

EXAMINATION OF PUPILS' OUTCOMES AND PUBLIC SCHOOLS' EXPENDITURES RELATIONSHIP IN POLISH LARGE CITIES

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Abstract: *This paper aims to analyze the impact of expenditures to fund primary schools in large cities in Poland on pupils' performance (measured with results of 6th graders' exam). Analysis of literature allowed to hypothesize about the correlation of average 6th graders' exam results as a test of competence, and expenditures related to the education of students in public primary schools, and presents the results of public primary schools in the large city. Research conducted by the author in a large city, between the primary schools, which were established by one unit of local government, suggests that, although the dependence can be observed, interestingly they are of a negative nature, they are not statistically significant. Thus there is no correlation between the 6th graders' exam results and the amount of expenditures in public primary schools.*

Keywords: *local government finance, education, pupils' outcome measurement*

JEL Classification: *I22, I23, I24, I28*

1. INTRODUCTION

Financing a primary education is a responsibility of local government in Poland. Determining the level of expenditures on education and identifying specific expenditures for maintenance of educational institutions is part of an expenditure policy of the local government units. Cost-effective education, is educating the largest number of pupils within limited financial resources, but also educating within limited financial specific resources, a specified number of pupils on the top level.

Educational institutions should work in a way that a quality of the performance of their tasks is optimal, possibly the best in the circumstances. This raises a question of an impact of the funding on the effects of educational tasks quality. This paper aims to analyse the impact of primary schools expenditures in large cities in Poland on pupils' performance (measured with results of 6th graders' exam).

This article reviews the literature on the correlation between pupils' performance and the level of expenditures related to the financing of education, both in Poland and in the world. Analysis of the literature helped to identify factors that influence the performance of pupils. It also allowed to hypothesize about the correlation of average 6th graders' exam results as a test of competence, and expenditures related to the education of pupils in public primary schools. This paper presents results of public primary schools in the large city.

2. LITERATURE BACKGROUND

Basis for research on relationship between the expenditure policy and effects of school education, expressed with scores of students' written competency exam, was created by Coleman and his team (Coleman, et al, 1999). They found that the increase in expenditures has no effect on student performance. Their research became the basis for many subsequent research projects. The rationale for the link between effects of learning process and expenditures incurred for this purpose is the production

function. It shows that the increase in production leads to an increase in expenditures. Assuming that the result of the school production, which should be achieved, is a properly educated student, than it should be associated with an increase in expenditures. Such an approach is justified by the type of expenditures incurred in schools. The main part of the expenditures are salaries of teachers, hence the higher salary level, from a theoretical point of view, the better quality of education, due to employing better experts. Hoxby points out, however, that in reality the statement according to which schools with more resources – higher expenditures per pupil or per school division will result in improved student performance, it is far from obvious [15].

In a number of studies, it is indicated that factors other than financial, determine the performance of students. Among them, following should be mentioned: immediate surroundings, in particular the level of parents' education of [5; 21; 22], teachers' experience [2].

Some research, however, have confirmed the existence of a relationship of educational expenditures and students' performance. Among those finding the most important are: schools in states with higher expenditures directly related to education, but lower expenditures associated with administration, achieved better results [18]; a correlation between expenditures per pupil and results in reading and mathematics is at level of -0.14 [7]; positive link between educational expenditures per pupil and students' performance in mathematics takes place in countries with very low expenditures and does not occur in developed OECD countries [9]; marginal expenditures allocated on students, affected results of the lowest elevation, and the elongation of the school year increases results in the upper half of the distribution, although these factors do not affect the average results [6]; additional resources have a positive impact on students' achievement in mathematics and science, but not in English [19].

One of important factors, indicated as the cause of the relationship between results of students and the level of education expenditures, is the dominant position of teachers' salaries in the general structure of educational expenditures. According to Fox [8], under certain conditions, there will be an increase, not decrease of maintaining costs in schools or departments. What's more, it is a characteristic phenomenon, in his opinion, for the majority of organizations in which employees are the most important resource. Reducing educational expenditures in developing economies, especially in rural areas, can lead to limited access to skilled teaching staff or teaching aids [13].

Research carried out in Poland led to identification of factors that determine the competency exams' results. In the first study conducted after the introduction of external evaluation of students factors significantly affecting the level of results were recognized as [14]:

- unemployment rate (at the district level),
- income of local government unit from participation in personal income tax,
- percent of agricultural land owned by the state (state farms, the level of the old province).

