Political competition, party polarization, and government performance

Rune Sørensen
BI Norwegian Business School

Political competition, party polarization, and government performance*)

Rune J. Sørensen

BI Norwegian Business School

Corresponding author: Rune J. Sørensen, BI Norwegian Business School, Department of Economics, Nydalsveien 37, N-0404 Oslo, Norway.

E-mail: rune.sorensen@bi.no; Phone: +47 46 41 05 95.

Abstract

Lack of party competition may impair government efficiency. If the voters are ideologically predisposed to cast their vote in favor of one political party, they may reelect an underperforming incumbent. Party polarization may augment this effect since the median voter faces a higher cost of selecting a better, but ideologically distant incumbent. Alternatively, if the electorate is evenly divided between parties, polarization may induce parties to apply greater effort to improve their election prospects.

The current paper analyzes efficiency in Norwegian local government. Efficiency has been measured by means of panel data on government service output over a ten-year period. Electoral dominance has been measured as number of elections where one party bloc receives at least 60 percent of the votes, measured over six consecutive elections. Party polarization is defined as the ideological distance between the two party blocs, and it is measured on basis of survey data on the ideological preferences of elected politicians. Lack of party competition reduces cost efficiency, the effect being stronger in governments where party polarization is large. These agency losses are greater in high-revenue municipalities.

1. Introduction

A large theoretical literature suggests that democratic competition improves government performance. Voters will oust the incumbent from office if he fails to provide public services efficiently. This contrasts with a situation in which one political party holds a near-monopoly position, and therefore expects to be reelected irrespective of performance. However, this assumes a considerable degree of party polarization. The voters face low costs of ousting an underperforming incumbent when the competing parties are ideologically close.[1] A majority of the citizens will cast their votes for an incompetent party only when alternatives are ideologically distant. This does not necessarily mean that party polarization always impedes government performance. When the electorate is evenly split between the contenders, polarization does not deter voters from selecting the best party as officeholder. When party leaders are policy oriented, they have an incentive to deliver better performance when the opponent is ideologically distant. Therefore, a stiff competition is always valuable, but polarization can both be beneficial or harmful.

A relatively small empirical literature addresses the effects of democratic competition. Part of this literature relies on indirect indicators of economic performance or rent-taking, such as economic growth (Keefer and Knack 2002; Pinto and Timmons 2005; Persson and Tabellini 2005; Besley et.al. 2010), levels of taxation and worker compensation (Besley and Case 2003), financial support to political parties and politicians' wage level (Svaleryd and Vlachos 2009), infant mortality (Svensson 2005), and various indicators of political corruption (Testa 2007; Brown et.al. 2011). A few studies use more direct indicators of government performance, typically data on local government efficiency. Studies on English and Flemish local authorities suggest that an intensive party competition improves government performance (Boyne et.al 2012; Ashworth et. al 2008). Neither these nor other existing empirical studies address the combined impact of electoral dominance and polarization on government performance.[2]

---

[1]Ideology may also refer to ethnic, racial, religious divisions in society; cf. Easterly and Levine (1997) and Alesina et.al (1999).

[2]Other studies have addressed local government performance, including Borge and Naper (2006), Borge et.al. (2008), Bruns and Himmler (2011), Geys et.al (2010), Hauner (2008), Padovano and Ricciuti (2009), and Petterson-Lidbom (2006). These studies do not analyze the impact of party competition on government performance.

The current analysis is based on Norwegian local government data.[3] Public service output has been measured over a ten-year period and data covers more than 400 local authorities. Electoral dominance has been measured as the extent to which one of the party blocs has held a dominant position in the electorate for up to six election periods before the relevant ten-year period. Survey data has been used to measure the ideological preferences of individual council members in 120 municipalities in two election periods. These data has been used to measure the ideological polarization. The analyses suggest that a lopsided electorate is detrimental to government performance, and that it can be especially harmful if party polarization is large.

We start by outlining the theoretical argument. The ensuing sections present the institutional setting and data sources; we outline measurement issues, and discuss the identification strategy. Finally, we present the panel data regressions that estimate the impact of party polarization on the cost efficiency of local government.

2. The impact of electoral dominance and party polarization

Electoral agency models address voters' capacity to minimize rent extraction by their elected leaders, and to induce politicians to work hard for the benefit the citizenry. Political competition is the key mechanism for disciplining the representatives. The democratic market can fail when one contender has a near-monopoly position. We address situations where one political party enjoys a dominant situation as consequence of voters' ideological preferences.

Some theoretical contributions explore models where the so-called valence dimension (such as government efficiency) is fixed, and the ideological dimension is endogenous. For example, Groseclose (2001) develops a model where polarization weakens incentives to invest in valence. He suggests that the party (or candidate) with an advantage on the valence dimension moves towards the ideological center; the disadvantaged party moves away from the center. Other models assume that both dimensions are endogenous. Based on such models, Ashworth and Mesquita (2008) propose that party polarization causes a reduction in parties' incentives

---

[3]Ideological polarization has increased in many national legislatures. In the U.S. case, the ideological distance between the Republican and Democrat parties has widened. For example, party polarization has grown considerably as measured by representatives' voting patterns in Congress (McCarthy et.al. 2006, table 1.1). Ideological distances between political parties have also increased in many European countries. Analyses addressing the European setting (based on data from the Manifesto project) suggest that parties take more divergent ideological positions (Schneider 2004).

to invest in valence. On the other hand, Serra (2010) and Van Weelden (2013a; 2013b) discuss models where higher levels of party polarization benefits the citizenry, usually subject to an ideologically balanced electorate.

As basis for empirical work, the current framework assumes that political parties have fixed ideological positions. The parties seek political office to implement their preferred policies (Wittman 1983; Calvert 1985), and the incumbent party therefore implements its preferred ideological policy. One reason for fixed positions could be that the ideological program is defined at national party conventions, and is binding for the local party groups. Another is that party representatives adhere to particular ideological belief systems, and election promises that deviate from underlying preferences are not credible (Alesina 1988; Persson and Tabellini 2000:99–101).

These modeling assumptions imply a low degree of contestability. A third party cannot enter the political arena due to high barriers to entry. If barriers to entry were low, an underperforming political party could be replaced with a new party with a similar ideological position (see for example, Wittman 1989). Similarly, intra-party competition could be a substitute for contestability. 'Internal takeovers' would imply that rival candidates could challenge and replace the less competent or hard-working party leaders. The above assumptions also imply that competition is hampered by ideological rigidity. One might imagine situations where the political parties shift their ideological positions to compensate lack of competence and policy performance (Groseclose 2001).

The selection hypothesis

Citizens can control their leaders either by means of selection (electing 'good' politicians) or by means of incentives (reelecting politicians who produce satisfactory policy outcomes). The selection mechanism is simple. Consider two political parties A and B with fixed ideal points on an ideological axis (y). The ideological stance of Party A is $-\frac{x}{2}$, and of party B $\frac{x}{2}$. The incumbent party can exert effort (e), while the opposition party exerts no effort. The preferences of voter i is described by an ideal point v_i on the ideological axis (y). We define the voter's utility function: $V = -(y_P - v_i)^2 + e_P$, where $y_P = -\frac{x}{2}, \frac{x}{2}$ and P = A, P. The voter benefits from incumbency effort and she dislikes ideological policies that deviate from her bliss point.

Party effort is fixed by competence. Therefore, the voter casts her vote for party A if $-(-\frac{x}{2}-v_i)^2 + e_A \geq -(\frac{x}{2}-v_i)^2 + e_B$. This means that $e_A - e_B \geq 2xv_i$. Similar to Besley et.al. (2010), lack of competition is defined by electoral dominance. Suppose voter i is the decisive median voter (i=m), and that her ideological position is closer to party B than party A ($v_m > 0$). This means that the median voter faces a higher ideological cost of ousting a (potentially) incompetent party B when the decisive voter has a strong ideological commitment and party polarization is high. The selection hypothesis suggests that higher levels of electoral dominance and party polarization to lead to lower performance.

The incentive hypothesis

The incentive hypothesis can be derived from a probabilistic voting model (Polo 1998; Persson and Tabellini 2000:91-91). Since effort is costly to the elected leaders[4], the utility functions of the political parties can be defined as follows: $U_A = -(y + \frac{x}{2})^2 - e_A$ and $U_B = -(y - \frac{x}{2})^2 - e_B$. Higher levels of effort are assumed to yield a positive social gain since the effort costs are very small relative to the benefits of a large citizenry.

