Evaluation of the Effectiveness of the Education System in Poland

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Abstract *It has been shown in the article that the system of education in Poland up to the secondary level is very efficient in comparison to other countries, however, thus developed human capital is not properly directed by the system of higher education. One of the main problems is lack of consistency between the system of higher education and national economy, which generates lack of correlation between the structure of the graduates and the labor market. In measuring the effectiveness of the education system four dimensions have been taken into account: !- **Economic dimension**, the performance (service efficiency of a school), which is expressed by comparing the production contribution and economic effect (graduates). 2- **Professional dimension,** the effectiveness of education, which measures the ability to improve knowledge and skills of the student.3- **Personal dimension**, satisfaction of the student, pupil and parent understood as quality (subjective) of teaching and the resulting probability of employment. 4- **Synthetic (social) dimension,** bringing up of the student to an approach free from selfishness, which can serve the public. It is compatible with the mission of any educational institution (the search for truth, a synthesis of knowledge and service to man). The evaluation should have an impact on the discovery of the quality of services, especially to increase their efficiency and effectiveness, and thus increased prosperity of the whole population.*

Keywords: *effectiveness, education system.*

1. Introduction

Human capital is understood as knowledge, health and capabilities of a person, which help to increase their production capacity. It is a form of capital, because it is the source of current and future income or future satisfaction. By investing in the biological and intellectual potential of a person it is possible to create conditions to raise revenue (benefits) in the future. Thus, every person in society, either directly or indirectly is interested in the quality of education, in particular the effectiveness and efficiency. Effectiveness and coherence of the whole process of learning provide a basis for economic development.

Poland is facing a serious problem, on the one hand the country should significantly reduce public debt, on the other improve efficiency and quality of social services which in addition to effects on growth of human capital are important for social welfare.

Quality in education is very important because mistakes committed in its course are difficult to repair, and can have great negative consequences (in this case one may apply the rule by Juran: 80% of the causes corresponds to 20% of defects). Hence the need for evaluation, which should have an impact on revealing the quality of education, and especially in improving its efficiency and productivity.

2. Quantitative description of the structure of the education system in Poland

Among schools covered by the educational system there are: 6-year primary schools 2 and 3-year lower secondary schools, where education is compulsory; next, upper secondary schools, i.e. 2 and 3-year basic vocational schools, 3-year general secondary schools and specialized secondary schools, and 4-year technical secondary schools.
At the next level of education are 5-year universities, broken down by three-year undergraduate studies [Bachelor's degree studies] and two-year "magisterskie" studies [Master's degree studies].

Number of students at different educational levels is shown in a table below. Clearly you can see the effects of demographic decline in the schools to which attendance is mandatory. Also the number of students decreases with time.

Table 1. Pupils and students in thousands by level of education

Schools:	**2005/06**	**2009/10**	**2010/11**
primary	2602,0	2234,9	2190,6
lower secondary	1596,8	1322,1	1260,6
higher secondary	1719,7	1519,5	1464,9
post secondary	313,5	284,8	298,8
universities	1953,8	1900,0	1841,3
students on every 10 thousand	509,4	493,4	476,4
women in overall % of students	56,5	58,2	58,8

Source: Polish Statistical Yearbook, GUS

Recently in Poland there have appeared non-public schools, whose fees are high, for Polish conditions. They are characterized by a large number of diverse extra-curricular activities that allow children to develop hobbies, and small classes (as opposed to public schools in large cities), so the teacher can talk with each child. Below in Table 2.one can compare the range of private schools to the public in Polish system of education.

Table 2. Schools and pupils, broken down by public and private in 2009/2010

	Schools		Studends in thousands	
	Public	Non-public	Public	Non-public
primary	13033	936	2171.5	63.4
lower secondary	6519	725	1270.1	52.1
higher secondary	6802	832	1453.8	65.8
post secondary	839	2371	284.8	208.9
universities	131	330	1266.9	633.1

Source: Polish Statistical Yearbook, GUS

Note the upward trend in the number of non-public schools and universities at a constant number of public schools and universities. However, it seems that with the increasing number of non-public schools and universities there has been no increase in the quality of education. Higher education has developed rapidly in number. In the year 1990/91 the number of students in Poland amounted to 404 thousand, in 2000/2001 it has reached 1685 thousand, and in 2009/2010: 1900 thousand. At the same time, infrastructure and the number of teachers increased at a much weaker pace. Hence, naturally appeared tendency of multi-jobbing of academics and, unfortunately, the quality of education has ceased to be the main goal of education.

