a combined list of candidates in which the candidates of all parties are enumerated in an order drawn by lot. The open and unordered list system thus implies that voters have a larger influence on who gets elected than under a closed list system. Voter turnout has been between 60 to 80 percent during the studied period 1977 to 2002. Three major parties dominate the political arena (the Social Democratic Party, the Centre Party, and the Coalition Party (right-wing)). Consensus has been the dominant mode of Finnish politics since the formation of a broadly based coalition government at the national level in the late 1960s.[13]

Finnish local governments have a council-manger government system.[14] The decision-making power of the local government is exercised by a council elected by the residents. The council is the highest decision-making body in the municipality. Decisions are taken by simple majority of the council members, but before 1995 decisions relating to financial or budgetary questions usually required two-third majorities in council votes. The municipal executive board is appointed by the council and it is chosen for a two-year period, albeit in practice it often remains the same for the full four-year term of the council. The board meets, on average, once a week. The manager is appointed by the council and her tenure may be either definite or indefinite. She is not a member of the Council, nor does she sit on the board. In other words, the manager is an employee, or the highest level civil servant within the municipality. She serves under the executive board. The manager is the head of the administration, financial management and other functions of the municipality.

[13] Studies that investigate the effect of partisanship variables on fiscal policy outcomes at the local level in Finland find little or no effects (e.g., Moisio 2002), which is consistent with the consensus mode of politics.
[14] More than half of all American cities with populations of between 25,000 and 250,000 operate under council–manager governments (e.g., MacDonald 2008) .

A national law prescribes a specific number of council members in relation to the population size at a specific date during the election year.[15] Importantly, data on population size is based on the central government's administrative records, which means that the population is measured without errors and that it cannot be misreported by the local governments. Moreover, population data is registered on a yearly basis which offers a number of attractive features as compared to data sets only based on census years (typically every tenth year).[16] Most importantly, there are no other policies that change at any of these population thresholds since according to the legislation, all municipalities, whether large or small, have identical responsibilities.

The council size law is displayed in Table 1 and it states that if a municipality's population is less or equal to 2,000, the council must consist of 17 members; if the population is larger than 2,000 but less or equal to 4,000 the law states that the council size must be 21, etc. The law can now potentially induce nine discontinuities between population size and the size of the council at the following population levels or thresholds: 2,001, 4,001, 8,001, 15,001, 30,001, 60,001, 120,001, 250,001 and 400,001. For instance, suppose that a municipality had 2,000 inhabitants and thus had to have 17 council members. Suppose further that the population increased by one, i.e., to 2,001, then the local government would be forced by law to increase its council size to 21.

2.2 Data and empirical framework

This paper uses data on Finnish local governments during the period 1977 to 2002. In 1977, there existed 464 local governments but due to voluntary amalgamations, this number was reduced to 448 in 2002. I will exclude all local governments that have amalgamated during the period and all local governments that belong to the autonomous region of Aland. This leaves us with a remaining sample of 391 local governments.

The empirical design will be based on a regression-discontinuity (RD) approach as noted above. However, the RD approach will differ from the traditional cross-sectional approach for reasons explained in the following. As an illustration of the problem with using a traditional RD design in the current application, all election years, namely the

[15] Until the election 1992, it was the population size on January 1st during an election year that determined the council size. From the election in 1996 it is the population size on May 31st.
[16] The population data used in this paper is measured on an annual basis on December 31st.

years 1976, 1980, 1984, 1988, 1992, 1996 and 2000, are pooled together. Table 1 shows the number of observations within an interval of one percent around each of the cut-offs (e.g., the interval at the threshold 2,000 ranges between population sizes 1980 and 2020). At each of these thresholds, the number of observations ranges from 0 to 26. The very small sample size creates problems for a traditional RD design since it is largely based on non-parametric identification (e.g., Hahn et al. 2001, Lee 2008). In particular, when the sample size is severely limited, the distribution of the treatment-determining variable will not have continuous support (i.e., there will be intervals with few or no observations) which makes non-parametric estimation methods impractical since extrapolation is now also required outside the neighborhood of the discontinuity. Moreover, a limited sample size also means that the efficiency aspect of the estimation method becomes much more salient. To address these concerns, I will pool together data from *all* thresholds and use a fixed-effect approach combined with the RD set up, that is, I will estimate regressions of the form

$$(1) \qquad Y_{it} = \alpha_i + \lambda_t + \beta Csize_{it} + f(x_{it}) + u_{it}$$

where Y_{it} is a measure of government size, $Csize_{it}$ is the council size, $f()$ is a smooth function of the treatment-determining or forcing variable x_{it} (population size), α_i is a fixed-municipality effect and λ_t is a year-fixed effect. The parameter of interest is β − the council-size effect − which is assumed to be linear across all treatment thresholds.

