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ECONOMIC DETERMINANTS OF THE FUNCTIONING OF PRIMRY SCHOOLS IN INOWROCŁAW BOROUGH AND IN NEIGHBOURING BOROUGH SINCE 2010

Summary: The purpose of this article is to present economic determinants of the functioning of primary schools in Inowrocław borough as well as its neighbouring boroughs since 2010. The aspect of functioning of schools as budgetary units based on financial plans as well as principles, which must be guided by the organizational unit of the public sector are presented. Various statistical analyzes were carried out to approximate the interdependencies between the given inputs and the achievements in primary schools to highlight the result of the so-called economic calculation. Then, all the data concerning individual primary schools from the analyzed period were collected to attempt to indicate the most similar boroughs in terms of expenditures and results achieved in primary schools as well as to indicate the most prosperous boroughs in this respect based on cluster analysis. The Central Statistical Office turned out to be indispensable, from which a lot of information about local data was obtained and thanks to which boroughs could be compared in many aspects. The source documents received from units serving individual boroughs, such as financial annual reports or information on the state of implementation of educational tasks, were the most helpful in conducting a study on the functioning of primary schools in individual boroughs. The article uses the data for the years 2010-2017.

Key words: budgetary unit, primary school, borough, expenditure, result, effect.

1. INTRODUCTION

The borough as one of three separate levels of territorial self-government is the leading authority for public primary schools. The decentralization of power caused many responsibilities, including the functioning of education. As the borough's tasks are to meet the needs of its communities, they must create favourable conditions to ensure access to education. In view of the need to fulfill these tasks, those are the boroughs closely related to the functioning of primary schools and their financing. The close cooperation between boroughs and schools is a basic

necessity for their proper prosperity. Every citizen of our country according to the Constitution of the Republic of Poland has the right to education and learning is free and compulsory until the age of 18. The parent is responsible for ensuring that the child attends school until the age of 18. Failure to do so will result in a financial penalty being imposed on the parent. The law allows the provision of some educational services for a fee in non-public schools. Public authorities provide citizens with universal and equal access to education as well as financial support for pupils and students [Art. 70 Constitution of the Republic of Poland]. Primary schools as budgetary units are disciplined by public finances. It is important to determine whether it is possible to translate the effort into effect in education. The result in this case may be learning outcomes or school-leaving examination results. It is also worth paying attention to the expenses of schools, where their determinant in schools is to calculate the cost of education of one student. The aim of this article is to present economic determinants of the functioning of primary schools in Inowrocław borough and its neighbouring boroughs since 2010. The article analyzes the functioning of primary schools on the example of Inowrocław and neighbouring boroughs.

2. PRIMARY SCHOOLS AS BUDGETARY UNITS

Primary schools have funds for their own activity from the budget of local government units, so in this case from communes. This is the commune, also through the state budget, is obliged to allocate funds for the functioning of schools from its circuit. Schools as local government budgetary units are required to set financial plans so that financial discipline is preserved [Zienkiewicz 2013, p.11]. Primary schools, especially the state ones, are specific units, because they are not profit-oriented. Their main activity is spending public money on the education of young generations. Communes allocate financial resources for the functioning of schools mainly from educational subsidies, however, these funds are not always sufficient. It is often the case that a commune has to contribute from its own funds for education, even for investment purposes. The amount of the subsidy depends on the number of students attending a given school as well as on the promotion rank of the teachers employed there [Filas 2011, p. 7]. Therefore, the amount of the subsidy allocated will be higher if we employ instead of a contracted teacher – a chartered one. Contrary to appearances, this is a better situation despite the fact that the contracted teacher earns much less than the chartered one. Local government units, in this case boroughs, are required to provide information to school principals about what incomes and expenses have been accepted in the draft budget resolution. Such an obligation results from the Regulation of the Minister of Finance on the manner of conducting financial management of budgetary units and self-government budgetary establishments. Financial plans of schools are constructed on the basis of budget classification, which consists of departments, chapters and paragraphs. Education has its own

section and primary schools have a separate chapter. This budget classification is used for the preparation of financial plans by school principals.