3.The four dimensions of quality evaluation of school activities

The proposed evaluation of schools activities was made in four dimensions:

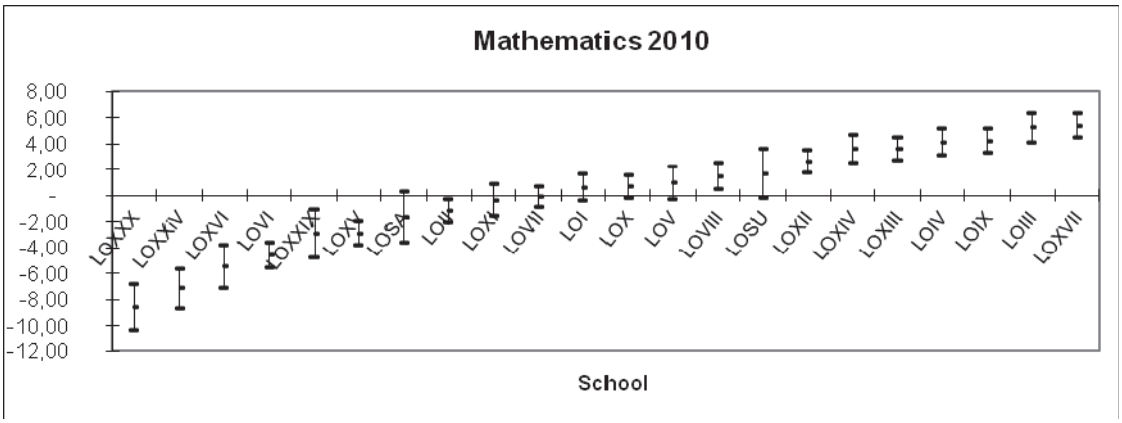
1. **Professional dimension,** the effectiveness of education, which measures the ability to improve knowledge and skills of pupils or students.
2. **Economic dimension**, the performance (service efficiency of a school), which is expressed by comparing the production contribution and economic effect (graduates).
3. **Personal dimension**, satisfaction of the student, pupil and parent understood as quality (subjective) of teaching and the resulting probability of employment.
4. **Social dimension,** bringing up of the student to an approach free from selfishness, which can serve the public through work for the development of economy and national culture.

3.1 Effectiveness

Effectiveness of education, or the ability of educational institutions to improve knowledge and skills of a pupil or a student is very difficult to measure. Various parties interested in economic activities can define the **efficiency** (effectiveness) in various ways. The terms of such comparisons can be as presented below:

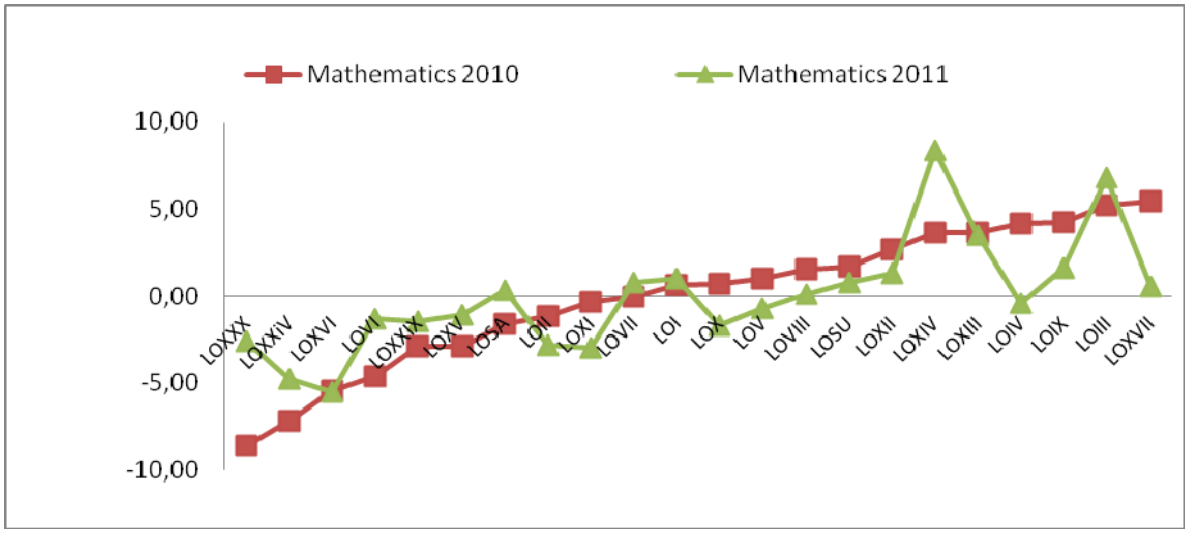
- Various alternatives of activities' realization / ex post evaluation and the associated relative effectiveness. Such an assessment is of interest for parents who want to choose the right school for their children, or local authorities that wish to strengthen the weakest schools to increase the average human capital. One such measure is the Educational Value-Added assessment created by Aitkin and Longford. The econometric model that they proposed is known as the variance components model - VC or the error component model. Coefficients of the model are estimated using maximum likelihood [e.g. Aitkin, Longford (1986)]) or generalized least squares method [e.g. Baltagi (2005)]. Value-added method takes into account the diversity of schools because it concerns the resources *at the entrance*. In the case of higher secondary schools the best available method of measuring resources *at the entrance* are pupils' results in lower secondary school final exam, and *at the output* - results of the "matura" examination (end of study examination at higher secondary level). Both exams are checked by external examiners and have the same task descriptions in entire Poland. This model will be presented on the calculating the efficiency of teaching in high schools in Wrocław. The following indications have been used: LO + a Roman numeral – denotes a high school whose number is given by the Roman numeral; LO SA – denotes the Private Salesian High School; LO SU – denotes the Ursuline High School.

