

Do re-election probabilities influence public investment?

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Abstract An insight from dynamic political economy is that elected officials may use state variables to affect the choices of their successors. We exploit the staggered timing of local and national elections in Norway to investigate how politicians' re-election probabilities affect their investments in physical capital. Because popularity is endogenous to politics, we use an instrumental variable approach based on regional movements in ideological sentiment. We find that higher re-election probabilities stimulate investments, particularly in programs preferred more strongly by the incumbent parties. This aligns with theory where capital and current expenditures are considered complementary inputs to government production.

Keywords Strategic capital accumulation · Incumbent popularity

JEL Classification E62 · H40 · H72

1 Introduction

Politicians who do not expect to be re-elected may use state variables, such as public debt or capital, to influence the policies of their successors. By choosing these variables today, incumbents affect the constraints faced by their successors in the future, and thereby which policies are implemented after they have left office. Thus, policymakers have incentives to consider their re-election probabilities when setting state variables. This insight plays a central role within the field of dynamic political economy, and is well established as a potential

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determinant of public debt accumulation.¹ However, less is known about how such considerations shape policymakers' investment strategies. In this paper we explore the empirical relevance of political turnover for investments in physical capital.

In theory, the impact of anticipated turnover on investment strategies depends on the relative strength of two opposing forces. On the one hand, a low re-election probability may motivate an incumbent party to invest heavily in the production of goods and services it prefers more strongly, for instance education, to ensure that in the future this particular public good is provided even though an opponent with different preferences takes office. Glazer (1989) and Beetsma and van der Ploeg (2007) emphasize this mechanism when they conclude that incumbents will invest more when their re-election is less likely. On the other hand, as emphasized in Natvik (2009), the return to public capital, such as school buildings, is likely to depend on the other inputs with which it is combined, such as teachers in the example. Hence, if capital is complementary to other flow variables in government production, and successors are unwilling to allocate resources to the goods preferred by their predecessors, incumbent parties may choose to cut investment if their re-election becomes less likely. Which of these forces dominates investment decisions is an empirical question. We address the issue by studying how variation in re-election probabilities affects both the total level of public investment and its composition. In addition, we contrast the responses of investment to those of current expenditures.

We use panel data for Norwegian local governments covering a period of 28 years. Norwegian local governments are well-suited for a study of public investment since they operate within a common institutional environment, which facilitates comparisons cross-sectionally and over time, and because they have wide discretion in investment policy compared to local governments in other OECD countries (Rattsø 2003). The following feature of the Norwegian system is particularly useful for our purposes: local elections are held every four years, while elections for the national parliament are held in the middle of each local term. The national election can be thought of as a "grand opinion poll" that captures the local electorate's ideological preferences, while leaving the composition of the governing local council unaffected. The national election is a particularly useful tool as it contains separate information from each municipality, and we can choose the level of aggregation at which we use this information. Thus, we use the national elections to measure changes in the electoral support for local incumbent parties, and inspect how variation in this measure affects spending decisions.

Inherent to any analysis of how elected officials' popularity influences public policy, lies the problem of reverse causality. In our case, the challenge is that how citizens vote in the national election may depend on how they evaluate their local incumbents. We address this issue by instrumenting the result of the national election held in each municipality i with the result from the same election held in all other municipalities of the county to which i belongs. In this manner we aim to capture swings in voters' ideological sentiments which are unrelated to local politics. Our identification strategy is closely related to U.S. studies that use the presidential vote measured at the congressional level to proxy for constituency ideology (for instance, see Ansolabehere et al. 2001). It is also similar in spirit to Levitt and Snyder (1997) who investigate how federal spending impacts local election outcomes by

¹Theories of strategic debt accumulation are emphasized both in general macroeconomic textbooks, such as Romer (2001), as well as in specialized textbooks on political economics, such as Persson and Tabellini (2000). The general idea that re-election concerns will affect current policy is a classic theme in the public choice literature, surveyed by Mueller (2003). Crain (2001) relates the public choice literature on policy durability to models of strategic debt accumulation.

using spending outside the district, but inside the state, as an instrument for spending in the district. Our identifying assumption is that county-wide results from national elections do not influence local policies except through their impact on perceived re-election probabilities. Furthermore, our rich data facilitates extensive robustness tests with regard to yardstick competition (Besley and Case 1995) and other potential problems.

Our main finding is that a higher re-election probability tends to stimulate investment. We distinguish between the two main political blocs in Norway, and find that Right-bloc incumbents raise aggregate investment, whereas Left-bloc incumbents raise child care investments. Current expenditures, in contrast, are left unaltered by both blocs. In light of the existing evidence on party preferences in Scandinavia (Sørensen 1995; Borge and Sørensen 2002; Svaleryd 2009), our finding for the Left-bloc indicates that when re-election becomes more likely, incumbent parties increase investment in the programs they prefer more strongly than their political opponents. For the Right-bloc, a composition effect in investment is less clear, but to the extent there is one it goes in the same direction as the finding for the Left-bloc. Hence, both the level and the composition effects of investment are closer to the predictions from a theory where incumbents are concerned about the future utilization of capital and therefore hold back on investment spending if they expect to lose office, as in Natvik (2009), than from a theory where public investments are used simply to pin down the future provision of public goods as in Glazer (1989).

Within the extensive literature on how incumbents may “tie the hands” of their successors through state variables, two theoretical cornerstones are Persson and Svensson (1989) and Tabellini and Alesina (1990). Both of these studies focus on public debt. For public investment, most theoretically oriented studies analyze accumulation of capital which is homogenous; for instance Besley and Coate (1998), Svensson (1998), Peletier et al. (1999), Hagen (2002), Bassetto and Sargent (2006), Battaglini and Coate (2007), and Azzimonti (2011).² In contrast, our analysis is motivated by a framework where public capital is heterogeneous and political agents disagree about the relative value of different types of capital. Our empirical analysis is not constructed to test the mechanisms of each of the alternative theories directly, but our results do support the general idea that public investments are influenced by strategic considerations on the part of elected officials.

Empirical studies of the strategic use of state variables have primarily focused on debt and relied on historical measures of political stability to proxy for re-election probabilities, such as Grilli et al. (1991), Crain and Tollison (1993), and Pettersson-Lidbom (2001).³ The evidence from these studies is mixed regarding whether or not policymakers use debt strategically.⁴ Darby et al. (2004) study capital accumulation using a similar approach, as they rely on the previous election when assessing the link between political uncertainty and public investments in a panel of European countries. The validity of these identification strategies hinges on the assumption that (historically) unstable units are similar to stable units in all

²Besley and Coate (1998) and Azzimonti (2011) both consider public capital as an input in private production, which makes current investments influence future tax revenues. Peletier et al. (1999) consider the impact of deficit restrictions on investments that yield financial returns in the future. Bassetto and Sargent (2006) study the incentives for public investments in goods that benefit not only today’s voters, but also individuals who are too young to vote. Battaglini and Coate (2007) consider investment as providing a public good that benefits all citizens, and contrast it to pork-barrel projects targeted at specific groups. Svensson (1998) considers investments in property rights that stimulate future tax revenues and Hagen (2002) analyzes institutional reform to enhance public sector efficiency.

³An exception here is Lambertini (2003) who relies on opinion polls.

⁴Cross country studies such as Grilli et al. (1991) tend not to find any support for strategic debt accumulation, while some studies of lower levels of government do (see Crain and Tollison 1993; Pettersson-Lidbom 2001).

other respects relevant for politics (given control variables). Our approach, based on changes in popularity within election periods, does not rely on this strong assumption.

The rest of this paper is organized as follows. Section 2 lays out a theoretical framework which captures the opposing in influences of incumbents' re-election probabilities on their investment incentives. Section 3 presents the data and the institutional setting. In Sect. 4 we discuss our empirical strategy. Section 5 presents the main results. Section 6 explores the robustness of our results along various dimensions and examines the validity of our identifying assumption. Section 7 interprets our findings in light of the theoretical predictions in Sect. 2, and also relates them to theories where re-election probabilities are endogenous and expenditure is used to boost popularity. Section 8 concludes.

