Aiming to Offset Local Cost Disadvantages: The Case of Finland

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1. Introduction

Fiscal decentralisation has been a major policy trend among both federal and unitary states for the past decades. Along this development path, intergovernmental transfers have become an increasingly important source of revenue for local governments. It is then not surprising that the questions of equitable and efficient fiscal equalisation systems have puzzled researchers and policymakers in countries around the world.

In this framework Finland represents the case of a small Nordic country facing challenging environment for fiscal equalisation. The country is large and sparsely populated. Despite of the rapid urbanisation in recent decades, still around 30 percent of the five million inhabitants live in rural areas. The age structure of the population differs much between areas in Finland and the ability to raise own source funding differs considerably. Despite of these obstacles, Finland has been able to build an extensive public service system so that the country is considered to be a “Nordic welfare state”.

In Finland, the public services are organised by two tiers of governments, the central government and the municipalities. The local government in Finland consists of municipalities and joint authorities of municipalities. At the beginning of year 2009, there are 348 municipalities.

Finnish municipalities are self-governing entities by constitution. This means that central government cannot assign new responsibilities to municipalities without first passing legislation to this effect. Nonetheless, many public services have been delegated from central government to municipal sector. As a result, municipalities are responsible of providing most social welfare and health care services as well as the education and culture services. In addition, municipalities provide the basic environment and technical infrastructure services.

Due to the many tasks assigned to municipalities, their overall economic importance is considerable. Municipality spending as share of GDP is around 18% and municipalities employ roughly 20% of the total Finnish workforce.

Municipal finances are based on own source revenues and grants from central government. On average, grants cover some 20 percent of the total municipal revenues. The main source of revenue is the municipal income tax that makes up 41 percent of all revenues. Municipalities are the sole receivers of the property taxes but the share of property taxes is only 2,5 percent of revenues. Municipalities also receive a share of corporate tax revenues. The rest of the municipal revenues consist of user fees and sales incomes. Due to big differences between municipalities, that the grant system tries to take into account, especially

the small rural municipalities rely on the grant system. In 2009, for every fourth municipality the grants cover than 50 percent of all revenues.

The present grant system is based on two block grants, one for health and welfare and another for education. The system also includes a minor general grant. In addition, a system to equalize tax bases is used. The present grant system was first introduced in 1993 when the previous matching grant system was abolished. Since the beginning, the system has been criticised for being partially ill-designed. The major criticism has been towards the grant formulas that are used to define the block grants. The system has been said to be complex and nontransparent method to provide funding for municipalities. In addition, the fact that three different ministries (Ministry of Welfare and Health, Ministry of Education and Ministry of Finance) are separately involved in the operation of the system has been said to cause coordination problems. As a result, the system has gone through several partial reforms or attempted reforms over the years. In addition, several minor changes have been made to grant formulas due to changes in the overall division of costs between central government and the municipalities. Despite of the efforts aiming to a reform, lack of political agreement has so far prevented a major change to the system. The reasons for disagreements originate from the ambitions of various interest groups involved. These include at least the three ministries and different types of municipalities on the other. Another important obstacle on the way to reforming the aid program has been the budgetary effects of the reform on single municipalities. In a situation where central government is reluctant to add any new funding to the total grant budget, it is inevitable that a reform would mean cuts on grants to some municipalities.

The latest and perhaps the most serious attempt to reform the grant system since the 1993 reform was the nomination of working group in 2007 to prepare a grant reform that would be in effect from the beginning of 2010. The objectives of the working group were first, to combine the three separate grants into a single grant that could be administered by Ministry of Finance. Second, the aim was to make the system more transparent and to introduce new grant measures in order to increase accountability, enhance incentives on improved productivity in the municipal services and also to take the special needs into account. Not all education and cultural services were included in the working group’s assignment, however. Some very important municipal services such as secondary schooling, vocational schooling and polytechnics were left out of the reform. Also most cultural services such as theatres and orchestras were not included in the reform. In addition, the revenue equalisation was left out of reform.

In order to prepare the proposal, the working group, together with Ministry of Finance, Ministry of Education and Ministry of Welfare and Health asked the Government Institute for Economic Research to set up a research programme to evaluate the present grant system and to make a study on new grant measures

using research methods. The research group published its proposal of the new grant system in the end of 2008 (Lehtonen, Lyytikäinen and Moisio, 2008). This paper describes the main research results and the proposal for a new grant system presented to the working group.