Although equation (1) clearly imposes more parametric assumptions than the traditional RD, it seems to be a sensible specification when the sample size is limited for two reasons. A traditional RD exploits the fact that local randomization ensures that the samples of subjects "just below" and "just above" the threshold are similar on average, both in terms of observed and unobserved characteristics. However, in practice, a very small sample size makes it questionable whether treatment and comparison groups are comparable, i.e., balanced on all pre-treatment characteristics, as recently discussed by Bruhn and McKenzie (2009).[17] In sharp contrast, a fixed-effect approach explicitly makes

[17] Bruhn and McKenzie (2009) state that in samples of 300 or more, the method of randomization (e.g., pure randomization, stratification, pair-wise matching) is of no importance in terms of achieving balance. However, for very persistent outcome variables and in smaller samples, the method of randomization is critical for achieving balance.

the treatment and comparison groups comparable *independently* of sample size, since the comparison is made within the same subject rather than between different subjects. A second reason for using a fixed-effect approach is that it can be more efficient than a pure cross-sectional approach if the error variance is greatly reduced by the inclusion of the fixed effects.

A within-subject approach also has the attractiveness that it can exploit the time-series variation in the data. For example, it is possible to estimate dynamic causal effects by using a distributed lag model of council size, i.e.,[18]

$$(2) \qquad Y_{it} = \alpha_i + \lambda_t + \beta_1 Csize_{it+1} + \beta_2 Csize_{it} + \beta_3 Csize_{it-1} + f(x_{it}) + u_{it}$$

where β_2 measures the impact effect, β_3 the one-period dynamic multiplier effect, and β_1 is the effect one-period before the treatment (council size) actually occurs. With equation (2), it is possible test for how quickly the change in council size affects the outcome. For example, if the treatment effect occurs within the first time period, then $\beta_3=0$. Moreover, if $\beta_1 \neq 0$, this would cast some doubt on a causal interpretation of the relationship between council size and government size, since this means that the treatment effect arises before the treatment itself. In other words, this is a falsification test of the identification strategy.

Another way of exploiting the time-series data is to estimate equation (1) separately for those local governments that increased their council sizes and for those that decreased their council sizes. If these two estimates are similar this would further strengthen a causal interpretation since it is then harder to explain these correlations by some omitted confounding factor.

Turning to a discussion about the time-series variation in council size in Finland, Table 1 shows the number of law-induced changes in council size across the years of investigation 1977-2002 for each of the nine population thresholds. There have been six elections and the change in council size can only occur the year after an election year. As a result, any changes in council size could only take place in the years 1981, 1985, 1989, 1993, 1997 and 2001. Table 1 shows that there are 30 or more changes at the first three thresholds (2000, 4000 and 8000). Table 1 also reveals that there are a total of 123

[18] For a textbook treatment of how to estimate dynamic causal effects, see Stock and Watson (2007).

changes in council size during the sample period: two municipalities had three changes, 11 had two changes, while 95 had one change.

Total real spending per capita will be used as a measure of government size. In the regressions, both spending and council size will be expressed in logarithmic form. Thus, the council-size effect β will have an elasticity interpretation.

A number of other control variables than the treatment-determining variable will be included: income, the proportion of the population aged 0 to 15, and the proportion of the population aged 65 and above. In principle, there is no need to include additional covariates in the regression discontinuity approach other than the correct functional form of the treatment determining variable to get an unbiased estimate of the treatment effect. In practice, however, there may still be reasons for including other regressors so as to avoid a small sample bias and increase statistical efficiency.

Table 2 presents summary statistics for the Finnish data. All Finnish data is publicly available and was obtained from Statistics Finland (Tilastokeskus).