2 Theory

Based on the framework proposed by Natvik (2009) to study public savings, we here assess how re-election probabilities may influence the aggregate level and composition of public investment, and the composition of current expenditure.⁵ After the empirical analysis, in Sect. 7, we will relate our findings to theories where causality runs in the opposite direction, from investment and current expenditure to re-election probability, as emphasized in the political business cycle literature.

2.1 The model

There are two periods, $t = \{1, 2\}$, and two parties, $J = \{R, L\}$. Each period a party holds office and decides how to spend a given income in order to produce two goods f and g with the production functions

$$h_t = h(n_t^h, k_t^h) = (\gamma n_t^{h \frac{\varepsilon-1}{\varepsilon}} + (1-\gamma)k_t^{h \frac{\varepsilon-1}{\varepsilon}})^{\frac{\varepsilon}{\varepsilon-1}}, \quad (1)$$

where n_t^h and k_t^h are the labor and capital used in period t to produce good h , $h = g, f$. The elasticity of substitution between the two input factors in production is ε .

Capital and labor are infinitely elastic at a unit cost of 1. While the amount of labor employed is freely chosen each period, capital is chosen one period in advance and specific to the production of each public good. Hence k_2^h is set in period 1. The income flow per period is normalized to one. The first period budget constraint for the government is

$$n_1^g + n_1^f + k_2^g + k_2^f = (1-\delta)(k_1^g + k_1^f) + 1 + b, \quad (2)$$

where δ is the depreciation rate of public capital and b is debt accumulated in that period. In period 2, no investments are undertaken, debt must be paid down, and the budget constraint is

$$n_2^g + n_2^f = 1 - b. \quad (3)$$

The gross interest rate on bonds is exogenous and equal to 1, which also is the inverse of the candidates' discount factor.⁶ This budget constraint also implies that public capital is irreversible in period 2.

⁵Natvik (2009) extends the model of Tabellini and Alesina (1990) by including public capital, and shows that contrary to conventional wisdom, anticipated turnover is likely to generate too little investment rather than too large deficits.

⁶We can think of the interest rate on b as determined on the world market.

In period 1 the party in office chooses $\{n_1^g, n_1^f, k_2^g, k_2^f, b\}$. The office holder in period 2 sets $\{n_2^g, n_2^f\}$. Party J 's preferences are given by $W^J = E \sum_{t=1}^2 u(g_t, f_t | \alpha^J)$, where

$$u(g_t, f_t | \alpha^J) = \frac{[(\alpha^J g_t^{\frac{\phi-1}{\phi}} + (1 - \alpha^J) f_t^{\frac{\phi-1}{\phi}})^{\frac{\phi}{\phi-1}]}{1 - 1/\sigma}. \quad (4)$$

Here σ is the intertemporal elasticity of substitution for efficiency units of public goods, while ϕ is the intratemporal elasticity of substitution between goods g and f .⁷ Hence, ϕ indicates the willingness of politicians to adjust the composition of public goods in response to changes in their relative production costs. $E(\cdot)$ is the expectations operator, reflecting that there is uncertainty about which party will be in charge next period. Before period 2 an election is held to determine which party holds office in that period. With probability p_R party R wins, with probability $1 - p_R$ party L wins.

2.2 Political equilibrium

In period 1 the party in office, identified by α_1^J , maximizes $E \sum_{t=1}^2 u(g_t, f_t | \alpha_1^J)$ with respect to $\{n_1^g, n_1^f, k_2^g, k_2^f, b\}$, subject to the budget constraint (2) and technology (1). In addition, the incumbent office holder internalizes how its choices will affect policy in period 2. In that period, the office holder sets $\{n_2^g, n_2^f\}$ so as to maximize $u(g_t, f_t | \alpha_2^J)$, subject to (3) and (1).

Since analytical results are attainable only for special cases of the model, we solve the model numerically.⁸ In presenting results, we will consider a variety of values for σ , ϕ and ε , because these parameter determine the model's qualitative predictions. The remaining parameters matter only quantitatively, and are held constant. Our benchmark parametrization is as follows: $\varepsilon = 0.7$, $\sigma = 1$, $\phi = 0.5$, $\gamma = 0.7$, $\delta = 0.2$, $\alpha^R = 0.6$ and $\alpha^L = 0.4$. Hence, we assume that the incumbent is of type R and prefers goods of type g relatively strongly.

2.3 Key implications

Figure 1 displays the model's predictions for how the re-election probability affects first-period policies. The plots display each variable's percentage point deviation from its level if re-election were certain ($p_R = 0$).

2.3.1 Investment

The first prediction from the model is that when capital and labor are complements, an increase in the probability of re-election leads to higher total investments. This is illustrated by the upward-sloping solid line in the lower left panel of Fig. 1. The intuition for this prediction is the following. The incumbent party (R in the example) foresees that if it is ousted from office, less labor will be employed in production of the good it more strongly prefers (good g in the example). Thus, when capital and labor complement each other in production, the return to investment in the incumbent's more preferred program is reduced by potential political turnover. The effect on returns to capital in the other program (f in the example) will of course go in the opposite direction, but since the incumbent derives

⁷An efficiency unit of public goods is $(\alpha^J g_t^{\frac{\phi-1}{\phi}} + (1 - \alpha^J) f_t^{\frac{\phi-1}{\phi}})^{\frac{\phi}{\phi-1}}$.

⁸Details on this solution are given in a working paper version of this paper (Fiva and Natvik 2009).

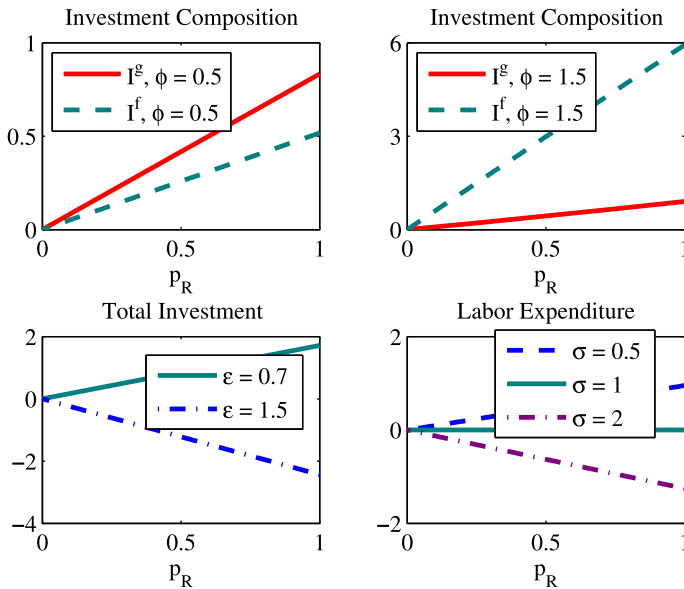


Fig. 1 The effect of re-election probability on policy. *Notes:* All plots show the percentage point difference from the corresponding outcome when turnover is certain ($p_R = 0$). I^g and I^f denote investment in production of good g and f . Total investment means investment in both goods summed. Labor expenditure means spending on labor in the production of both goods summed. Unless otherwise noted, the parameter values are $\varepsilon = 0.7$, $\sigma = 1$, $\phi = 0.5$, $\gamma = 0.7$ and $\delta = 0.2$

relatively little utility from this good, that effect will not outweigh the first. Hence, the more likely an incumbent party is to remain in office, the higher it will value future public capital, and the more it will invest. The lower left plot of Fig. 1 illustrates that the essential assumption behind this prediction is sufficient complementarity between capital and labor, meaning that ε is small.