Fig. 1. The results obtained in Mathematics /Value- added method (EWD) – 95% - confidence intervals



Source: Own calculations based on the Regional Examination Commission in Wrocław

Fig. 2. The results obtained in Mathematics /Value-added method (EWD)/



Source: Own calculations based on the Regional Examination Commission in Wrocław

- Objective achievements (as a realization of stated objectives); In this approach, the efficiency is defined as the ratio between the actual and expected outcome. The result should be described quantitatively, for example, as a score (points) from a final exam. In order to compare with the expected result one should analyze the results from the same examination among other students. An example of such analysis is the international PISA study on a group of 17-year-olds:

Table 3. International comparison of average educational attainment of 17 - year-olds

Country	2003	2006	2007	2009
U.S.	483	490	481	500
Germany	503	499	505	497
Italy	466	476	469	486
Poland	490	495	500	500

Source: OECD PISA

The above table presents a high level of progress visible in average results of educational outcome among Polish high school students.

3.2 Efficiency

In a "production system," which a school undoubtedly is, financial outlays in the form of teachers' salaries, cost of technical equipment, operating costs and operating fees (in schools and private institutions, and public evening and extramural), are transformed into certain number of graduates, Bachelors and Masters.
In education, the economic effect is sufficiently high state of knowledge and skills of the graduate (student, pupil). In the measurement of school performance it is often assumed that the effect is the number of graduates, and the contributions are expenses of the state budget and budgets of local governments on education plus tuition.
In table 4. we compare educational expenditure in Poland (divided into levels) to spending in other selected countries.

Table 4. International comparison of annual expenditure per pupil at different levels (PPP USD 2007)

	Primary	Secondary	Higher	Average
USA	10229	11301	27010	14269
Germany	5548	7841	13823	8270
Italy	7383	8004	8673	7948
Poland	4063	3590	5576	4134
OECD Average	6741	8267	12907	8216

Source: OECD in Figures 2007 Edition

For a full picture of the effectiveness of education in Poland in Table 5. an international comparison is made:

Table 5. International comparison of efficiency

	A	B	C	D	D/B w %
USA	24074	40088	39	490	1,22
Canada	19992	19994	31	526	2,63
France	10704	33548	53	506	1,50

Germany	11594	48167	64	499	1,03
Italy	8764	31291	53	476	1,52
Czech Rep.	6774	37925	59	509	1,34
Poland	4589	10263	15	495	4,82

Source: OECD in Figures 2007 Edition.

where: A - annual expenditure per student in USD according to PPP B - Annual salary of a school teacher with 15-year experience in USD according to PPP C - wage per hour of teaching, the same teacher D - average rate of knowledge and skills of 15-year-olds, D / B - reflects the function of the quality of education thanks to which we can say that our educational system is at the forefront when it comes to the effectiveness of training of the average high school student.

