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The flypaper effect and political strength

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Abstract. Simple models of local government behavior predict equal effects of private income and unconditional federal grants on local government expenditures. Numerous empirical analyses, however, find that the effect of grants is larger than the income effect. We argue that this flypaper effect may be a result of weak political leaderships in multi–issue and multi–party decision–making environments. In multi–issue institutions, a strong political leadership may reduce inefficiency due to interest group influence and inter–party bargaining in the local council. Utilizing data for Norwegian local governments in the 1930s, we find that political strength reduces the size of the flypaper effect. When the local council consists of only one political party, we cannot reject absence of a flypaper effect, while the flypaper effect is large in fragmented local councils.

Key words: flypaper effect, local public finance, political strength

JEL classification: D72, H72

1. Introduction

Simple models of local government behavior, as the median voter model, predict equal effects of private income and unconditional federal grants on local government expenditures. The empirical evidence, however, indicate that unconditional grants increase local government expenditures more than an equivalent rise in private income, see the surveys in Fisher (1982) and Hines and Thaler (1995). This is labeled the flypaper effect by Gramlich and Galper (1973), the money

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"stick where it hits". Most of the explanations of the flypaper effect have in common that politicians play a small role in the decision-making. However, there is a growing literature dealing with the relationship between economic and political factors. Several recent studies indicate that political structure influences the economic outcome, and these studies have motivated us to investigate whether the size of the flypaper effect depends on political strength.

We analyze the determination of Norwegian local government expenditures in the fiscal year 1934–35, a period with a small degree of central government regulation. The local governments could to some extent determine what kind of local public services they would offer, and the tax discretion was large. Unconditional grants accounted for about 12% of the local government revenues. Most local governments had a representative democracy with several political parties represented in a fragmented local council. Our hypothesis is that in local councils in which only one single political party is represented, the outcome will be close to the predictions from simple models relying on a decisive voter, or more generally, a decisive decision–maker. On the other hand, with a highly fragmented local council, there is no decisive decision–maker. The economic outcome is determined through some kind of bargaining, and the political leadership is weak. We expect such bargaining to reduce the propensity to use increased grants to cut taxes. The empirical analysis indicates that the effect of unconditional grants depends on our index of political strength, the party fragmentation of the local council. We cannot reject that grants and private income have equal effects in local governments with a strong political leadership, while the flypaper effect is large in fragmented local councils.

The existence of a flypaper effect has traditionally been interpreted as a sort of fiscal illusion. Fiscal illusion refers to systematic biases in the voters' perception of fiscal parameters. Empirical analyses of fiscal illusion have mainly been undertaken on the revenue side of the government budget, see for example Dollery and Worthington (1996) for an overview. Empirical regularities in line with voter misperception, however, may have alternative explanations based on rational voter behavior. Eichenberger and Serna (1996) argue that inefficient policy outcomes can be explained by random errors in the voters' assessments of policy proposals because voting procedures are likely to weight the errors asymmetrically. Oates (1988) focuses on institutional structure, and discusses how tax competition between local governments, transaction costs inherent in modifying budgetary parameters, and the form of the budgetary processes can explain several of the empirical regularities. In an early contribution, Pommerehne and Schneider (1978) find that increased complexity of the tax system raises public sector spending in cities with a representative democracy, but has no effect in cities with direct democracy.[1] Their interpretation relies on the electorate's incentives to seek information. The voters are rational, but under representative

[1] With direct democracy "virtually all collective decisions . . . are taken only in general assemblies open to all of the city's voters" (Pommerehne and Schneider, 1978, p. 395).

democracy "the incentives for always being well informed on their fiscal burden is for most voters very small" (Pommerehne and Schneider, 1978, p. 394).

Some public finance models taking different institutional factors into account have been motivated by the evidence of a flypaper effect. In a model with heterogeneous local governments within a federal system, Brennan and Pincus (1996) show that a flypaper effect may arise if there are constraints on the tax mix decided at the local level. Dougan and Kenyon (1988) model government budget determination when interest groups are decisive in marginal budget allocations. Here a flypaper effect may arise because grants can alter the relative wealth positions of various pressure groups. If a budget maximizing agent is an agenda setter, the flypaper effect may arise in some circumstances as shown by Romer and Rosenthal (1980). Wyckoff (1988) shows that the marginal effect of unconditional grants may in fact be larger than unity if a budget maximizing bureaucracy decides the expenditure level. The evidence in, for example, Wyckoff (1988, 1991) and Romer et al. (1992), indicates that budget maximizing agents have some power. Thus, to the extent that bureaucratic power is heterogeneous across local governments, the propensity to consume from unconditional grants will vary. Strumpf (1998) tests this proposition by using estimated administrative overhead spending as a proxy of bureaucratic power, and finds a positive effect of bureaucratic power on the size of the flypaper effect.

Bureaucratic power is likely to depend on political structure. Recently, political structure has been related to political strength. Contributions that focus on the strength of the political leadership include Roubini and Sachs (1989), Inman and Fitts (1990), Alt and Lowry (1994), Borge (1995) and Falch and Rattsø (1999). The evidence indicates that public sector spending, public sector deficits, and tax rates are negatively related to the strength of the political leadership. The mechanisms through which political strength influences economic outcomes, however, are not entirely clear. Several possibilities are suggested in the literature. We will concentrate on bargaining between the political parties and interest group pressure. Our hypothesis is that also the size of the flypaper effect is negatively related to political strength.