The distribution of voters is described by a simple uniform distribution on $[-\frac{1}{2\theta} + v_m, \frac{1}{2\theta} + v_m]$ where v_m is the ideal point of the median voter. Again the positive dominance implies a median voter bliss point closer to party B ($v_m > 0$). The share of votes in favor of party A is $P_A = \frac{1}{2} - \theta v_m + \theta \frac{e_A - e_B}{2x}$. The median position is subject to random popularity shocks. Suppose $v_m = \tilde{v}_m + \varepsilon$ where $\tilde{v}_m$ is the expected position and ε is uniformly distributed on $[-\frac{1}{2\varphi}, \frac{1}{2\varphi}]$. The probability of party A getting a majority of votes is: $\pi_A = \Pr\left(P_A > \frac{1}{2}\right) = \Pr\left(\frac{1}{2} - \theta(\tilde{v}_m + \varepsilon) + \theta \frac{e_A - e_B}{2x} > \frac{1}{2}\right) = \frac{1}{2} - \varphi \tilde{v}_m + \varphi \frac{e_A - e_B}{2x}$.

The parties maximize expected utility with respect to effort, given the effort level offered by the opponent. The first-order conditions yield equilibrium effort levels and winning probabilities[5] and define the expected effort level: $E(e_A) + E(e_B) = x^2 - [\frac{2}{3}x\tilde{v}_m]^2 - \frac{x}{\varphi}$.

---

[4]Similar models have been suggested in the corporate governance literature. For example, Bertrand and Mullainathan (2003) analyze the impact of antitakeover laws. When firms are insulated from takeovers, managers prefer "to enjoy the quit life".

[5]Equilibrium effort levels are: $e_A = \frac{2}{3}x\tilde{v}_m - \frac{x}{\varphi} + x^2$ and $e_B = -\frac{2}{3}x\tilde{v}_m - \frac{x}{\varphi} + x^2$. The equilibrium probability that party A wins the election is: $\pi_A (= 1 - \pi_B) = \frac{1}{2} - \frac{1}{3}x\tilde{v}_m$.

Levels of expected effort are influenced by both incentive and selection effects. Greater party polarization (x^2) induces more effort. The second term is the selection effect ($-[\frac{2}{3}x\tilde{v}_m]^2$). A combination of electoral dominance and party polarization leads to a lower level of expected effort. With balanced elections, polarization has a 'pure' incentive effect where polarization causes higher effort levels. With sufficiently unbalanced elections, polarization can also lead to a lower level of expected effort. These propositions are analyzed in the ensuing empirical analysis.[6]

The current empirical setting is sub-national units with a multiparty system (see section 3). This calls for two qualifications. First, accountability is the weak point of multiparty systems (Bingham Powell 2000, chapter 10). One reason is shifting coalitions. Even in situations when one coalition is punished by the voters, coalition partners may remain in office as members of a new alliance. This could dilute voters' ability to select the competent incumbents (Ferejohn 1986). Another reason is lack of transparency. It can be hard for voters to identify which party or parties are responsible for performance (see Nannestad and Paldam 1994:238; Anderson 2000; Persson and Tabellini 2005: chapter 7). On the other hand, with a plethora of political parties, voters can choose between ideologically close parties.[7] Therefore ideological polarization is less likely to prevent voters from replacing an underperforming incumbent with the challenger.

---

[6]The probabilistic voting model assumes full commitment, which is problematic in an electoral agency setting. As an alternative, the hypothesis can be derived from a model where parties cannot commit to effort levels before the election. Like in Ferejohn (1986), a decisive voter sets a reservation utility for reelecting the incumbent. The two-period game can be defined in the following way: 1) The median voter declares a reservation utility for reelecting the incumbent party. 2) The incumbent party decides an effort level and implements his preferred ideological policy. 3) The voter observes the incumbent's effort and she decides whether or not to reelect the incumbent. 4) Whichever party is elected for the second period enacts its preferred ideological policies and sets the effort for the second period. The game ends. Both parties and the voter use a common discount factor $\delta < 1$. *Lopsided elections:* In the final period, either party will implement its preferred ideological policy, and make a zero effort. Suppose the voter's position is closer to party A than party B ($v_m > 0$). The voter will always reelect the ideologically 'closer' party in the final period. Therefore, neither party will exert effort in the first period. *Not lopsided elections elections*: Consider the case where the voter is ideologically indifferent to the parties, that is $v_m = 0$. With indifference we assume that the voter can commit to reelect the incumbent provided it delivers the reservation utility. Each of the parties will benefit from an effort level in the first period if $\bar{e}_P \leq \delta x^2, P = A, B$. Therefore, higher party polarization (x) increases effort in balanced elections, while polarization has no effect in elections where one of the parties has a dominant position in the electorate. The model can be elaborated as a game over an infinite time horizon.

[7]A related point is relatively low barrier to entry. As compared to majoritarian systems, proportional representation may sharpen competition since relatively few votes are required to obtain at least one seat in the local assembly. A small contender has a better chance of growing into a serious challenger to the established party lists.

Second, a highly redistributive grant scheme may weaken accountability. Suppose that citizens oversee the performance of local government performance by comparing levels of service output and tax costs. High revenue municipalities could provide first-class services despite having low efficiency, which would distort citizens' assessment. We would therefore expect the agency problem to be of greater consequence in high-revenue authorities.

3. The institutional setting

The institutional setting is a two-tier system comprising a central government, 19 county governments and 434 municipalities.[8] Norwegian counties and municipalities are responsible for implementing national welfare policies, including the provision of nursing services for children and elderly, general health care and schools. The local government sector provides a number of services including child care, primary and lower secondary education, primary health care, and care for the elderly. Local government revenue amounts to about 18 percent of GDP, with employment in the local government sector accounting for about 20 percent of total employment. The local government revenue is described in section 7.

The current study uses data on the municipalities. As already indicated, local elections take place in the context of a system with a multi-party system based on proportional representation with one electoral district per municipality. Local elections are held at fixed dates every four years alternating with national elections. The executive board is organized on the 'alderman principle'. This principle implies that the parties gain seats in the executive board relative to the number of representatives on the council. Beginning with the local elections of 1999, political parties have increasingly opted to enter into mutually binding political agreements.[9]

4. Measuring electoral dominance

The theoretical framework invoked here is based on the idea that an ideologically lopsided electorate can lead to a near-monopoly party power. Therefore, a lopsided electorate is one where a dominant share of the electorate persistently supports the socialist or the non-socialist

---

[8]We have excluded Oslo, the capital, from the analyses, since it is both a municipality and a county.
[9]According to the Polls-Of-Polls organization, nearly all municipalities had an agreement between political parties related to the election of the major at the start of the election period. See:
http://www.pollofpolls.no/?cmd=Kommentarer&do=vis&kommentarid=689

party bloc as consequence of their ideological preferences. Electoral dominance should therefore not be measured on data for one election period only.[10] In principle, a party may win a majority of votes by a large margin in one election, and the rival party may win in the next by an equally large margin. Although the absolute difference in voter support is considerable in both elections, it is not reasonable to describe party competition as low. Likewise, an incumbent party (or party bloc) may win the majority in one election with a very narrow margin, and the subsequent election with a large margin. Yet it would not be reasonable to characterize competition as stiff in the first period, and not in the second. Past voter behavior suggests that the incumbent cannot take a reelection for granted, and the party in office is likely to act accordingly.

Electoral dominance has therefore been measured on data for six consecutive local elections.[11] DOMINANCE has been defined as the share of election periods where either the socialist or non-socialist party bloc blocs received more than 60 percent of the votes.[12] Municipalities where local lists accounted for more than 2 percent of the votes were excluded from the analysis. We measure DOMINANCE on basis of the six local elections in 1971-1991 period; the elections in the 1975-1995 period; and the elections in 1979-1999 period. These indicators have been matched with data on efficiency for the period 2001-2010. The first indicator (based on the elections in 1971-1991) has been matched with efficiency data for 2001-2003, the second indicator with efficiency data for 2004-2007, and the third with efficiency data for 2008-2010. We present descriptive statistics for electoral dominance in table 1 below.

Table 1 here

Based on statistics on the local elections in the period 1971-1999, the average score on the DOMINANCE indicator is well over 0.4. For an average municipality, about 40 percent of the elections are dominated by one of the party blocs. About 70 percent of the municipalities

---

[10]Existing studies have measured political competition as the absolute difference in voter support between the right-wing and left-wing party bloc in each election (Besley and Case 2003; Svaleryd and Vlachos 2009). The current conceptualization is slightly different as brings in an enduring predisposition to support one party bloc.

[11]This conceptualization implies that estimation with municipality fixed effects is not possible as the DOMINANCE indicator is relatively stable. Besley and Case (2003) use annual data on US states for the period 1950 to 1990, which allows them to include state fixed effects. Svalerud and Vlachos (2009) employ annual data on Swedish local government for the period 1974 to 2003, and include municipality fixed effects.