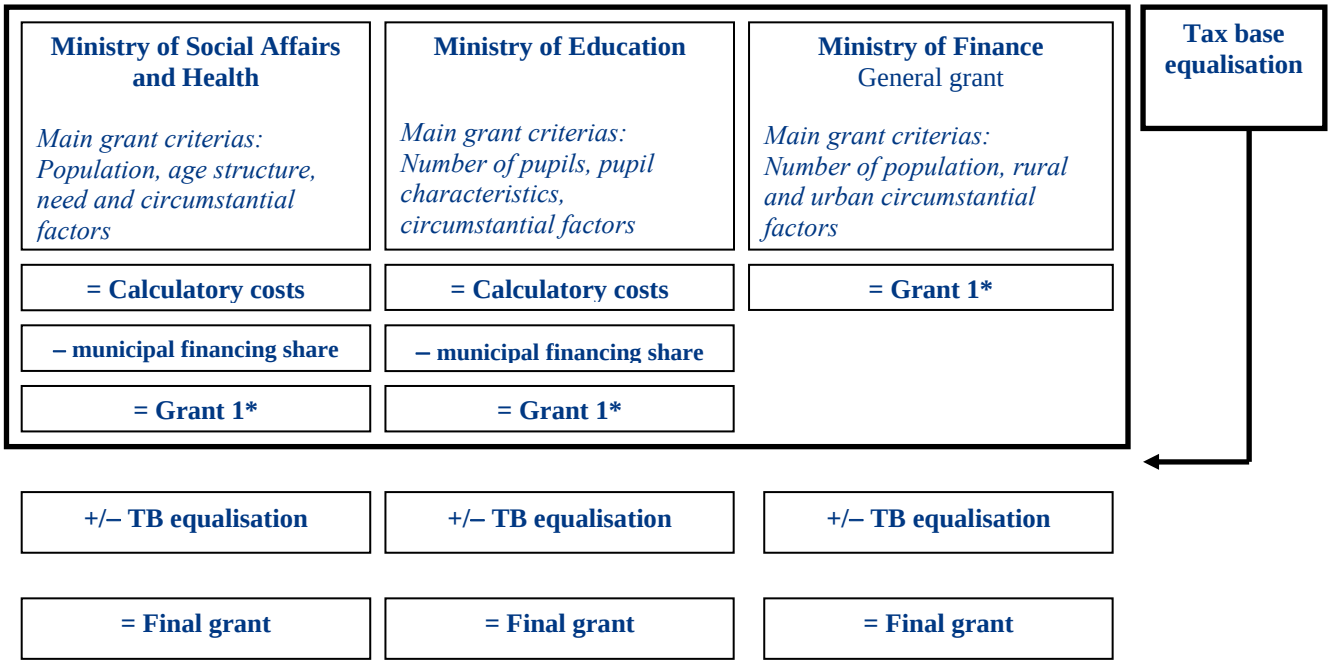
There is a considerable literature on different aspects of grants-in-aid systems, grant instruments and aid programs using formula. Boadway and Shah (2007) and Martinez-Vazquez and Searle (2007) provide both conceptual and practical discussion about grant systems, grant effects and formula design. Ladd (1999) provides several useful articles on the design intergovernmental aid programmes to offset fiscal disparities across local governments. Louis, Jabine and Gerstein (2002) and Smith (2006) provide thorough presentations on formula funding. Zhao and Bradbury (2009) discuss the problem of dealing with the problems of existing and new aid formulas in a grant reform. Recent cross country comparison and analysis is provided by OECD: Blöchliger and King (2006), Blöchliger et al (2007), Blöchliger and Charbit (2008).

This paper is organised as follows. Section 2 illustrates the present Finnish grant system and the purpose and aims of the new grants system reform. Section 3 presents the main results of the research programme on Finnish grant system. Section 4 summarises the main results and discusses their implications.

2. A short description to fiscal equalisation in Finland

In Finland fiscal equalisation consists of two parts: the block grants system that aims to offset disparities in public service costs and the revenue equalisation. At present, three ministries are involved in the operation of the fiscal equalisation: Ministry of Finance, Ministry of Education and Ministry of Social Affairs and Health. Figure 1 shows the basic framework of the system. The block grants are defined using formulas. The revenue equalisation is organised separately, but block grants and revenue equalisation are united in the phase of payments.