In a fragmented legislative, the decisions are made trough some kind of bargaining. The bargaining parties may agree that total spending is too high, but each party may have some cost item(s) for which they reject to cut spending. From the legislatures point of view, the costs of changing the tax structure may exceed the benefits as argued by Oates (1988). The degree of fragmentation may thus influence the political transaction costs in a way that make the tax rate rigid, which implies that the spending level is strongly affected by changes in the grant level. The interaction between the legislature and different kinds of interest groups may also give a flypaper effect. Baber and Sen (1986) notice that local authorities attempt to appeal both to interest groups that receive local public services and groups that supply local resources. Thus, local politicians seek ways to increase spending without increasing taxes. Their empirical results indicate that this is done by running deficits. Another possibility is to let variation in grants mainly influence spending and deficit, and not the tax rate.

The evidence of a large flypaper effect in most local government demand studies may, of course, be a result of econometric misspecification, see for example Fisher (1982), Hines and Thaler (1995) and Becker (1996). The evidence presented by Becker (1996) indicates that studies using a linear specification of the empirical model tend to find larger flypaper effects than studies using a log–linear specification. We will show that the results in the present paper do not seem to be sensitive to the choice of functional form. Another obvious problem in studies of the flypaper effect is that grants perceived as unconditional by the researcher may in fact include price elements. We handle this problem by dividing the grants into three schemes. One of these grants, directed only to local governments defined by the central government to be in a state of financial crisis, was clearly unconditional. A third econometric challenge is the question of whether grants are endogenous in the spending decision. Becker (1996) argues that there may be a positive feedback from spending on grants due to "forces such as large staffs to write proposals and to lobby granting agencies" (p. 91). Tests for endogeneity are in general difficult to perform in purely cross-sectional data sets.[2] We will argue, however, that even though the estimated flypaper effect may be overstated due to one of the reasons mention above, such a bias should not alter the way political strength influences the effect of grants.

The rest of the paper is organized as follows. The next section discusses how public choice mechanisms in the local public sector may explain the existence of a flypaper effect. Section 3 describes the data, while the empirical results are presented in Section 4. Some concluding comments are given in Section 5.

2. Theoretical considerations

The budget constraint of a local community can be written

$$Y + L = E + C \tag{1}$$

The total income of the society, consisting of private income Y and lump–sum grants from the central government L, finances local government expenditures E and private consumption C. All variables are measured at per capita form. Assume that there is a linear non–progressive income tax system and a single almighty decision-maker (e.g., a decisive voter as in the median voter model) faced with the budget constraint (1). He will decide an income tax rate dividing the total income between private and public consumption. If there is no further constraint (i.e., neglecting institutions), it follows from (1) that the partial effects of private income and lump-sum grants will be equal whomever the decision-

[2] Becker (1996) finds a large endogeneity bias. When the grants are instrumented she cannot reject absence of a flypaper effect. However, as instruments for grants she uses variables that traditionally are considered to have independent effects on local government expenditures. Without a test of the validity of the instruments, it is hard to evaluate whether this result reflects a true endogeneity bias or whether it is caused by the choice of instrumental variables.

maker is.[3] Assuming that the decision–maker has preferences over E and C, the demand for E is a function of $Y + L$ and a vector of taste variables Z. In empirical applications, Z is typically a set of sosiodemographic characteristics. In a linear specification, the outcome can be written

$$E = \alpha(Y + L) + \beta Z, \tag{2}$$

where α and β are parameters. In the case of a flypaper effect, however, the effect of L is greater than the effect of Y. The model can be written

$$E = \alpha_1 Y + \alpha_2 L + \beta Z, \tag{3}$$

where $\alpha_1 < \alpha_2$.

The institutional structure may violate important assumptions in this simple model. As most European governments, the Norwegian local governments are representative democracies including several political parties, offering various public services. The main difference from the national system is absence of a cabinet. Instead an executive board with proportional representation from all major parties in the local council is formed. The main local public services in the empirical period of the present paper, the 1930s, were education, health care, support of the poor and infrastructure. The tax structure was progressive, and the local governments set both the marginal income tax rate and what one may denote a lump–sum tax subsidy.[4] Income redistribution was a part of local politics.

Given such a multi–issue decision–making environment, bargaining and formation of coalitions in the local council may play a crucial role as demonstrated by for example Inman (1979) and Craig and Inman (1986). Without a sustainable coalition, the bargaining process in the legislature may be complex, and the council is likely to have low bargaining power in interaction with interest groups. Roubini and Sachs (1989) claim that "[w]hen power is dispersed, ... the likelihood of intertemporally inefficient budgetary policy is heightened" (p. 905). Inman and Fitts (1990) put it the following way: "Without suitable incentives to consider the implications of their actions on all other elected representatives, each "player" adopts an own best political strategy, which together may harm the legislature's collective benefit" (p. 81–82). In our setting, the "players" are the political parties. The parties may agree that total spending is too high, but the legislative bargaining process necessary to cut spending may be complex with some uncertainty related to the composition of the winning coalition. This can be interpreted as a situation with high political transaction costs as described by Oates (1988). In such a situation, it will most likely be hard to reduce total

[3] Notice that equal effects of mean income and unconditional grants requires that the actual decision–maker is faced with a budget constraint like (1). This may be realistic in multi–issue and multi–party decision–making environments. In the median voter model, this is only the case when the median voter has mean income. The consequences of using mean values in empirical studies based on the median voter model are discussed in for example Romer and Rosenthal (1979). In our general case without a decisive voter, mean income may be the best income measure.