[12] The data on election outcomes, demographic and accountancy data have been provided by the Norwegian Social Science Data Services (NSD). NSD is not responsible for the analysis or interpretations presented in this paper.

experience at least one lopsided election over six consecutive elections. Non-socialist bloc dominance is two-three times as frequent as socialist dominance. As expected, lopsided election outcomes are a relatively persistent phenomenon. The DOMINANCE-variable is skewed to the right: Many municipalities rarely see a lopsided election, while 3 - 6 percent of the municipalities have lopsided outcomes in all six elections (not reported in Table 1).

In Table 1, we show comparable statistics for the 1955, 1959 and 1963 local elections. The average DOMINANCE has increased from about 0.3 to 0.42-0.45. This is mostly due to lower levels of voter support for the socialist party bloc relative to the non-socialist bloc.

5. Measuring party polarization

Party polarization describes the ideological distance between two major competitors, which means that polarization is conceptually distinct from electoral dominance. This implies that party polarization cannot be measured on data on party representation in the legislature (Brown et. al. 2011) or by means of population surveys (see Dalton 2008 for a recent review). The credibility of political parties requires ideological platforms to be relatively persistent, and ideological positions are therefore likely to be quite stable over election periods.

Party polarization has been measured by means of extensive surveys of a random sample of 120 Norwegian municipalities. Half the sample of municipalities was drawn as a random sample of municipalities with fewer than 5.000 inhabitants, the other half from municipalities with more than 5.000 inhabitants. All council members were asked to position themselves on the left–right self-positioning scale.[13] Data were collected for two local election periods, 2003–2007 and 2007–2011. We used the common survey question on left–right self-placement to measure party polarization:

> *In politics we often talk about 'the left' and 'the right.' Below is a scale where 0 represents those who are far left politically, and 10 represents those who are far right politically. Where would you place yourself on this scale? Please respond by marking your position on the scale from 0 (far left) to 10 (far right).*

---

[13] The surveys of local council members have been carried out by Statistics Norway on behalf of Lars Chr. Monkerud and Rune J. Sørensen at BI Norwegian Business School. The mayors and deputy mayors of the remaining municipalities were asked to respond to the same question as well.

We rescale the left-right axis to make it vary from -5 (far left) to +5 (far right). The response rates in the surveys were over about 60 percent, providing data on nearly 4,500 councilors.[14]

We use the average score of the party groups in the local assemblies in both election periods as our measure of the party's ideological position. We apply the conventional classification of political parties as socialist (or social-democratic) and non-socialist. On this categorization the left-wing party bloc comprises the Labour Party, Socialist Left Party and Red Electoral Alliance; the right-wing party bloc comprises the center parties (that is the Center Party, Christian People's Party, the Liberal Party and local party lists), the Conservative Party and the Progress Party. Let X_{Li} denote the average score on the left–right self-placement index for members of party i belonging to the left-wing party bloc (L). Let s_{Li} measure party i's seat share within the left-wing bloc. Similarly, let X_{Rj} and s_{Rj} denote left-wing scores and seat shares within the right-wing party bloc (R). Party polarization (POLARIZATION) is the ideological distance between the socialist and non-socialist party blocs. Since $X_{Rj} > X_{Li}$, we can define polarization as:

$$POLARIZATION = \sum_j X_{Rj} \cdot s_{Rj} - \sum_i X_{Li} \cdot s_{Li} \text{ where } \sum s_{Rj} = 1 \text{ and } \sum s_{Li} = 1.$$

In Table 2, we present descriptive statistics for the variables used to estimate party polarization.

Table 2 about here

In Table 2, we observe that the Labour Party is the dominant player on the socialist side, while the sum of the center party seat shares corresponds roughly to the sum of the seat shares of the Conservative and the Progress Parties. The representatives of the left-wing parties (mostly the Socialist Left Party) and the Progress Party occupy about the same distances from the midpoint (centered on the basis of the original left-right scale). We have a maximum degree of polarization of about 6.5 points when the local council comprises of these two parties only. The Conservative Party is about one point closer to the center than the Progress Party, while the Labour Party is much closer to the midpoint than the Socialist Left Party. The center parties are relatively close to the political center, but on the non-socialist side. The inter-municipal variations in party positions are significant: standard deviations are in the

---

[14]The response rate varies between municipalities, from 29% to 80% (2003-2007) and 29% to 82% (2007-2011). I correlate the response rate with measured levels of party polarization. The Pearson correlation coefficient is r=0.023 (N=120) in the first election period, and r=0.109 (N=120) in the second period. None of the correlations are statistically significant at the 10 percent level. Including the response rate as a control variable in the regression analysis had little bearing on the results obtained.

range 0.62-0.34. The average position of the socialist bloc is -1.76, and the non-socialist bloc is 1.56. This gives an average score of party polarization of 3.32 with an (inter-municipal) standard deviation of about 1.

6. Measuring service output

Service output (OUTPUT) has been measured as a composite index covering the major public service sectors. The index has been developed by the Advisory Commission on Local Government Finances.[15] The aggregate output measure is available for the ten-year period 2001–2010 (see Borge et.al. 2008; Burns and Himmler 2011). For the period 2001-2007, the production indicator is based on indicators that cover service production in six service sectors: child-care centers, primary and upper secondary education, primary health care, nursing services, child custody, and social welfare programs. Output in each of these sectors has been measured by several indicators, and the OUTPUT indicator is based on a total of 17 indicators. These indicators cover about 70 percent of gross operating costs in the municipality. For the period 2008-2010, the index includes the cultural sector and additional quality indicators have been developed. The 2008-2010 OUTPUT measure is based on a total of 25 indicators. The composite indicator has been defined as follows[16] (i: municipality, t: year):

$$
\begin{aligned}
OUTPUT_{it} = {} & \alpha_t^1 Kindergartens_{it} + \alpha_t^2 Primary\ Education_{it} + \alpha_t^3 Primary\ Health\ Care_{it} \\
& + \alpha_t^4 Nursing\ and\ Care_{it} + \alpha_t^5 Child\ Custody_{it} + \alpha_t^6 Social\ Welfare_{it} \\
& + \alpha_t^7 Culture_{it}, \sum_j \alpha_t^j = 1
\end{aligned}
$$

The weight for each sector has been set according to the sector's share of aggregate spending, and weights have been updated each year. The composite production index (OUTPUT) is standardized with a national average of 100 (using municipal population sizes as weights).

The output measures for the individual sectors have been defined by a key output indicator and a set of quality indicators (c.f. Appendix). For example, the key output indicator for kindergartens is number of staying hours for children in daycare institutions relative to number of children aged 0–5 years. The quality indicators are defined by personnel

---

[15]We appreciate the assistance of the Ministry of Local Government and Regional Development for access to the data on production index and the revenue indicator.

[16]This refers to the OUTPUT indicator for the 2008-2010 period.

qualifications and the area allocated for children's play and outdoor activities. The output measure for kindergartens is the sum of the key output indicator and the quality indicators, using weights that add up to one for each of the sectors.

7. Measuring local government revenue

Municipal revenue comes from three sources, local tax revenue, government grants, and user charges. Tax revenue accounts for 41 percent of municipal revenue. Tax revenue is mostly collected from a proportional income tax, and tax rates are regulated by central government. All municipalities have used the maximum tax-rate since 1977.[17] Central government grants account for another 47 percent, mostly in the form of a general purpose grant. A large part of this block grant is a per capita subsidy designed to equalize revenues across municipalities ('revenue equalization'). Another component in the general purpose grant scheme compensates municipalities for such external factors that influence production costs ('expenditure equalization'). Population size, age structure and settlement pattern are important criteria.

The sum of block grants and tax revenues is called 'free revenue'. After attending to statutory obligations, councils can allocate the 'free municipal revenue' to different service sectors as they see fit. Local authorities are required by law to maintain a balanced budget and to run an operating surplus, first to finance investments and second as a financial buffer.[18] The municipalities have very little influence on the level of free municipal revenue.

Adjusted free revenue (REVENUE) is an indicator of the municipality's purchasing power. It makes adjustments in free municipal revenue per capita using the same criteria (cost keys) that are included in the system of expenditure equalization described above. The REVENUE index is standardized by a national average of 100.[19] The adjustment for cost differences does

---

[17] The maximum income tax rates have varied from 12.05 percent to 13.30 percent in the 2001-2010 periods.

[18] We include property tax revenue as part of the free revenues. About 300 municipalities levy a tax on properties; this revenue accounts for nearly 2 percent of total current revenues. Local property taxes can be levied on land and buildings according to specific criteria. The tax rate must be at least 2 but no more than 7 per thousand of the taxable property value. When a council decides to levy property tax, 2 per thousand is the maximum rate the first year. Before 2007, property taxes could only be levied in urban areas. Outside these areas, property taxes could only be levied on industrial plants. From 2007, rural councils were allowed to levy property tax in the whole municipality.

