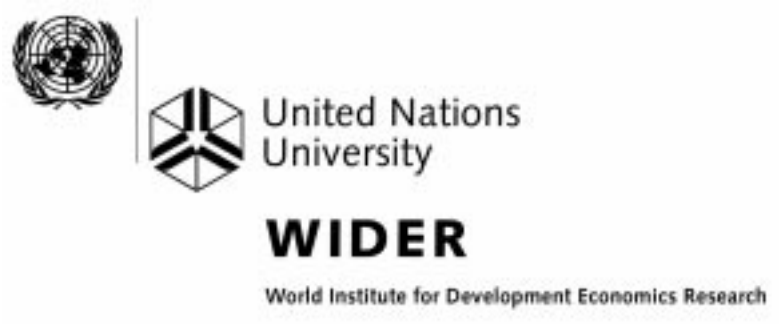

Discussion Paper No. 2002/60

What Determines Public Education Expenditures in a Transition Economy?

Inna Verbina[1] and Abdur Chowdhury[2]

June 2002

Abstract

Recent studies suggest that the allocation of expenditures in education matters for growth. Public education spending in many transition economies, however, is often inefficient and inequitable with education outlays misallocated across sectors. This highlights the need for an assessment of the nature of education expenditures in these countries. This paper attempts to fill the gap in the literature by estimating the determinants of education expenditures in the Russian Federation. Results from panel data analysis show that revenue and the student-population ratio have a positive impact on education expenditures while the effect of population density is negative. Three regional variables also show significant impact. The income and price elasticity of education expenditures are estimated to be 0.56 and –0.47, respectively and is comparable to studies from other countries. The results presented here raise questions about how fiscal institutions and the structure of the political process in Russia may affect the degree of resource allocation in the educational sector during the transition process.

Keywords: education, expenditure, transition, elasticity, Russia

JEL classification: L10, O57

[1]Research Associate, World Institute for Development Economics Research, Helsinki, Finland, verbina@wider.unu.edu, [2]Marquette University, Milwaukee, USA, abdur.chowdhury@marquette.edu

This paper was written while Adbur Chowdhury was visiting WIDER as a Sabbatical Fellow and has been prepared within UNU/WIDER research on Transition Economies.

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UNU World Institute for Development Economics Research (UNU/WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Camera-ready typescript prepared by Jaana Kallioinen at UNU/WIDER
Printed at UNU/WIDER, Helsinki

ISSN 1609-5774
ISBN 92-9190-244-6 (printed publication)
ISBN 92-9190-245-4 (internet publication)

1 Introduction

The thrust of systematic transformation in the post-Soviet Russian economic and social system has been to bring about the transition from an administrative government economic management system to a market-oriented economy with regulatory government functions. As expected, many features of the new economic system are not yet clarified and the forms of economic organization – both in private and, especially, in public goods production – are still being debated (Hare and Lugachyov 1999). Consequently, various issues relating to the public and private financing of social sector activities, the public and private provision of social services, and the limits and effectiveness of privatization in the social sector have generated keen interest among both academicians and policy makers.

In this context, a vocal debate on public education finance reform has been evident in the public policy circles. The Soviet educational system, with broad access, and high levels of scholarly achievement, had long been a source of strength. However, it failed to adapt to the rapidly changing economic environment following the market-oriented transition beginning in the early 1990s. During this period, Russia has experimented with rapid decentralization attempts and implemented changes in primary education, fiscal decentralization in the education sector, diversification at the secondary level, and expansion of higher education. These rapid decentralization attempts have not been well designed, since there has been no commensurate transfer of resources and the levels of budget responsibility have remained unclear (Canning et al. 1999). These reforms have led to a mixture of successes and challenges that are worth analyzing as they provide valuable information regarding the future of the system.

There is a general consensus in the literature that expansion in the skills, knowledge, and capacities of individuals – increasing human capital – is critical for economic growth (Dabla-Norris and Matovu 2002).[1] Education plays a key role in creating human capital. Thus the high estimated rates of return to schooling is often cited as justification for increased public investment in more and better quality schools.[2] At the same time, given budgetary constraints, many countries face important tradeoffs between education and other types of expenditures, such as, domestic infrastructure. For example, fiscal austerity programmes often make it necessary for countries to take difficult choices regarding which components of public expenditures should be reduced or reallocated within the overall budget. This is true for a transition economy like Russia where acute financial constraints force the government to make critical, and sometimes unpopular, choices.