[4] The total tax payment of voter i is $T_i = t(Y_i - F)$ if $Y_i > F$, and $T_i = 0$ if $Y_i \leq F$. The lump–sum tax subsidy F and the marginal tax rate t were local decision variables in the empirical period.

spending, and the result is overspending, deficits, and a high propensity to use increased grants to finance the outlays.

Interest group power may also generate a flypaper effect. Users of public sector services have strong incentives to lobby for increased production of public sector services because they are mainly free of charge. This can be seen as a negative fiscal externality on tax payers. The ability of internalizing such externalities is likely to depend on the strength of the political leadership. But because the political parties also attempt to appeal to the tax payers, the local governments may let variation in grants mainly influence the size of the deficit and the spending level, and not the tax rate. Both cases imply that voters and interest group members suffer from a kind of fiscal illusion. In the case of deficits, they ignore the fact that the deficit will lead to higher taxes or lower spending in future periods, see Baber and Sen (1986). In the case of grants, the fiscal illusion can be of the form described by Filimon et al. (1982); there is imperfect information about the grant level. Using increased grants to finance overspending instead of reducing the tax rate is the "easy way out" for weak political leaderships. The costs of changes in the tax rate is considered as higher than the cost of changes in spending levels and deficits. Changes in the tax rate are visible to all citizens, while variation in overspending and deficits are more or less hidden.[5]

3. Data and empirical specification

The hypothesis of equal effects of income and unconditional grants follows from models without any restrictions on local tax policy. In most European countries today, the local government tax policy is regulated to some degree. Norway is an extreme example where all local governments have the same income tax rate. Regulations on the local tax policy will induce a higher marginal effect of grants than of private income on local public spending, see Nagamine (1995). It is therefore of interest to go to the historical record in order to investigate determinants of the flypaper effect. We use data from the 1930's, a period with few federal regulations of the local governments.

The data covers all Norwegian rural municipalities in the fiscal year 1934–1935 (July through June). This particular year is chosen because it is the only year where suitable data are available. From 1935–1936, a new grant system was established where both the marginal and average income tax rates influenced the grant level. Consequently, the grants were not unconditional. Prior to 1934–1935, only data for the cities are available, while only rural municipalities received unconditional grants.

[5] It is questionable whether the effect of grant is symmetric. When a rise in the grant level does not reduce the income tax rate, this reflects a flypaper effect. On the other hand, in order to have a symmetric flypaper effect, reduced grant level must neither influence the tax rate. To test for whether the flypaper effect is symmetric, time series data are necessary, which is not available in the present study. Gamkhar and Oates (1996) test for asymmetries of the flypaper effect using data for almost 40 years. They cannot reject that the flypaper effect is symmetric.

Some rural local governments were under fiscal administration due to financial crises caused by the depression in the 1920s and 30s (36 observations). Other governments did not have a system with political parties (35 observations). We will concentrate the discussion on rural local governments with a representative democracy (605 observations), and we show that including the other rural observations does not influence the benchmark results.

The variables used in the analysis can be classified into economic, political and control variables. Definitions and descriptions of the variables are delegated to an Appendix table, while augmented descriptive statistics for the variables of interest are presented in Table 1.[6]

Table 1. Descriptive statistics for variables of interest, representative democracies

Sample		All	$Grant_FC > 0$	$Grant_FC = 0$
Local government	Mean	59.6	51.8	64.0
expenditures	St. dev.	23.6	16.7	25.8
per capita	Min	23.4	26.7	23.4
	Max	202.0	107.9	202.0
Private income	Mean	355.7	237.3	422.9
per capita (Y)	St. dev.	192.3	94.3	201.2
	Min	99.9	99.9	102.5
	Max	1400.0	610.1	1400.0
Grant per capita	Mean	1.50	4.14	0.00
due to financial crisis	St. dev.	3.00	3.73	0.00
(Grant_FC)	Min	0.00	0.04	0.00
	Max	25.90	25.90	0.00
Ordinary lump–sum grant	Mean	5.75	6.44	5.36
per capita	St. dev.	4.77	5.10	4.54
(Grant_O)	Min	0.00	0.00	0.20
	Max	38.30	28.46	38.30
Socialist share	Mean	0.37	0.40	0.35
in the local council (SOC)	St. dev.	0.19	0.20	0.18
	Min	0.00	0.00	0.00
	Max	0.81	0.81	0.80
Index for political strength	Mean	0.46	0.47	0.45
(POLSTR)	St. dev.	0.16	0.15	0.16
	Min	0.18	0.18	0.21
	max	1.00	1.00	1.00
Observations		605	219	386

[6] A closer description of the data and the institutional setting in the empirical period is given in Falch and Tovmo (2000). The small extent of federal regulation is reflected in a huge variation across local governments. For example, in the fiscal year 1934–1935, the marginal income tax rate varied from 6% to 22%.