2.3 Results

In this section, I present results on the relationship between council size and government size from the RD designs in Finland. Initially, however, I present results from a conventional cross-sectional regression, i.e., OLS regressions with a number of control variables, as used by many of the previous studies. These results may be seen as a benchmark for assessing potential biases in previous work. Columns 1 and 2 of Table 3 present the results from OLS regressions of government spending on council size with and without controls for a number of confounding factors. I control for the proportion of people aged above 65, the proportion of people aged below 15, income per capita, population size, since these are considered to be a standard set of control variables in the empirical literature investigating the determinants of policy choices of state and local governments (e.g., Besley and Case 2003). I also add a full set of time-fixed effects since I pool the data across many years. Huber-White standard errors clustered at the municipality level are reported following the suggestions of Bertrand et al. (2004). This turns out to be an important consideration since the standard errors allowing for arbitrary

serial correlation within municipalities are roughly two times larger than the heteroskedastic-robust standard errors suggesting that the latter are not valid.[19]

Column 1 shows that the relationship between spending and council size is positive and highly significant in the specifications without any controls. For example, the estimated council size effect is 0.21. Since this effect is expressed as an elasticity measure—spending and council size are in log forms—this implies that a 10 percent increase in council size increases spending by about 2.1 percent. This suggests that, in practice, total spending is increased between 4.2 and 6.3 percent since most of the changes in council size are between 20 and 30 percent. When including control variables in column 2, the estimated council-size effect decreases somewhat to 0.16.

As previously noted, a positive statistical association does not necessarily reflect a causal relationship since we have not isolated any exogenous variations in council size. This is what I attempt to do in the following using results from the RD design, i.e., equation 1. Since a major concern in a regression discontinuity design is whether the control function $f(x_{it})$ is correctly specified, I will a use number of different specifications of the control function. Specifically, I will go from a first-order up to a fifth-order polynomial in population size as a way of testing whether the estimate of the council-size effect is sensitive to the different specifications of the control function.

I will also include fixed-municipality and time effects in all specifications. The inclusion of the fixed-municipality effects ensures that we only compare within-municipalities which are of great importance since otherwise the treatment and control groups are not likely to be comparable due to a problem with small sample sizes as previously discussed.

Table 3 shows the results. In Column 3, the results from a pure fixed effect (FE) regression are displayed. In Column 4, I add the proportion of people aged above 65, the proportion of people aged below 15, and income per capita to the specification. Columns 5-9 of Table 3 show the result from the regression-discontinuity (RD) specification: I step-wise add more flexible polynomials in population size: first to fifth order. In sharp

[19] The statistical significance of the results from the papers by Bradbury and Crain (2001), Gilligan and Matsusaka (1995, 2001) and Perotti and Kontpoulos (2002) are probably grossly overstated since they do not account for serial correlation in their panel data regressions even though legislature size and spending are quite persistent over time.

contrast to the conventional OLS results, all estimated council size effects are negative, i.e., a larger council size decreases spending. It is important to note that the estimated council size effect is basically similar in the last three columns (7-9) since all estimates are in the narrow range of −0.081 to −0.090. Thus, the insensitivity of the estimated council-size effect to polynomials of degree 3 or higher suggests that the control function is not misspecified. It is also noteworthy that a pure fixed effect analysis or controlling for too few polynomials in population size would result in a larger estimate of the council-size effect.

As an additional specification check, the council-size effect is estimated only using observations that are close to the treatment thresholds since the estimate from such a "discontinuity" sample should be equal (apart from sampling variability) to the estimate from the control function approach, unless the control function $f(x_{it})$ is misspecified. Table 4 reports results from samples with four different window sizes around the discontinuities: ±25, ±10, ±5, and ±2.5 percent, respectively. In addition, different specifications of $f(x_{it})$ are being used, namely in Column 1 it is a third-order polynomial, in Column 2 it is a fourth-order polynomial, and in Column 3 it is a fifth-order polynomial. Most of the council-size estimates in Table 4 are strikingly similar suggesting that $f(.)$ is not misspecified.

As another specification check is to exploit time series changes in council size, namely rule-based increases and decreases in council size over time as discussed above. Table 5 reports specifications for those local governments that were required to increase their council size and for those that were forced to decrease their size. In each case, three different specifications of the control function are used: namely a third-, fourth- and fifth-order polynomial in population size. Once more, all specifications include control variables together with fixed municipality and time effects. The estimates for those with an increasing council size are about −.07 and for those with a decreasing council size about −.09. Although these estimates are less precisely estimated than those in Table 3 (the standard errors are about 30 percent larger), they are still broadly similar which lends some credibility to a causal interpretation of the estimated council size effect.

