

# **A Public Choice Model of Grant Allocation Under Conditions of Systemic Transition in School Finance**

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## **Abstract**

This paper applies a public choice model of the determination of grants to municipalities to the augmentation of school aid in Lithuania, during the transformation of its school finance system. It used the augmentations of the formula aid to test whether political actors used the funds to further their special interest. It finds that grants do appear to have been higher to those municipalities where the leading party changed in the last election. As a result of this effect municipalities that exhibit unstable preferences appeared to gain additional grants worth 2.2% of their school finance budget. Thus the results imply an aversion to funding municipalities with entrenched political preferences among national politicians.

JEL codes: H77, D78

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## **Introduction**

This paper examines the application of a public choice model of grant allocations to the school finance allocations made in Lithuania in 2002 and 2003. Previous work on the determination of grants to municipalities has not looked at states emerging from transition. One possible reason for this is that, although in many aspects of economic life the transition may be said to be over in countries such as Lithuania, there are still rapid systemic changes taking place in the spheres of public administration and budgeting. This often makes it difficult to obtain data and to track financial systems for long enough to model the process. In this paper I take advantage of data made available by the National Audit Office when evaluating the new school finance formula and of the distortions to the new system caused by incorporation of additional funding after the formula amounts had been allocated. This provides an unusual opportunity to test the decision making of political actors in a transition country with reliable data on budget allocations that are relatively free money, being in addition to the previously legislated formula amounts. Furthermore the local elections at the end of the first year of the new school finance formula allow me to pool the first two years of the system with a fixed effects model, increasing the power of the results.

## **Allocation of Budget Funds to Municipalities**

The initial approach of political scientists to intergovernmental grants focused on the needs approach. Stein [1981] modelled per-capita direct federal aid to general-purpose governments in the U.S. His results for three separate years indicated that the proportion of the aged, dependent children, poverty and crime in the population and the tax burden were consistently significant positive determinants of aid while the education level and home ownership had negative impacts. When economists started working on intergovernmental grants they changed the approach radically. Downs [1957] argued that democratic governments designed policies to maximize their probability of re-election. Alperovich [1984] showed that this could be directly applied to the study of intergovernmental grants. Grants that are predetermined by legislative formula would not be under the discretion of politicians hence he focused on non-formula grants for the larger

Jewish municipalities in Israel. The public choice variable Alperovich introduced was the proportion of municipal voters who voted for the party of national government. The other variables included a dependency measure, population, and the municipality's per-capita annual budget deficit. He presented a variety of specifications for two different years but in most cases the political variable was significantly positive, implying that Israeli governments rewarded their political supporters. For the 1978 data logarithmic specification he found a per-capita grants elasticity of 0.28 with respect to this variable.

Grossman [1994] extended the analysis of Alperovich by including more political variables in the U.S. institutional environment and by including measures of special interest pressure. He split the political measure into two variables, the percentage of votes cast for a Democrat governor in the state (the Democrats controlled the U.S. House of Representatives during the period) and the percentage of seats in the state house of representatives held by the Democrats. Grossman modelled interest group pressure through incorporating state and local government employment per capita and union membership per capita as two additional explanatory variables. His results for total federal grants to state governments in four separate years did not produce significant coefficients for the gubernatorial variable but did indicate a significantly positive coefficient on the percentage of Democrat seats in the state house of representatives for three of the four years.

What these studies clearly lacked was any attempt to pool the data from different years. Worthington and Dollery [1998] pooled data for six Australian states over an 11-year period. They modelled three classes of per-capita federal grants using dummy variables for the states. The political variables related not only to votes in state elections, as in Grossman, but also the number of federal seats allocated to the state, the proportion of marginal federal seats in the state and dummy variables for election years. Worthington and Dollery contrasted ordinary least squares results with the results of a general least squares model corrected for heteroskedasticity and autocorrelation. Other than the dummies no variables were significant throughout all six models. The number of federal seats, proportion of state seats held by the federal government's party, and the proportion of marginal federal seats had significantly positive coefficients in the

regressions of welfare spending grants but significantly negative for health grants. Overall the public choice approach seems most applicable to the welfare expenditure grants in the Australian case.