3.1. Economic variables

Local government expenditures per capita varies from 23–NOK (590 1997–NOK, or about 80–USD) to 202–NOK. The huge regional variation is also documented by the variation in private income, as the maximum value in the sample is 14 times larger than the minimum value.

Even in the empirical period, the grant system was rather complex with several different grant schemes. We have separated out a school grant that clearly was a matching grant, where a share of the teacher wages was reimbursed by the central government. This grant is included in the analysis as total school grant per children. A clearly unconditional grant was directed against local governments defined by the central government to have a financial crisis, but of a smaller degree than required for direct federal administration. About 36% of the local governments in our sample received this grant, which will be denoted *Grant_FC*. In our opinion, the rest of the grants, denoted *Grant_O*, are also best understood as unconditional grants. They mainly consist of reimbursement of infrastructure maintenance and outlays on support for the poor and disabled people. But these grants had no matching–rates and were completely based on the grantors judgment of the local governments' needs.

Thus, our data includes two different types of an unconditional grant, *Grant_FC* and *Grant_O*. Notice, however, that as usual in the flypaper literature, none of the grant variables is necessarily ideal for testing the flypaper effect. *Grant_O* may include price elements, and the financial stress of local governments receiving *Grant_FC* may have induced an atypical behavior. But since we focus on whether the size of the flypaper effect depends on political strength, it is not the level of the flypaper effect that is of main interest.

3.2. Political variables

The political variables constructed are related to ideology and political strength. Like Borge (1995) and Falch and Rattsø (1999), we relate political strength to the fragmentation of the local council measured by an Herfindahl index. The index is $POLSTR = \sum_{p=1}^{P} SH_p^2$, where SH_p is the share of representatives in the local council of party p. *POLSTR* is negatively related to political fragmentation. Thus, the index is expected to be positively related to political strength. It takes the value of unity if the local council consists of one single political party, while the minimum value $1/P$ is attained if the seats are equally divided among the P parties. To investigate whether the size of the flypaper effect depends on political strength, we include interaction terms between *POLSTR*, unconditional grants (*Grant_FC* and *Grant_O*) and private income. The variation in *POLSTR* across local governments is large. Since the sample consists of 12 local governments in which the council consists of only one party (*POLSTR* is equal to unity), there is a unique possibility to estimate the flypaper effect both for maximum political strength along this dimension and a highly fragmented local council.

Ideology is included to capture differences in preferences for public goods between local governments. The rivalry between the socialist and the non–socialist camps was particularly strong at the time around the first social democratic government at the national level in 1935.[7] The national political struggle was reflected at the local level as well. The share of representatives from socialist parties in the local council (*SOC*) is included both at level and in interaction with private income. We expect that the socialist share has a positive effect on local government expenditures, and we also expect a positive connection between the socialist share and the effect of private income on the expenditures. For poor communities, there may be little room for ideology.

Political variables are only available for the election in 1937. This can give biased estimators because the expenditure data are for the fiscal year 1934–1935. With measurement errors, the estimated parameters are biased toward zero. We believe measurement errors only will have a minor effect on the estimators since the variation across governments is much larger than the variation within a government over time.[8] However, if the local government expenditures in period t have a causal effect on the election outcome in period $t + 1$, we may have a serious endogeneity bias. While this may be the case for the variable measuring ideology, a causal relationship from expenditures to political strength is unlikely. When there is an inefficient outcome under a fragmented local council, it is hard for the voters to know whom to blame. Because of potential biased estimates in a model including political factors, we will first estimate a model without political variables. Thereafter we show that including the political variables does not alter the effects of the other independent variables.

3.3. Control variables

The model includes the following control variables: Population size, population density, the age and occupational composition of the population, taxpayers per capita, debt per capita in the start of the fiscal year, and a dummy variable for financial stress ($Grant_FC > 0$).

3.4. Functional form of the model

The flypaper effect is defined as a larger marginal effect of unconditional grants than of private income on local government expenditures. Because the marginal effects are estimated directly in a model with a linear functional form, we choose

[7] Except the social democratic government in 1929, surviving only for two weeks.

[8] For Norwegian cities, for which data on elections are available for a longer time period, the correlation between *SOC* in the elections in 1934 and 1937 is 0.91, while the correlation coefficient for *POLSTR* is 0.80. In addition, the composition of the national parliament was quite stable in the 1930s. In the national elections in 1933 and 1936 (the next election was after WW2), the socialist share of the parliament was 0.46 and 0.47, respectively, while the Herfindahl index for party fragmentation was equal to 0.30 and 0.31, respectively.

a linear specification as our benchmark model. Becker (1996) argues that the flypaper effect is inflated in the case of a linear specification. Thus, we will investigate whether the results are different in a log-linear model as she suggests as the appropriate specification. There is, however, a problem related to *Grant_FC* in this regard. Because *Grant_FC* is equal to zero in several observations, one cannot take the log of this variable. We try to circumvent this problem in two ways. First, we will estimate a quasi log-linear model where we take the log only of variables with a positive value in each observation. Second, we will split the sample after the financial crisis criterion. Then we can take the log of all variables of interest in each subsample. There is also an economic motivation behind the split of the sample. The behavior of the local governments may depend on the level of financial stress. We will include a dummy variable for the local governments for which $Grant_FC > 0$, but the reaction to changes in economic conditions may also differ. In fact, the estimate of *Grant_FC* using the whole sample may be flavored by a selection bias.