[19] Data on adjusted free revenues have been provided by the Ministry of Local Government. The adjustment includes the following criteria (for 2005; weights in parentheses): basic criterion (independent of population size; 0.025), population 0–5 years (0.023), population 6–15 years (0.307), population 16–66 years (0.121), population 67–79 years (0.085), population 80–89 years (0.133), population 90 years and over (0.049), divorced and

not take into account geographical variations in social security contributions. The municipalities pay a fixed rate on total wage spending as social security contributions, and the rate varies from 14.1 percent in urban areas to zero in the smaller municipalities located in peripheral regions. We include here the rate for employers' contribution to national social security as an additional control variable.

8. Measuring efficiency

Efficiency is defined as the level of production output for a given level of exogenous government revenue. Services are provided efficiently when it is impossible to increase output with a fixed amount of revenue, and inefficiently when output can be increased with available revenues. This is productive efficiency, not allocative efficiency. We therefore measure efficiency by regressing (log) OUTPUT against (log) REVENUE and other control variables.

Free revenue and adjusted free revenue do not correspond exactly to the costs used to produce those services that are covered by the production index (OUTPUT). Local government may collect additional revenues. They can do so by charging higher levels of user charges[20], by running smaller operating surpluses, or by taking large dividends of from government-owned companies. The production index does not include administration and infrastructure services, and cultural services are not covered in the years 2001-2007. We therefore use the municipal accounts to estimate the per capita expenditures (EXPENDITURE) used to provide those services covered by the OUPUT index. These spending levels result from political choices, and we therefore use the REVENUE indicator as instrument variable when the expenditures are used as an alternative measure of available resources.

Population size could impinge on local government performance. Large municipalities have more complex and possibly less transparent organizational patterns, which is likely to increase the costs of monitoring performance. We may also observe higher levels of party polarization

---

separated persons 16–59 years (0.038), unemployed 16–59 years (0.011), death rate (0.025), non-married persons 67 years and over (0.025), share of immigrants (0.005), estimated travel time to center (0.015), distance within living zone (0.010), distance to the nearest neighboring district (0.011), mentally impaired 16 years and over (0.066), mentally impaired under 16 years (0.004), urban settlement (0.042), agricultural employment (0.005). The adjustment does not take into account differences in capital costs and regional variations in the social security contributions.

[20]Note that the funding of infrastructure services (water supply, sewage, garbage collection and disposal, electricity distribution) comes from user charges, and not from 'free revenue'.

and lower frequencies of lopsided elections in populous municipalities.[21] We therefore include population size (measured on a log-scale) as a control variable.

Most of the service production targets particular age groups, toddlers, school students and senior citizens. To account for potential biases related to different budgetary allocations, we include the age groups 0-5, 6-15 and 67 + as additional controls. This corresponds to the children who use day-care centers and primary schooling, while the elderly are more likely to use health care and nursing services.

Finally, the municipalities have been classified into 90 economic regions, and we include fixed effects for these geographical units (Statistics Norway 2000). This takes out a lot of unmeasured variation between municipalities, including variations in voter preferences.

Table 3 here

In table 3, we display descriptive statistics for the production indicator and related variables. We present data for the entire set of municipalities (about 420 municipalities over the ten-year period) and for the subset of the 120 municipalities where survey data is available. The stratified sampling of municipalities explains why we observe a higher average population size in the subsample where data on party polarization is available than in the total municipality population. Otherwise the data on the subsample show that the data are comparable to those of the entire municipality population.

An important concern whether the measured aspects of service production (OUTPUT) correlate negatively with service quality. A municipality might achieve a high level of measured service production by cutting down on unmeasured aspects of quality. To explore the quality hypothesis further, we estimate a regression with the production indicator as response variable (log(OUTPUT)) and with controls for the revenue level (log(REVENUE) and the controls outlined above (social security rate, demographics, year-region fixed effects). The logarithmic form means that the exponential of the estimated residuals is an indicator of relative efficiency: Values higher than 1 indicate higher-than-average performance (given municipal revenue levels and the other controls), and values lower than 1 suggest lower-than-average performance. The regression has been estimated with data for the years 2008, 2009 and 2010. This efficiency indicator has been combined with survey data that includes

---

[21]At the same time, party polarization correlates positively with population size (r=0.30), while electoral dominance correlates negatively with population size (r=-0.11).

municipality identification, and which measures the residents' assessment of the service quality. We use data from a large survey on user satisfaction with public services from 2010. The results have been presented in Table 4.

Table 4 here

In Table 4, the municipalities have been classified by levels of efficiency performance. The first column displays citizens' direct evaluation of *service quality* measured in 2010. The data indicate a weak, positive correlation between the efficiency indicator and the assessments. The second column shows how the population assesses service quality relative to their *expectations* (also 2010-data). Again we observe a relatively weak and positive correlation between measured efficiency and the subjective assessments. This tabulation lends no support to the notion that the quantitative performance indicator correlates negatively with subjective valuations of service quality.[22]

9. Empirical strategy

A key advantage of the current design is a homogenous institutional environment. All local authorities share a similar election system and political institutions, and they face the same type of tax constraints and grant system. Another advantage is the centralized control of local government revenues in Norway. In the current setting, cost efficiency is unlikely to influence government revenue levels ('soft budget constraints'). Since local governments cannot influence the sum of block grants and tax revenues ('free revenue'), we assume that revenues are exogenous. To the extent that reverse causality impinges on the results, we would expect it to make it harder to obtain empirical support for the selection model.[23]

The main identification problem is due to omitted variable bias, particularly as consequence of unmeasured voter preferences. We include a number of controls to eliminate such effects.

---

[22]Borge and Haraldsvik (2009) analyze efficiency in the elderly care (c.f. 'nursing and care in the Appendix). Their output indicators are similar, though not identical, to the one employed here. Using survey data, they do not find that the more efficient municipalities have lower levels of service quality (Borge and Haraldsvik 2009, table 4).

[23]First, a highly competent and/or hard-working incumbent that provides services efficiently can be reelected despite taking extreme ideological positions. High performance could therefore induce more polarization. A reverse causality effect would cause a positive correlation between polarization and efficiency. Second, a persistently high incumbency performance (relative to other municipalities) could be the reason why one party bloc has been reelected in several periods. We should also expect to see a positive correlation between electoral dominance and efficiency. These correlations would go against the selection hypothesis.

First, nearly all variations in electoral dominance and party positions are cross-sectional, and the estimation therefore does not allow for municipality fixed effects. We do, however, include fixed effects for region-years, which capture regional shocks. Second, the regression model comprises a number of time-varying controls, particularly demographic controls. We also include a dummy variable for socialist party majority in the current election period and Herfindahl index of party concentration. Party concentration could improves efficiency (Borge et. al. 2008), and it also correlates negatively with electoral dominance. Thirdly, the production index comprises more quality indicators and covers a broader range of services after 2007. We therefore present regression result based on data for the 2008-2010 period. We also control for share of population with higher education. This is potentially relevant as education reduce service demands in many sectors, including schooling, health care and social welfare.

Finally, we estimate the impact of electoral dominance, socialist party majority and party concentration (the Herfindahl index) with instrument variables. Similar to Svaleryd and Vlachos' (2009:361), we measure electoral dominance on data prior to the large-scale restructuring of Norwegian municipalities in the 1960s. Number of municipalities were reduced from 744 in 1957 to 454 1967. We use the election statistics from the local elections in 1955, 1959 and 1963 to construct instrument variables (cf. Table 1 and 3). The support for the individual political parties in the pre-reform municipalities has been aggregated to match consolidated structure, and we calculate average electoral dominance, socialist majority and party concentration in three pre-reform elections. Since the composition of the electorates and the local councils changed as result of the structural reform, we can use pre-reform electoral dominance as instruments for electoral dominance in the 1971-1999 periods.

10. Regression results

We estimate a baseline regression with the production index as response variable, and electoral dominance, party polarization and the interaction between polarization and dominance as the main explanatory variables. The model includes controls for local government revenue, social security contributions, demographics and region-year fixed effects.

$$\log(OUTPUT) \; = \; \beta_0 + \beta_1 \log(REVENUE) + \beta_2\, DOMINANCE$$

$$+ \beta_3 POLARIZATION + \beta_4 DOMINANCE \cdot POLARIZATION$$

$$+ \; Controls\; for\; socialist\; party\; bloc\; majority, index\; of\; party\; concentration,$$

$$social\; security\; contributions, population\; size\; and\; age\; structure$$

$$+ \; Year \cdot Region\; fixed\; effects\; + Residual$$

Based on the *selection* hypothesis, we expect both DOMINANCE and POLARIZATION to have negative effects on efficiency. The polarization effect is likely to larger with lopsided elections (and vice versa), and no effect in situations with balanced competition. This implies that $\beta_2 \leq 0, \beta_3 < 0, \beta_4 < 0$. The alternative *incentive* hypothesis implies that POLARIZATION has a positive bearing on efficiency, subject to a low degree of DOMINANCE. This implies that $\beta_2 \leq 0, \beta_3 > 0, \beta_4 < 0$. The regression results are presented in Table 5.