Sørensen (2003) looks at national grant allocations to both local and county level governments in Norway. He is able to take advantage of the rigid Norwegian parliamentary seat boundaries to test the impact of the number of parliamentary seats per 1,000 voters on municipal grants. He finds a significantly positive effect on grant allocations. Sørensen also makes use of survey data on lobbying activity to test its impact on grants. He finds that while local lobbying of the national parliament has no significant effect, lobbying aimed at ministries has a significantly positive impact on grants

### **The Transition of Lithuania's School Finance**

Lithuania's national government keeps tight control over its local authorities. Municipal revenue is almost completely determined at the national level. The expenditure side is more under the control of municipalities, but this has also been subject to rigid regulation. In 2001 the Lithuanian government abandoned the pretence of local control over education policy and instituted a transparently centralised system. Education policy was placed firmly under the control of the national Ministry of Education and Science, with municipalities responsible only for implementation of this policy in their local area. Starting in 2002 municipalities received a specific grant, called the pupil basket, for schooling to cover current expenditures on education. Furthermore, that grant is directly proportional to the standardised number of pupils in the municipality and has to be transferred to schools according to the standardised number of pupils in each school.

Perhaps the most immediate reaction to any reform is an inevitable degree of confusion as to how to implement the new rules. This is especially true when a complicated reform is instituted relatively quickly with little time between passage of the law and the beginning of its operation. The Lithuanian pupil basket reform instituted several new processes and put significant strain on municipalities as well as national institutions to perform these new tasks.

The new tasks included calculation of standardized pupil numbers by local authorities, preparation and approval of pupil basket grant allocations by the national ministries and passage of these allocations through the legislative bodies. Hence in the first years of operation a fair amount of learning by doing is natural and not all parts of the process may proceed as clearly as originally hoped. In parallel to this development of the new approach to financing comes the challenge of unforeseen events that threaten to distort the normal operation of the system.

All of the above creates a specific environment for political actors, which may be more conducive to pursuing the interests of their constituency. Since all participants in the process are operating on less familiar territory there may be enhanced opportunities for politicians to augment funds to their support base. Such an opportunity arose in Lithuania when the Ministry of Education found it needed to allocate additional funds to schools after the budget year had commenced. This was found necessary in both 2002 and 2003 in order to meet the national target for percentage of GDP spent on education.

It would have been possible to allocate the additional funds proportionately among the municipalities with a fixed percentage increase for all. However, two main types of concern argued against this route. Firstly, there were concerns that the pupil basket formula was not providing enough funds for some jurisdictions with higher need. It was recognised that although the standardisation formula took some account of the higher cost of more rural schools, it may not fully capture it.

The second group of concerns that argued against a straightforward proportionate increase in the allocation to each local authority was the narrow interest of elected politicians. They could be expected to try to use the windfall of extra funds to increase their chances of re-election. Applying a public choice model to the allocation of the augmentation of the pupil basket grants might be expected to be more successful than other applications since these funds are specifically in addition to the formula amounts. They were thus closer to being at the free disposal of politicians than most funds.

## **Empirical Specification and Data**

I use a standard public choice model of grants to municipalities to explain the augmentations of the pupil basket grants in 2002 and 2003. I start with two need measure of grant augmentation. The first is based on the hypothesis that the national authorities sought to compensate smaller school systems for their lack of opportunity to exploit fully economies of scale. Density of pupils would reduce grants since more densely populated jurisdictions should be less costly to serve. Thus the log of density is expected to have a negative impact on the grant augmentation. Secondly, I consider the log of the teacher pupil ratio as a variable of short-run importance. Municipalities with high teacher-pupil ratios would require more funds in the short-run even though they might be expected to make economies in their staffing over time.