4. Results

Table 2 presents the results when the behavior of all local governments is assumed to be equal. In the column (2), all rural local governments are included. Since we focus on the effect of the political variables, the next regressions exclude local governments under federal administration and local governments without a political party system. Comparison of column (2) and (3) shows that the selection does not alter the effects of the economic variables.

When private income per capita increases by 100–NOK (about 0.5 standard deviations), local government expenditures increase by 8.3–NOK (0.35 standard deviations). At mean values, the income elasticity is equal to 0.50. This is the same result as in a range of different studies. For example Bergstrom and Goodman (1973) find an income elasticity with respect to total local government expenditures of 0.64 for US local governments in the 1960s.[9] The similarity between the US in the 1960s and pre–WW2 Norway is particularly interesting since the regulation of the local public sector seems to have been quite similar.

The flypaper effect is substantial. The effect of the grant due to financial crisis (*Grant_FC*) is in line with the evidence from the US, while the effect of the ordinary lump–sum grant (*Grant_O*) is somewhat higher. When *Grant_FC* and *Grant_O* increase by 10–NOK, expenditures increase by 7–NOK and 14–NOK, respectively.[10] The latter result may indicate that *Grant_O* includes elements of matching grants, there may be price effects of *Grant_O* in addition to the pure

[9] This is in accordance with most of the studies for the US, the earlier studies for the US are summarized by Inman (1979). In Swiss municipalities with representative democracies, Pommerehne (1978) finds income elasticities in the range 0.4–1.0 in different specifications. Using Swedish data from 1990, Aronsson and Wikström (1996) report an income elasticity of 0.82. All together, the reaction to changes in private income seems to be independent of country, time period, and institutional structure.

[10] The hypothesis of equal effects of *Grant_FC* and *Grant_O* is rejected at 1% level.

Table 2. Estimated local government expenditure function

Sample	All	Representative democracies					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Private income (Y)	0.085	0.083	0.083	0.058	0.095	0.083	0.067
	(11.2)	(10.5)	(10.4)	(6.99)	(6.47)	(10.5)	(4.03)
Grant per capita due to	0.79	0.70	0.70	0.78	0.70	1.07	1.49
financial crisis (Grant_FC)	(5.31)	(4.17)	(4.22)	(4.71)	(4.20)	(2.13)	(2.93)
Ordinary lump–sum grant	1.38	1.38	1.36	1.31	1.36	2.09	2.03
per capita (Grant_O)	(14.1)	(12.7)	(12.7)	(12.4)	(13.2)	(5.63)	(6.18)
School grant per student	0.16	0.15	0.15	0.15	0.15	0.15	0.15
	(10.7)	(10.1)	(9.63)	(9.15)	(9.56)	(9.80)	(9.44)
Debt per capita	0.011	0.012	0.012	0.011	0.011	0.011	0.011
	(4.25)	(3.90)	(3.82)	(3.71)	(3.79)	(3.90)	(3.80)
Population/1000	0.44	0.42	0.42	0.40	0.43	0.44	0.43
	(5.53)	(5.15)	(5.10)	(4.76)	(4.96)	(5.33)	(4.98)
Density	0.005	0.005	0.005	0.003	0.005	0.005	0.002
	(0.89)	(0.92)	(0.94)	(0.45)	(0.89)	(0.89)	(0.39)
Taxpayers per capita	−27.1	−25.0	−23.5	−22.7	−23.1	−24.1	−23.1
	(3.64)	(3.14)	(2.90)	(3.11)	(2.86)	(2.98)	(3.22)
Students per capita	44.6	51.2	49.6	40.5	48.3	47.4	37.9
	(1.80)	(1.89)	(1.84)	(1.59)	(1.79)	(1.76)	(1.48)
Non-school children	−46.4	−41.2	−38.0	−34.6	−38.1	−40.2	−36.7
per capita	(2.36)	(1.96)	(1.82)	(1.71)	(1.81)	(1.93)	(1.82)
Elderly per capita	33.4	46.4	48.8	43.7	52.2	55.9	54.1
	(1.00)	(1.34)	(1.39)	(1.27)	(1.48)	(1.59)	(1.56)
Socialist share (SOC)	–	–	2.42	−16.9	2.94	3.47	−15.5
			(1.02)	(3.28)	(1.26)	(1.46)	(2.90)
SOC*Y	–	–	–	0.061	–	–	0.061
				(3.39)			(3.28)
Index of political strength	–	–	−2.98	−4.74	5.59	6.09	10.8
(POLSTR)			(1.39)	(2.36)	(0.87)	(1.59)	(1.40)
POLSTR*Y	–	–	–	–	−0.027	–	−0.018
					(1.25)		(0.85)
POLSTR*Grant_FC	–	–	–	–	–	−0.82	−1.54
						(0.89)	(1.65)
POLSTR*Grant_O	–	–	–	–	–	−1.68	−1.67
						(2.30)	(2.66)
Financial crisis	−1.23	−0.92	−0.94	−1.47	−0.92	−0.85	−1.40
(Grant_FC $>$ 0)	(1.25)	(0.88)	(0.90)	(1.41)	(0.88)	(0.83)	(1.37)
Income elasticity at mean	0.50	0.50	0.50	0.48	0.49	0.50	0.48
	(11.2)	(10.5)	(10.4)	(11.1)	(10.4)	(10.5)	(11.2)
Observations	676	605	605	605	605	605	605
R^2	0.85	0.85	0.85	0.86	0.85	0.85	0.86