Figure 1 The structure of the present grant system



* Grant before the tax base equalisation

In 2009, the total amount of grants paid to municipalities and joint authorities of municipalities was 9,4 billion euros, of which 5,5 billion was the share of Ministry of Social Affairs and Health, 3,7 billion the share of Ministry of Education and the rest around 200 million was the general grant operated by the Ministry of Finance. The funds in the revenue equalisation system were around 800 million euros.

2.1 Grant programme to equalise cost disparities

The grant system for health and welfare services is based on two formulas. The formula for health care service grant is based on measures for population age structure, sickness and remoteness of the municipality (long distances and low density population). The welfare services formula is based on measures of the population shares of child and elderly people, unemployment and remoteness. In addition, the welfare services formula uses need indicators for child daycare, child welfare and aid for handicapped.

The formulas are used to make a calculation of the municipality specific costs for health and welfare services. The so called standard cost is defined as the national average calculatory cost. The block grant for health and welfare services is then defined so that each municipality is expected to finance 65 percent of the calculatatory exenditures from own source revenues. The calculatory expenditures exceeding this amount is the grant for health and welfare services for the municipality.

As for the education services, such as comprehensive and secondary schooling, the formulas are mainly based on number of pupils[1]. Also several additional cost indicators such as share of pupils at the upper level of comprehensive schools, handicapped pupils, pupils in remedial instruction, pupils from foreign origin and Swedish speaking pupils are used. In addition, indicators such as population density, school size, bilingual status of the municipality and location in archipelago are used. The calculated education and cultural service costs are used to define the benchmark per capita cost, which is 58 percent of the whole country average of per capita costs[2]. For each municipality the calculatory cost, defined by the formulas, that exceeds the benchmark cost is the grant for education and culture services for the municipality.

The third element of the grant system is the general grant. This is defined using several indicators that try to take both the rural and urban cost factors into account. The importance of this grant is small, only 2 percent of all grants.

None of the above described grant formulas or the coefficients used in the formulas are based on publicly documented research. The two sector ministries, Ministry for Education and ministry for Welfare and Health, have chosen the variables and coefficients independently so that they suit for the policy they want to advance in the municipalities.

[1] Ministry of Education gives grant funding for several cultural services using formulas. These formulas are not discussed here for brevity reason.

[2] Population weighted average.

2.2 Revenue equalisation system

The revenue equalisation is based on municipality specific calculation on the tax revenues that the municipalities could raise, if they used the average tax rates. In other words, actual taxable incomes and property tax bases are used with the country average tax rates.[3] The revenue equalisation guarantees all municipalities 91,86 percent of the average per capita calculatory tax revenues. For the municipalities below this threshold, they receive the difference as a supplement in their grants. The municipalities above the threshold must pay 37 percent of the exceeding amount to the funding of the equalisation. In practise, this sum is reduced from their grants. Although revenue equalisation is operated by Ministry of Finance, the system is totally financed by the municipalities.

[3] The actual revenue from corporate tax is taken into account in the calculation.

3. The research results

3.1 Econometric model

In order to construct a grant system that successfully offsets or mitigates cost disadvantages, good estimates of public service cost functions are needed. Estimating cost functions is not straightforward since data on outputs rarely covers all relevant outputs. Most notably, indicators for the quality of services are typically missing. These missing outputs are likely to be negatively correlated with municipality attributes that increase production costs since higher production costs affect the demand for services negatively. Hence, the effects of municipality attributes are likely to be estimated with error.

Our econometric methodology uses two approaches depending on the quality of data available on the specific service (or branch of services) studied. When sufficiently detailed data on outputs is available, we estimate the cost function directly. For the public services for which only simple output measures are available, we identify the cost function parameters from an estimated expenditure function. The latter methodology follows Downes and Pogue (1994) who test the two methods and find that modelling the unobserved outputs through the demand for public services yields good estimates for cost parameters. Substituting the demand function for unobserved outputs controls for the quality under plausible assumptions on the determination of public expenditures. They also show that the reduced form estimates of expenditure functions including demand determinants have to be adjusted to obtain the cost function parameter estimates.