Table 5 here

The two first columns (A1, A2) yield estimates for DOMINANCE only, which allow estimation on the entire sample of municipalities. Electoral dominance has a significant in the OLS-regression (A1), suggesting that party competition leads to a higher level of service output for a given revenue levels. The second column (A2) displays the 2SLS-estimate. Like in Svaleryd and Vlachos (2009, table 3), the IV-estimates display a somewhat larger impact. A one unit increase in DOMINANCE implies a shift from never having a lopsided electorate to having a lopsided electorate in all election periods. According to these regressions, such a shift would cause an output reduction of about one percentage point.

The revenue elasticity is about 0.3, which is similar to previous studies (Borge et.al. 2008, table 3; Hauner and Kyobe 2010; Burns and Himmler 2011). Population size has a modest negative effect. The population shares of young and elderly also have a negative effect, suggesting that service output is lower in municipalities with a high 'dependency ratio'. Neither socialist party majority nor party concentration appears to have much bearing on efficiency.

The ensuing regressions (B1, B2) display regressions for the smaller sample where both survey and relevant register data are available. The impact of party polarization is

significantly negative. A one unit change in the ten-point left-right scale (about one standard deviation in the polarization index, cf. table 3) causes an output reduction of about one percentage point.

That party polarization induces lower levels of cost efficiency lends preliminary support to the selection model. In two final column (C1, C2) yield estimates for the baseline model, that is we test whether the (negative) impact of electoral dominance is larger in polarized polities. Note that polarization and electoral dominance are centered at their mean values. The estimated interaction term close to zero in both specifications.

In Table 6, we estimate regressions for municipalities when we split the sample into high- and low revenue municipalities as defined by the average revenue level. Revenues have been coded as whole numbers (i.e. percentages), and we allow for a flexible functional form by including REVENUE fixed effects. The regressions are similar to those presented in Table 5 (Table 6, columns i and iii). We may assume that the observed variables provide an indication on amount of selection on potential unobserved factors (Altonji et.al 2005). As a robustness check, we therefore present regressions with control for revenue and year-region fixed effects only (Table 6, columns ii and iv). Since the OLS and 2SLS methods yield comparable estimates, we present OLS estimates only.

 Table 6 here

The two first columns (i) yield estimates for DOMINANCE based on data for the entire sample of municipalities. Persistently lopsided elections generate a substantial and significant efficiency loss in the high-revenue municipalities (R≥105), but not in the low-revenue municipalities (R<105). In the ensuing columns (ii), all covariates except revenue (fixed effects) have been excluded. The estimates are very similar to those obtained in the larger model specification.

We present the baseline model in columns (iii). In the case of high-revenue municipalities, POLARIZATION has a negative and significant effect on efficiency. The interaction term is also negative and significant, suggesting that polarization has a larger, negative effect when dominance is large (and vice versa). Neither electoral dominance nor party bloc polarization have substantial or significant effects in low-revenue municipalities. The final pair of estimates (iv) are based on regressions where all covariates are excluded as controls. The

estimated effects are somewhat larger (in absolute values), but similar to those where the time-varying controls were included in the regressions.

In Figure 1, we display the effects the baseline results for polarization in high-revenue municipalities.

Figure 1 here

When party competition is stiff (DOMINANCE=0), polarization has no bearing on efficiency. In the extreme case of recurrent lopsided elections (DOMINANCE=1), polarization has a negative effect of about -0.10. An increase in POLARIZATION of one point on the left-right scale (about one standard deviation, c.f. Table 2) would reduce efficiency of about 10 percentage points. This is consistent with the voter selection model: A polarized party structure will not necessarily cause lower government performance. But the combination of party polarization and electoral dominance is likely to lead to lower levels of government efficiency, particularly in situations where government revenues are lavish.

Table 7 here

We present robustness tests in Table 7. In the first specification (I), we substitute the DOMINANCE-indicator with separate indicators for socialist- and non-socialist bloc dominance. The estimates take similar, negative values in both cases, suggesting that the DOMINANCE-estimate is not an artifact of parties' ideological preferences.[24] In the following robustness check (II), we redefine DOMINANCE by measuring share of election with more than 70 percent of voter support (instead of 60 percent). We also include share of population with higher education (III), and estimate the model on data for the 2008-2010 period better data on OUTPUT is available (IV). All the DOMINANCE estimates are negative, and quite similar to those obtained in Table 5. In models V, VI and VII, we estimate the baseline model using the smaller dataset with 120 municipalities. We restrict the sample to high-revenue municipalities (c.f. Table 6; R≥105). The modifications used are similar to those implemented in models II, III and IV above. The estimates are quite similar to those obtained in Table 6 (A1, A2).

---

[24] The baseline model includes control variables for socialist party majority. The share of representatives from each individual political party has also entered as controls in a supplementary robustness test (not presented). The results did not change much.

11. Conclusions

Polarization is not necessarily detrimental to government performance. The policy oriented incumbent may worry about the prospects of seeing the opponent in office, and he will therefore make a greater effort to improve performance when polarization is large. This assumes a stiff competitive situation, meaning that the decisive voter is ideologically indifferent between the political rivals. The situation is different when the electorate is ideologically predisposed in favor of one party or party coalition[25]. In this situation the median voter faces a potential ideological cost if she ousts an underperforming incumbent, and these costs will be greater when polarization is large. The combination of party polarization and electoral dominance can cause government inefficiency. The empirical analysis suggests that electoral polarization and partisan dominance cause lower government performance, and these effects appear to reinforce each other. This agency problem has greater bearing in high-revenue municipalities.

Further empirical research may benefit from developing better indicators of government performance, including better measures of service quality. It would be valuable have direct indicators of the incumbent politicians' effort levels and competences. Empirical work would also benefit from addressing the 'electoral linkage' more closely: how actual performance impacts on perceived performance, and the extent to which the subjective voter assessment influences the behavior of voters and incumbent politicians. In this context, it is relevant to test explicitly whether efficiency is a valence issue. For example, local government employees may prefer lower levels of efficiency than people working in central government and in private sectors. The valence assumption could be analyzed by comparing users and non-users prioritization of service quality and volume. Finally, the estimation of causal effects can be improved. For example, central government reforms in the local government structure may produce exogenous shocks to polarization and dominance, which could be exploited in further empirical analyses.

According to Oates' decentralization theorem (Oates 1972), decentralization facilitates allocation efficiency (under certain assumptions). Polities with homogenous constituencies have a greater degree of allocation efficiency, while heterogeneity in voter preferences impedes efficiency. The current empirical analysis addresses a different type of efficiency,

---

[25]Relevant examples are the political situations in Norway and Sweden in the period of Social Democratic hegemony and in Italy in the decades of Christian Democracy dominance. Numerous instances can be found in local elections, including the elections to Norwegian local councils.

whether service output can be increased for given level of resources (cost efficiency). If Oates-type homogeneity leads to a lower degree of party polarization, it could improve cost efficiency as well. Yet preference homogeneity might also lead to more lopsided elections. For example, small and wealthy suburban local authorities may be completely dominated by a right-wing coalition, while other local governments are fully controlled by a left-wing party bloc due to their socio-economic structure. Whether decentralization improves or impairs cost efficiency depends on how preference homogeneity translates into different patterns of party polarization and electoral dominance.

References

Alesina, A. Bakir, R. and Easterly, W. 1999. Public Goods and Ethnic Divisions. *Quarterly Journal of Economics* 114, 1243-84.

Altonji, J.G., Elder, T.E. and Taber, C.R. 2005. Selection and Oserved and Unobserved Variables: Assessing the Effectiveness of Catholic Schools. *Journal of Policial Economy* 113, 151-184.

Anderson, C.J. 2000. Economic voting and political context: a comparative perspective. *Electoral Studies* 19, 151-170.

Ashworth, J., Geys, B. Heyndels, B. and Wille, F. 2008. Political Competition and Local Government Performance: Evidence from Flemish Municipalities. *Paper*. Department of Economics and Finance, University of Durham.

Ashworth, S. and Mesquita, E.B. de. 2008. Elections with Platfrom and Valence Competition. *Games and Economic Behavior* 67, 191-216.

Bertrand, M. and Mullainathan, S. 2003. Enjoying the Quit Life. Corporate Governance and Managerial Preferences. *Journal of Political Economy* 111, 1043-1075.

Besley, T. and A. Case 2003. Political Institutions and Policy Choices: Evidence from the United States. *Journal of Economic Literature41,* 7-73.

Besley, T., Persson, T. and Sturm, D. 2010. Political competition and economic performance: Theory and evidence from the United States. *The Review of Economic Studies* 77, 1329-1352.