3. INTERDEPENDENCE OF COSTS AND EDUCATIONAL OUTCOMES IN PRIMARY SCHOOLS IN THE INOWROCŁAW AND NEIGHBOURING COMMUNES

Expenditures and effects are usually shown in monetary units to make their comparability easier. However, it is not possible to demonstrate the effects in the form of money in primary schools. Primary schools in Inowrocław borough are not focused on profitability and therefore they do not generate profits. In addition, they do not organize paid extra classes or other similar ventures that could generate any income for schools, so it is impossible to demonstrate the effects in the form of money. The expenditure may be that, within the meaning of quantitative, what is used to perform a specific task, e.g. human work and the value of quantitative inputs expressed in cash. The effects are defined as the result of the activities carried out compared to the expenditures incurred. Effectiveness measurement is necessary to determine the economic calculation. In education, the indicator method can be used to measure effectiveness. The calculation of relevant indicators shows how the results of incurred expenditures have been shaped over the years [Lubimow-Burzyńska 2014]. It should be remembered that in case of education, the amount of spent money and better academic results do not always go hand in hand. Other factors, such as the environment, in which it functions, also influence the student's performance in learning. If a student does not have the motivation to learn or there is a lot of other more important things for him to achieve good results, the student will not achieve them despite the teacher's greatest efforts. Apart from Inowrocław borough, four others were selected for the research, where the necessary data were obtained. The total expenditure consists of all expenses incurred by the school in a given year. Statistical data measures are used to compare individual data. Such measures include, among others, Pearson's correlation coefficient, thanks to which one can study the interdependencies between particular features as well as study their strength and direction. The positive values of the result indicate that both, the one and the second feature will increase, whereas if the values of the result are negative, then if one feature decreases, then the other feature will grow and vice versa. In case of a result value equal to 0, it means that there is no correlation between the features. As part of the statistical analysis, an important element is also regression, thanks to which you can calculate the values of the dependent variable (Y) based on the result of an independent variable (X), i.e. an explanatory variable [Józwiak, Podgórski 2006, p.110].

- Interdependencies between the cost of one student's education as well as expenditures and the number of students in primary schools in Inowrocław and neighbouring boroughs

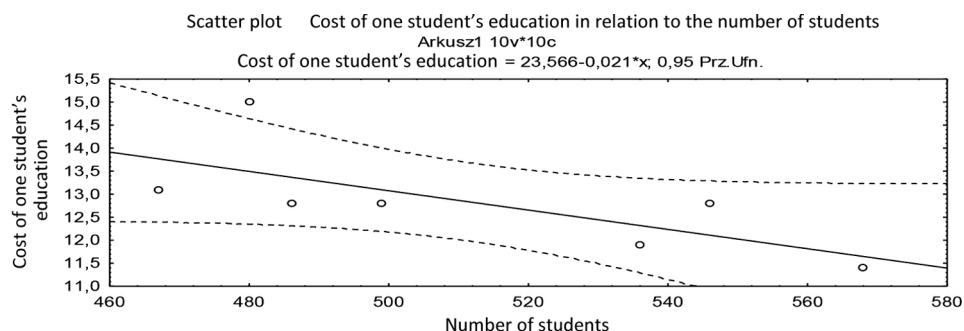
Table 1. Measures of correlation and regression analysis of the cost of education of one student (in thou. PLN) as well as the number of students in primary schools in Inowrocław and neighbouring boroughs

Bor- ough	Variable	Average	Odch. std	Correlation coefficient	r ²	p	Regression equation
Inowrocław	cost of education of 1 student	12.8286	1.1324	-0.708068	0.501361	0.708100	cost of education of 1 student = 23.566-0.021 number of students
	number of students	511.7143	38.2131				
Gniewkowo	cost of education of 1 student	10.1800	0.5848	-0.984512	0.969264	0.002000	cost of education of 1 student = 16.0004-0.0064 number of students
	number of students	911.8000	90.1953				
Janikowo	cost of education of 1 student	9.6333	1.2044	-0.669589	0.448349	0.146000	cost of education of 1 student = 18.5244-0.0106 number of students
	number of students	837.3333	75.9517				

Source: own elaboration based on information about the state of implementation of educational tasks and financial statements RB-28S.