Regarding investment composition, our prediction is given in the upper left panel of Fig. 1: when the probability of re-election increases, an incumbent party will raise investment in its more preferred program relative to its less preferred program. There are several counteracting mechanisms at work here. When ε is low, capital returns are highly sensitive to how labor is allocated in the future, and the incumbent political party will place importance upon how the capital it builds will be combined with labor after the election. Hence, the prospect of losing influence may motivate the incumbent to invest more in the project preferred strongly by its successor, as this is where capital will be complemented by most labor. On the other hand, the labor allocation after political turnover also implies that relatively less will be produced of the incumbent's preferred good. To compensate for this effect, the incumbent may tilt the investment composition toward its own favorite projects as re-election becomes less likely.

Finally there is a third mechanism: the incumbent party's investment composition affects the successor's allocation of labor. An extra unit of k_2^g increases the marginal productivity of labor in producing g_2 , and the larger is the complementarity (the smaller is ε) between the two input factors in production, the stronger is the effect. This motivates higher employment in sector g . On the other hand, an extra unit of k_2^g raises the provision of g -goods relative to f -goods, which motivates a shift of labor from g -production to f -production if the two goods are considered imperfect substitutes ($\phi < \infty$). Hence, the use of labor in g -production

increases with the amount of capital installed for that program, if and only if the degree to which k_2^g substitutes for n_2^g in production (ε) is less than the degree to which g_2 substitutes for f_2 in consumption (ϕ).⁹ Thus, when $\phi < \varepsilon$ the incumbent has an additional incentive to tilt the investment composition *away from* its own most-preferred program as re-election becomes *less* likely. This is what occurs in the upper left plot of Fig. 1. If $\phi > \varepsilon$ the investment composition would be tilted toward good f when p_R increases, as we see in the upper right plot of Fig. 1.

Here we have deliberately focused on the model's predictions when capital and labor are complements. The reason is that this seems both empirically relevant, due to macro evidence, such as Klump et al. (2007), and because complementarity gives rise to interactions between current and future policy which are not considered in other studies. For instance, Glazer (1989) and Beetsma and van der Ploeg (2007) analyze investment when public capital is equivalent to a durable version of a public consumption good, in which case an incumbent party that is about to lose power may simply pin down future goods provision through investing. This is analogous to assuming full substitutability between capital and labor, which illuminates why these studies conclude that anticipated turnover motivates *higher* total investment, and that the composition of investment is tilted toward the incumbent's most preferred program if political turnover becomes more likely. The two predictions above allow us to evaluate whether the more complicated interplay between future and current policy that arises under complementarity is relevant empirically.

2.3.2 Wage expenditure (“Current expenditure”)

For wage expenditure, the prediction is that the composition of spending across the policy objectives is unaffected by the incumbent party's probability of re-election. The reason is that employment composition (n_1^g/n_1^f) is determined by the initial capital stocks. Because these are beyond an incumbent's control, and because wages are exogenous, it follows that the composition of wage spending is not influenced by the incumbent party's re-election probabilities.

As shown in the lower right panel of Fig. 1, an incumbent party may also adjust the total level of wage spending in response to changes in its re-election probability. Wage expenditure increases with the re-election probability when $\sigma > 1$, decreases when $\sigma < 1$, and is unaffected when $\sigma = 1$.¹⁰ However, because the Norwegian municipalities we explore must balance current expenditure against income, as explained below, we do not believe that this dimension of the model can be explored with our data.

The key difference between capital and labor in the model is that the latter is freely determined each period, while the former is not. In our empirical approach below we will distinguish between investment in physical capital and current expenditures, which are dominated by wage expenditures. We believe that although current expenditures might not be

⁹As shown in Natvik (2009), when $\phi < \varepsilon$, it follows that $dn_2^f/dk_2^f = -dn_2^g/dk_2^g < 0$ and $dn_2^f/dk_2^g = -dn_2^g/dk_2^f > 0$, and vice versa.

¹⁰On the one hand, turnover implies a “substitution effect”: the incumbent party will want to shift labor expenditure from the second period to the first period, as this allows it to spend more on the program it prefers more strongly. On the other hand, turnover implies an “income effect”: politicians want to smooth the instantaneous utility flow from publicly provided goods over time. Because electoral turnover implies that in period 2 relatively little labor is allocated to the program that the incumbent derives most utility from, the way to smooth the utility flow is to cut labor expenditure in period 1 in favor of period 2. This income effect dominates the substitution effect if $\sigma < 1$, while the substitution effect dominates if $\sigma > 1$. If $\sigma = 1$, the two effects cancel each other out.

completely flexible each period, as assumed in the model, they are considerably more flexible than physical capital.

3 The institutional setting and data

We utilize data from Norwegian municipal governments. These constitute a substantial part of the Norwegian economy. Together with the regional level of government, the counties, the municipal governments account for about 15 to 20 % of mainland GDP. Their main responsibilities include child care, primary education and care for the elderly. In addition the local Norwegian governments are responsible for some other activities, such as providing cultural services and infrastructure. The local governments face some regulations concerning the coverage and standards of welfare services, but have considerable discretion concerning the composition of expenditures. On the revenue side they are more restricted. The local public sector is financed largely by block grants from the central government, and regulated income taxation. The income tax rate cannot exceed a ceiling that is determined centrally, and since 1977 no municipality has deviated from this upper bound. Furthermore, revenues from income taxation are strongly equalized across governments in a rule-based income tax revenue-sharing system. Grants are also largely determined by rules and regulations, as 98–99 % of grants are non-discretionary, and the remaining grants are primarily used to compensate for extraordinary events (like floods). The revenue sources where local governments have some control, are user fees and property taxation. For more details, see Rattsø (2003).

An important feature of the Norwegian system is that local governments are free to deficit finance investment, but not current expenditures. The sum of current expenditure and interest payments on outstanding debt cannot exceed revenues.¹¹

3.1 Data from local government accounts

Our data stem from the local governments' accounts, which distinguishes between current expenditures and investment for different programs.¹² Our dataset covers seven local election cycles, from 1972 to 1999. We do not use data after 1999 because in the following election term, the organization of the account data was reformed. In the period we study, the number of local governments fell from 454 to 434.

We focus on the main welfare services that local governments are responsible for: education, elderly care and child care.¹³ On average, spending on these three programs together constitutes about 45 % of total municipal spending in our sample. Local governments are the main providers of these services. The public sector faces little competition from the private sector, in particular for educational services. Almost all pupils are enrolled in public primary schools.

¹¹The punishment for violating this requirement is to be put under administration by the central government, but this very rarely happens. Budgets and borrowing must, however, be approved by the regional commissioner (*fylkesmannen*), the central government's representative in the county. If the balanced budget requirement is broken, the regional commissioner will act to restore economic balance (Borge 2005).

¹²The dataset is available online (cf. Fiva et al. 2012).

¹³In preliminary investigations we also analyzed the impact of changes in re-election probabilities on other sectors, namely central administration, culture and infrastructure. We did not find any impact of re-election probabilities on these expenditure categories. This fits well with the theory in Sect. 2, since only spending on the programs about which the parties disagree should be influenced by re-election probabilities.