Baqir (2002) has shown that countries at similar levels of economic development vary considerably in how much their governments spend on the education sector. The value of education spending also changes within countries over time. Given this significant variation in education spending across and within countries, a natural question arises as

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1 See Barro and Lee (2000) for a cross-country study emphasizing the importance of education for economic growth.

2 Judson (1998) reports that countries whose allocation are inefficient gain little in output and growth from their investments in education.

to what factors help to explain this difference. This issue is interesting from a public policy perspective as spending on education has significant positive redestributive effect and because it raises the human capital of the economy, which can lead to direct growth effects (Barro 1991) and indirect spillover benefits for the rest of the economy (Baqir 2002). Despite the importance of this issue for the transition economies, there is surprisingly little formal theoretical or empirical work.

This is one of the first studies that we are aware of that tackles this issue in public policy economics with the realistic expectation of obtaining results comparable in quality and reliability to those available in developed countries. The paper fills a gap in the literature by conducting an empirical analysis of the determinants of public expenditures on the general education system in Russia. General education is selected as the demand function (or household preferences) for this type of education is more complicated and diverse but at the same time less well-known than those of the other types of education, such as, graduate and post-graduate. Moreover, greater opportunities of labour market success and earning potentials in Russia have increased the returns to acquired education. This has reinforced the importance of general education, which involves mostly public funds, leading many students to prolong their studies (Laporte and Ringold 1997).

The analysis in this paper, based on the fiscal and regional characteristics of the Russian Federation, is similar in spirit to that reported in Fernandez and Rogerson (1997) and Poterba (1996). They use a panel data set for the fifty states in the US to examine the effects of demographics (Poterba 1996) and growth in income and students (Fernandez and Rogerson 1997) on public education spending.

The necessity of reforming the education system in Russia is now generally acknowledged. The current discussion among policy makers is, therefore, evolving around the particular nature of reform, such as, finding alternative off-budget ways to finance education. Irrespective of the scheme proposed, the reaction of economic agents would depend upon their preferences over education spending, or alternatively, the 'demand' for education spending which can be predicted using the income and price elasticity of demand for education expenditures. The value of this elasticity would affect forecasts of education spending. The paper, therefore, estimates this elasticity. In their evaluation of California's education finance reform, Fernandez and Rogerson (1995) show that predictions for the change in total spending can vary by as much as 40 per cent depending upon income and price elasticity.

The paper is organized as follows. In the next section we provide a brief background on the Russian educational system, highlighting the characteristics most important to our estimation strategy. The model and data sources are presented in Section 3; while the estimation results are discussed in Section 4. Section 5 reports the calculation of price elasticity. The paper ends with concluding remarks in Section 6.

2 State of general education[3]

The Russian Federation inherited a fairly well-developed and mature educational system from the former Soviet Union. During the Soviet-era, most school age children had access to general education, and literacy was almost universal. Enrollment rates, especially those for pre-school and basic education equaled or exceeded those in the Western developed countries (Laporte and Ringold 1997). However, the transition to a market economy exposed certain weaknesses in the education system, which was tailored to the needs of a centrally planned economy. As education was directed toward the productive and ideological goals of the socialist regime, its ability to respond to changing economic structures and employment patterns essential for the success of a market economy was limited.

With a view to bringing greater efficiency and accountability to the education system, a large part of the education sector was decentralized under the 1992 Law on Education (Russian Federation 1995). Under this law, the responsibility for general education and school finance has been entrusted to the regional (oblast) and local (rayon) level authorities. However, the regions share a certain ambiguous joint responsibility with the federal government for education spending along with health, social policy, and economic subsidy. The federal government participates in the financing of the education sector through unconditional federal transfers. Although most regions have benefited from such transfers, fiscal relations between the federation and the regions remain unclear, responsibilities overlap, and financing is inefficient (World Bank 1995).[4]

The financial transfers from the federal to the regional government have recently decreased both in absolute terms and relative to what the regions themselves spent. Fluctuating between 3.4 and 4.5 per cent of GDP, public expenditures on education has also fallen during the 1990s (Fretwell and Wheeler 2001). This declining trend has been one of the major problems facing the education sector in Russia. While the gradual decrease in funding was typical for the last two decades, the transition related reductions in real expenditures have greatly aggravated the situation (Human Development Report 1995).[5]

In real terms, public spending on education fell at a rate of about 6 per cent per year. For instance, in 1998 consolidated public education expenditures accounted for 3.6 per cent of GDP, compared to about 5.5 per cent in OECD countries (World Bank 2001). The consolidated budget for education amounted to 189 billion Rubles (3.2 per cent of GDP)

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3 For a more detail discussion on the education system in Russia and other related issues, see, among others, Russian Federation (1995) and OECD (1997).