The correlation coefficient for primary schools in Inowrocław borough was around -71.71, which means that it is a negative correlation. Along with the increase in the number of students, the education costs of one student decrease and vice versa as the number of students in the school decreases, the cost of maintaining one student increases. In this case, the significance level $p < 0.1$ was adopted. The dependent variable is explained in about 50% and the regression equation is interpreted as follows: if the number of students in primary schools of Inowrocław borough increases by 100, then the cost of one student's education will decrease by an average of PLN 2,100.

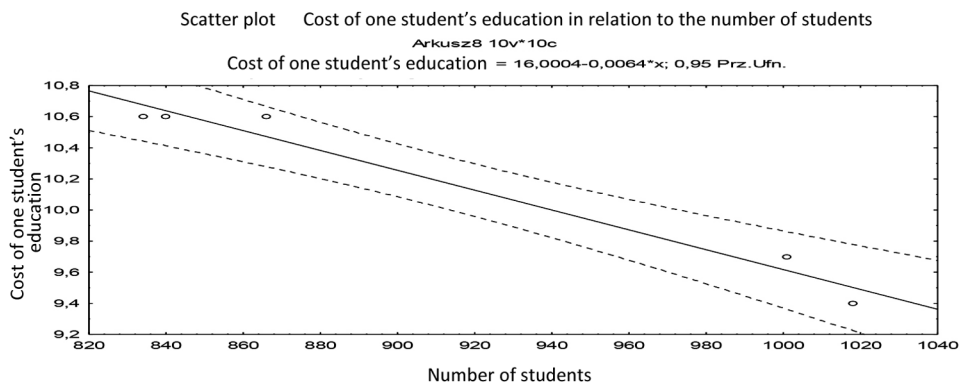
Figure 1. Scatter plot along with the regression line on the correlation between the education costs of one student (in thou. PLN) and the number of students in primary schools of Inowrocław borough in the years 2010-2016



Source: own elaboration based on the Table 1.

The above chart shows the interdependencies described previously in the graphic form. The regression line has a negative slope indicating a negative correlation coefficient result as well as a negative coefficient b of the equation. The most important study turned out to be the study of the correlation between the number of students and the cost of education of one student in primary schools in Gniewkowo borough. We get here a high level of significance and a high percentage of explanation of the dependent variable, as much as 97%. The correlation coefficient here was -0.98 , which is very close to unity. The regression equation says that if the number of students in the primary schools of Gniewkowo increases by 100, the cost of one pupil's education will decrease by an average of 640 zlotys. The figure below shows the regression equation and the negative regression line. The variables go to a linear model and they are placed within a certain confidence interval.

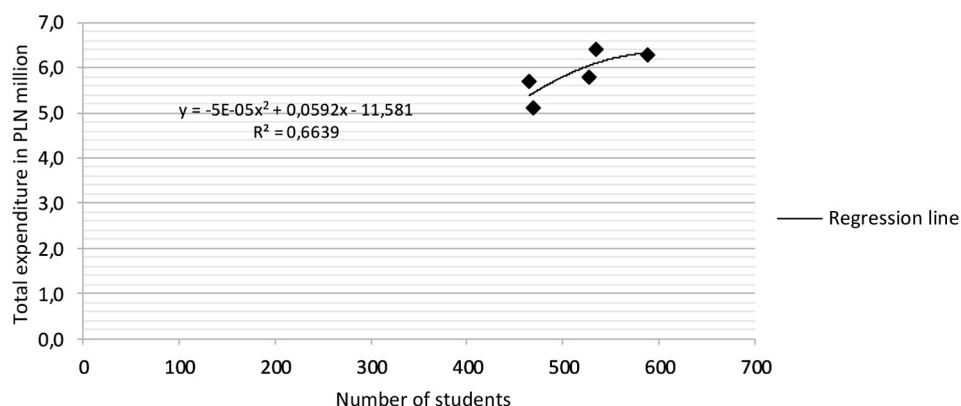
Figure 2. Scatter plot along with the regression line on the correlation between the education costs of one student (in thou. PLN) and the number of students in primary schools of Gniewkowo borough in the years 2010-2016



Source: own elaboration based on the Table 1.