Table 1 Descriptive Statistics: Investment and Current Expenditures

Variable	Mean	Std. Dev.	Min.	Max.
Investment Aggregate	1.133	1.237	−15.632	12.247
Investment Education	0.667	0.832	−5.198	9.797
Investment Elderly Care	0.387	0.886	−16.11	10.986
Investment Child Care	0.08	0.182	−1.409	3.2
Current Expenditures Aggregate	10.52	4.804	3.498	48.125
Current Expenditures Education	5.818	1.44	2.551	16.267
Current Expenditures Elderly Care	3.862	3.106	0.106	34.124
Current Expenditures Child Care	0.84	0.829	0	4.922
<i>N</i>	3758			

Notes: Investment is defined as maintenance and spending on new buildings and structures minus sales of buildings and structures. Current expenditure is the sum of wages, equipment, external transfers and ‘other current expenditures’. All figures are measured per capita in NOK 1000 and deflated to 1998 levels. Descriptive statistics are based on two-year averages. The sample is restricted as in baseline estimations below

Table 2 Descriptive Statistics: First Differences in Investment and Current Expenditures

Variable	Mean	Std. Dev.	Min.	Max.
Δ Investment Aggregate	0.001	1.253	−12.874	8.492
Δ Investment Education	−0.046	1.253	−11.161	8.269
Δ Investment Elderly Care	0.031	1.288	−17.481	10.448
Δ Investment Child Care	0.036	1.29	−10.867	17.461
Δ Current Expenditures Aggregate	0.204	0.234	−0.623	2.743
Δ Current Expenditures Education	0.194	0.35	−1.805	2.794
Δ Current Expenditures Elderly Care	0.176	0.284	−0.995	3.982
Δ Current Expenditures Child Care	0.187	0.23	−0.565	1.797
<i>N</i>	1879			

Notes: Investment is defined as maintenance and spending on new buildings and structures minus sales of buildings and structures. Current expenditure is the sum of wages, equipment, external transfers and ‘other current expenditures’. All figures are measured per capita in NOK 1000 and deflated to 1998 levels. Descriptive statistics give changes in spending from the first two years in the election period to the last two years in that same election period. The sample is restricted as in baseline estimations below

Investment is defined as maintenance and purchases of new buildings and structures (including wage expenditure in relation to these) minus sales of buildings and structures. On average, maintenance accounts for about 50 % of investment, while sales amount to about 2.5 % of investment. Current expenditure is the sum of wages, equipment, external transfers and “other current expenditures”. Table 1 displays spending per capita for the different programs based on two-year averages. The descriptive statistics are based on the data set that we use in our empirical analysis.

In our sample, the average local government spends about NOK 11500 (approximately USD 2000) per capita on the production of education services, elderly care and child care each year. Current expenditures account for about 90 % of the total. The coefficients of variation for investments on education, elderly care and child care are 1.25, 2.29 and 2.28,

which reflect that investments in welfare services are lumpy. The corresponding coefficients of variation for current expenditures are 0.25, 0.80 and 0.99.

Table 2 offers descriptive statistics for the dependent variables to be used in the empirical analysis. Δ is the first-difference operator, giving the change in spending from the first two years in the election period to the last two years in that same election period. The positive first-differences for current expenditures implies that current expenditures per capita is rising over time. There is no such trend for aggregate investment.

3.2 Political system

Each municipal government is ruled by a local council elected through open-list proportional representation. Council members represent either political parties or local lists formed outside the party structure. Most council members represent one of the seven major parties that are dominant at both the local and the national level.

The Norwegian policy space is well represented by a left-right dimension (Strøm and Leipart 1993). The main political divide is between the left-leaning socialist and the right-leaning conservative camp, and the political system is dominated by these two blocs. The left bloc is strongly dominated by the Labor Party, while the right bloc is more fragmented.¹⁴ At the local level parties sometimes form joint lists, which are always from the same bloc in our data. In the average local council, 41 % of the members represent one of the parties in the left bloc, or joint lists of left-bloc parties; 52 % represent right-bloc parties, or joint lists of right-bloc parties; and 7 % represent local lists which cannot immediately be categorized as belonging to the left or right bloc. In the empirical analysis we exclude local governments with one or more representatives from local lists.¹⁵

The mayor is the key player in the local council, and is elected by the local council at the beginning of each election term. Under the New Local Government Act, implemented in 1992, the mayor cannot be removed within the election term.¹⁶

County and local government elections are held in September every fourth year. National elections are also held every fourth year in September, but the electoral cycle differs from the local elections by two years, meaning that national elections are held exactly in the middle between two local elections. We will use this institutional feature in our empirical strategy.

The system of representation into the national parliament largely mirrors the system at the local level. Although local lists are sometimes formed for the national election, their electoral support is in most cases negligible at the national level. Between 1973 and 1997 only two candidates from local lists got elected to the national parliament. We exclude local governments from these counties in the relevant election periods.¹⁷

¹⁴We classify representatives that belong to the Socialist Left Party, the Labor Party, Red Electoral Alliance and the Communist Party as belonging to the left bloc.

¹⁵The total number of available observations is 2933; 1093 observations are excluded because the local council has at least one representative from local lists.

¹⁶Before 1992 some local governments had a practice whereby the mayor and the deputy mayor swapped positions after two years (Gravdahl 1998). However, this practice seems irrelevant for the link between re-election probabilities and investment, as our main results are unaltered when we exclude observations before 1992 where the mayor and deputy mayor represented different blocs.

¹⁷We exclude local governments involved in mergers, secessions, or border changes during an electoral period; local governments that do not have proportional election systems; and the capital, Oslo, which has a different institutional structure than other local governments. We also exclude local governments with less than 1000 inhabitants. Finally, we omit a limited number of observations due to missing data from the local government accounts.

Table 3 Descriptive Statistics: Political Variables

Variable	Mean	Std. Dev.	Min.	Max.	N
Mayor Left	0.454	0.498	0	1	1879
Mayor Right	0.546	0.498	0	1	1879
Voteshare Left	0.444	0.144	0.062	0.832	1879
Voteshare Right	0.555	0.144	0.167	0.938	1879
SupportLocalElection	0.61	0.108	0.211	0.938	1879
SupportNationalElection	0.59	0.1	0.222	0.908	1879
ReElection	0.813	0.39	0	1	1858
$\Delta Support$	−0.018	0.041	−0.243	0.192	1879
$\Delta Support^{County}$	−0.005	0.025	−0.066	0.072	1879

Notes: SupportLocalElection is the incumbent bloc's share of votes in the local election held at the beginning of each local election period. SupportNationalElection is the incumbent bloc's share of votes in the parliamentary election held in the middle of the local election period. ReElection is an indicator variable which equals one if the bloc of the incumbent remains in power the next election period, zero otherwise. $\Delta Support$ is the change in support for the bloc of the incumbent from the local election held in year t (SupportLocalElection) to the national election held in year $t + 2$ (SupportNationalElection). $\Delta Support^{County}$ is the population-weighted average of $\Delta Support$ at the county level, excluding the local government under study. The sample is restricted as in baseline estimations below

Table 3 provides descriptive statistics on political variables in our final sample. These are dummies for the mayors' bloc (Mayor Left and Mayor Right), share of votes for each bloc (Voteshare Left and Voteshare Right), support for the incumbent bloc at the local (SupportLocalElection) and national elections (SupportNationalElection), a dummy variable capturing whether the bloc of the incumbent remains in power after the next election period (ReElection), and finally the change in support for the incumbent's bloc from the local election to the national election, measured both at the local ($\Delta Support$) and county-wide levels ($\Delta Support^{County}$). The latter variable, $\Delta Support^{County}$, is key in our empirical strategy, and we elaborate on its role in Sect. 4.

Given the theory in Sect. 2, it is instructive to know which welfare services each local bloc prefers more strongly, before we study how spending decisions react to re-election probabilities. Sørensen (1995) and Borge and Sørensen (2002) provide direct evidence on such partisan preferences, based on a survey where municipality council members elected for the 1987–1991 period were asked which of the local government's existing responsibilities deserved to receive more or fewer resources. The answers revealed that left-bloc representatives wanted to increase spending on child care services and cut back on education relative to what right-bloc representatives wanted. Right-bloc representatives wished to expand both education and elderly care at the expense of child care.¹⁸ This pattern is consistent with an ideological divide in which the left bloc is more concerned with stimulating female labor force participation than is the right bloc, which values traditional family life more strongly. Furthermore, Svaleryd (2009) documents a similar preference pattern in data from a survey of elected representatives in Swedish local councils from 1980 and 1993. In contrast to

¹⁸In the survey the separate category stated was health care, not elderly care. However, elderly care largely dominates this category in the accounts.

right-bloc politicians, left-bloc politicians ranked child care as the most important spending category.¹⁹

In light of this evidence, disagreement between the two blocs seems most pronounced for spending on child care relative to education and elderly care. Hence, for composition-effects we would expect the strongest impact of re-election probabilities to occur along this dimension in the data.