4 The decentralization of school finance and school administration under the new legislation led to further differentiation of available resources across and within regions. Sixteen of the country's 88 regions now spend more than one-third more per student in compulsory education than do the eighteen regions at the bottom of spending on schools (authors' calculation).

5 The proportion of GDP Russia allocates to education has declined from 7 per cent in 1970 to around 3.4 per cent in 1992. The figure has fluctuated in the 3–4 per cent range during the last decade. Comparative international figures include the United States, which allocates 5.5 per cent; France, 5.4 per cent; and the United Kingdom, 5.3 per cent (World Bank 1995). Figures for 1998/99 for other regions range from a low of 2.5 per cent in South Asia to a high of 5.8 per cent in the Middle East and North Africa (Dabla-Norris and Matovu 2002, Table 6).

in 2000. About 18 per cent of this budget had been spent at the federal level while the remaining amount was divided between the regional and municipal level.[6]

In the course of the transition process, the size and diversity of Russia, reinforced by increasing decentralization of government, led to growing regional inequality as well as inequality of access to education. A number of regions have been able to capitalize on their resource endowments, location and other factors to increase per capita income relative to the rest. These regions with high per capita incomes have been able to spend more on education and other social areas. This variation in endowments and expenditure composition will enable us to estimate the differential impact of the demand function for education and the related income and price elasticity.

Given the extent of its territory, the extreme climate and dispersed population, the federal structure of government, and the ongoing transition from a planned to a market economy with resulting acute financial constraint, Russia faces a particularly difficult task in adapting and updating its general education system to meet emerging need. In this context, it would be quite informative for the policy makers to know what factors influence the expenditures on education. A proper understanding of these factors would help in formulating policies conducive to the transition process. This provides a rationale for the model that will be developed in the next section.

3 Model specification and data sources

The demand function for public goods is analyzed within a median voter framework as given in Meltzer and Richard (1981). Given the variation of regional data across the Russian Federation, we can estimate the parameters of the demand function based on the observations. In the model, the median voter decides on budget shares for particular types of public good. Although the distribution of income across the regions is different, we assume that there is no correlation between the median voter's income and his preferences for particular types of public goods. He has the same demand function irrespective of his position in the income scale and his decision on the composition of public service is based on the size of the public budget.

Earlier studies on educational expenditures have used cross section analysis, using either individual survey data or data for a sample of school districts.[7] However, Fernandez and Rogerson (1997) have argued that time series relationships in the data can provide useful complementary information. Following their suggestion, we perform a panel analysis with the cross section and time series pooling data from 88 regions in the Russian Federation over the calendar year 1999–2000. The sample period is constrained by the availability of consistent data series for all the variables considered in this model. The basic specification of the model that will be used in the paper is given by:

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6 In 2000, about 60 per cent of the federal budget share of educational expenditures went to higher education. On the other hand, the major share of the regional budget went into general education (61 per cent), followed by primary education (18 per cent) and vocational training (6 per cent).

7 See Bergstrom et al. (1982) for a detail literature survey on this issue.

$$\log(y_{it}) = \alpha + e\log(x_{it}) + \sum_{k} \beta_k z_{kit} + c_i + u_{it}$$

$i = 1,2,...N$, $t = 1,2,$

where y_{it} represents education expenditures[8] in region i in period t, x_{it} represents budget revenues in region i in period t, and z_{kit} are the remaining k independent variables. The constant term is α, c represents the region specific variable, and u_{it} is assumed to be a random error with zero mean.