The production of a specific public service or branch of services in a municipality is modelled in the following way. The municipality incurs a cost or expenditure M by using inputs I with prices p to produce a vector of outputs G. The costs of producing any output vector are given by the cost function C, which is affected by municipality attributes X and Z and a random term v.

(1) $$M = p'I = C(G,X,Z,v)$$

Municipality attributes are divided into control variables Z and variables X that are seen to reflect disadvantages that should be compensated in the grant allocation formula.

Following Downes and Pogue (1994) and Duncombe et al. (1996), among others, we write the cost function as the product of an index of outputs $g(G)$ and an index of per unit costs $h(X,Z,v)$.

(2) $$M = C(G,X,Z,v) = g(G)h(X,Z,v).$$

We model the costs per population covered by the service studied. For instance, when modelling preschool and comprehensive school cost functions, the variable to be explained is expenditure per pupil. Hence, outputs *G* should be thought of as quality of services, which may include several quality attributes such as educational attainment, quality of class rooms, playgrounds and meals.

For the purposes of estimation we write the log of the unit cost *h* as

(3) $$\ln h = \alpha \ln X + \beta \ln Z + v\,.$$

Taking the natural logarithm of (2) and plugging in (3) yields the cost function

(4) $$\ln M = \ln g(G) + \alpha \ln X + \beta \ln Z + v\,.$$

We are ultimately interested in the coefficients α, which give the effects on costs of variables *X* that are intended to be included in the grant allocation formula. When good data on outputs is available, parameters α can be estimated directly. However, when the data lacks sufficiently detailed output variables, the estimation of (4) is likely to yield biased results. In order to control for missing outputs we assume that the quality of services *g(G)* in (4) is determined by the demand for services by the voters in municipal election.

Many studies assume that the service production is adjusted to match median voter's preferences. Accordingly, the demand function should include median voter's characteristics. Typically median citizen's attributes are used as proxies, even though turnouts in local elections may be low. Moreover, the relevance of the median voter hypothesis is questionable, especially in the Finnish setting with representative democracy and a wide range of municipal services. In this study we refer somewhat loosely to a representative voter or decisive voter, since it is not clear whether the median voter's demand determinants are what we should include in the demand function affecting spending decisions by local governments. The demand function we specify may be interpreted as median voter's demand function under certain assumptions. Alternatively, it can be interpreted as an approximation of any demand function reflecting community preferences.

The main determinants of the public service demand of the representative voter are his/her income and cost he/she incurs from an increase in services. The price of a one unit increase in *g* for the representative tax payer is called the *tax price*. A unit increase in *g* increases expenditure by *h* times the population covered by the service. Assuming that these expenditures are funded by a rise in the flat rate municipal income tax gives the following expression for the tax price

(5) $$\textit{Tax price} = h * \textit{Pop} * T,$$

where *Pop* is the population covered by the particular service studied and T is the tax base share of the representative tax payer. In Finland, local income tax is the main source of funds for municipalities. We assume that increases in expenditures are financed through the income tax. We do not have data on median voter's income

Downes & Pogue (1994) base their analysis on the median voter theorem and measure median voter's tab base share as the ratio of median assessed property value to the total property tax base, since school's are funded through property taxes. In line with the Finnish tax system, we use taxable earned income instead. Median taxable income was not available on municipality level. We assume that the representative voter's tax base share can be approximated by the ratio of mean taxable income to total taxable income. In fact, mean income may be a more accurate measure of the median voter's income than median income since income distributions are typically right-skewed and turnout is higher on the right tail. The tax base ratio is written as

$$T = \sum Y/N \Big/ \sum Y = 1/N \tag{6}$$

where Y denotes taxable income and N denotes population. It is seen that the tax base ratio simplifies to the inverse of population. Thus, the demand function captures the idea that, for a given subpopulation *Pop* covered by the service, the demand depends positively on the amount of tax payers sharing the costs.

The log demand function is now written as

$$\ln g = \phi \ln[h(X, Z, v)T] + \theta \ln D + e \tag{7}$$

where the bracketed term is the tax price of the representative tax payer without *Pop*, We have moved *Pop* into vector *D* denoting other demand determinants to simplify notation. In addition to *Pop*, *D* includes variables such as income and grants. Finally, *e* denotes the error term. Note that for services covering the whole population *Pop* in (5) equals *N*. For these services defining the tax base share as in (6) implies that the tax price elasticity is not identified separately from the scale effects. On the other hand, measures of tax base share that include income might be unidentifiable separately from income elasticity, since income is included in *D*.