4 Empirical strategy

To pin down how re-election probabilities affect policy choices we face three econometric challenges. First, we are interested in estimating the impact of a variable, the perceived re-election probability, that is inherently unobservable. Second, this variable may be correlated with other local government characteristics that influence political outcomes (an omitted variable problem). And third, the perceived re-election probability may be a result, and not a cause, of political decisions (a reverse causality problem).

Our empirical strategy is based on the following conjecture: The share of votes an incumbent bloc received when it was elected into office in the local election in year t contains information about how likely that bloc is to be re-elected in the local election in $t + 4$. Similarly, the share of votes an incumbent bloc receives in the national election in year $t + 2$ also contains information about how likely re-election is. These two vote shares are denoted as $S_{i,t}$ and $S_{i,t+2}$, respectively. If our conjecture is correct, then a change in support within election period T , $\Delta S_{i,T} \equiv S_{i,t+2} - S_{i,t}$, indicates that an incumbent's re-election probability has changed.²⁰ Hence, we consider the results from the national election as a "grand opinion poll" that captures the electorate's ideological preferences, while leaving the composition of the governing local council unaffected. The national election is a particularly useful tool as it contains separate information from each municipality, and we can choose the level of aggregation at which we use this information. The empirical relevance of this idea is evaluated in the next section.

With the above logic in mind, we aim to estimate the following relationship:

$$\Delta Y_{i,T}^h = \psi \Delta S_{i,T} + \tau_T + \varepsilon_{i,T}, \quad (5)$$

where $\Delta Y_{i,T}^h$ is the change in spending on program h from the first two years in election period T to the last two years in that same election period. We include election period fixed effects, τ_T , in order to allow for general political business cycle effects, of the type documented by, for example, Veiga and Veiga (2007), Drazen and Eslava (2010) and Dahlberg and Mørk (2011). The election period fixed effects will also absorb other time effects common to all municipalities, such as the trend in current expenditures that are present in the data (cf. Table 2). The key parameter of our interest is ψ .

Note that with the specification in Eq. (5) our inference is based on policy changes within election periods. Hence, unobserved characteristics of the incumbents will not influence our results. However, an ordinary least squares (OLS) regression run directly on Eq. (5) is likely

¹⁹ An alternative approach for identifying party preferences is to study actual expenditure decisions with a regression discontinuity design (cf. Lee et al. 2004; Pettersson-Lidbom 2008, and Folke 2011). As our objective is not to reveal politicians' preferences, such an analysis is beyond the scope of this paper.

²⁰ An alternative proxy for incumbent's perceived re-election probabilities could, in principle, be constructed by relying on local level opinion polls. In the Norwegian context such opinion polls are, however, very rare and never held simultaneously across the country.

to suffer from an endogeneity problem: parliamentary election results may be correlated with preceding local political decisions, so that $Cov(\Delta S_{i,T}, \varepsilon_{i,T}) \neq 0$. For instance, if a mayor is perceived as having done a good job during his first two years in office, voters may be more inclined to support his bloc at the national election. This generates an endogeneity problem if spending is correlated with voters' perceptions of incumbents' performance. More generally, omitted variables that influence both local priorities and voting will bias OLS estimation of Eq. (5).

To address the endogeneity problem we use an instrumental variable approach. Our instrument is the population-weighted average of the support for the incumbent's bloc in all other municipalities in the county to which municipality i belongs. This county-level information, denoted $S_{i,T}^{county}$, is calculated as follows:

$$\Delta S_{i,T}^{county} = \frac{\sum_{j \neq i}^{C_i} pop_{j,t} \Delta S_{j,T}}{\sum_{j \neq i}^{C_i} pop_{j,t}},$$

where C_i denotes the number of other municipalities in the county to which municipality i belongs and $pop_{j,t}$ is the population of municipality j in year t .

Our first stage equation is given by

$$\Delta S_{i,T} = \zeta \Delta S_{i,T}^{county} + \tau_T + \epsilon_{i,T}. \quad (6)$$

The idea behind this equation is that the change in support from the local election result at the county level ($S_{i,t}^{county}$) to the national election result at the county level ($S_{i,t+2}^{county}$) two years later captures regional swings in partisan sentiment, which can be treated as independent of local decisions. Our identifying assumption is that a change in support for the incumbent's bloc at the county level does not influence the change in local decision making, except through its impact on perceived local re-election probabilities. In sensitivity analyses this assumption will be closely investigated. The idea that voter movements between parties is to some extent due to general trends, independent of local politics has also been utilized by Svaleryd and Vlachos (2009) in a study of political rent seeking in Sweden.

We will estimate all equations separately for mayors from each of the two blocs. Hence, changes in the composition of the national parliament cannot be driving any results, as long as all incumbents from the same bloc are affected similarly.

5 Results

The central element in our empirical strategy is to consider the results of the national election for parliament as signals to local incumbents about their likelihood of being re-elected. A key question is therefore: Does the national election provide relevant information about the local incumbents' re-election probabilities? Before presenting the main analysis of re-election probabilities and policies we therefore answer this question.

5.1 The national election and local re-election probabilities

To investigate whether the national election results provide relevant information on local incumbent's re-election probabilities we estimate probit regressions that relate local election outcomes in $t + 4$, denoted by $R_{i,t+4}$, to the incumbent blocs' support at the elections in t and $t + 2$:

$$R_{i,t+4} = \nu + \omega S_{i,t} + \theta S_{i,t+2} + \tau_T + \eta_i. \quad (7)$$

Table 4 Information from Parliamentary Election

Right-Bloc Mayors			
SupportLocalElection	5.37*** (0.65) [1.04]		0.84 (1.42) [0.16]
SupportNationalElection		6.09*** (0.69) [1.16]	5.28*** (1.50) [1.01]
<i>N</i>	1015	1015	1015
pseudo R^2	0.156	0.168	0.168
Estimation Method	Probit	Probit	Probit
Left-Bloc Mayors			
SupportLocalElection	6.50*** (0.74) [1.52]		−0.95 (1.52) [−0.21]
SupportNationalElection		7.96*** (0.90) [1.76]	8.90*** (1.80) [1.96]
<i>N</i>	843	843	843
pseudo R^2	0.224	0.260	0.260
Estimation Method	Probit	Probit	Probit

Notes: SupportLocalElection is the incumbent bloc's share of votes in the local election held at the beginning of each local election period. SupportNationalElection is the incumbent bloc's share of votes in the parliamentary election held in the middle of the local election period. The dependent variable is an indicator variable which equals one if the bloc of the incumbent remains in power the next election period, zero otherwise. Regressions are run separately for mayors from each bloc. The sample is restricted as in baseline estimations below. Election period fixed effects included in all specifications. Standard errors clustered at the local government level in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects in closed brackets

Here $R_{i,t+4} = 1$ if the incumbent bloc is re-elected, and zero otherwise. If θ in Eq. (7) is different from zero, then the parliamentary election results bring new information to the incumbents about their support among voters.

Since the correlation between $S_{i,t}$ and $S_{i,t+2}$ is very high (about 0.92) we also provide results where we include either $S_{i,t}$ or $S_{i,t+2}$ as the single regressor. The results are provided in Table 4. The table shows that the estimates of ω and θ are large and highly statistically significant when each regressor is included one at a time. The pseudo- R^2 indicates a better fit of the models where $S_{i,t+2}$ is the single regressor. When both $S_{i,t}$ and $S_{i,t+2}$ are included simultaneously only $S_{i,t+2}$ has any explanatory power. Hence, while $S_{i,t}$ is a significant predictor of future re-election before $S_{i,t+2}$ is known, this is no longer the case once $S_{i,t+2}$ is included in the information set; the impact of $S_{i,t}$ is close to zero and statistically insignificant when we control for $S_{i,t+2}$. These results imply that a change in support for the bloc of the local incumbent from the local to the national election, $\Delta S_{i,t}$, indicates a change in an incumbent's probability of being re-elected in the next local election.