In this study I focus on three public choice dummy variables to measure political influence on the allocation process. The first of these is a dummy for local authorities where the party with the most seats on the council is one of the parties in the national governing coalition. There are two expected impacts from this variable and hence the direction of the overall impact is ambiguous. Councillors from one of the parties of national government may be able to exert influence on the national government to increase their budget allocation. However, the Government may direct more funds to jurisdictions led by other parties in order to reduce opposition. Furthermore, the national Government may be better able to restrict lobbying local politicians from the same party by use of party discipline and incentives. Hence it is an empirical question as to which of these effects prevails. The second variable is a dummy for local authorities where the same party won the last two local government elections. Again there are two possible directions for the impact of this variable, and as before it depends on whether the primary influence comes from the local authority or from the national government. We might expect that a party that has been in power for longer will have developed a more efficient set of lobbying mechanisms and hence might be able to extract greater resources for their jurisdiction. However, from the national government's perspective such jurisdictions may appear less prone to their influence and thus a less worthwhile investment of budget funds. The third political dummy

variable indicates whether there is a single party with a majority on the municipal council. This happens only in a few cases and might be a further measure of stability with similar effects to the previous variable.

The main sources of data are *Counties of Lithuania: Economic and Social Development* published annually by Statistics Lithuania for the independent variables and the grant and expenditure data from the State Audit Office. The dependent variable is the percentage augmentation of the pupil basket grant in the budget allocation law compared to the grant calculated by the pupil basket grant formula. There are 60 municipalities in Lithuania so I have 120 observations for the two years pooled into a panel using a least squares dummy variable approach.

I will first present some data on the deviations of the pupil basket grants from the formula amounts.

Table 1. Percentage increase in legislated pupil basket grants compared to the formula.

|         | 2002                     | 2003                    |
|---------|--------------------------|-------------------------|
| Mean    | 0.83                     | 0.52                    |
| Median  | 0.90                     | 0.42                    |
| Minimum | 0.11 (Alytus City)       | 0                       |
| Maximum | 4.67 (Kedainai District) | 3.69 (Pageges District) |

*Source:* [NATIONAL AUDIT OFFICE, 2003]; own calculations.

Hence in 2003 the augmentation of grants was lower than in 2002. Note in particular that there were 19 municipalities in 2003 that received no augmentation of their grant above the formula amount. Table 2 lists the top 5 beneficiaries of the grant augmentation in each year.

Table 2. The Top 5 Beneficiaries from the Legislated Augmentation of Pupil Basket Grants

| 2002 |                 |                         | 2003 |                 |                         |
|------|-----------------|-------------------------|------|-----------------|-------------------------|
| Rank | Local Authority | % Augmentation of Grant | Rank | Local Authority | % Augmentation of Grant |
| 1.   | Kedainiai       | 4.67                    | 1.   | Pageges         | 3.69                    |
| 2.   | Neringa         | 2.76                    | 2.   | Alytus          | 3.47                    |
| 3.   | Lazdijai        | 2.70                    | 3.   | Elektreniai     | 2.78                    |
| 4.   | Anyksciai       | 1.89                    | 4.   | Panevezys       | 2.71                    |
| 5.   | Kaisiadoriai    | 1.66                    | 5.   | Siauliai        | 2.59                    |

*Source:* See Table 1.



Hence there has not been a very stable distribution of the additional funds across municipalities. None of the towns among the top 5 recipients in 2002 were one of the top 5 recipients in 2003. If we take these two initial years of the pupil basket reform together the following picture emerges.

Table 3. The Top 5 Beneficiaries Across Both Post Reform Years

| Rank | Local Authority | Sum % Augmentation of Grants |
|------|-----------------|------------------------------|
| 1.   | Pageges         | 4.94                         |
| 2.   | Kedainiai       | 4.67                         |
| 3.   | Alytus          | 4.30                         |
| 4.   | Siauliai        | 3.69                         |
| 5.   | Elektrenai      | 3.63                         |

*Source:* See Table 1.

Given that only one municipality gained in total a percentage higher than the top beneficiary gained in 2002, there appears to be a levelling of municipalities between the 2 years. However, the median sum increase in 1.44 per cent so the towns in Table 3 have each done more than twice as well as the median town. Moreover, there is a slight positive correlation between the percentage grant increase in each year across municipalities.

## Results

Table 4 shows the correlation coefficients between the variables, pooling the data for 2002 and 2003.