From the demand function it is already evident that excluding important outputs from the cost function may lead to biased estimates for the effects of municipality attributes. Production disadvantages increase the tax price through per unit cost *h* and higher tax price reduces output by depressing demand. Hence, estimating (4) without demand variables or relevant outputs would lead to downward biased estimates for disadvantage variables.

The estimating equation is obtained by first substituting (3) into (7) and then substituting (7) into (4). The expenditure equation is written as

(8) $$\ln C = \phi(\alpha \ln X + \beta \ln Z + \ln T + v) + \theta \ln D + \alpha \ln X + \beta \ln Z + v + e .$$

The first bracketed term is the tax price of the representative voter and ϕ is the tax price elasticity of demand. *D* includes other demand determinants, *X* includes proposed grant allocation variables, and *Z* consists of control variables. Rearranging (8) gives

(9) $$\ln C = \theta \ln D + \phi \ln T + \alpha(1+\phi) \ln X + \beta(1+\phi) \ln Z + u$$

where u is a composite error term $u = (1+\phi)v + e$. It is seen that reduced form estimates of (9) do not give the structural estimates for the average effects of *X* (parameters α). Since the tax price elasticity is ϕ negative, the reduced form estimates are biased towards zero. The alpha parameters can be recovered from (9) since ϕ is obtained as the coefficient of the tax base share *T*.

We estimated equation (9) by OLS separately for each type of service studied since data on relevant variables were available was from one or two years depending on the service. This rules out the use of fixed effects panel methods that control for unobserved time constant heterogeneity arbitrarily correlated with explanatory variables. Hence, the results are likely to suffer from endogeneity problems. However, we believe that the proposed new grant allocation formulas based on our estimates are better justified than the existing formulas which are not based on systematic publicly available analysis of factors affecting costs of service production.

3.2 The main regression results

Equation (9) served as the basis for the estimation of *preschool and elementary school* expenditures and *child daycare* expenditures. For *library services* detailed data on outputs was available and we estimated the cost function (4) directly. For other services we used a reduced form approach due to either data problems or conceptual issues. *Health care* and other social services cover the whole population, which implies that the tax price elasticity is not identified separately from population. Moreover, for these services sample sizes were small since only one year of data was available. Data on *elderly services* was of poor quality.

The data were collected from various registers provided by Statistics Finland, different ministries and other governmental bodies. For some services two annual cross sections were available, but for some services we were able to use only one cross section. Regression results are presented in Appendix.

Table 3 shows the results for pre- and comprehensive schools. The opposite number of the coefficient of population gives the estimate for the tax price elasticity. The estimate of tax price elasticity is quite low (-0.09) but highly significant. The elasticity estimate was used to inflate the Grant Criteria coefficients, as described in section 3.1. Income elasticity and elasticity of demand with respect to grants are insignificant. Corporate tax revenue is positive and significant. The number of pupils is included to control for scale effects. The remaining control variables were included as potential grant criteria but the working group decided to exclude them to keep the grant formula simple.

The coefficients of proposed grant criteria are shown in the upper panel. The share of preschool aged children is negative as expected but insignificant. The share of upper level comprehensive school age group (13-15) has a positive and highly significant effect. One percentage point increase in the share of 13-15 aged increases costs by 0.38 per cent. The share of pupils taught in Swedish is positive and significant but the share pupils living in archipelago does not seem to affect costs. The share of immigrant pupils seems to increase costs, but the estimate is inaccurate.

The grant criteria include a set of variables reflecting the spatial distribution of the population in the municipality. The concentration measures were constructed at Statistics Finland by first dividing the country into squares using a 1 kilometre grid. For each square, the population within 10km radius was then calculated. Next the whole population was divided into quintiles based on the population within the 10km radius surrounding the square in which they live. The shares of population in these quintiles were used as explanatory variables in all models we estimated. Group 1 refers to the least populated areas. The most densely populated quintile (Group 5) is the reference group. It is seen that the share of people in the least populated areas (Group 1) has a strong and significant positive effect on costs. The coefficient diminishes when moving to more densely populated squares, but all four groups are highly significant. The use of the new measures for remoteness of population is one of the main new criteria introduced in this study. The old grant formula uses population density in the whole municipality, which is arguably a poor measure of the spatial concentration of the population.