Another way of exploiting time series changes in council sizes is to estimate dynamic causal effects, i.e., a distributed lag model relating council size and its lags (and

leads) to spending (see equation 2). Table 6 shows the results from such specifications where the ±5 percent sample with a fifth-order polynomial is being used. For comparison purposes, Column 1 displays the estimate from the ±5 percent sample which is taken from Panel C in Table 7. In the subsequent columns of Table 6, results are reported where lags and leads of council size are added to the specification in Column 1. It is noteworthy that it is only the coefficient on the contemporaneous value of council size that is significant since neither the lags nor the leads are significantly different from zero in any of the specifications in Table 6. The insignificant estimates of all lags of council size therefore suggest that the effect of a change in council size takes place within the first year of a change in council size, while the insignificant estimates of the leads lend support to the credibility of the identification strategy.

3 Sweden

3.1 Background

Sweden is currently divided into 290 local governments or municipalities, which cover the entire country. Local governments (or municipalities) play a very important role in the Swedish economy, both in terms of the allocation of functions among different levels of government and economic significance. They are, for example, responsible for the provision of day care, education, care of the elderly, and social welfare services. In trying to quantify their economic importance, it can be noted that during the 1980s and 1990s, their share of spending out of GDP was 25 percent and they employed roughly 20 percent of the total Swedish workforce. Swedish local governments also have a large degree of autonomy. They have the constitutional right of self-government, they have no restrictions on borrowing, and they have no balanced budget rules.[20] Moreover, less than 25 percent of their income come from grants, whereas the rest mostly comes from a proportional income tax, which each municipality can set freely.

The election schedule is fixed and elections are held every fourth year on the third Sunday in September.[21] Voter turnout has been high, close to 90 percent, in many of the local elections in Sweden. The Swedish election system is based on closed list

[20] From 2000, there is a "weak" balanced budget rule in force.
[21] Since 1994, elections are held every fourth year.

proportional representation with the existence of several political parties. However, in contrast to the consensus mode of politics in Finland, the political map in Sweden has been characterized by a clear dividing line between socialist and non-socialist parties leading to a quite stable two-bloc system. The two-bloc feature has also lead to relatively large differences in fiscal policy outcomes between the two blocs at the local level as discussed by Pettersson-Lidbom (2001a, 2008).

The system of local government in Sweden is in many respects similar to a city commission government and a cabinet-style council government. A legislative municipal assembly is elected from party-list proportional representation at municipal elections. The assembly, in turn, appoints a municipal executive committee from its council members. The executive committee is headed by its chairman. The structure of the local public administration in Sweden is similar to the Finnish structure discussed above.

The Swedish council size law prescribes a minimum requirement of council size in relation to the number of eligible voters as can be seen from Table 7.[22] The law states that if the number of eligible voters is less or equal to 12,000, the council must consist of at least 31 members; if the number of eligible voters is between 12,000 and 24,000, the law states that the council size must be no less than 41; if the number of eligible voters is over 24,000 but less or equal to 36,000, then the size must be at least 51, and finally if the number of eligible voters is more than 36,000, the size must be at least 61. The law can now potentially induce three discontinuities between the number of eligible voters and the size of the council at the thresholds of 12,000, 24,000 and 36,000.

Table 7 shows the actual size of the local council grouped by segments with a minimum requirement of council sizes of 31, 41, 51 and 61. This table also reveals that many municipalities have chosen to have more council members than what is required by law. This is particularly true for those with a requirement of at least 31 members. On average, this group has slightly more than 40 seats. As will be discussed below, the municipalities that were forced to change their council size due to the statutory law are those who will help identify the council size effect.

[22] Until 1997, eligibility to vote was based on information pertaining to July 1st the year before the election year, but since then it is based on information from the previous election (i.e., four years back in time).

At the 12, 000 threshold only one municipality was forced to change its council size at the lowest threshold, whereas 12 and 7 municipalities had to change their number of seats for the middle and highest cutoffs, respectively.

2.2 Data and empirical framework

This paper uses data on Swedish local governments during the period 1977 to 2002. In 1977, there existed 277 local governments but due to voluntary splits, this number was increased to 289 in 2002. I will exclude all local governments that have been engaged in splits during the period. This leaves us with a remaining sample of 265 local governments.