Table 4. Correlation matrix of dependent and explanatory variables

|   | Log of pupil density | Log of teacher-pupil ratio | National coalition party largest on council | Same party won last two local elections | Single party majority | % grant augmented by law |
|---|----------------------|----------------------------|---|---|-----------------------|--------------------------|
| Log of pupil density                        | 1                    |                            |   |   |                       |                          |
| Log of teacher-pupil ratio                  | 0.010                | 1                          |   |   |                       |                          |
| National coalition party largest on council | 0.071                | 0.095                      | 1   |   |                       |                          |
| Same party won last two local elections     | -0.054               | -0.255                     | 0.053                                       | 1                                       |                       |                          |
| Single party majority                       | -0.199               | -0.287                     | -0.064                                      | 0.285                                   | 1                     |                          |
| % grant augmented by law                    | -0.330               | -0.169                     | -0.119                                      | 0.019                                   | 0.077                 | 1                        |

Multicollinearity does not appear to be a major problem among the explanatory variables. The highest correlation is between the log of the teacher-pupil ratio and the dummy for a single party majority on the local council, with a correlation coefficient of -0.287.

Table 5 below presents the basic least squares dummy variable regression results and the results of generalized least squares regression to remove heteroskedasticity.

Table 5. Regression Results

|   | <i>LSDV</i>         |             |               | <i>GLS</i>          |             |               |
|---|---------------------|-------------|---------------|---------------------|-------------|---------------|
|   | <i>Coefficients</i> | <i>S.e.</i> | <i>t stat</i> | <i>Coefficients</i> | <i>S.e.</i> | <i>t stat</i> |
| Intercept                                   | 17.724**            | 3.688       | 4.81          | 26.663**            | 6.629       | 4.02          |
| Log of pupil density                        | -12.711**           | 2.789       | -4.56         | -16.159**           | 4.772       | -3.39         |
| Log of teacher-pupil ratio                  | 0.167               | 2.208       | 0.08          | -1.187              | 4.161       | -0.29         |
| National coalition party largest on council | 0.018               | 0.264       | 0.07          | 0.893               | 1.232       | 0.73          |
| Same party won last two local elections     | -0.348*             | 0.198       | -1.76         | -2.229**            | 0.385       | -5.79         |
| Single party majority                       | 0.009               | 0.418       | 0.02          | 1.143               | 1.852       | 0.62          |

\*Significant at the 10% level; \*\*Significant at the 5% level.

For the basic LSDV regression there was an  $F$  statistic of 2.90,  $R^2$  is 0.777 and the adjusted  $R^2$  is 0.510. While the overall model thus shows high significance, most of the individual variables do not fare so well. The only highly significant variable is the log of pupil density, which has the predicted negative impact on grant augmentation. The first political stability dummy variable, indicating that the same party has received the most votes in the last two local elections, was also significantly negative. This suggests that national politicians direct funds to where they have a chance of influencing election outcomes without being influenced very much by the lobbying of

the local governments. The results of generalized least squares are similar. The  $F$  statistic is 2.31,  $R^2$  is 0.736 and adjusted  $R^2$  is 0.417 so this regression is also highly significant overall. The main difference is a large increase in the significance of the impact of political stability. This indicates that a change in the most popular party in the last local election gives rise to a 2.2% increase in the grant allocation for schooling. Neither the teacher-pupil ratio measure of need nor the other two political variables have any significance in these regressions. Hence, for example, whether the parties of the national governing coalition have a majority in the local councils appears to have no impact on their augmentation of this grant.

## Conclusions

This paper tested the application of a public choice model of grant allocation to a transition context in which the school finance system of Lithuania was undergoing radical change. A system of grants based on standardised pupil numbers was being augmented with additional funds on top of the formula amounts while institutions were still learning how to operate the new grant formula. The public choice approach met with some success. The most important explanatory variables were pupil density, a measure of need, and the dummy variable for repeated party victory in local elections, a measure of local political stability. The results were confirmed by generalized least squares, demonstrating robustness of the model. This suggests that national politicians respond to shifts in local voting patterns and seek to avoid granting funds to areas with entrenched political preferences. Further research might examine whether this aversion can be detected elsewhere.

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