In addition to linear relationships, you can also provide data in a non-linear, e.g. multiple, form. In primary schools of Złotniki Kujawskie borough, the coefficient of determination is about 0.66, which means that in 66% the model explains the impact of the number of students on total expenditure. The graph below and the polynomial function equation show that along with the increase in the number of students to around 590 in primary schools of Złotniki Kujawskie borough, the total expenditure also grows, and then with the increase in the number of students the expenditure begin to fall. In primary schools of Kruszwica borough the dependencies between the cost of one student's education or the total expenditure and the number of students do not take place at all. This may be related to the large sponsorship of Zakłady Tuszczowe Kruszwica, which support the schools financially.

Figure 3. Scatter plot along with the trend line on the correlation between the amount of total expenditure in PLN million and the number of students in primary schools of Złotniki Kujawskie borough in the years 2010-2016

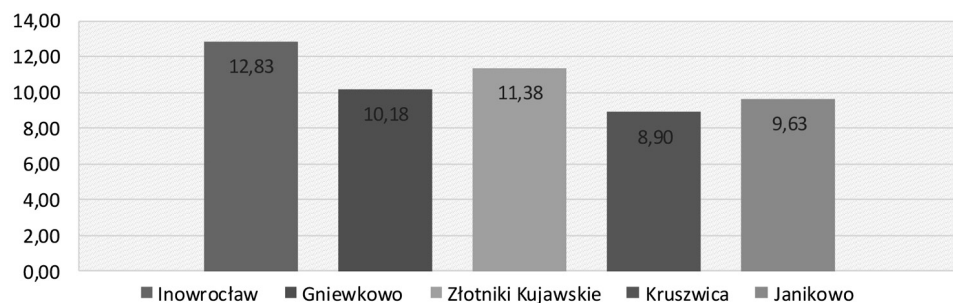


Source: own elaboration based on the Table 1.

In primary schools it is very difficult to evaluate the results achieved, because the effects are not presented in cash. They can be shown as part of the student's major achievements, the number of scholarships received or the results of tests at the end of the sixth grade of primary schools.

While analyzing primary schools in terms of various aspects in individual boroughs, some similarities and differences can be noticed. The average highest education cost of one student was the highest in the primary schools of Inowrocław borough and the lowest in the primary schools of Kruszwica borough.

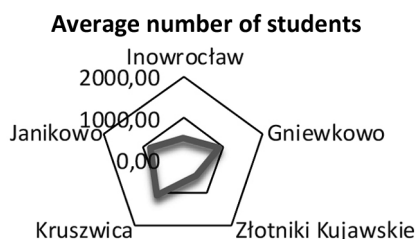
Figure 4. The average cost of education of one student (in thou. PLN) in primary schools of Inowrocław and neighbouring boroughs in the years 2010-2016



Source: own elaboration based on the data from RB 28S as well as the information on the status of implementation of education tasks from primary schools of Inowrocław and neighbouring boroughs.

Due to the fact that the largest number of students attend primary schools in Kruszwica borough, i.e. the average number of students since 2010 was 1074, thus the cost of education for one student is the lowest.

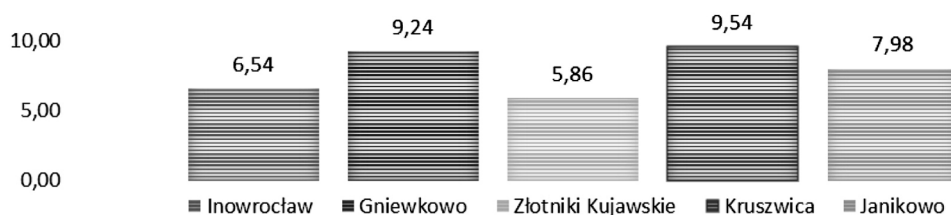
Figure 5. The average number of students in primary schools of Inowrocław and neighbouring boroughs in the years 2010-2016



Source: own elaboration based on the information on the status of implementation of education tasks from primary schools of Inowrocław and neighbouring boroughs.