In the Swedish setting, where the size of the local council is only partly determined by statutory law, a different empirical approach than in the Finnish case is required since the regression discontinuity design is not sharp but rather "fuzzy". One approach in the fuzzy regression-discontinuity case is to use the method of instrumental variables (e.g., Angrist and Pischke 2009 and Hahn et al. 2001) as explained in the following.[23]

The Swedish council size law, as displayed in Table 7, states that the number of council members must be at *least* 31, 41, 51 or 61 depending on in which of four intervals the number of eligible voters in a local government falls. Thus, the law potentially induces three discontinuities in council size at values 12,000, 24,000 and 36,000. The idea is to use these discontinuities as instrumental variables, that is, to divide the municipalities into four groups and use a set of dummy variables to indicate each group, i.e., Z_{31}=1[$vot \leq 12{,}000$], Z_{41} =1[$12{,}000 < vot \leq 24{,}000$], Z_{51} =1[$24{,}000 < vot \leq 36{,}000$], and Z_{61} =1[$vot > 36{,}000$] where *vot* is the number of eligible voters and the sub-indices

[23] The use of instrumental variables raises the issue of the interpretation of the estimated parameter of interest, namely the council-size effect. Here, we can draw on the treatment literature. This literature has defined four different causal effects: average treatment effect (ATE), treatment on the treated effect (TT), local average treatment effect (LATE) and marginal treatment effect (MTE). It turns out that these effects coincide if the treatment effect is linear and constant across all units. However, if this is not the case, the exogeneity assumption of the instruments alone is usually not sufficient for identifying a meaningful treatment effect. Instead, one needs to make additional assumptions about how the instrument affects the participation or selection into treatment. For example, random assignment into treatment and control groups and full compliance with the treatment protocol identifies the ATE. In our case, if the constant treatment assumption fails, the council size effect will be identified as TT since there is a population of municipalities that is denied to take certain treatments because of the council size law as discussed by Angrist and Imbens (1991).

refer to the minimum required council size within each group. Since the instruments are mutually orthogonal indicator variables, it is possible to construct distinct IV or Wald estimates of the council-size effect (e.g., Angrist 1991). Thus, it is possible to construct three different estimates of the council-size effect since there are three linearly independent dummy variables. However, we can use a Two-Stage-Least-Square (2SLS) procedure to form a single 2SLS estimate. The 2SLS estimate is a weighted average of each of the instrumental variables estimates obtained taking the instruments one by one.[24] The instrumental variable approach can now formally be expressed by two equations:

$$Y_{it} = \alpha_i + \lambda_t + \theta Csize_{it} + f(x_{it}) + \varepsilon_{it}, \tag{3}$$

$$Csize_{it} = \alpha_i + \lambda_t + \psi_{41} Z_{41it} + \psi_{51} Z_{51it} + \psi_{61} Z_{61it} + g(x_{it}) + \xi_{it}, \tag{4}$$

where equation (3) is the structural equation and equation (4) is the reduced form or the "first-stage" equation for the endogenous variable $Csize_{it}$. Here, equation (3) is similar to equation (1) except for the treatment-determining variable in the Swedish case being the number of eligible voters, *vot*, rather than population size. The previous discussion about equation (1) therefore automatically transfers to equation (3) while equation (4) requires some additional comments about instrument validity, that is, whether the instruments: Z_{41}, Z_{51}, and Z_{61}, are exogenous and relevant.

The requirement that the instruments should be exogeneous implies that once we control for $f(.)$, λ_t, and α_i, this will partial out any other effects between the instruments and the size of government. The requirement of relevance of the instruments will be checked by computing the *F*-statistics testing the hypothesis that the coefficients on the instruments are all zero in the first-stage regression of 2SLS. This first-stage *F*-statistic should exceed 10 to avoid the weak instrument problem as discussed by Staiger and Stock (1997).

[24] Another useful way of thinking about this particular way of constructing instrumental variables is to make a comparison with a randomized experiment where there is only partial compliance with the treatment protocol. Since the council size can be partly chosen by the municipalities, there will only be partial compliance with the treatment protocol. In such a case, the *assigned* treatment level can serve as an instrumental variable for the *actual* treatment level, which is exactly the reason why the council-size law can be used to construct instrumental variables for council size.

In contrast to the sharp RD design, in the fuzzy design it is problematic to take dynamic treatment effects, i.e. include leads and lags of the council size, into account since the fuzzy design is based on an instrumental variable approach where the identification of many endogenous variables with only a few available instruments is infeasible.