Note: Estimation method is ordinary least squares where the standard errors are estimated using the heteroskedastic–consistent method suggested by White (1980). t–values in parentheses. In addition to the reported variables, the equations include seven variables describing the occupational composition, and the model in column (2) includes dummy variables for federal administration and non–party system.

income effect.[11] But nevertheless, because *Grant_O* includes lump–sum elements, we expect the effect to depend on political strength.[12]

When the model is estimated using a quasi log–linear specification, the results are mainly unchanged.[13] Thus, the estimated size of the flypaper effect does not seem to be a result of the linear specification of the model.

Political variables are included in the next columns. The effects of the economic variables are stable across the specifications. In column (4), the socialist share (*SOC*) and the index of political strength (*POLSTR*) are included without interaction terms. None of these variables are significant at 10% level, but both have the expected sign. Notice that variables describing the occupational structure are included in the model (the parameters are not reported). Hence, the effect of ideology is conditioned on occupational structure. The small effect of *SOC* seems to be a result of this fact.[14]

Column (5)–(8) Table 2 include different interaction terms. The information in Table 1 helps calculating in–sample marginal effects. Column (5) includes an interaction term between the socialist share and private income. The interaction effect is significant, indicating that the income effect is positively related to the share of socialists in the local council. This can also be interpreted via the effect of ideology. If private income is a half standard deviation below its mean, the effect of *SOC* is close to zero. For private income 2 standard deviations above mean, however, a rise in *SOC* from zero to 0.4 (about 2 standard deviations) increases the expenditures by 11–NOK (0.5 standard deviations), and the effect is highly significant. The expected ideological influence seems to be present only in the richest local governments. The result is in line with for example Alt and Lowry (1994), who find a higher income effect for Democrats than for Republicans in the US states.

Column (6) indicates that local governments with a strong political leadership have a lower income effect than local governments with a weak political leadership. This works in the direction of a larger flypaper effect under strong political leaderships. However, to evaluate how political strength affects the magnitude of the flypaper effect, one must also include interaction between political strength

[11] Notice, however, that other studies also have found effects of lump–sum grants of this magnitude, see for example Grossman (1990).

[12] The effects of the control variables are as expected, see Falch and Tovmo (2000) for a discussion. The effect of school grant per student is 0.15, and implies that, at mean, private consumption is unaffected by changes in this grant since the student share of the population is 0.15 at mean.

[13] The quasi log-linear model uses the log of each variable except *Grant_FC* and *Debt per capita*, for which the value is equal to zero in some observations. The results of the model are independent of whether the full sample or the sample of representative democracies is used. The income elasticity is estimated to 0.50, the elasticity of *Grant_O* is 0.12, and the quasi-elasticity of *Grant_FC* is 0.021. Using the mean values presented in Table 1, the results imply marginal effects of private income, *Grant_O* and *Grant_FC* of 0.08, 1.24 and 1.25, respectively. While the marginal effect of *Grant_O* at mean is somewhat lower than in the linear specification (but not significantly so), the marginal effect of *Grant_FC* is significantly higher than in the linear specification. In our case, in contrast to the evidence in Becker (1996), it seems like the quasi log-linear model may inflate the flypaper effect.

[14] If variables describing occupational structure are excluded, the effect of *SOC* increases almost five times, and is highly significant. The effect of the other variables, including *POLSTR*, is of similar magnitude as in the reported specification.

and the grant variables as done in columns (7) and (8).[15] The interaction term between *POLSTR* and *Grant_O* is significant at 5% level, while the interaction term between *POLSTR* and *Grant_FC* is marginally significant at 10% level in column (8). The effects of both interaction terms are negative as expected. In the case where the local council consists of only one political party (the maximum value of *POLSTR*), the estimated effects of *Grant_FC* and *Grant_O* are –0.1 and 0.4, respectively. In addition, and most important, the effects of the grant variables are not significantly different from the income effect.[16] One can therefore not reject that observed flypaper effects are a result of weak political leaderships. For weak local councils, the effects of the grant variables are great. When *POLSTR* is at its minimum in the sample, the effects of both grant variables are above unity (but the effect of *Grant_FC* is not significantly different from unity).[17]

Table 3 splits the sample after the financial crisis criterion. The partial effect of private income is higher in local governments in crisis, but since the income level is lower (see Table 1), the income elasticities are similar. In the specifications without political variables, the effect of *Grant_FC* increases from 0.7 to 0.9, while the effect of *Grant_O* is largest in the local governments without a crisis. Again, the results do not seem to be inflated by the functional form of the model chosen.[18]

The effect of ideology is strongest in the local governments without a crisis. The effect of a rise in the socialist share is about the same at mean level of private income in such local governments as when the income is two standard deviations above its mean in local governments in a financial crisis. Again the results indicate that ideology plays a role mainly in good economic conditions.