The dependent variable is measured as the spatial and inflation-adjusted per capita educational expenditures (CPEDEXP). Total budget revenue is also measured in spatial and inflation-adjusted per capita form (CPREV). Among the other variables, the student-population ratio (STUDPPOP) represents the number of pupils per thousand inhabitants enrolled in secondary schools in 1999–2000 school year. This variable is a reasonable proxy for the education benefit incidence for region i.[9] Population density per square kilometer is represented by the variable (PDENC). Following Goskomtat, geographical differences across regions are captured in the model by sub-dividing the regions into eleven groups, *R1…R11*. As the logarithm of CPEDEXP, CPREV, and PDENC are used in the model, the estimated parameters corresponding to these variables give the elasticity properties of education demand.[10]

Our empirical analysis takes into account differences among the regions and changes over time. In doing so, we combine our data cross section and over time in one single model. Such procedure increases the variation of the data and improves available degrees of freedom to achieve efficient parameter estimates. It also helps to take regional effects into consideration.

Data for the 88 regions have been collected for the calender years 1999 and 2000 giving a total of 176 observations for each variable. The short period of time is unfortunate but cannot be avoided when researching economies in transition. Moreover, in case of Russia, the currency crisis of 1998 significantly affected the data for that year. So care was taken to avoid figures for 1998. Data on total revenue, expenditures on education and federal fiscal grants[11] are taken from the Ministry of Finance of the Russian Federation[12]. The regional price index is constructed by the Russian State Statistical

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8 Estimation of the demand function requires the quantity of goods consumed. Since reliable data on quantity of educational output is not available, education expenditures are used as a proxy. Here, education expenditures (y_i) can be expressed as the product of units of education consumed (q_i) and price of the unit (p_i), i.e., $y_i = q_i * p_i$. Assuming that the price of one unit of education is unity, education expenditures is a proxy for quantity, $y_i = q_i$.

9 Schultz (1996) has used a similar variable and has shown that the number of school-aged children as a share of total population has varied widely over time due to the demographic transition in low-income countries and the baby-boom in high-income countries.

10 Other functional forms, such as simple linear specification were also examined. The best results were obtained with log specification.

11 The grant consists of two budgetary items – direct transfers and mutual settlements.

12 Since the general education is mostly financed through the regional budgets, we used the regional fiscal data, without considering federal budget expenditures on the education.

Agency (Goskomtat) and is calculated on the basis of a basket of 25 items. The 2000 GDP Inflation index for the Russian Federation is used to adjust the 1999 data to 2000. The figure is taken from the Bureau of Economic Analysis, Moscow. The data on population, demographic structure, and regional subdivision into 'geographical rayons' are also taken from Goskomstat. Summary statistics for the variables are given in the Appendix in Table A1.

4 Estimation results

Given the nature of the data, we expect individual region-specific heterogeneity to exist within the model. Regions are likely to systematically vary in terms of weather, infrastructure, productive efficiencies, income, etc. Consequently, the use of standard least square methods – which ignore such differences – would lead to biased estimates. Moreover, the direction of the bias cannot be identified *a priori*. An alternative choice would be the use of a panel data analysis.

In order to capture the cross-sectional parameter heterogeneity, two types of models are generally proposed in the literature. The random effect model, treats the region-specific variables as time-invariant random variables, which are independent of the explanatory variables of the model. The fixed effects model (the within, or least squares dummy variable estimator), on the other hand, allows individual effects to be correlated with the regressors. Results of different estimates can vary substantially if the time period (T) analyzed is small and the cross-sectional units (N) are large.

The choice of the model can be based solely upon *a priori* assumptions. The test of our panel data set for unobserved effect (Breusch-Pagan Lagrangian multiplier effect) show that the individual effect exists and this supports the use of panel estimation, rather than pooled GLS method.[13] Next, the possibility of applying the more efficient random effects model against the fixed effects model is checked using the Hausman chi-squared statistic. The test examines the correlation between the region-specific effects and the explanatory variables. In the presence of the correlation, fixed effects estimator is consistent while the random effects estimator is biased.[14] Failure to reject the null hypothesis of no correlation would, however, lead us to the adoption of the random effects model.