Tables 4 – 8 show the estimations for child daycare, health care, cultural services, elderly care and other welfare services. [To be completed]

3.3 The proposed new formula to offset cost and need disparities

Based on the regression results the researchers proposed a model that consisted of six “submodels”. The submodels were: pre- and comprehensive schooling,

child daycare, health care, cultural services, elderly care and other welfare services.

In each submodel, the calculatory costs are defined using a formula that consists of two parts: a basic euro amount per the population base used[4] and a need indicator that aims to take the relevant cost factors into account. Table 1 shows the formulas for calculatory costs in each submodel.

*Table 1 The six submodels**

Submodel	**The definition of calculatory costs**
Child daycare	2 894 euros × daycare need indicator (i) × population aged from 0 to 6 years (i)
Pre- and comprehensive school	5 288 euros × schooling need indicator (i) × population aged from 6 to 15 years (i)
Culture services	51 euros × culture need indicator (i) × total population (i)
Health care	1293 euros × health care need indicator (i) × total population (i)
Care for elderly	3130 euros × elderly care indicator (i) × population aged from 65 or older (i)
Other welfare services	166 euros × other welfare need indicator (i) × total population (i)

* The euro amounts are in 2006 price levels

Table 2 presents the formulas used to calculate the need indicators. The coefficients in the formulas are based on regression models estimated for each submodel separately. The regression results are presented in the Appendix (Table 3 to Table 8). The basic euro amounts used in the calculation (in Table 1) are also based on regression estimations. The basic euro amounts come from estimation where the grant criteria-variables are set to zero and the control variables are set to the national average.

The calculation in Table 1 gives the sum of calculatory costs for each municipality. Equation 10 illustrates the calculation of the grant for municipality i in year t using the submodels:

$$(10) \qquad GRANT_{it} = \sum_{k=1}^{6} CC_{it} - \left[\frac{(1-GR)\times CC}{\sum_{n=1}^{N} n_{it-1}} \right] \times n_{it-1}, \text{ where}$$

[4] The population base differs in different submodels depending on the service in question: for example, in health care the population base is the whole population, but in child daycare the population base is the number of newborns to 6 children under seven years old.

GRANT is amount of the single block grant in euros for municipality i, t is year, k denotes the submodel, CC is the sum of the calculatory costs for the whole country, CC_i is the sum of calculatory cost for municipality i, GR is the grant rate for the block grant[5], n is the number of inhabitants and N is the number of municipalities.

The idea behind the use of separate submodels/formulas was to give a flexible and transparent tool for the decisionmakers if, for example, they would want to channel more funding to some specific service. In this case, the basic euro amounts could be changed and let the municipality specific coefficients to take the differing situations into account.

[5] Here, it is assumed that the grant rate is 35.

Table 2 The need formulas for the six submodel

Pre- and comprehensive schooling:

1 +
Share of 6 year old population of population aged 6 to 15 (preschool age children) × -0,51 +
Share of 13 to 15 year old population of population aged 6 to 15 (upper level of comprehensive schooling) × 0
Share of population in population structure group 1 × 1,35 +
Share of population in population structure group 2 × 0,42 +
Share of population in population structure group 3 × 0,14 +
Share of population in population structure group 4 × 0,05 +
Share of population whose first language is Swedish × 0,09 +
Share of population living in archipelago × 0,01 +
Share of foreign origin population × 0,43 +

Child daycare:

1+
The share of population aged 20 to 44 -that belongs to labour force × 1,223 +
Share of population in population structure group 1 × 0,085 +

Culture services:

1+
Dummy for bilingual municipality (1/0) × 0,157 +
Share of population in population structure group 1 × 1,472 +
Share of population in population structure group 2 × 0,211 +
Share of population in population structure group 3 × 0,193 +
Share of population in population structure group 4 × 0,042

Health care:

1 +
Health care need index × 1,091 +
Share of population in population structure group 1 × 0,871 +
Dummy for bilingual municipality (1/0) × 0,097 +

Elderly care:

1 +
Elderly care need index × 0,343 +
Dummy for bilingual municipality (1/0) × 0,098 +

Other welfare services:

1 +
Share of population in population structure group 1 × 0,344 +
Share of population in population structure group 2 × 0,299 +
Dependency ratio × 0,456 +
Share of handicapped persons × 2,443 +
Child welfare custodies for children aged 0 to 17 years per population × 142,3 +
Other child welfare measures for children aged 0 to 17 years per population × 6,836 +

4. Discussion

This paper presents the main results of a research project that was set up to plan new formulas for the new single block grant system to equalise cost differences. The research project was started by request of the Ministry of Finance working group that is in charge of preparing the grant system reform from the beginning of 2010. The reform was limited to a certain municipal services that cover approximately 70 percent of the grants. Also the revenue equalisation system was left out of the working groups' agenda. All these limitations of course affected the assignment given to the research group. The time limit given to the research project was 8 months. The research results were published in three intermediate reports. The proposal for the new grant system was published in the final report of the research project.

The proposed system is based on six submodels that add up to one grant. Each submodel represents an important municipal service. The main idea of the separation into six formulas was to keep the model as transparent and easy to administer as possible. Each formula consists of basic euro amount and an indicator that describes the need and circumstantial factors that affect the cost differences. All coefficients and basic euro amounts used in the formulas are based on regression analysis.

The proposed model was presented to the working group in August 2008. At first, the working group decided to take the proposition as a base for the preparation for the legislative proposal. This was despite the fact that the proposal - if fully implemented – would have meant losses for many municipalities. On average though, the per capita changes (positive or negative) from the proposal were not big, for half of the municipalities less than 50 euro per capita. But for some municipalities the change could have been bigger without central government bringing more funding to the system.

In January 2009 the news from deteriorating economic stuation changed the status of the reform. Political decision-makers were no longer willing to put forth a reform that would alter the municipalities' grants at the same time that the tax revenues were falling sharply. Therefore, the proposal done by the research group was set aside and only a moderate reform will be done in 2010.

Nevertheless, the results from the research project have shown that the present grant system needs considerable improvements. The grant formulas and measures used to define service needs are often imprecise and partly inadequate. The present funding of municipalities gives rise to the questions of fair and equitable division of resources.

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Appendix [to be completed]

Table 3 The regression estimation for pre- and comprehensive schooling (years 2005-2006)

	Estimated coefficient[§]	Robust standard error
Grant criteria		
Share of 6 year old population of population aged 6 to 15 (preschool age children)	-0.51	(0.279)
Share of 13 to 15 year old population of population aged 6 to 15 (upper level of comprehensive schooling)	0.38***	(0.076)
Population structure (group 1)	1.35***	(0.187)
Population structure (group 2)	0.42***	(0.053)
Population structure (group 3)	0.14***	(0.030)
Population structure (group 4)	0.05***	(0.014)
Share of pupils taught in Swedish language	0.09***	(0.024)
Share of pupils living in municipalities located in archipelago	0.01	(0.026)
Share of foreign origin pupils	0.43*	(0.230)
Control variables		
ln(Taxable incomes €/inhabitant)	-0.016	(0.067)
ln(Corporate tax revenues, €/inhabitant)	0.028***	(0.009)
ln(Grants €/ inhabitant)	0.014	(0.028)
ln(Population)	0.093***	(0.031)
ln(Number of pupils)	-0.18***	(0.046)
ln(Square number of pupils)	0.002	(0.004)
Increased number of pupils (1/0)	-0.01	(0.008)
The absolute value of proportional change in number of pupils	0.93***	(0.172)
Dummy for increased number of pupils * absolute value of proportional change in number of pupils	-0.89***	(0.173)
Dummy for bilingual municipality (1/0)	0.07***	(0.017)
The share of pupils taught in Sami language	0.12	(0.176)
The share of pupils taught in other languages (than Finnish, Swedish or Sami)	1.01	(0.968)
Share of pupils receiveing remedial instruction	-0.28	(0.171)
Dummy for year 2005 (1/0)	-0.04***	(0.007)
Constant	9.55***	(0.761)
Number of obs.	794	
R^2	0.749	

Estimation data for years 2004-2006; ***p<0.01, ** p<0.05, * p<0.1

Table 4 The regression estimation for child daycare (year 2006)