In addition, taking into account the average expenditure incurred for primary schools, the figure below shows that it was closest in Gniewkowo borough and Kruszwica borough, i.e. around PLN 9.5 million and thus they were the highest values among the analyzed boroughs. The smallest total expenditures for primary schools were incurred by Złotniki Kujawskie borough, i.e. 5.86 million PLN.

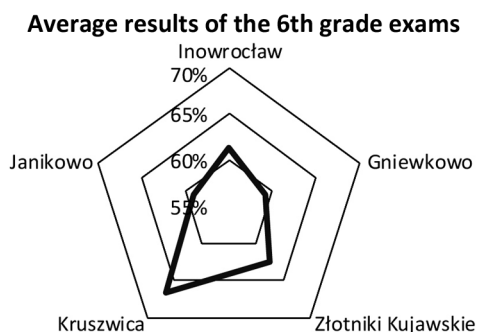
Figure 6. The average total expenditure (in PLN million) in primary schools of Inowrocław and neighbouring boroughs in the years 2010-2016



Source: own elaboration based on the data from RB 28S from primary schools of Inowrocław and neighbouring boroughs.

You can also compare primary schools in individual boroughs in terms of average results of the sixth grade exam. The figure below immediately shows that the highest average scores were obtained by pupils from the primary schools of Kruszwica borough, i.e. around 67%. Similar results were obtained by students from Janikowo and Gniewkowo boroughs.

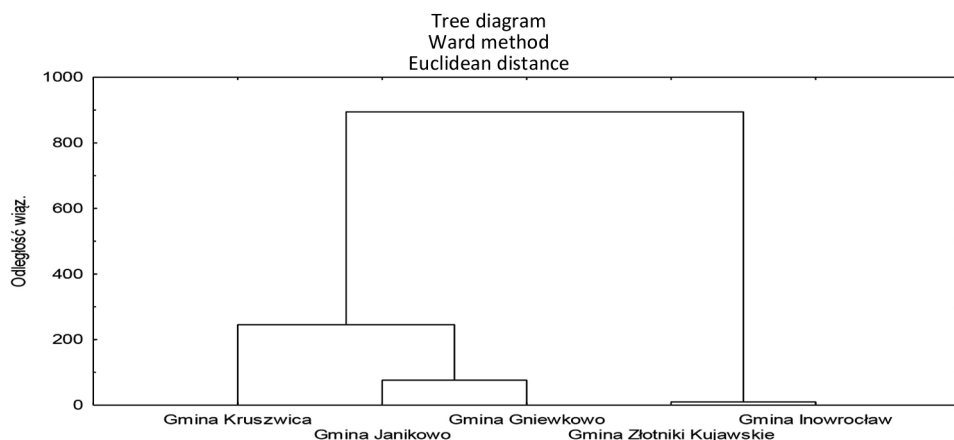
Figure 7. The average results of the 6th grade exams in primary schools of Inowrocław and neighbouring boroughs in the years 2010-2016



Source: own elaboration based on the information on the status of implementation of education tasks from primary schools of Inowrocław and neighbouring boroughs.

The calculations carried out using the Ward method show that in terms of the studied characteristics, i.e.: the average education cost of one student, the average number of students, the average number of teachers, the average number of scholarships, the average results of the 6th grade exam, the most similar schools are primary schools of Inowrocław borough and Złotniki Kujawskie borough – a tree diagram showed the shortest distances for these boroughs.

Figure 8. Analysis of clusters of primary schools of Inowrocław and neighbouring boroughs according to the Ward method based on the average studied characteristics: the number of students, the sum of expenditures in PLN, the sum of education costs of one student in PLN, results of the 6th grade exams



Source: own elaboration based on the information on the status of implementation of education tasks, RB-28 S reports from primary schools of Inowrocław and neighbouring boroughs.

Similar characteristics were also demonstrated by the schools of Janikowo and Gniewkowo boroughs. The primary schools of Kruszwica borough are the most different from the other boroughs in terms of the studied characteristics.