The panel regression results are shown in Table 1. Estimations have been carried out using the GLS random effect procedure as given in the STATA statistical package. The model indicates a good fit with the data, explaining about 91 per cent of the variation in educational expenditures across regions. Three specification tests are reported in the table. First, the Breusch-Pagan Langrange Multiplier test is used to test the statistical significance of the regional random effects. The null hypothesis is that the variance of the region-specific error component is equal to zero, that it, Var(u) = 0. The test statistic, calculated from the OLS residual of the panel regression has a chi-square distribution with one degree of freedom. The calculated test statistic of 30.92 comfortably rejects the null hypothesis of zero variance at the 1 per cent significance level. This indicates that the region spesific effects are statistically significant.

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13 The specific results are discussed later.

14 See Love and Turner (2001) on this issue.

Table 1

Results from panel data estimation using the GLS random effects model

Dependent variable: Per capita education expenditures (CPEDEXP)

	Coefficient		
Variable	Estimate	z-statistic	P>abs. Z
Constant	1.861	7.57	0.000
Ln(CPREV)	0.561	22.00	0.000
STUDPPOP	0.003	4.42	0.000
Ln(PDENC)	-0.041	-4.49	0.000
R1	0.166	2.93	0.003
R7	-0.122	-2.42	0.015
R8	0.105	2.16	0.031
Adj. R-square		0.92	
Number of observations		174	
Wald Test [chi-square(6)]		948.13	
Prob>chi-square		0.000	

Breusch-Pagan Lagrange Multiplier test:
Null Hypotheses: Var(u)=0
Calculated Chi-square(1) = 30.92
Prob>chi-square = 0.000

Hausman Specification test:
Null Hypothesis: No systematic difference in coefficients
Calculated Chi-square(1) = 0.00
Prob>chi-square = 0.989

Note: The variables CPEDEXP, CPREV, STUDPPOP, and PDENC represent per capita educational expenditures, total tax revenue, student-population ratio, and population density, respectively. R1, R7, and R8 are the three regional variables. *Ln* represents the logarithm of the variables.

Second, we test the orthogonality of the region-specific error component *u* with the explanatory variables, a condition that is necessary for avoiding inconsistency that can result from omitted variables in the random effects specification. As discussed earlier, the Hausman correlation test is used for this purpose. Under the null hypothesis of zero correlation between the error term and the regressors, the test statistic is asymptotically distributed as chi-squared with the degrees of freedom equal to the number of regressors. The calculated test statistic do not reject the null hypothesis of orthogonality at the one per cent significance level. This justifies the use of the random rather than the fixed effects model. Finally, given that only the asymptotic properties of the random-effect estimators are known, a chi-square statistic, instead of an F-statistic, is reported for the overall significance of the coefficient. Considered jointly, the calculated chi-square value show that the coefficients are significant.

Now let us turn our attention to the coefficient estimates. The coefficient of per capita revenue, which is used as a proxy for income, is positive and highly significant. As the decision of the median voter in our model is constrained by the budget, the coefficient estimate indicates that regions with higher income tend to attract higher education expenditures. The numerical value of 0.56 shows that a one per cent change in per capita budget revenue (CPREV) changes per capita education expenditures (CPEDEXP)

by 0.56 per cent. Given the logarithmic form of the function, this measures the income elasticity of the demand for education and confirms that education is a normal good in Russia. We can consider the elasticity value as a mixed blessing. On one hand, it is quite low suggesting that Russian households consider education expenditures to be a necessity. A high income elasticity, on the other hand, would have indicated that education expenditures is a luxury. The elasticity figure lies within the range of income elasticity reported for other countries.[15]

However, from a policy perspective, the elasticity figure may be a source of concern. Policy makers cannot depend upon general increases in income to lead to higher expenditures on education. For every doubling of income, the budget share spent on education increased by about a half. Combined with the finding, discussed later in this section, that the level of expenditures on education vary significantly by income level in different regions, the results show the need for specific policy tools in order to address the inability of poorer regions to incur additional expenditures. This is similar to the findings for Peru as reported in World Bank (2001).

The ratio of student to population also has a significant positive impact on educational expenditures. Evaluated at the mean value, the coefficient estimate indicates that an increase in the average ratio of student to population by one percentage point leads to an almost one-half of one percentage point increase in educational spending. Interestingly, this result for the Russian regions is contrary to those reported for the US states in Poterba (1996) and Fernandez and Rogerson (1997). Both these studies found that increasing the fraction of the population of school age has little effect on education spending.[16] Our findings, if they in fact reflect tensions between generations in the allocation of funds, suggest that the changing demographic profile of the Russian Federation may lead to long-term increase in the level of government financing of general education.