3.3. Personal Dimension

Satisfaction of a pupil, student and parent, which should be the subject of the area of market education and should measure the level of satisfaction with the result of education, teaching service and opportunities available to improve knowledge. Satisfaction Survey allows you to specify how the service offered by the school meets the expectations of students, better understand their preferences and their subjectively perceived learning outcomes. Example of measuring satisfaction through a survey is given below. Students of two majors (Economic Sciences and Finance Management), at the same university were asked the following questions: 1. Does the teacher teach clearly? 2. Is s/he enthusiastic about teaching? 3. Does s/he promote active participation in the classroom? 4. Is s/he late? 5. Overall assessment. Results of the survey for question 1 and the overall assessment is given below.

Figure 2 a. Box graph presenting distribution of student responses for question 1.

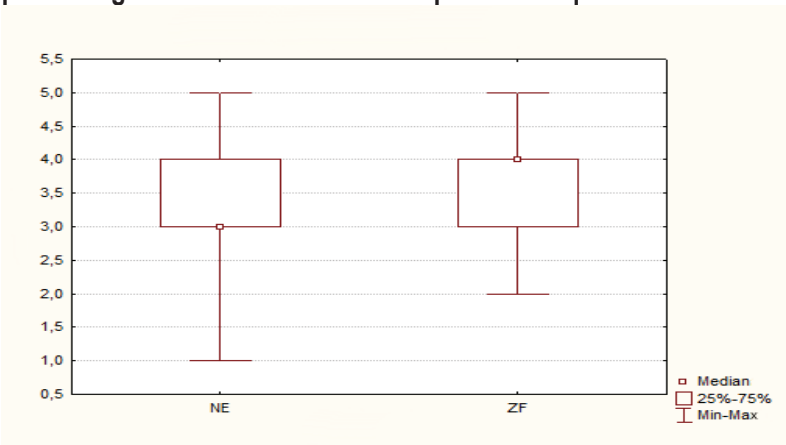
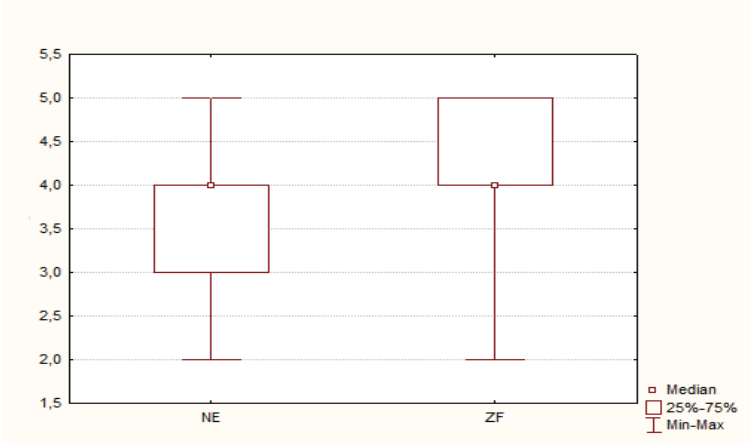


Figure 2 b. Box graph presenting the distribution of the overall assessment



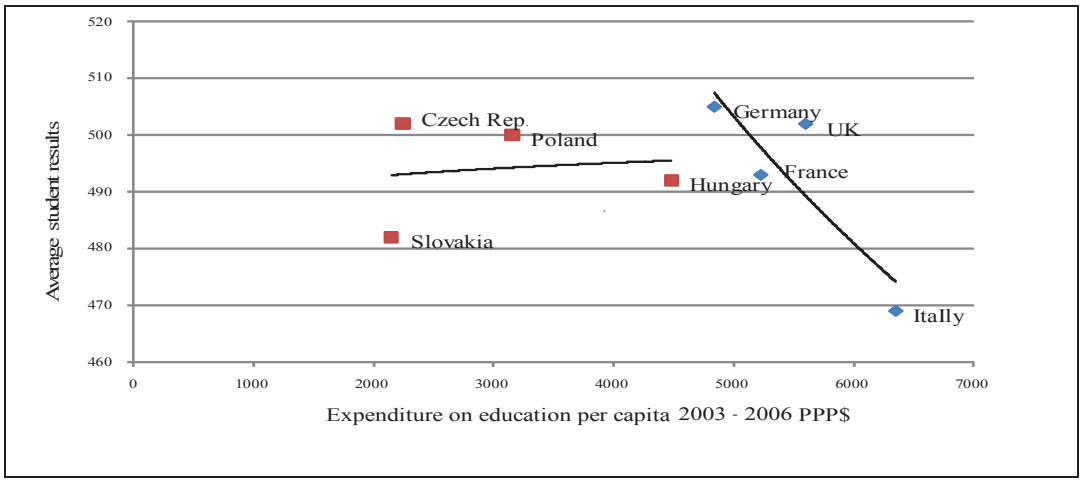
Source: own research

3.4. The social dimension.

When dealing with the effectiveness of training you need to look also for the preparation of personnel for the national economy and culture, and education of adults who can distinguish truth from falsehood and form their own judgment about the objective state of things. Consistency of training with the needs of national economy, optimization of human capital can be measured by a force of relationship between education and economic growth or unemployment rates of graduates.