4. SUMMARY

The carried out research shows that in education, the effort is not always effective. The specificity of this area accepts such situations due to the fact that it is not based on generating financial profits, but it acts as a public good. The interdependencies between the effort and the effect in primary schools can, but not necessarily, have the desired effect. In some cases, the effect is quite the opposite, as proved by the fact that sometimes money does not affect the learning outcomes. In schools, where the number of pupils is greater, the dependence of one student's education costs on a larger number of students is affected. The biggest costs are incurred by schools with a small number of students. It was examined, using statistical measures, whether there are correlations between the number of

pupils and the cost of education of one student. The research has shown that the greatest dependence occurred in Gniewkowo borough and Inowrocław borough. The effects in primary schools cannot be expressed in the form of financial profits, especially in public schools, which is why they were presented in a different way. For primary schools, effects such as results from tests, the number of scholarships for students or achievements in competitions count. The correlation coefficient showed that there are no very strong correlations between the inputs and the results from tests, which means that the expenditure in education does not translate into an effect. The only dependencies that could be noticed took place in the borough of Janikowo and Kruszwica. As far as scholarships are concerned, statistical surveys did not show any correlations between the cost of one student's education and the number of scholarships received by students. The article points out the similarities and differences between communes, as well as the indication of the most similar municipalities in terms of outlays and effects in primary schools. The article points out the similarities and differences between boroughs as well as the indication of the most similar boroughs in terms of efforts and effects in primary schools. Kruszwica borough turned out to be the most effective borough running the primary schools. In terms of the examined features, the most similar are the primary schools of Inowrocław and Złotniki Kujawskie borough as well as the boroughs of Gniewkowo and Janikowo. Turning to the conclusion, it can be concluded that:

- boroughs as the leading bodies for primary schools must provide them with financial resources so that they can function properly and fulfill their tasks as public goods;
- the greater number of students attending primary schools means that the cost of one student's education decreases. Therefore, schools should take all actions in order to get as many students as possible;
- financial outlays do not constitute the basis for a better education of the student. Interdependencies in statistical surveys in some cases were even negative, which indicates that in education the amount of incurred expenditure is not always accompanied by the achieved effects. The borough as the body running public schools that guarantee free education has to finance them from its own budget, which is why the expenditure on education constitutes a fairly significant percentage share in the structure of all communal expenditures.

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EKONOMICZNE DETERMINANTY FUNKCJONOWANIA SZKÓŁ PODSTAWOWYCH W GMINIE INOWROCŁAW I OŚCIENNYCH OD 2010 ROKU

Streszczenie: Celem niniejszego artykułu jest przedstawienie ekonomicznych wyznaczników funkcjonowania szkół podstawowych gminy Inowrocław oraz jej gmin sąsiadujących od 2010 r. Przedstawiono aspekt funkcjonowania szkół jako jednostek budżetowych bazujących na planach finansowych, a także zasady jakimi muszą się kierować będąc jednostką organizacyjną sektora publicznego. Przeprowadzono rozmaite analizy statystyczne, aby przybliżyć współzależności pomiędzy danymi nakładami, a osiągnięciami w szkołach podstawowych, aby naświetlić wynik tak zwanego rachunku ekonomicznego. Następnie zebrano wszystkie dane z badanego okresu dotyczące poszczególnych szkół podstawowych, aby na podstawie analizy skupień podjąć próbę wskazania najbardziej podobnych do siebie gmin pod kątem nakładów i wyników osiąganych w szkołach podstawowych, a także wskazania najlepiej prosperującej gminy w tym zakresie. Niezbędnym okazał się Główny Urząd Statystyczny, z którego zaczerpnięto wiele informacji o danych lokalnych i dzięki którym można było porównać gminy pod wieloma aspektami. Najbardziej pomocne w przeprowadzeniu badania dotyczącego funkcjonowania szkół podstawowych w poszczególnych gminach były dokumenty źródłowe otrzymane od jednostek obsługujących poszczególne gminy takie jak finansowe sprawozdania roczne czy też informacje o stanie realizacji zadań oświatowych. W artykule wykorzystano dane dotyczące lat 2010-2017.

Słowa kluczowe: jednostka budżetowa, szkoła podstawowa, gmina, nakład, wynik, efekt.

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