Table 8 shows the summary statistics for the Swedish data. All Swedish data is publicly available and was obtained from Statistics Sweden.

3.3 Results

In this section, I present the results from the Swedish natural experiment. However, I first start with the results from conventional cross-sectional specifications which are displayed in Columns 1 and 2 of Table 9. The OLS specifications in Table 9 are identical to the OLS specification in Table 3 for Finland. Similarly to the Finnish results, there is a positive relation between council size (Column 1) and spending but the council-size effect becomes negative but insignificant when controls are added to the specification for Sweden (Column 2).

Turning to the instrumental variable approach (i.e., equation 1 and 2), Table 9 shows the results from two-stage least squares specifications. The first-stage *F* test is about 10 for most of the specifications, suggesting that the instruments are not particularly weak. All council-size estimates in columns 3-9 are very imprecisely measured which is not surprising given the very few numbers of law-induced council size changes in Sweden (the standard errors are 6-8 times larger for Sweden as compared to Finland). Nonetheless, it is still noteworthy that all estimates are negative. Moreover, the elasticity of the council-size effect in Columns 8 and 9, the two most general specifications, is nearly identical to the elasticity results in Finland (e.g., see Table 3).

Taken together, the close similarity between the Swedish and the Finnish results suggests that the same mechanism may be at work in both settings. In other words, this suggests that the negative council-size effect of the RD designs does not only have internal validity but also some external validity.

4. Mechanism

In this section, I provide suggestive evidence on the mechanism that might underlie the negative council-size effect for total spending in Finland and Sweden. As noted in the introduction, the agency problem between politicians and bureaucrats is likely to be most noticeable in policies over which the administration has considerable influence.

One policy outcome that the local administration is likely to have considerably discretion over is operating expenditures since it is generally the bureaucrats that are involved in most of the day-to-day activities of the local governments. Unfortunately, operating expenditures are not available for Sweden. Table 10 presents the results for Finland using the same RD specification as in Table 3. All estimates are negative and all of them except one are significantly different from zero at the 10 percent level. Moreover, the size of the council-size effect is nearly identical to those in Table 3.

Another local policy over which bureaucrats may have considerably influence is local public employment. The number of local government employees per 1000 inhabitants is 68 for Sweden and 46 for Finland. These numbers are comparable with the U.S average of 52 for state employees and local government employees in 2003, which once more underscores the economic importance of local governments in Finland and Sweden. Table 11 shows the results for public employment,[25] as measured by the number of employees per capita: Columns 1-3 show the results for Finland while Columns 4-6 display the results for Sweden. These RD specifications are more parsimonious than previous ones. This is because employment in Finland is only available for a shorter period of time (i.e., 1980-2002); there are lots of missing values, and employment is a highly persistent outcome. It is noteworthy that the estimates are negative for both Finland and Sweden, and of similar magnitudes. All estimates for Finland are also statistically significant from zero at conventional levels.

Finally, I test the Weingast et al. (1981) prediction about the oversupply of public projects. Capital expenditure should be a good measure of the size of public projects. I only have data on capital expenditure from Finland. Table 12 shows that capital expenditure is not related to the council size for any of the seven specifications.

[25] I am grateful to Matz Dahlberg for providing me with the employment data for Finland.

Moreover, the council-size estimate also switches signs, i.e., it is sometimes positive and sometimes negative. These results therefore suggest that there is not much of pork-barrel politics in Finland.

5. Conclusion

This paper empirically investigates the relationship between council size and government size. It exploits unusually credible sources of exogenous sources of variation in council size in Finland and Sweden. In Finland, council size is a deterministic and discontinuous function of population size while in Sweden council size is a discontinuous but not deterministic function of the number of eligible voters. The Finnish council-size law thus fits with a sharp regression-discontinuity (RD) design while the Swedish law fits with a fuzzy RD design.

The results indicate a negative effect i.e., the larger the size of the legislature the smaller is the size of government in both settings. This runs counter to conventional wisdom based on the model by Weingast et al. (1981).

I argue that the negative council size effect may be due to a potential conflict between the legislature and the bureaucracy about spending. Bureaucrats are likely to prefer larger spending than politicians since they want to maximize their budgets (Niskanen 1971) while politicians would like to cater to “fiscally conservative” voters (Peltzman 1992). I present evidence that is consistent with the proposed mechanism.