Table 5 First-Stage Regressions

	Right-Bloc Mayors	Left-Bloc Mayors
$\Delta Support^{County}$	0.49*** (0.08)	0.59*** (0.09)
N	1025	854
R^2	0.195	0.281
Estimation Method	OLS	OLS

Notes: The dependent variable, $\Delta Support$, is the change in support for the bloc of the incumbent from the local election held in year t to the national election held in year $t + 2$. $\Delta Support^{County}$ is the population-weighted average of $\Delta Support$ at the county level, excluding the local government under study. Regressions are run separately for mayors from each bloc. Election period fixed effects included in all specifications. Standard errors clustered at the local government level in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.2 The effects of changes in re-election probabilities

The results from the first stage regression, specified in (6), are reported in Table 5. The excluded instrument, $\Delta S_{i,t}^{county}$, is a strong predictor of $\Delta S_{i,t}$. The F-statistics are 52 and 69 for the right and left blocs, respectively, indicating that the instruments are relevant. A one percentage point increase in county-wide support for the incumbent bloc translates into increases of roughly 0.5 and 0.6 percentage points in support for the right and left-bloc incumbents at the local level, respectively.

Our results for public investment are presented in Table 6 and the results for current expenditure are given in Table 7. The results are obtained from separate regressions for each category of public expenditure (education, elderly care, and child care), as well as the aggregates (meaning the sum of all three categories).²¹ Each table presents results for right-bloc incumbents in the upper panel and results for the left-bloc incumbents in the lower panel. In order to facilitate interpretation, the dependent variable in each regression is scaled by its standard deviation.

Table 6 shows that public investment varies with changes in incumbents' support. For the right bloc, there is a positive aggregate effect that is statistically significant at the 5% level. This effect seems to be driven by investment responses in education and elderly care, although neither of these components' responses are statistically significant when considered separately. Incumbents from the left bloc, on the other hand, tend to raise investment in child care when their re-election chances increase. This effect is statistically significant at the 1% level. Because these incumbents do not adjust spending on elderly care or education, which together dominate total investments (child care constitutes only 7 % of the investment aggregate used in this paper), the aggregate investment effect is not significantly different from zero.

Quantitatively, the results show that a five percentage point increase in the support of a right-bloc incumbent raises aggregate investment by 0.6 standard deviations. Similarly, a five percentage point increase in the support for an incumbent from the left bloc increases investment in child care by 0.8 standard deviations.

²¹ An alternative would be to run Seemingly Unrelated Regressions (SURs). However, this would not increase efficiency in our case, since we include the same covariates across all spending programs (Davidson and MacKinnon 2004: 509).

Table 6 Effects of Increased Support for the Incumbents' Bloc on Investment

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	12.09** (5.15)	7.99 (4.98)	8.15 (5.29)	3.11 (4.65)
N	1025	1025	1025	1025
F-statistic from 1st.	36.76	36.76	36.76	36.76
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	4.22 (4.64)	-0.25 (3.84)	2.84 (5.04)	15.15*** (5.82)
N	854	854	854	854
F-statistic from 1st.	41.66	41.66	41.66	41.66

Notes: Each cell represents coefficients from IV regressions for each category of public expenditure on changes in support for the bloc of the incumbent. The dependent variable is the change in yearly spending from the two first years in each election period to the two last years in each election period, scaled by the relevant standard deviation (from Table 1). The parameter estimates measure spending responses if support were to increase from zero to 100 %. The instrument for $\Delta Support$ is the population-weighted average of the change in support for the incumbent's bloc at the county level, excluding the local government under study ($\Delta Support^{County}$). Regressions are run separately for mayors from each bloc. Election period fixed effects included in all specifications. Standard errors clustered at the local government level in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A study related to ours is Darby et al. (2004), who document a negative association between political instability and public investment in a panel of European countries. While interesting, their approach cannot say much about causality. Our analysis, however, corroborates the general hypothesis that there is a causal effect of the election outlook on public investment.

From the theoretical studies of Glazer (1989) and Beetsma and van der Ploeg (2007), a central prediction is that the less likely incumbents are to be re-elected, the more will they invest. Our finding that investments tend to increase with support for incumbents contradicts this prediction. This result is more consistent with the theoretical predictions emphasized in Sect. 2, where capital and current expenditure are complements in production, as in Natvik (2009).

In light of the evidence in Sørensen (1995) and Borge and Sørensen (2002) on party preferences, our results suggest that incumbents tend to tilt the composition of investment toward their most preferred welfare services when their re-election probabilities increase. While this tendency is strong for left-bloc incumbents who raise child care investments, it is less distinct for incumbents from the right bloc who in surveys report to favor education and elderly care. Cast against theory, these findings are not consistent with a framework where capital can be used to simply pin down the future provision of public goods, as in Glazer (1989). Instead, the composition effects lie closer to the predictions obtained with sufficient input complementarity, as explained in Sect. 2.

In contrast to the investment effects, Table 7 shows that current expenditures do not respond to variation in incumbents' support. Across all three spending categories considered,

Table 7 Effects of Increased Support for the Incumbents' Bloc on Current Expenditures

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	0.53 (0.70)	0.69 (0.93)	0.36 (0.94)	0.44 (0.77)
N	1025	1025	1025	1025
F-statistic from 1st.	36.76	36.76	36.76	36.76
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	0.02 (0.59)	-0.08 (0.77)	0.23 (0.78)	-0.64 (0.83)
N	854	854	854	854
F-statistic from 1st.	41.66	41.66	41.66	41.66

Notes: For explanatory details, see Table 6

for both right-wing and left-wing mayors, the estimated effects are never statistically significant. While the absence of an aggregate effect is likely to be due to the balanced budget requirement, and thus is not informative on how re-election prospects shape policymakers' choices, the lack of a composition effect is more interesting. The balanced budget rule does not prevent politicians from re-allocating current expenditures across different programs. That politicians do not vary the composition here, while they do vary their investment composition, is consistent with the specific theory presented above where incumbents are partisan and do not use expenditure to boost popularity, and where labor allocations are closely tied to the available capital stock.

To clarify the role of our instrumental variable strategy, consider Tables 8 and 9 which report OLS estimates from our second stage regression (Eq. (5)) without instrumenting $\Delta Support$. In comparison to the IV specification, the OLS specifications indicate smaller and mostly insignificant associations between the support for the incumbent and public investments. For current expenditures the associations are mostly negative and in many cases highly statistically significant.

A priori, it is not clear whether the OLS estimates are biased upward or downward. The bias depends on which effect spending has on the incumbent's support and the relationship between omitted variables and spending. However, in comparison to the IV estimates, which correct for both sources of bias, OLS estimates seem to be biased downwards. A plausible explanation for this bias is that high spending early in the election period (all else equal) increases incumbents' mid-term popularity consistent with the findings of Levitt and Snyder (1997) for U.S. House districts.

6 Sensitivity checks

The results reported in the previous section capture the average causal effect of changes in re-election probabilities on local decision making as long as the instrument we apply is valid. To investigate our benchmark results we have conducted several sensitivity checks. We report results from two of them here. First, we include potentially relevant control variables.