Population density has a negative impact on total educational expenditures. High population density enables regional governments to reduce the cost of educational service provided because of the developed infrastructure and/or economies of scale.

The results show that regional location is another important factor in explaining the behavior of educational expenditures. Models are initially estimated using eleven regional variables. However, only three turn out to be statistically significant. The remaining eight insignificant regional variables are, therefore, dropped and the model reestimated. The three regions that significantly affected the dependent variable are located in geographical areas that possess particular properties which influences expenditures on education.

The regions of European North (*R1*) probably have, on average, a more severe climate than other regions. The positive sign associated with this variable indicates that this region attracts more government money for providing educational services. The positive

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15 Recent estimates for income elasticity range from a low of 0.27 in Peru (World Bank 2001) to a high of 0.73 in Kenya (Mwabu 1994). However, Schultz (1996) reports an income elasticity of greater than one in a panel estimate from sixty countries.

16 In a related study, Figlio (1997) also reports evidence that schools operating under government restrictions had a higher student-teacher ratio but lower spending levels than the unrestricted schools.

sign for the Ural region (*R8*) can be explained by the high industrial development that has taken place in this region and the resulting high demand function for education. The variable *R7* represents the North Caucasus region and the negative sign for this variable reinforces the proposition that in highly populated regions, local educational expenditures can lead to future migration of students. Anticipating such a process, the results indicate that the region is not interested in higher spending on education. The findings can also be attributed to the dominance of agriculture in the local economy and the favourable climate which helps the regional authorities to save money by reducing utility expenses on buildings.

5 Price elasticity estimation

In the previous section, we assumed that prices for public goods in real terms[17] are the same across regions. In this section, we will estimate the price elasticity of demand for public expenditures on education. In order to estimate price elasticity, it is useful to think of regional budgets in the context of an inter-budget fiscal framework. The idea being that federal government transfers decrease the cost of providing public service to the taxpayers. Each ruble spent on public goods is partially paid by the federal government through the transfers from central resources to regional budgets.

Under this framework, the pivotal voter disposes of his own income, C_i, and the regional per capita government revenue, R_i , so he can consume the value W_i

$W_i = C_i + R_i$

When the region *i* obtains the transfer, the total budget constraint for the voter within the jurisdiction is given by:

$W_i = C_i + R_i + G_i$

where G_i is the amount of per capita federal transfer for the region.

If the decisive voter can convert lump-sum grants into private income through tax reduction as well as an increase in both private and public consumption due to a relaxation of budget constraint, the expenditure effect of federal grants could be measured only by the income effect. But due either to fiscal illusions or political reasons, the taxpayer cannot successfully transform the public money into private consumption. Under this scenario, a flypaper effect can be observed.[18] Now the expenditure effect of the federal transfers would not only be from the income effect, but also from the price-substitution effect between public and private goods. The lump-sum grant generates a price effect that is usually associated with the matching grant.

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17 Spatial price adjustment was made for all fiscal figures.

18 The flypaper effect shows that public income is disproportionately spent on private consumption while a federal grant is primarily spent on public services. Knight (2000) reports that empirical research in the United States has found that state government public spending in increased far more, often dollar-for-dollar, by federal grant receipts than by equivalent increases in the level of private income of the constituents.

Table 2

Estimation of price elasticity

Dependent variable: Per capita education expenditures (CPEDEXP)

Variable	Estimate	z-statistic	Prob>abs._z
Constant	1.863	7.16	0.000
Ln(CPREVW)	0.561	19.73	0.000
Ln(RREV)	-0.470	-7.49	0.000
STUDPPOP	0.004	3.87	0.000
Ln(PDENC)	-0.055	-5.93	0.000
Adj. R-square		0.90	
Number of observations		176	
Wald test [chi-square(4)]		829.72	
Prob>chi-square		0.000	

Breusch-Pagan Lagrangian multiplier test:
Null Hypothesis: Var(u) = 0
Calculated Chi-square(1) = 36.19
Prob>chi-square = 0.000

Hausman specification test:
Null Hypothesis: No systematic differences in coefficients
Calculated Chi-square(2) = 1.57
Prob>chi-square = 0.457

Note: CPREVW measures per capita revenue without federal grants. For a description of the other variables, see notes to Table 1.