Bingham Powell , Jr., G. 2000. *Elections as Instruments of Democracy. Majoritarian and Proportional Visions.* New Haven & London: Yale University Press.

Borge, L.-E. and Naper, L.R. 2006. Efficiency Potential and Efficiency Variation in Norwegian Lower Secondary Schools. *FinanzArchiv: Public Finance Analysis* 62, 221-249.

Borge, L.-E., Falch, T. and Tovmo, P. 2008. Public sector efficiency: the roles of political and budgetary institutions, fiscal capacity, and democratic participation. *Public Choice* 136, 475-495.

Borge, L.-E. and Haraldsvik, M. 2009. Efficiency potential and determinants of efficiency: an analysis of the care for the elderly sector in Norway. *International Tax and Public Finance* 16:468-486.

Boyne, G.A., James, O., John, P. and Petrovsky, N. 2012. Party control, party competition and public service performance. *British Journal of Political Science* 42, 641-660.

Brown, D.S., Touchton, M. and Whitford, A. 2011. Political Polarization as a Constraint on Corruption: A Cross-National Comparison. *World Development* 39, 1516-1629.

Burns, C. and Himmler, O. 2011. Newspaper Circulation and Local Government Efficiency. *Scandinavian Journal of Economics* 113, 470-492.

Calvert, R. 1985. Robustness of the Multidimensional Voting Model: Candidate Motivations, Uncertainty, and Convergence. *American Journal of Political Science* 29, 69-95.

Dalton, R.J. 2008. The Quantity and the Quality of Party Systems. Party System Polarization, Its Measurement, and Its Consequences. *Comparative Political Studies* 41, 899-920.

Easterly, W. and Levine, D. 1997. Africa's Growth Tragedy. Policies and Ethnic Divisions. *Quarterly Journal of Economics* 112, 1203-50.

Ferejohn, J. 1986. Incumbent performance and electoral control. *Public Choice* 50, 5-25.

Geys, B., Heinemann, F. and Kalb, A. 2010. Voter involvement, fiscal autonomy and public sector efficiency: Evidence from German municipalities. *European Journal of Political Economy* 26, 265-278.

Groseclose, T. 2001. A Model of Candidate Location When One Candidate Has A Valence Advantage. *American Journal of Political Science* 45, 862-886.

Hauner, D. and Kyobe, A. 2010. Determinants of Government Efficiency. *World Development* 38, 1527-1542.

Keefer, P. and Knack, S. 2002. Polarization, politics and property rights: Links between inequality and growth. *Public Choice* 111, 127-154.

McCarthy, N. Poole, K.T., Rosenthal, H. 2006. *Polarized America. The Dance of Ideology and Unequal Riches. (Walras-Pareto Riches)*. MIT Press.

Oates, W.E. 1972. *Fiscal Federalism* NY: Harcourt Brace Jovanovich.

Padovano, F. and Ricciuti, R. 2009. Political competition and economic performance: evidence from Italian regions. *Public Choice* 138, 263-277.

Pinto, P.M. and Timmons, J.F. 2005. The Political Determinants of Economic Performance: Political Competition and the Sources of Growth. *Comparative Political Studies* 38, 26-50.

Persson, T. and G. Tabellini 2000. *Political Economics: Explaining Economic Policy*. Cambridge Mass.: The MIT-Press.

Polo, M. 1998. Electoral competition and political rents. *Working Paper*. Milano IGIER.

Serra, G. 2010. Polarization of What? A Model of Elections with Endogenous Valence. *Journal of Politics* 72, 426-437.

Schneider, G. 2004. Falling Apart or Flocking Together? Left right polarization in the OECD since the World War II. *Mimeo*, University of Konstanz.

Statistics Norway 2000. Classification of Economic Regions (Standard for økonomiske regioner). *Official Statistics of Norway* C616.

Svaleryd, H. and Vlachos, J. 2007. Political rents in a Non-Corrupt Democracy. *Journal of Public Economics 93,* 355-372.

Svensson, J. 2005. Controlling spending: Electoral competition, polarization and endogenous platforms. *Working Paper*. Institute for International Economic Studies, Stockholm University.

Testa, C. 2010. Party Polarization and Electoral Accountability. *Working Paper*. Royal Holoway University of London.

Van Weelden, R. 2013a. Candidates, Credibility, and Re-Election Incentives. *Review of Economic Studies* 1:1-32.

Van Weelden, R. 2013b. Moderate Voters, Polarized Parties. *Working Paper*, University of Chicago.

Wittman, D. 1983. Candidate Motivation: A Synthesis of Alternative Theories. *American Political Science Review* 77, 142-57.

Wittman, D. 1989. Why democracies produce efficient results. *Journal of Political Economy* 97, 1395-1424.

Appendix. Documentation of production index

The index is based on six main sectors for each of the years 2001-2007, and seven sectors (including culture) for the years 2008-2010. Production output in each of the six (seven) sectors is calculated as a weighted average of a number of indexes. These weights are presented in parentheses after each of the indexes. The overall index is a weighted average of the six (seven) main service sectors.

Documentation of production index (OUTPUT) 2001-2007

1. Child-care centers (BH)
   - Opening hours in municipal day-care centers relative to number of children 0-5 years (0.854)
   - Number of square meters per outdoor play and children in public kindergartens (0.079)
   - Local transfers to private day care per child 0-5 years (age adjusted) (0.067)

2. Primary education (GS)
   - Teaching hours per year per pupil (0.940)
   - Percentage of population aged 6-9 years with access to after-school scheme (0.030)
   - Percentage of users of municipal after-school scheme with weekly 15 hours or more (0.030)

3. Primary health care (PH)
   - Number of working hours per week by doctors, measured per 10 000 inhabitants (0.406)
   - Number of working hours per week by physical therapists, measured per 10 000 inhabitants (0.406)
   - Number of working hours per week by health nurses, measured per 10 000 inhabitants aged 0-6 years (0.188)

4. Nursing services (PO)
   - Percentage of residents over 80 who receive home care services (0.263)
   - Percentage of residents over 80 years with room in institutions (0.237)
   - The proportion of persons in nursing institutions that have separate rooms (0.237)
   - Percentage of users of home care services who receive both practical assistance and nursing services (0.263)

5. Child custody (BV)
   - Percentage of children 0-17 years who are included in survey on child custody (0.311)
   - Percentage of children 0-17 years in the child custody program (0.689)

6. Social welfare (SK)
   - Percentage of population 20-66 years who receive social benefits (0.500)
   - The average benefit payment per month (0.500)

Sector weights in the 2001-2007 index (OUTPUT)
   - Day care: 0.117
   - Primary education: 0.348
   - Primary health care: 0.057
   - Nursing and Care: 0.382
   - Child Custody: 0.033
   - Social welfare: 0.063

Documentation of production index (OUTPUT) 2008-2010

1. Child-care centers (BH)
Adjusted stay hours in public and private kindergartens in relation to the number of children 0-5 years (0.8)
Number of square meters of playroom and outdoor area per child in kindergartens (0.1)
Percentage of staff with early childhood education (0.1)

2. Primary education (GS)
Number of primary school points (based on exam results, adjusted for socio-economic factors) (0.752)
Learning environment (physical facilities and subjective satisfaction) (0.141)
Number of PCs per pupil in primary schools (0.047)

Percentage of population aged 6-9 years with space in municipal (0.030)
Percentage of users of municipal after-school scheme (0.030)

3. Primary health care (PH)
Number of hours per week by doctors in relation to the needs adjusted population (0.413)
Number of hours per week of physical therapists in relation to the needs adjusted population (0.390)
Number of hours per week of health nurses in relation to the needs adjusted population (0.197)

4. Nursing and Care (PO)
Recipients of home care services in relation to the needs adjusted population (0.436)
Residents in institutions in relation to the needs adjusted population (0.364)
The proportion of institutional places that are secluded room (0.090)
Percentage of users of receiving practical assistance and home nursing (0.110)

5. Child Custody (BV)
Children covered by the child welfare investigation in relation to the needs adjusted population (0.252)
Children 0-17 years covered by the measures in relation to the needs adjusted population (0.548)
Percentage of employees with relevant professional training (0.200)

6. Social welfare (SK)
Number of recipients of social assistance in relation to the needs adjusted population (0.500)
The average benefit payment per month (0.500)

7. Culture (KUL)
Books in libraries per capita (0.2665)
Lending of books per capita (0.2665)
The number of cinema seats per capita (0.055)
Visit the cinema per capita (0.055)
Support to activities for children and kids 6-16 years per capita (0.357)

Sector weights in the 2008-2010 index (OUTPUT)
Kindergarten 0.144
Primary education 0.310
Primary health care 0.052
Nursing and Care 0.361
Child Welfare 0.032
Social services 0.058
Culture 0.043

Source: Rapport fra Det tekniske beregningsutvalget for kommunal og fylkeskommunal økonomi (TBU), april 2009, kapittel 3.