Table 8 Investment: Simple OLS

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	2.36* (1.32)	2.36* (1.22)	0.86 (1.41)	0.36 (1.08)
N	1025	1025	1025	1025
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	-1.12 (1.41)	-0.52 (1.31)	-1.24 (1.46)	0.24 (0.98)
N	854	854	854	854

Notes: Each cell represents coefficients from OLS regressions for each category of public expenditure on changes in support for the bloc of the incumbent. The dependent variable is the change in yearly spending from the two first years in each election period to the two last years in each election period, scaled by the relevant standard deviation (from Table 1). The parameter estimates measure spending responses if support were to increase from zero to 100 %. Regressions are run separately for mayors from each bloc. Election period fixed effects included in all specifications. Standard errors clustered at the local government level in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9 Current Expenditures: Simple OLS

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	-0.28 (0.18)	0.03 (0.26)	-0.27 (0.20)	-0.65*** (0.25)
N	1025	1025	1025	1025
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	-0.77*** (0.19)	-0.42* (0.23)	-0.91*** (0.27)	-0.41 (0.27)
N	854	854	854	854

Notes: For explanatory details, see Table 8

Second, we investigate whether yardstick competition threatens the validity of our exclusion restriction.²²

²²In a previous version of this study, we also report results from varying the threshold population size below which we exclude municipalities from our sample, and from applying alternative strategies to deal with the presence of local lists. Neither approach alters our main results in a substantial way. For details, see Fiva and Natvik (2009).

6.1 Control variables

Our inference is based on policy changes within election terms, and all time-invariant factors are thus netted out. However, there may potentially be time-varying factors that affect policymaking and therefore could give rise to omitted variable bias. For this to be the case, the omitted variables must affect not only local politics, but also be correlated with county-wide swings in ideological sentiment, which is our instrument.

Factors that reflect the need for welfare services is one class of variables that may be correlated across local governments within counties and possibly also correlated with our instrument. To address this issue we control for time-variation in municipal demographics, namely the number of inhabitants (ΔPop), the share of children aged between 0 and 6 years ($\Delta Children$), the share of children aged 7 to 15 years ($\Delta Young$), the share of the population of age 67 years and older ($\Delta Elderly$), the share of women ($\Delta Women$) and the share of the female population 15 years and older who are married ($\Delta MarriedWomen$).²³

On the revenue side, it is unlikely that changes in local economic conditions can be driving any of the results presented above. The reason is that local revenues are largely determined by non-discretionary grants and regulated income tax sharing. However, as a robustness check we also include changes in the local unemployment rate ($\Delta Unemp$) in our second stage.

Tables 10 and 11 report results from specifications where control variables are included. The demographic variables mainly have the expected signs. We find that a large number of inhabitants in a particular age group is associated with an increase in current expenditures in the relevant sector. For instance, when the school-aged share of the population increases, spending on education rises too. Changes in demographics are less important for investment in physical capital. There is some evidence that higher unemployment is associated with lower current expenditures. This might work through the revenue side of the budget, but is more likely caused by greater local demand for welfare benefits, which crowds out spending on other programs. Spending on public investment is largely unrelated to the local unemployment rate.

Importantly, our main results regarding the impact of politicians' re-election probabilities are essentially unaltered when we include control variables.

6.2 Yardstick competition

Voters may use information about political decisions in neighboring local governments to evaluate their own government's performance (Salmon 1987; Besley and Case 1995). Such yardstick competition is a potential problem in our setting. If voters in local government i condition their voting at the national election on the performance of their own local incumbent relative to the incumbent in local government j , then the county-wide ideological sentiment (where votes in i are excluded) may be endogenous to local decision made in i . This implies that the exclusion restriction we impose, namely that the county-level change in support for an incumbent does not affect spending decisions except through the local re-election probability, may not hold.

To investigate whether yardstick competition biases our IV estimates, we need to exclude from our instrument, $\Delta S_{i,T}^{county}$, municipalities that voters in local government i use for yard-

²³Note that these variables may be endogenous due to Tiebout sorting and it is not obvious that they belong in our second stage.

Table 10 Investment: Control Variables Included

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	12.53** (5.20)	8.09 (5.06)	8.52 (5.39)	4.19 (4.78)
ΔPop	−0.12 (0.09)	−0.02 (0.09)	−0.12 (0.09)	−0.08 (0.08)
$\Delta Children$	11.60 (13.17)	15.51 (13.86)	−1.68 (12.12)	15.54 (12.52)
$\Delta Young$	17.50 (10.96)	32.33*** (10.95)	−4.77 (8.84)	−5.38 (11.06)
$\Delta Elderly$	−5.62 (12.05)	8.48 (13.84)	−12.11 (9.82)	−12.87 (15.16)
$\Delta Women$	−31.85 (21.48)	−13.82 (21.76)	−32.42 (21.10)	−21.54 (13.73)
$\Delta Married Women$	−6.49 (8.08)	−2.33 (7.92)	−3.29 (7.65)	−18.64*** (6.80)
$\Delta Unemp$	−6.84 (9.24)	−11.16 (10.35)	0.68 (8.02)	−1.46 (8.32)
<i>N</i>	1025	1025	1025	1025
F-statistic from 1st.	36.24	36.24	36.24	36.24
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	3.28 (4.78)	−0.55 (3.91)	1.81 (5.20)	15.24*** (5.88)
ΔPop	0.03 (0.18)	0.02 (0.19)	−0.00 (0.13)	−0.07 (0.14)
$\Delta Children$	−3.40 (12.64)	8.15 (12.92)	−12.82 (15.21)	9.05 (16.00)
$\Delta Young$	−10.98 (12.22)	−2.76 (12.47)	−11.00 (10.62)	−6.05 (13.54)
$\Delta Elderly$	21.74 (14.60)	11.98 (15.15)	16.91 (15.74)	6.36 (13.85)
$\Delta Women$	−48.97** (23.57)	−24.48 (18.24)	−45.95* (23.85)	−9.33 (24.80)
$\Delta Married Women$	6.15 (7.65)	4.96 (7.81)	6.63 (7.32)	−17.92* (9.77)
$\Delta Unemp$	8.09 (7.66)	−2.13 (6.15)	13.00 (8.20)	1.50 (9.59)
<i>N</i>	854	854	854	854
F-statistic from 1st.	44.11	44.11	44.11	44.11

Notes: For explanatory details, see Table 6

Table 11 Current Expenditure: Control Variables Included

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
Δ Support	0.45 (0.69)	0.41 (0.90)	0.33 (0.95)	0.60 (0.79)
Δ Pop	−0.05*** (0.02)	−0.03** (0.02)	−0.05** (0.02)	−0.02 (0.02)
Δ Children	1.15 (1.93)	−5.23** (2.25)	2.87 (2.49)	4.85** (2.15)
Δ Young	5.51*** (1.70)	7.52*** (2.38)	4.79** (2.00)	1.04 (1.89)
Δ Elderly	3.39** (1.47)	−1.17 (2.15)	6.11*** (1.80)	−1.07 (2.11)
Δ Women	0.63 (2.12)	1.31 (2.67)	1.36 (2.74)	−3.54 (3.09)
Δ MarriedWomen	−0.21 (0.73)	0.24 (1.09)	0.05 (0.94)	−1.90* (0.98)
Δ Unemp	−1.36 (1.32)	−3.22** (1.61)	−0.18 (1.66)	−1.80 (1.67)
<i>N</i>	1025	1025	1025	1025
F-statistic from 1st.	36.24	36.24	36.24	36.24
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
Δ Support	0.06 (0.59)	0.02 (0.76)	0.27 (0.79)	−0.70 (0.80)
Δ Pop	−0.06*** (0.02)	−0.04* (0.03)	−0.07** (0.03)	−0.01 (0.02)
Δ Children	−2.65 (1.77)	−5.73*** (2.20)	−1.40 (2.28)	−0.24 (1.85)
Δ Young	1.64 (1.59)	7.08*** (2.15)	0.11 (2.00)	−3.32 (2.18)
Δ Elderly	3.18 (2.16)	−2.42 (1.97)	5.40* (3.06)	2.15 (2.29)
Δ Women	2.70 (3.74)	−2.88 (3.31)	6.43 (5.47)	−3.60 (3.68)
Δ MarriedWomen	0.70 (0.86)	0.10 (1.23)	0.89 (1.20)	0.56 (1.11)
Δ Unemp	−3.78*** (1.04)	−2.66* (1.45)	−3.67** (1.47)	−3.43*** (1.20)
<i>N</i>	854	854	854	854
F-statistic from 1st.	44.11	44.11	44.11	44.11

Notes: For explanatory details, see Table 6

stick comparisons. Empirically, it is not obvious how this should be operationalized. We use two alternative approaches to investigate the importance of yardstick competition. First, we exclude local governments where the county administration is located. These “county capitals” are considerably larger than the average local government, and consequently become more important when we generate our population-weighted instrument.²⁴ In addition, these local governments may be problematic because the county population pays attention to the politics of the “county capital” (due to, for example, media coverage). In Tables 12 and 13 we report results where “county capitals” are excluded. The results are basically the same as before, except that for right-bloc incumbents, the impact of re-election probabilities on investment in education now is statistically significant at the 5% level.