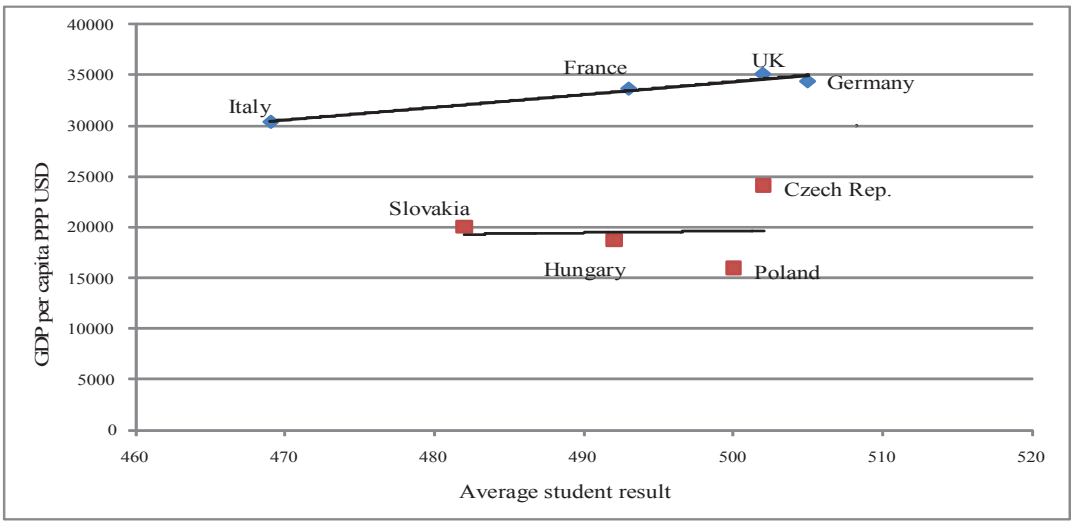
The empirical studies [Dougherty] That shows the share of human capital in the growth of GDP, depending on the countries and periods, ranges from 5% to 20%. Empirical verification of models of growth [Griliches, 1997, Mankiw et al, 1992] Particular in GDP per capita, show interesting conclusions for the economies regarding human capital. It turns out, for example, that countries with lower GDP per capita may be at a higher rate of growth than technologically advanced countries, provided that, they have a high level of human capital. Another interesting finding is the relationship between human capital and investment expenditures.

Figure 3. Dependence of average student achievement from per capita education spending; divided into developed and developing countries



Source: Human Development Report 2009

Figure. 4. Relation of GDP per capita to the average outcome of student' the average result of a student's achievements.



Source: Human Development Report 2009

Figures 3 and 4 present the fact that, in spite of good results at the secondary level of education, there can be observed the lack of consistency between the system of higher education and the economy. Lack of such consistency also leads to high unemployment rate among university graduates. According to GUS (Central Statistical Office of Poland) data, even every fifth Polish student receiving a Master's degree cannot find a job, and during the last year (of economic crisis) as compared to the previous year the number of unemployed university graduates increased by 40%. Unfortunately, the problem of high unemployment of university graduates is a problem present throughout entire Europe.

4. Conclusion

Comparing the international results of the effectiveness of education systems one can state that the education system in Poland including upper secondary level is effective and efficient. According to the latest ranking of the OECD PISA Poland is in 15th place. As for performance, we are also at the forefront of the world. Unfortunately, the state authorities and specifically local authorities are planning for the next year to close about 300 schools, 120 of which in rural areas. This will mean extending time needed to get to school, and the deteriorating conditions of learning (large classes). Unfortunately, when it comes to Polish universities, in international rankings they are far, the best of Polish universities the Jagiellonian University took around 300th place in the ranking.. When it comes to state spending on research and development, it known that for this purpose we devote (in % of GDP), two times less than Estonia and Italy, three times less than the EU average. To conclude it should be stated that Poland does not use its human capital optimally, particularly at the higher education institutions and does not ensure consistency with the national economy. This is probably related to an unstable labor market.

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