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Table 1. Local councils in Finland during the period 1977-2002

Population thresholds	Number of council members required by law	Number of observations within an interval of one percent below cut-off	Number of observations within an interval of one percent above cut-off	Number of council changes
2,000	17 below and equal to the threshold and 21 above	14	9	30
4,000	21 below and equal to the threshold and 27 above	7	17	35
8,000	27 below and equal to the threshold and 35 above	10	16	33
15,000	35 below and equal to the threshold and 43 above	7	1	16
30,000	43 below and equal to the threshold and 51 above	2	3	8
60,000	51 below and equal to the threshold and 59 above	0	0	0
120,000	59 below and equal to the threshold and 67 above	0	1	1
250,000	67 below and equal to the threshold and 75 above	0	0	0
400,000	75 below and equal to the threshold and above	0	0	0

Note. At the 2,000 threshold there are altogether 23 observations from 18 different local governments, at 4,000: altogether 24 observations from 18 different local governments, at 8,000: altogether 26 observations from 21 different local governments, at 15,000: altogether 8 observations from 8 different local governments, at 30,000: altogether 5 observations from 5 different local governments, at 60,000: no observation, at 120,000: altogether one observation from one local government, at 250,000: no observation, at 440,000: no observation.

Table 2. Descriptive statistics for Finland

	Mean	St. Dev.	Min	Max
Council size	28.0	10.0	17	85
Spending per capita	20,041	5,577	6,537	58,345
Population size	10,913	31,765	240	559,718
The proportion of the population aged 0 to 15	20.88	3.30	11.35	38.64
The proportion of the population aged 65 and above	16.04	4.48	4.08	30.33
Income	44,314	12,607	16,723	174,557

Note- Spending per capita is expressed in 1995 prices and in FIM for Finland ($1≈ 5FIM).

Table 3. Council size effect in Finland

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS		FE		RD				
Council size effect	.214***	.157***	-.199***	-.169***	-.159***	-.147***	-.090**	-.081**	-.088**
	(.023)	(.037)	(.040)	(.041)	(.041)	(.041)	(.039)	(.039)	(.038)
Degree of polynomial in population size	None	None	None	None	First	Second	Third	Fourth	Fifth
Controls	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Each entry is a separate regression. The dependent variable is log per capita spending. Council size is also in log form. Data includes 391 local governments over the period 1977 to 2002, i.e., there are 10,166 observations.. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, the proportion of people aged 65 or above, the proportion of people aged below 15, and per capita income. All regressions include time-fixed effects. Columns 3-9 include municipality-fixed effects. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 4. Estimates of the council size effect in Finland: different window sizes around thresholds

	Third-order polynomial in population size	Fourth-order polynomial in population size	Fifth-order polynomial in population size
		Panel A: ±25 percent	
Council size effect	-.087**	-.092**	-.081**
	(.039)	(.038)	(.037)
		Panel B: ±10 percent	
Council size effect	-.075*	-.078**	-.068
	(.039)	(.040)	(.045)
		Panel C: ±5 percent	
Council size effect	-.083*	-.083*	-.084*
	(.044)	(.044)	(.044)
		Panel D: ±2.5 percent	
Council size effect	-.079	-.079	-.076
	(.066)	(.067)	(.065)

Notes: The dependent variable is log per capita spending. Council size is also in log form. Huber-White standard errors allowing for clustering at the local government level are in parentheses. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 5. Estimates of the council size effect in Finland: decreasing and increasing council sizes

	Council size increased			Council size decreased		
	(1)	(2)	(3)	(4)	(5)	(6)
Council size effect	-.072	-.059	-.068	-.090*	-.085*	-.090*
	(.053)	(.053)	(.051)	(.047)	(.047)	(.047)
Degree of polynomial in population size	Third	Fourth	Fifth	Third	Fourth	Fifth
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is log per capita spending. Council size is also in log form. Data includes 391 local governments over the period 1977 to 2002. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, proportion of people aged 65 or above, proportion of people aged below 15, and per capita income. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 6. Estimates of the council size effect in Finland: dynamic specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Council size$_t$	-.084*	-.123***	-.091**	-.082**	-.070**	-.081**
	(.044)	(.039)	(.038)	(.037)	(.034)	(.039)
Council size$_{t-1}$		.060	.029	.031	.033	.040
		(.049)	(.038)	(.038)	(.045)	(.040)
Council size$_{t-2}$			.054	.054	.048	.043
			(.071)	(.056)	(.054)	(.053)
Council size$_{t-3}$				-.010	-.015	-.016
				(.051)	(.051)	(.053)
Council size$_{t+1}$					-.016	.015
					(.038)	(.037)
Council size$_{t+2}$						-.047
						(.036)