Our second approach is to rely on information on local labor market regions. Statistics Norway defines a total of 90 labor market regions on the basis of commuting flows across local government borders. In Tables 14 and 15, we present results where the instrument is based on changes in the regional partisan sentiment, excluding election results from local governments belonging to the same labor market region.

As expected, the instruments become slightly weaker with the alternative instrument. The aggregate investment effect for right-bloc incumbents is of similar magnitude as in our baseline specification, but is now only statistically significant at the 10 % level. The child care effect for left-bloc incumbents is still statistically significant at the 5 % level.

Because results change little when we exclude local governments based on two plausible definitions of “neighborhood,” it seems unlikely that our main findings are severely biased by yardstick competition.

7 Discussion: theory and the results

As Sect. 2 made clear, even if one ignores channels through which politicians may use spending to boost popularity, it is not obvious theoretically how politicians should be expected to adjust investment decisions when their re-election probability changes. Instead, qualitative predictions depend on the parameterization of the utility and production function. Here our empirical findings have an implication: Within models where incumbents do not use spending to raise their re-election probabilities, complementarity between capital and current expenditure is required to explain our findings. Our evidence contradicts the hypothesis proposed by Glazer (1989) that incumbents who expect to lose an upcoming election will boost investment.

While our analysis has focused on models where politicians treat re-election probabilities as exogenous, our findings may also be interpreted in light of models where spending is used to generate electoral support. Most closely related is the political business cycle literature where the idea is that incumbents will raise spending at the end of their election term in order to gain re-election. Cornerstone studies here are Rogoff and Sibert (1988) and Rogoff (1990), which show that particularly visible types of expenditure may be used to boost popularity among rational but imperfectly informed voters. Two recent studies that emphasize this mechanism are Drazen and Eslava (2010) and Aidt et al. (2011). They argue that because public investments are particularly visible types of public expenditure, office-seeking incumbents will invest more when electoral competition is perceived to be vigorous and politicians need to boost their popularity. Our evidence does not support this prediction

²⁴The average population of the “county capitals” is 56,000.

Table 12 Investment: County Administration Local Governments Excluded

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	12.13** (5.03)	9.54** (4.83)	7.38 (5.33)	−0.52 (4.74)
N	976	976	976	976
F-statistic from 1st.	35.29	35.29	35.29	35.29
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	4.00 (4.22)	−0.70 (3.28)	3.08 (4.69)	14.63*** (5.33)
N	815	815	815	815
F-statistic from 1st.	59.37	59.37	59.37	59.37

Notes: For explanatory details, see Table 6

Table 13 Current Expenditures: County Administration Local Governments Excluded

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	0.63 (0.68)	0.47 (0.90)	0.52 (0.92)	0.84 (0.79)
N	976	976	976	976
F-statistic from 1st.	35.29	35.29	35.29	35.29
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	−0.43 (0.49)	−0.13 (0.67)	−0.24 (0.62)	−1.39* (0.71)
N	815	815	815	815
F-statistic from 1st.	59.37	59.37	59.37	59.37

Notes: For explanatory details, see Table 6

because greater support for the local incumbent's bloc in the national election indicates a higher re-election probability, and thus that the incumbent will face less competition in the upcoming election.²⁵

²⁵The positive relationship we find between investment and support is therefore the opposite of what both Drazen and Eslava (2010) and Aidt et al. (2011) predict.

Table 14 Investment: Local Governments Belonging to the Same Labor Market Region Excluded from Instrument

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	10.13* (5.69)	9.33 (6.00)	4.62 (5.53)	0.65 (4.83)
N	1025	1025	1025	1025
F-statistic from 1st.	29.46	29.46	29.46	29.46
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	6.32 (5.19)	1.22 (4.49)	4.28 (5.51)	15.20** (6.18)
N	854	854	854	854
F-statistic from 1st.	33.30	33.30	33.30	33.30

Notes: For explanatory details, see Table 6

Table 15 Current Expenditures: Local Governments Belonging to the Same Labor Market Region Excluded from Instrument

Right-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	0.67 (0.77)	0.63 (1.03)	0.60 (0.99)	0.52 (0.91)
N	1025	1025	1025	1025
F-statistic from 1st.	29.46	29.46	29.46	29.46
Left-Bloc Mayors				
	Aggregate	Education	Elderly Care	Child Care
$\Delta Support$	0.17 (0.68)	0.34 (0.84)	0.30 (0.88)	−0.72 (0.90)
N	854	854	854	854
F-statistic from 1st.	33.30	33.30	33.30	33.30

Notes: For explanatory details, see Table 6

An alternative model of endogenous voting and public investment is that of Robinson and Torvik (2005), where incumbents may choose to invest in socially inefficient projects (“white elephants”) targeted at their core voters so as to raise their own re-election probability. While this theory may well be relevant for developing countries (as the authors allude to), we do not view our findings from Norway as consistent with it. The reason is that this theory predicts that incumbents will invest more in their most-preferred projects when elec-

toral competition is expected to be tough, which, under the premise that a small re-election probability signals tougher competition, is the opposite of what we find.

Of course, our findings do not rule out the possibility that incumbents may attempt to influence their own re-election chances when choosing how to invest. But, to the best of our knowledge, existing frameworks cannot explain our findings as being driven by endogenous voting. A potentially fruitful direction for future work may be to combine capital labor complementarity with a model of endogenous popularity.

Finally, it is striking that re-election probabilities seem to affect the composition of investment, but not the composition of current expenditures. This finding supports the general idea that the inflexible nature of capital makes politicians consider their re-election prospects when investing, whereas for more flexible expenditure components, such considerations are not important.

8 Conclusion

We have found that politicians in office tend to adjust investment in response to shifts in their support among voters. In contrast, current expenditures do not respond in such a way. Investment responses depend on incumbents' party affiliation, as Right-bloc incumbents raise aggregate investment while Left-bloc incumbents raise child care investments only, which compared to the other investment components is too small a category to lift the aggregate investment level. In terms of specific theories, our results are inconsistent with models where public investment can be used to pin down which goods government will provide in the future, as in Glazer (1989), but they fit better with a model where incumbents consider how their investments are complemented by current expenditure in the future, as in Natvik (2009).

A central question in political economy is whether democratically elected governments should face restrictions on the set of policies they may implement. On this issue the emphasis has traditionally been on deficit restrictions, as in Persson and Svensson (1989) and Tabellini and Alesina (1990). For investment, emphasis has been on the aggregate level of capital accumulation, with a central prescription being the “golden rule”, which states that investment in physical capital should be exempted from deficit restrictions (see, for instance, Bassetto and Sargent 2006). The institutional setting in which Norwegian municipalities operate is very similar to such a “golden rule”. Hence, our results indicate that such a rule does not prevent politicians from varying the capital stock in response to altered re-election prospects. On the one hand, these responses may be beneficial for society, as we find a tendency for incumbents to tilt the investment composition toward the programs which elections signal that voters favor. On the other hand, the responses do indicate that the aggregate level of public capital is reduced by anticipations of turnover, which may result in stocks of public capital that are too low in democratic societies. Assessing the welfare consequences of public investment under political uncertainty therefore seems an important subject for future research.

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