The split of the sample does not change the qualitative impact of political strength on the size of the flypaper effect, there are only minor quantitative

[15] Initially, we also included interaction terms between the socialist share and the grant variables. These interaction terms were never significant at 10% level, and they are therefore excluded in the models reported.

[16] In column (8), the size of the flypaper effect depends on the level of both *POLSTR* and *SOC*. To test whether the effects of the grant variables are different from the income effect, a value of SOC must be specified. For mean value of SOC, the t–statistics for the tests are equal to 0.26 and 0.93 when *Grant_FC* and *Grant_O* are considered, respectively. Since the income effect is within a quite small interval (the income effect is equal to 0.067 and 0.116 for the minimum and maximum value of *SOC* in the sample, respectively), the size of *SOC* does not influence the conclusion that the flypaper effect is insignificant.

[17] The interaction terms also imply that the effect of political strength depends on the grant levels. Political strength has a strong negative impact when the grants are large. For local governments with low grant levels, however, *POLSTR* has in fact a weak positive effect (but not significantly different from zero).

[18] When the sample split is based on the financial crisis criterion, the model can be estimated on log–linear form because all grant variables included in the regressions are positive in each observation. For the local governments with a financial crisis, the elasticities estimated in the log–linear model of *Grant_FC* and *Grant_O* are 0.08 and 0.11, respectively, while the income elasticity is 0.52. The results imply that, at mean, the marginal effects are equal to 1.00, 0.88 and 0.11, respectively. For local governments without a crisis, the elasticities of *Grant_O* and private income are estimated to 0.12 and 0.48, respectively, in the log–linear specification. These results imply marginal effects of 1.43 and 0.08, respectively. Thus, the marginal effects are almost equal for the linear and log–linear functional forms of the model.

Table 3. Separate local government expenditure functions for local governments with and without a financial crisis

Sample	Grant_FC > 0			Grant_FC = 0		
(1)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
Private income (Y)	0.117	0.118	0.120	0.082	0.082	0.057
	(12.8)	(13.2)	(5.97)	(9.27)	(9.27)	(2.90)
Grant per capita due to	0.93	1.96	1.94	–	–	–
financial crisis (Grant_FC)	(6.35)	(4.09)	(4.06)			
Ordinary lump–sum grant	1.08	1.35	1.31	1.64	2.40	2.37
per capita (Grant_O)	(15.9)	(6.00)	(5.79)	(9.84)	(6.10)	(6.97)
School grant per student	0.15	0.15	0.15	0.15	0.14	0.14
	(7.61)	(8.39)	(8.09)	(7.59)	(7.19)	(7.17)
Debt per capita	0.003	0.004	0.004	0.015	0.014	0.015
	(1.08)	(1.26)	(1.33)	(3.38)	(3.25)	(3.27)
Population/1000	0.71	0.76	0.68	0.43	0.46	0.44
	(2.02)	(2.23)	(1.89)	(4.93)	(5.01)	(4.79)
Density	−0.012	−0.013	−0.013	0.008	0.007	0.005
	(1.26)	(1.46)	(1.59)	(1.54)	(0.44)	(0.88)
Taxpayers per capita	−8.81	−11.0	−11.0	−33.9	−34.8	−31.9
	(0.98)	(1.25)	(1.25)	(3.30)	(3.34)	(3.56)
Students per capita	46.8	49.8	51.5	59.5	55.5	42.1
	(1.77)	(1.92)	(2.04)	(1.68)	(1.59)	(1.26)
Non-school children	−58.3	−56.2	−57.5	−38.0	−38.8	−26.3
per capita	(2.64)	(2.55)	(2.60)	(1.27)	(1.32)	(0.93)
Elderly per capita	−5.76	9.49	12.1	74.7	82.4	77.3
	(0.15)	(0.24)	(0.30)	(1.58)	(1.73)	(1.64)
Socialist share (SOC)	–	−1.64	−10.5	–	5.64	−22.0
		(0.74)	(1.70)		(1.54)	(2.58)
SOC*Y	–	–	0.047	–	–	0.070
			(1.47)			(2.98)
Index of political strength	–	8.14	16.6	–	6.27	6.82
(POLSTR)		(1.93)	(1.61)		(1.41)	(0.74)
POLSTR*Y	–	–	−0.050	–	–	−0.007
			(1.05)			(0.26)
POLSTR*Grant_FC	–	−2.18	−2.20	–	–	–
		(2.34)	(2.35)			
POLSTR*Grant_O	–	-0.61	−0.56	–	−1.92	−2.06
		(1.31)	(1.23)		(2.29)	(2.97)
Income elasticity at mean	0.54	0.54	0.53	0.54	0.52	0.52
	(12.8)	(13.2)	(12.7)	(9.27)	(9.27)	(10.0)
Observations	219	219	219	386	386	386
R^2	0.89	0.90	0.90	0.84	0.84	0.85