Notes: The dependent variable is log per capita spending. Council size is also in log form. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, the proportion of people aged 65 or above, the proportion of people aged below 15, and per capita income. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 7. Local councils in Sweden during the period 1977-2002

Number of eligible voters	Number of council members required by law	Mean	S. D.	Min	Max
0-12,000	At least 31	40.5	5.0	31	49
12,001 – 24,000	At least 41	47.6	4.1	41	61
24,001 – 36,000	At least 51	52.8	4.7	49	75
36,000-	At least 61	67.2	8.0	51	85

Note: Stockholm (the capital) is required to have at least 101 council member

Table 8. Descriptive statistics for Sweden

	Mean	S.D.	Min	Max
Council size	47.5	10.9	31	101
Spending per capita	34,068	7,273	19,253	90,123
Population size	29,991	54,878	3,132	754,948
The proportion of the population aged 0 to 15	20.68	2.41	12.65	36.42
The proportion of the population aged 65 and above	18.25	3.96	3.97	27.37
Income	87,404	17,745	38,674	234,625

Note- Spending per capita is expressed in 1995 prices and in SEK for Sweden. ($1≈ 8 SEK).

Table 9. Council size effect in Sweden

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS		FE		RD				
Council size effect	.123	-.048	-.688**	-.389	-.264	-.136	-.376	-.143	-.102
	(.046)	(.057)	(.198)	(.253)	(.263)	(.275)	(.291)	(.318)	(.321)
Degree of polynomial in population size	None	None	None	None	First	Second	Third	Fourth	Fifth
Controls	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-test			12.8	9.1	8.6	9.3	9.9	10	10
J-test			0.591	1.650	2.042	2.293	2.214	2.214	2.186
			Chi-sq(2) P-val = 0.74	Chi-sq(2) P-val = 0.44	Chi-sq(2) P-val = 0.36	Chi-sq(2) P-val = 0.32	Chi-sq(2) P-val = 0.33	Chi-sq(2) P-val = 0.33	Chi-sq(2) P-val = 0.34

Notes: Each entry is a separate regression. The dependent variable is log per capita spending. Council size is also in log form. Data includes 265 local governments over the period 1977 to 2002. There are 6,876 observations. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, the proportion of people aged below 65 or above, the proportion of people aged below 15, and per capita income. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 10. Council size effect: operating expenditures in Finland

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Council size effect	-.177***	-.139**	-.129**	-.122**	-.077*	-.070	-.078*
	(.046)	(.047)	(.046)	(.047)	(.044)	(.043)	(.042)
Degree of polynomial in population size	No	No	First	Second	Third	Fourth	Fifth
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is log per capita operating expenditures. Council size is also in log form. Data includes 391 local governments over the period 1977 to 2002, i.e., there are 10,166 observations. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, the proportion of people aged 65 or above, the proportion of people aged below 15, and per capita income. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 11. Council size effect: public employment

	Finland			Sweden		
	(1)	(2)	(3)	(4)	(5)	(6)
Council size effect	-.034***	-.029**	-.025**	-.145***	-.037	-.021
	(.012)	(.012)	(.012)	(.043)	(.053)	(.060)
Degree of polynomial in number of eligible voters	No	First	Second	No	First	Second
Number of municipalities	387	387	387	365	365	365
Number of observations	7,458	7,458	7,458	6,890	6,890	6,890

Notes: The dependent variable is employment per capita. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, the proportion of people aged 65 or above, the proportion of people aged below 15, and per capita income. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

Table 12. Council size effect: capital expenditures in Finland

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Council size effect	.064	-.030	-.030	-.010	.048	.060	.039
	(.108)	(.115)	(.115)	(.115)	(.115)	(.116)	(.116)
Degree of polynomial in population size	No	No	First	Second	Third	Fourth	Fifth
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is log per capita capital expenditures. Council size is also in log form. Data includes 391 local governments over the period 1977 to 2002, i.e., there are 10,166 observations. Huber-White standard errors allowing for clustering at the local government level are in parentheses. The control variables are population size, the proportion of people aged 65 or above, the proportion of people aged below 15, and per capita income. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.