Bański, Smith and Śleszyński [1] in their study for the same period, found that nationwide results reflected the history of Polish historical specific regions, as well as economic status and social position of the family. It should be noted, however, that the main object of the studies was presented at municipality level, which means that the relationship between competency test results and the municipal budget expenditures and their structure, was tested as an average for the municipality, rather than results and expenditures for particular schools. These studies have shown that in the case of large cities, there is a correlation between the total expenditures per pupil and the average annual 6th graders' exam results (Pearson correlation coefficient of about 0.29), and also:

- in case of eligible expenditures (budget classification chapters directly related to education) per pupil, the relationship was substantially lower - the correlation coefficient of approximately 0.05 [22].
- in case of chapter 80101 Primary School - correlation reaches the level of 0.5.

Previous studies in Poland concerned diversity and, consequently, the correlation of learning outcomes and educational expenditures between municipalities, as authorities which established educational institutions, including primary schools. There are no studies on diversity in learning outcomes and the level of expenditures between schools. More often such studies are published in foreign literature. The results of these studies allowed to bring the hypothesis of the existence of the relationship between the performance of pupils in schools and expenditures related to the education of these pupils.

3. SCIENTIFIC AIM, METHODOLOGY/METHODS

In order to carry out the research, it has been assumed that there exists a relation between average 6th graders' exam results carried out at the end of primary school and the level of expenditures associated with the operation of public schools (per school division in a six-year learning period).

The study is thus primarily on the efficiency of the public schools. Measuring the efficiency of public expenditures is about determining the relationship between the level and structure of public expenditures and the actual benefits that reference society and the economy as a result of these expenditures [17]. Efficiency is treated as a quantitative feature of activities, reflected in the relationship to utility effects, obtained at a certain time and efforts to meet needs of the recipient (intermediate and final) and inputs (resources) needed to achieve these effects, incurred in a period of time [4]. Benefits of educational tasks are understood to be educated pupils. The measurement of this feature is carried out through an indicator that shows the average level of the 6th grades' exam (competency exam). Average 6th grades' exam score as the indicator of outcome has certain disadvantages, but it is an objective measure of the amount of knowledge possessed by pupils. At the same time it is the indicator [16] for which it is possible to determine the value. Quite apart from expenditures, 6th grades' exam score is a measure of the effectiveness. Effectiveness as an economic category which determines whether the goal has been achieved fully or satisfactorily, or whether achieving it in the future has been made easier [11].

From the point of view of measuring the efficiency of primary schools, expenditures per school division are also important. The primary expenditure schools expenditures' structure is dominated by expenditures on salaries. In order to ensure comparability between primary schools, the relative altitude, i.e. staff costs per school division will be used in the study. "School division" is defined by Polish Central Statistical Office, as follows: "the school division is a group of pupils in the same class" [10].

The relation between the 6th graders' exam results and the level of expenditures per school division in the following years was studied using correlation, both linear and multiple. In the first case, correlation is examined using the Pearson coefficient, in second case, with a use of regression analysis, the relationship can be defined as the model determined by the formula:

$$Ex_t = a \times exp_t + b \times exp_{t-1} + c \times exp_{t-2} + d \times exp_{t-3} + e \times exp_{t-4} + f \times exp_{t-5} + g \quad (1)$$

where:

Ex_t – average 6th graders' exam result in year t ;

a, b, c, d, e, f, g – regression parameters;

exp_t – primary school expenditures per school division in year t ;

t – year 6th graders' exam.

Research period is 2006-2012. 62 large cities, which established municipal primary schools, were examined. Some school that could likely distortion exam results were not qualified to research, for example primary school at emergency shelters.

Using public value matrix, which takes into account the interaction between efficiency and effectiveness, public organizations can be distinguish in four groups, that [20]:

- destroy value - reach the low performance, low efficiency;
- are focused on efficiency - focus on improving efficiency in achieving low or average performance;
- are focused on efficiency - focus on improving performance at average or low efficiency,

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- create value - expertly combine to achieve high performance with high efficiency.

4. FINDINGS

Analysed cities schools can be divided into four main groups based on two parameters: the amount of expenditures per school division and the average 6th grades' exam result. The value that indicates the status to a particular group is the average value of those parameters. In the case of expenditures per school division, the reference value is the average expenditures per school division in analysed schools from the period of six years proceeding the time of carrying out the exam. Thus, the reference value of expenditures per school division for the examination conducted in 2012 includes the school years started from 2006 to 2012. The criterion to qualify a particular elementary school in one of groups is to reach the level of expenditures per school division higher (respectively lower) than the reference value. In case of 6th grades' exam result that will allow schools to divide into two groups (those in which high exam scores are achieved and those in which the exam results are low), is a weighted average of the exam result in primary schools surveyed in a given year. The city is classified into one of groups, if the average exam results are higher (respectively lower). Schematic division of the above-mentioned schools' groups are shown in Figure 1. It also gives the number of schools selected for a specific group.