	Estimated coefficient[§]	Robust standard error
Grant criteria		
The share of population aged 20 to 44 -that belongs to labour force	1.223***	(0.240)
Population structure (group 1)	0.085	(0.265)
Control variables		
ln(Taxable incomes €/inhabitant)	0.596***	(0.075)
ln(Corporate tax revenues, €/inhabitant)	-0.009	(0.016)
ln(Grants €/ inhabitant)	0.003	(0.022)
ln(Population)	0.377***	(0.035)
ln(population aged 0 to 6)	-0.396***	(0.054)
ln(population aged 0 to 6)^2	0.005	(0.004)
Share of 3 to 5 year old children of children aged below 7	0.012	(0.197)
Share of 6 year old children of children aged below 7	0.494*	(0.298)
Population structure (group 2)	0.111	(0.129)
Population structure (group 3)	-0.008	(0.050)
Population structure (group 4)	0.011	(0.027)
Dummy for bilingual municipality (1/0)	0.019	(0.019)
Constant	0.726	(0.834)
Number of observations	398	
R^2	0.610	

Estimation data for year 2006;
***p<0.01, ** p<0.05, * p<0.1

Table 5 The regression estimation for library services

	Estimated coefficient[§]	Robust standard error
Grant criteria		
Dummy for bilingual municipality (1/0)	0.157***	(0.019)
Population structure (group 1)	1.472***	(0.259)
Population structure (group 2)	0.211***	(0.066)
Population structure (group 3)	0.193***	(0.035)
Population structure (group 4)	0.042**	(0.019)
Control variables		
Book circulation/inhabitant	0.018***	(0.002)
Physical visits/inhabitant	0.009***	(0.002)
Visit in internet pages/inhabitant	0.0002***	(5.67e-05)
ln(population)	-0.574***	(0.053)
$\ln(\text{population})^2$	0.0282***	(0.003)
Dummy for arhipelago	-0.101**	(0.040)
Dummy for remote archipelago	0.076*	(0.040)
Dummy for year 2005 (1/0)	0.048***	(0.011)
Dummy for year 2006 (1/0)	0.077***	(0.012)
Constant	6.154***	(0.254)
Number of observations	1233	
R^2	0.491	

Estimation data for years 2004-2006;
***p<0.01, ** p<0.05, * p<0.1

Table 6 Regression estimation for health care

	Estimated coefficient[§]	Robust standard error
Grant criteria		
Health care need index	1.091***	(0.084)
Population structure (group 1)	0.871*	(0.461)
Dummy for bilingual municipality (1/0)	0.097***	(0.019)
Control variables		
Population structure (group 2)	0.0913	(0.172)
Population structure (group 3)	-0.016	(0.044)
Population structure (group 4)	-0.043*	(0.025)
Constant	6.103***	(0.083)
Number of observations	387	
R^2	0.403	

Estimation data for years 2006;
***p<0.01, ** p<0.05, * p<0.1

Table 7 Regression estimation for elderly care

	Estimated coefficient[§]	Robust standard error
Grant criteria		
Elderly care need index	0.343**	(0.142)
Dummy for bilingual municipality (1/0)	0.098***	(0.036)
Control variables		
Population structure (group 1)	-0.049	(1.057)
Population structure (group 2)	0.065	(0.163)
Population structure (group 3)	0.052	(0.062)
Population structure (group 4)	0.011	(0.037)
Constant	7.671***	(0.143)
Number of observations	387	
R^2	0.044	

Estimation data for years 2006;
***p<0.01, ** p<0.05, * p<0.1

Table 8 Regression estimation for other welfare services

	Estimated coefficient[§]	Robust standard error
Grant criteria		
Population structure (group 1)	0.344	(0.401)
Population structure (group 2)	0.299	(0.241)
Dependency ratio	0.456***	(0.094)
Handicapped persons/population	2.443*	(1.282)
Child welfare custodies for children aged 0 to 17 years per population	142.3***	(16.58)
Other child welfare measures for children aged 0 to 17 years per population	6.836**	(2.783)
Control variables		
ln(Taxable incomes €/inhabitants)	0.579***	(0.187)
Population structure (group 3)	0.099	(0.090)
Population structure (group 4)	-0.036	(0.057)
Constant	-0.911	(1.858)
Number of population	387	
R^2	0.355	

Estimation data for years 2006;
***p<0.01, ** p<0.05, * p<0.1