Table 1. Electoral dominance.

Election periods:	Socialist bloc		Non-socialist bloc		DOMINANCE	
	% one period	Mean	% one period	Mean	% one period	Mean
Election in the years 1955,1959 and 1963	21,4 %	**0,175** (0.36)	21,1 %	**0,123** (0.26)	42,8 %	**0,299** (0.39)
Election in the period 1971-1991	20,4 %	**0,112** (0.27)	47,8 %	**0,303** (0.38)	68,2 %	**0,415** (0.39)
Election in the period 1975-1995	18,2 %	**0,095** (0.24)	52,5 %	**0,334** (0.39)	70,4 %	**0,429** (0.39)
Election in the period 1979-1999	17,7 %	**0,081** (0.21)	55,9 %	**0,363** (0.40)	73,2 %	**0,444** (0.38)

Mean: Average score on the DOMINANCE indicator, i.e. average share of election periods where one of

the party blocs have at lest 60 percent voter support . (Standard deviations in parentheses).

% one period: Percent of municipalities with more than 60 percent party bloc support

in at least one election period.

Table 2. Party polarization.

	Political party		Left-right score	Seat share
Socialist bloc	The left-wing parties	Mean	**-3,09**	**0,08**
		(Std.err.)	(0.49)	-
		Std.dev.	0,53	0,06
	The Labour Party	Mean	**-1,44**	**0,31**
		(Std.err.)	(0.43)	-
		Std.dev.	(0.56)	0,12
Non-socialist bloc	The center parties	Mean	**0,11**	**0,31**
		(Std.err.)	(0.42)	-
		Std.dev.	0,62	0,17
	The Conservative Party	Mean	**2,59**	**0,16**
		(Std.err.)	(0.35)	-
		Std.dev.	0,34	0,09
	The Progress Party	Mean	**3,44**	**0,14**
		(Std.err.)	(0.48)	-
		Std.dev.	0,51	0,10
	Non-Socialist party bloc position	Mean	**1,56**	
		Std.dev.	0,76	
	Socialist party bloc position	Mean	**-1,76**	
		Std.dev.	0,56	
	Party polarization	Mean	**3,32**	
		Std.dev.	1,02	

Left-right score yields the average left-right positions of local council members in political
parties and party groups. Party polarization has been measured as the difference in
left-right score beteen the non-socialist and socialist party bloc.
The left-wing parties comprises the Red Electoral Alliance and the
the Socialist Left Party. The center parties comprises the Liberal Party,
the Christian People's Party, the Center Party and a few local lists and other parties.
Number of respondents: 2266 (2011) and 2125 (2007). Number of municipalities: 120.
Source: Survey to local council members in 2007 and 2011.

Table 3. Descriptive statisics 2001-2010

	Entire sample			Subsample with data on party polarization		
	Average	Std. Dev.	(N)	Average	Std. Dev.	(N)
Production index (OUTPUT)	108,6	15,1	(3710)	103,1	12,6	(1078)
Revenue index (REVENUE)	105,8	21,7	(3710)	100,0	12,2	(1078)
Per capita costs (EXPENDITURES)	48,0	14,0	(4288)	43,9	10,4	(1190)
Rate of social security contributions	11,1	4,2	(3944)	12,1	3,7	(1091)
Population size	9558	18541	(4286)	16892	30119	(1193)
Share aged 0-5 years	0,08	0,01	(4286)	0,09	0,01	(1193)
Share aged 6-15 years	0,12	0,01	(4286)	0,12	0,01	(1193)
Share aged 67 years or more	0,14	0,03	(4286)	0,13	0,03	(1193)
Share with higher education	0,17	0,05	(4317)	0,18	0,05	(1193)
Socialist majority (=1)	0,17	0,38	(4393)	0,18	0,39	(1193)
Party consentration (Herfindahl ind.)	0,25	0,11	(4273)	0,23	0,07	(1193)
Electoral dominance (DOMINANCE)	0,43	0,39	(4050)	0,37	0,38	(1193)
Party polarization (POLARIZATION)				3,30	1,02	(1193)
Instrument.: Socialist majority (=1)	0,09	0,22	(4340)	0,09	0,22	(1193)
Instrument: Party consentration	0,36	0,14	(4340)	0,34	0,12	(1193)
Instrument: Electoral dominance	0,30	0,39	(4340)	0,27	0,38	(1193)

The revenue index is the sum of taxes on income and assets plus bloc grants. The index has been
adjusted by the criteria in the grant system. This includes population, age structure, settlement
pattern and various social indicators. The adjusted revenue index (REVENUE) has been calculated
as the revenue index less municipal social security contributions.

Per capita costs (EXPENDITURES) cover those spending items that are included in the production
index (OUTPUT), and has been taken from the municipal accounts.

Share with higher education is the share of population aged 15 years or more with higher
education, that is people with a tertiary degree from a university or college.

Instruments: The instrument variables for socialist majority, party concentration and electoral dominance
has been calculated on basis of the years 1955, 1959 and 1963.

Table 4. Efficiency and quality assessment
(Standard errors in parentheses.)

Estimated relative efficiency	2010 user survey			2008-2010 efficiency index		
	Service quality	Service quality relative to expectations	Number of respondents in the survey	Average relative efficiency	Average population size	Number of municipalities
- 0.94	0.964 (0.044)	0.795 (0.049)	693	0.906	4867	51
0.94 - 0.97	1.048 (0.034)	0.890 (0.037)	1336	0.956	9464	53
0.97 - 1.00	1.035 (0.025)	0.872 (0.027)	2255	0.986	12500	67
1.00 - 1.03	1.036 (0.019)	0.834 (0.021)	3769	1.014	15398	89
1.03 - 1.06	1.080 (0.023)	0.893 (0.025)	2398	1.043	14670	60
1.06 -	1.053 (0.030)	0.880 (0.032)	1633	1.090	12428	48
All	1.072	0.899	12084	1,000	11224	368

Estimated relatiave efficiency:

The efficiency score has been estimated by means of a regression model with log(OUTPUT) as response variable,
and with controls for adjusted municipal revenue (log), population size (log), share of population in the age groups
 0-5 years, 6-15 year and 67 years or more, share of population with higher education, and fixed effects for
economic regions (N=90). The efficiency index has been defined as residual OUTPUT (i.e. exp(residual OUTPUT)).

The 2010 user survey:

Data on service quality has been taken from a large population survey (2010) conducted by the Norwegian Agency
for Public Management and eGovernment (Difi).
Detailed documentation of the survey data has been posted on DiFi's webpage:
http://www.difi.no/artikkel/2010/11/innbyggerundersokelsen-de-ansatte-er-viktigst-for-tilfredsheten-med-det-offentlige
The averages have been estimated using the survey weight supplied by the data provider.
Service quality : "Considering these services (specified above), to what extent are you satisfied or dissatisfied with the service quality?'
Service quality relative to expectations :'To what extent does the service quality of these services meet your expectations?'
For each of the two general questions, the respondents indicated levels of satisfaction on a scale from -3 (very dissatisfied)
to +3 (very satisfied). The 2010 survey data have been combined with efficiency scores from 2008, 2009 and 2010.

Table 5. Regression estimates for efficiency. 2001-2010.
(Robust standard errors clustered by municipality in parentheses.)

	A1		A2		B1		B2		C1		C2	
REVENUE (log)	0,261	***			0,393	***			0,411			
	(0.0099)				(0.028)				(0.030)			
EXPENDITURES (log)			0,365	***			0,421	**			0,479	***
			(0.046)				(0.141)				(0.086)	
RATE (Social secur. contr.)	-0,002	***	0,000		-0,003		-0,003		-0,004		-0,002	
	(0.0007)		(0.0014)		(0.002)		(0.002)		(0.002)		(0.003)	
DOMINANCE	-0,009	*	-0,014						-0,015	*	-0,003	
	(0.004)		(0.020)						(0.007)		(0.015)	
POLARIZATION					-0,009	**	-0,015	*	-0,010	**	-0,012	*
					(0.0029)		(0.006)		(0.003)		(0.005)	
POLARIZATION*DOMINANCE									0,000		0,001	
									(0.006)		0,011	
Population size (log)	-0,039	***	-0,048		-0,024	***	-0,020		-0,023	***	0,000	
	(0.0017)		(0.065)		(0.003)		(0.011)		(0.003)		(0.008)	
Share 0-5 year	-1,281	***	1,613	***	-0,896	**	3,863	*	-0,862	*	3,805	***
	(0.189)		(0.296)		(0.333)		(1.771)		(0.362)		(0.934)	
Share 6-15 year	-1,014	***	-1,026		-1,926	***	-0,357		-1,863	***	-0,505	
	(0.159)		'(0.686)		(0.259)		(0.756)		(0.267)		(0.585)	
Share 67 years -	0,095		0,464	**	0,286		1,210	**	0,269		1,389	***
	(0.079)		(0.149)		(0.151)		(0.366)		(0.159)		(0.299)	
Socialist majority	-0,006		0,179		0,002		0,140	*	0,002		1,389	
	(0.004)		(0.376)		(0.006)		(0.067)		(0.006)		(0.012)	
Herfindahl index of	0,034		-0,566		-0,170	**	-1,132		-0,204	**	-0,458	***
party consentration	(0.0214)		(2.247)		(0.062)		(1.100)		(0.069)		(0.128)	
Estimation method	OLS		2SLS[a,b]		OLS		2SLS[b]		OLS		2SLS[c]	
Fixed effect for region*year	Yes		Yes		Yes		Yes		Yes		Yes	
(Number of municipalities)	(379)		(379)		(116)		(116)		(116)		(116)	
(Number of economic regions)	(90)		(90)		(65)		(65)		(65)		(65)	
(Number of observations)	(3271)		(3271)		(1011)		(1011)		(1011)		(1011)	