Table 1 Number of schools according to their public value

Average 6th graders' exam result	Expenditures per school division	
	Low	High
High	12	16
Low	14	20

Source: own study

Statistical analysis showed that regression parameters describing the relationship are statistically insignificant, excluding g . If expenditures are calculated per pupil, conclusions from the analysis of the regression function are similar.

During the period of research the general trend in 6th graders' exam results achieved by pupils of schools is elusive. In primary schools surveyed in cities, out of 40 points possible to gain, those achieved in subsequent years at the level, are presented in Table 2. There is no one-way trend and it causes the inability to identify a trend in the relationship between pupils' exam results and level of expenditures per school division.

Table 2 Weighted average 6th grades' exam result large cities (over 100 000 citizens)

2007	2008	2009	2010	2011	2012
28,1	27,2	24,5	26,41	26,81	24,68

Source: own study based on source data

In the case of expenditures per school division an increase can be observed. This increase should have been examined in the 6-years period. Staff expenditures per school division in an average city in 2006-2012 increased by nearly 37%. In 2006-2012, the minimum basic salary of a teacher has increased by 46%, and the average salary of a teacher, which is the basis of the average teacher salary dimension of higher levels of career advancement, increased by 49%. There is therefore apparent influence of other factors than the amount of salary regulated through

legislation. One can presume that the observed increase arose from with ancillary activities of teachers, for example, or the larger number of extra-curricular activities or ancillary services.

5. DISCUSSIONS

As mentioned earlier, the amount of staff expenditures per school division, as the primary costs' carrier, allows to assess the average level of professional advancement of teachers in a particular school, as a minimum basic salary of a teacher is dependent on this factor. In addition, the amount of personal expenditures of the school will also be affected by factors related to the additional activity of teachers. If, therefore, primary school extra-curricular activities will be carried out, or a teacher will carry out some additional functions in school, staff expenditures will be higher.

Similar conclusions arose from the analysis carried out with a use of assuming the use of public value matrix. From the point of view of diversification of the most important groups are:

- destroying value - low average 6th graders' exam results and high staff costs per school division,
- that creates value - high average 6th graders' exam results and low staff costs per school division.

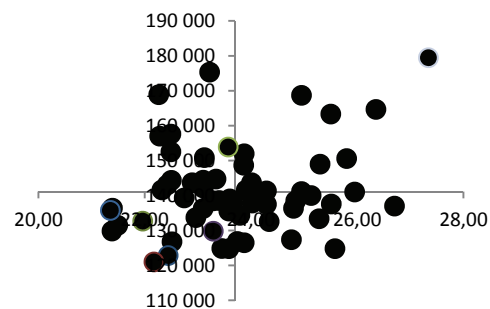


Figure 1 Distribution of 6th graders' exam results and expenditures per school division

The analysis of the regression of 6th graders' exam results against expenditures per school division in a period of six years prior to the analysis, in those two groups, does not indicate the presence of statistical dependence between two parameters (compare Figure 1).

6. CONCLUSION

The analysis of the literature shows that the measurement of effects of educational tasks should primarily affect learning outcomes. This means, therefore, that the main objective of education is to educate in order to achieve a certain level of knowledge by pupils. However, there is disagreement on impact of educational expenditures on achievements of pupils. A significant part of the research indicated weak or statistically insignificant relationship. On the other hand, studies show that the level of expenditures per pupil may have an impact on the achievement of a single item or on certain groups of pupils, but does not affect the average level of competence of the exam results.

Research conducted by the author in a large city, between primary schools, which were established by one unit of local government, suggests that, although the dependence can be observed, interestingly they are of a

negative nature, they are not statistically significant. Thus there is no correlation between the 6th graders' exam results and the amount of expenditures in public primary schools. The reason for that may be due to three reasons. Firstly, the traditional method of budgeting might be used. This is confirmed by the fact that the amount of the average salary of teachers and the amount of the minimum basic salary of teachers each year are determined at the level of the state budget in an arbitrary manner. Another possible cause is the lack of incentive for teachers' salaries impact

the quality of their work and therefore an essential prerequisite for the next step on a career in financial terms, but the level of education is not substantially altered. A third possible cause is directing funds to those schools that have achieved low exam scores, in order to improve the situation. Due to the fact that the history of competency exams in Polish education is only a few years (the first was conducted in 2002), the effects of these actions are likely to be visible only in a few more years.

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