Note: Estimation method is ordinary least squares where the standard errors are estimated using the heteroskedastic–consistent method suggested by White (1980). t–values in parentheses. In addition to the reported variables, the equations include seven variables describing the occupational composition.

changes. For local governments in a financial crisis, the interaction effect between *Grant_FC* and *POLSTR* is now significant at 5% level. While the effect of *Grant_FC* is in the range -0.05–1.21 when the whole sample is used (column (8) Table 2), it is in the range -0.26–1.54 in the sample including only local governments in a financial crisis (column (3c) Table 3). At mean value of *POLSTR*, the effects are 0.78 and 0.90, respectively. Regarding *Grant_O*, the effect strongly depends on political strength in the sample of local governments without a financial crisis, while for the local governments with a crisis, the interaction term is insignificant. In the former case, the effect of *Grant_O* is in the range 0.31–1.94 compared to 0.36–1.73 when the whole sample is used. For local governments with a financial crisis, there is a significant flypaper effect of *Grant_O* for all sample values of *POLSTR*, although the results indicate that the size of the flypaper effect is negatively related to political strength. Using the estimated parameters, the effect of *Grant_O* is in the range 0.75–1.23.

5. Conclusion

The results in this paper indicate that the size of the flypaper effect depends on the heterogeneity of the local councils. A higher share of unconditional federal grants ends up in local public sector consumption when a local council consists of several small parties compared to local councils with few and big political parties. The Herfindahl index of party fragmentation has turned out to be an important determinant of public sector spending in several recent analyses on Norwegian data, indicating that political strength affects several aspects of public sector decision–making. The present analysis adds to the understanding of how local politics works. While the effects of federal grants are significantly larger than the income effect when the local council is fragmented, we cannot reject that the grant and income effects are equal when the local council consists of only one single political party.

The results in this paper must be considered to be only indicative for a broader understanding of how federal grants affect the local public sector. First, we study local public finance in a period with a very small degree of federal regulation and federal redistribution compared to the modern welfare state. Regulations on local tax policy instruments will “institutionalize” a flypaper effect. Second, the present paper does not use ideal election data. While we think the estimated effects of the political variables may be biased towards zero due to measurement errors, this can only be evaluated by future analyses. In carrying out such analyses, political strength must be operationalized in a way suitable for the institutional structure investigated. While party fragmentation seems to be a good measure in representative democracies with several political parties, other measures must be used for two–party systems. For the US states, Alt and Lowry (1994) distinguish between unified states, states with a split legislature (different parties control the chambers of legislature) and split branch (one party control the executive and the other party control both chambers of legislature). These may be good

measures of political strength since it influences how easy it is for voters to estimate whom to blame for an inefficient policy. Although Alt and Lowry find that divided government matters for the adjustment of state spending, they do not report whether the effect of federal contributions differ between the different government types.

Table A1. Variables, definitions, and descriptive statistics

Variable	Details	Data source	Mean value (Std. dev.)
Local government expenditures	Current expenditures in the fiscal year 1934–1935 (July 1934 through June 1935), calculated as total municipal expenditures per capita minus deficit last year, taxes regarded as lost, down payments, loans and interest payments.	A, C	59.6 (23.6)
Y	Private income per capita. Calculated on the basis of the assessment.	E, C	356 (192)
Grant_FC	Grant per capita due to financial crisis.	A, C	1.50 (3.00)
Grant_O	Ordinary lump–sum grant per capita.	A, C	5.75 (4.77)
SOC	Socialist share in the local council, calculated as the number of representatives in the local council from the social democratic party and the communist party divided by the total number of representatives. Data from the election in 1937.	B	0.37 (0.19)
POLSTR	Index for political strength, see the main text for definition. Data from the election in 1937.	B	0.46 (0.16)
School grant per student	Total matching grant to primary schools per student.	A, D	56.2 (30.9)
Debt per capita	Debt per capita in the start of the fiscal year.	A, C	118 (155)
Population	Population in 1930.	C	3013 (4210)
Density	Population per squared kilometer.	C	26.0 (92.7)
Taxpayers per capita	The number of taxpayers per capita.	A, C	0.38 (0.07)
Students per capita	The number of students in municipal primary schools per capita.	D, C	0.15 (0.02)
Children per capita	The share of the population below 15 in age in 1930 minus Students per capita.	D, C	0.16 (0.02)
Elderly per capita	The share of the population above 70.	C	0.06 (0.02)
Financial crisis	Dummy variable equal to one if the local government receives grant due to financial crisis ($Grant_FC > 0$).	A	0.36 (0.48)
Occupation structure	The share of men above 15 in age working in different occupations in 1930. The classification includes seven occupations plus non–occupation (unemployed and retired).	C	–

Note: The data are collected from official publications from Statistics Norway. A = NOS Municipal Finances, B = NOS Municipal Elections, C = NOS Population Census 1930, D = NOS School Statistics, and E = Statistical Information.

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