The decision of the median voter on the size and composition of public spending is now based upon the price of the public good subsidized by the federal government through the transfer. The net price which the average taxpayer in the jurisdiction *i* faces is given by

$$p = R_i/(R_i + G_i)$$

where p is the net price.

Under this framework, the federal transfers to regional budgets alter the price for public education relative to that of private goods. Therefore, we can capture the price difference given the variation in the size of federal transfers and own budgets over different regions of the Russian Federation. In the model, rather than the total budget revenue, we use own budget revenue (the revenue collected by the regional government) of the jurisdiction *i* as a proxy for income. The plausible logarithmic demand function to estimate price elasticity would thus be:

$$\log(y_{it}) = \alpha + e\log(x_{it}) + e_p\log(p_{it}) + \sum_k \beta_k z_{it} + c_i + u_{it}$$

where

x_{it} own regional per capita budget revenue

p_{it} price for public education

y_{it} per capita education expenditures

e income elasticity

e_p price elasticity

c_i region specific effect

The equation is estimated by panel data random effects model. The results are given in Table 2. The robustness of this particular panel estimation is examined using a battery of tests including the Hausman specification test, Breusch-Pagan Lagrangian Multiplier test and the Wald chi-square test. Results from all these tests, reported in Table 2, show that the random effects model estimated in this table is appropriate and efficient. The R-square of about 0.90 is quite high for panel data. The coefficient of the RREV variable measures the price elasticity of the demand for education. The coefficient is statistically significant and of the anticipated negative sign, suggesting a substitution effect. The numerical value shows a price elasticity of –0.47. Thus an inelastic price elasticity of education is evident in Russia. This finding is similar to the price elasticity of –0.39 as reported in Chandler (2001) for the Connecticut school system.[19]

6 Conclusion

Economic growth and the development of a civil society during transition depend upon the capacity of well-educated workers and citizens to respond to changing economic conditions. Education has emerged as an essential component of the transition to a market economy. The Russian Federation is no exception. Education financing in Russia is undergoing reform on a number of fronts. On one hand, it is becoming multi-level and multi-channel; while on the other hand, normative specifications and personal financing decisions are dominating discussion in the public policy arena. In this context, an exercise in determining the factors that influence public education expenditures is not only informative but also essential in understanding the reform process that underlies a successful transition in the education sector.

The paper uses panel data to estimate the determinants of education expenditures. Results show that revenue and the student-population ratio have a positive impact on education expenditures while the effect of population density is negative. Three regional variables also show significant impact. The income elasticity of education expenditures is estimated to be 0.56 and is comparable to studies from other countries. The paper also estimates the price elasticity that turns out to be –0.47 indicating an inelastic demand.

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19 Previous estimates of tax-price elasticity for median-voter models of the effects of grants-in-aid to school districts in the United States ranged between –0.09 and –0.34 (Chandler 2001).

Recent studies suggest that the allocation of expenditures in education matters for growth. Public education spending in many transition economies, however, is often inefficient and inequitable with education outlays misallocated across sectors. This highlights the need for an assessment of the nature of education expenditures in these countries. This paper attempts to fill the gap in the literature in this area.

The results presented here raise, but do not resolve, questions about how fiscal institutions and the structure of the political process in Russia may affect the degree of resource allocation in the educational sector during the transition process. It will be interesting to see how both the people and the policy makers in the Russian Federation respond to this daunting task in the near future.

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Appendix

Table A1

Summary statistics of the variables

Variable	Obs.	Mean	Std. Dev.	Min	Max	Units
rev99	88	7 238 043	11 400 000	208 781	87 700 000	th rub
revw99	88	6 468 615	11 400 000	29 767	87 700 000	th rub
edexp99	88	1 414 195	1 489 510	55 398	9 480 594	th rub
rev00	88	11 800 000	24 000 000	377 581	196 000 000	th rub
revw00	88	10 600 000	24 100 000	59 773	196 000 000	th rub
edexp00	88	1 964 396	2 216 296	92 276	14 200 000	th rub
gks_index	88	1.10	0.39	0.77	3.25	
PDENC	88	161	975	0.02	8589	persons/km^2
POP	88	1626	1470	19	8537	th people
STUDPPOP	88	158	24	120	236	per 1000