*:p<0.05; **:p<0.01; ***:p<0.001

a) Table A1 provides the reduced form and first stage regression results.

b) The 2SLS estimations in A2 and B2 employs instruments for expenditures, electoral dominance, socialist majority
and party consentration.

c) The 2SLS estimation in C2 use log(REVENUE) for log(EXPENDITURES) only.

The variables DOMINANCE and POLARIZATION have been centered at the sample means.

Table 6. Regression estimates for high- and low revenue municipalities.

(Robust standard errors clustered by municipality in parentheses.)

	i		ii		iii		iv	
	R≥105	R<105	R≥105	R<105	R≥105	R<105	R≥105	R<105
DOMINANCE	**-0,037** ***	**-0,006**	**-0,045** ***	**0,001**	**0,122** *	**0,004**	**-0,080**	**-0,015**
	(0.010)	(0.004)	(0.012)	(0.005)	(0.053)	(0.010)	(0.054)	(0.010)
POLARIZATION					**-0,034** *	**-0,008**	**-0,064** ***	**-0,018** ***
					(0.015)	(0.003)	(0.010)	(0.003)
POLARIZATION*DOMINANCE					**-0,112** **	**-0,002**	**-0,085** ***	**0,001**
					(0.035)	(0.008)	(0.021)	(0.008)
Fixed effect for region*year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effect for REVENUE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-varying controls	Yes	Yes	No	No	Yes	Yes	No	No
(Number of municipalities)	(183)	(289)	(183)	(289)	(37)	(84)	(37)	(84)
(Number of economic regions)	(62)	(83)	(62)	(83)	(46)	(53)	(46)	(53)
(Number of observations)	(1048)	(2239)	(1048)	(2239)	(194)	(762)	(194)	(762)

*:$p<0.05$; **:$p<0.01$; ***:$p<0.001$

R≥105: Revenue level greater than the average level; R<105: Revenue level smaller than the average level.

Fixed effect for REVENUE: The revenue index has been coded in whole numbers, and included as fixed effects in the regression model.

Time-varying controls: Population size (log), age structure (share 0-5 years, 6-15 years and 67- years),

party concentration, (Herfindahl index), and socialist majority (=1).

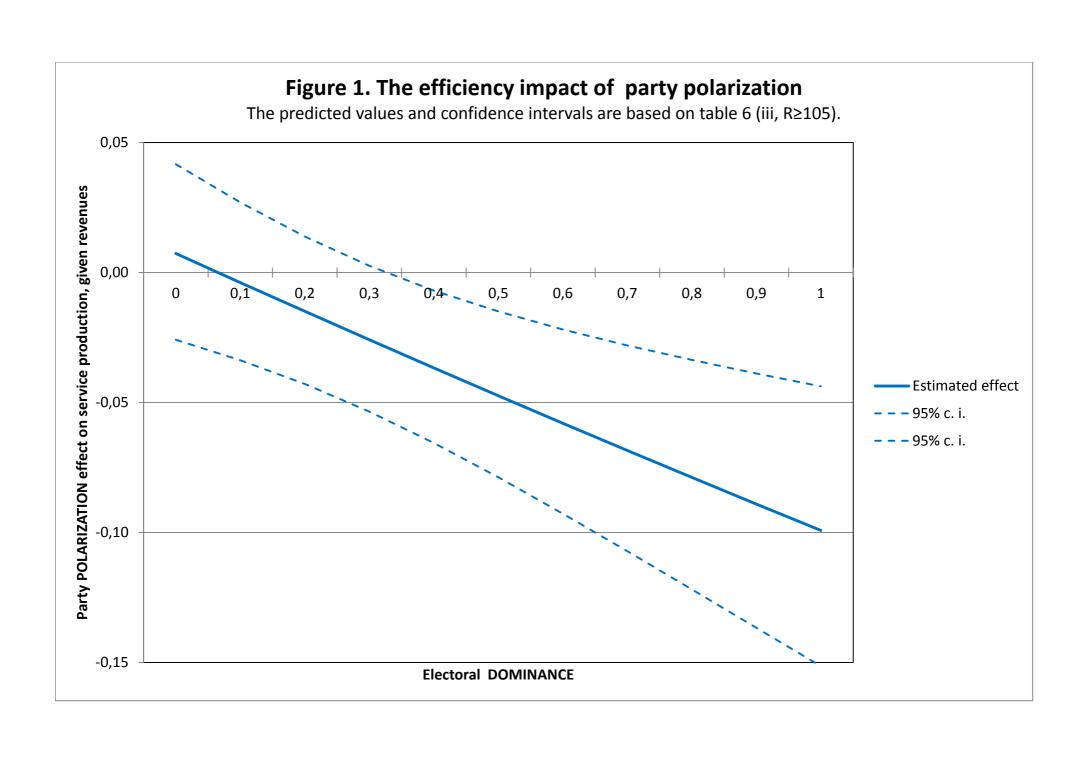Party polarization and electoral bias have been centered at the sample means.

Figure 1. The efficiency impact of party polarization

The predicted values and confidence intervals are based on table 6 (iii, R≥105).

Table 7. Roboustness checks. Estimates for party polarization and electoral bias only.

(Robust standard errors clustered by municipality in parentheses).

	Estimates				Model specification
	DOMINANCE	Non-socialist DOMINANCE	Socialist DOMINANCE	POLARIZATION	
I		-0.021** (0.007)	-0.0047 (0.0043)	Not included	Like A1 in table 5, but separate effects for socialist/non-socialist dominance
II	-0.016** (0.0051)			Not included	Like A1 in table 5, but DOMINANCE has been redefined as share of years where one party bloc had 70 percent or more of the votes
III	-0.009* (0.0037)			Not included	Like A1 in table 5, but the model includes share of population aged 15 years or more with higher education
IV	-0.010 (0.0071)			Not included	Like A1 in table 5, but estimated on basis for the years 2008-2010.

	Estimates			Model specification
	DOMINANCE	POLARIZATION	POLARIZATION*DOMINANCE	
V	-0.131*** (0.036)	-0,001 (0.014)	-0.121 (0.081)	Like iii (R≥105) in table 6, but DOMINANCE has been redefined as share of years where one party bloc had 70 percent or more of the votes
VI	-0.128*** (0.029)	-0.004 (0.016)	-0.099* (0.049)	Like iii (R≥105) in table 6; with control for share of population aged 15 years or more with higher education
VII	0,0513 (0.082)	-0,0358 (0.0396)	-0.217** (0.081)	Like iii (R≥105) in table 6; estimated on basis of the years 2008-2010.

*:p<0.05; **:p<0.01; ***:p<0.001

Party polarization and electoral bias have been centered at the sample means.

Table A1. First stage regression results for 2SLS (table 5, A2)

(T-values in parentheses.)

	Selected first stage estimates						
	Electoral DOMINANCE		Socialist majority		Party concentration (Herfindahl index)		Expenditures (log)
REVENUE (instrument)	**-0,020**		**0,235** ****		**0,049** ***		**0,646** ***
	(0.47)		(4.35)		(5.68)		(25.80)
DOMINANCE (Instrument)	**0,391** ***		**0,235** ***		**0,012** ***		**-0,029** ***
	(26.98)		(4.96)		(4.14)		(3.31)
Socialist majority (Instrument)	**-0,290** ***		**0,198** ***		**0,032** ***		**-0,053** ***
	(12.03)		(6.36)		(6.37)		(3.35)
Herfindahl index (instrument)	**0,030**		**0,185** ***		**0,037** ***		**-0,089** ***
	(0.68)		(3.25)		(4.02)		(3.36)
Fixed effects for region*years	Yes		Yes		Yes		Yes
F-test for excluded instruments	**727,9**		**40,4**		**16,2**		**665,6**

*:p<0.05; **:p<0.01; ***:p<0.001