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STUDY ON PRODUCTIVITY INDICATORS IN EDUCATION

Methodological article

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Abstract

This paper aims to outline synthetically a set of indicators for the study of productivity in education and to critically analyze their suitability as input, output or outcome. References were made to the indicators available in the databases of Romania, World Bank, Eurostat, OECD relevant for measuring productivity in education, which opposed to usual reporting between effect / result and inputs elements consumed in the production process,in the case of educational services should be considered the quantitative, but also qualitative aspects - and especially - mediated effects, on long-term and very long term.

The research results presented, emphasize the importance of the educational reform efforts to focus more on qualitative aspects in measuring productivity, more precisely on the abilities, competencies that have pupils /students and adults, on motivating teachers, to achieve educational outcomes which could increase students performance, productivity growth on long-term and very long term effects, with an impact at the macroeconomic level.

1. Introduction

The intellect (the intellectual factor) is the one that gives value to the work carried out in any domain (Jivan, 1995), known in the economic theory as the human capital (under neoliberalism contributions). The value of the human capital is given, firstly by the formal education system (Suciu, 2000), based on the expenses made for education by individuals, corporations or by society as a whole, with very long and long term positive effects. Miles (2008) states that education reproduces and disseminates knowledge, information being given to the beneficiaries of the educational system in various learning contexts; in contrast with the other educational levels, higher education is based mostly on channeling creativity to generate new knowledge, because of the studies carried out in Higher Education Institutes. Also, the author mentioned above (Miles, 2008), highlights that education requires the highest level of skills, including of knowledge in education in comparison to other intellect-intensive services.

Measurement of productivity as an efficiency indicator, is discussed in various ways and on various issues posed. For example, the report of the Center for the study of living standards in Canada (1998), defines productivity as a relationship between the output of goods and services, on one hand, and the input of human and non-human resources, on the other hand, the relationship usually being expressed as a ratio. Both, outputs and inputs, are measured in physical volume, not being affected by price variations. Constant prices over a certain period of time are used to add different input and output units to be combined into aggregate sizes. Institutions dealing with statistical data analysis, do not collect statistical data concerning productivity from companies, but calculate productivity based on inputs and outputs data. Indeed, data on production, employment, prices, investments, basic materials, stocks are used on the development of productivity analysis.

Sharpe (2004) identified some problems concerning productivity, of which we retain his concerns for its growth, such as: determinants of productivity developments rhythms, productivity growth in the educational system, comparisons between levels of labour productivity in USA and Europe, the effects of the Internet on productivity etc. Also the problem of productivity growth is approached by Brynjolfsson and Hitt (1998) in "Beyond the Productivity Paradox: Computers have the Catalyst for Bigger Changes". Among specialists who focus on the differentiation between productivity in services and productivity in industry, we can exemplify Sahay (2005), who stated that, for the development of the productivity index in services, static and dynamic parameters, must be used.

In addition, Jivan (2011) states that output type effects (immediate) and result type effects, meaning outcome (mediate) should be considered and implicitly have different time horizons: short term, long term and very long term. Lobonț and Nicolescu (2012), analyse the possibility of performance measurement in the public sector (and implicitly, in the educational system), stating that it is "necessary to outline a new dimension of performance or even improve it, from the valences that were given in literature, to the performance concept, placed in the current economic environment, in order to better reflect the results, consistent with the stakeholders requirements."

2. Methodology and results

This paper discusses several expressive indicators for various determining aspects, influence or possible effects on the productivity in the field of education, realizing an analysis and systematization of them, in terms of their suitability to custom studies.

Measuring output in the intensive-intellect services sector can be done in relation with various value efforts (inputs), on one hand, and, on the other hand, according to activities carried out: recommended solution by OECD and Eurostat, according to Gallouj (2011) and Djellal and Gallouj (2008).

Syverson (2011) clarifies internal factors that affect productivity at a microeconomic level, such as managerial experience, capital and work force quality, information technology, research-development, learning-by-doing, product innovation, firm structure decisions. Among external factors, the author mentions productivity externalities, competition, adequate regulation, input market flexibility (e.g. labor market flexibility).

In The Ministry of National Education Strategy, regarding education and training (2013), indicators such as: school dropout rate based on residence, development regions and sexes, the rate of youngsters who dropped out of school, but which are included in the apprenticeship programs or which have passed through a process of evaluation and certification of competencies acquired in the education system, the share of teachers certified for working in "second chance" type programs are taken into account.

Relating to providing and quality evaluation in higher education, we can distinguish a number of indicators with applicability in Romania.

An interesting set of indicators is the one proposed by Tavenas (2004), using case studies in countries like Italy, Switzerland, Belgium, France, and Portugal. Adapting these indicators to the specific context of the educational system in Romania, we can identify: indicators regarding the

quality of students which take admission exams, indicators regarding the performance of students, the level of research activities, the productivity of the research activities, the level of resources allocated for teaching and research, college governance and management practices.

Regarding indicators that focus on quality, we mention the selection proposed by Damme (2004), which takes into account the phenomenon measured position of the institution evaluated, that measure phenomena related to inputs (the quality and quantity of staff, requirements for admission, admission/registration and access of students), specific activities carried on within the institution (more accurately, clearly defined objectives and strategies, correspondence between learning outcomes and qualifications-level descriptors; the relationship between curriculum, discipline contents and didactic approaches, on one hand, and the objectives of study programs, on the other hand, duration of studies, consultations for students and students ' tasks, student assessment features) to outputs (correspondence between learning outcomes and qualifications-level descriptors, the impact on society and workforce market, the efficient use input resources to achieve outputs) and the answer received by the institution form the socio-economic medium in which it operates (efficient internal procedures for quality evaluation, arrangements regarding the efficient management of quality and innovation, capacity of strategic change and improvement/amelioration processes, efficient organizational strategies to improve quality and students ' participation).

For a proper analysis of the output and performance level, a systematic frame must be used, according to several criteria, indicators based on the literature consulted that can be adjusted and, where appropriate, rephrased, using statistical databases available online, such as the National Institute of Statistics of Romania, the World Bank, Eurostat and OECD, indicators that will form the basis for drafting analyses (including empirical studies).

Thus, depending on the available indicators (availability of data in data bases) and the manner in which they (and relations that can be established between them), can be logical suited for the goals of productivity analysis, for the present analysis we consider the following.

A first group of indicators would be framework-indicators - that generally represent the social and economic system of the country in which the education system reviewed takes place; they include the overall data, data on population (concerning the population whose educational system is analyzed) and economic data. Among economic indicators, we consider: size of the GDP and GDP/capita, GDP/person employed, the number of population, Birthrate, life expectancy at birth (total), the number of infant deaths, the relative poverty rate, etc. Some of these indicators must be considered as conditions, so must be the independent variables. To those mentioned earlier, we can add also within this group (because we consider them characteristic dimensions of socio-economic system), indicators about population such as: employed population (total), employment rate and activity rate (by age group), and according to other criteria, active population, inactive population, unemployment rate, long-term unemployment rate (percentage in total unemployment), people discouraged in finding a job; but also emigrants by age.

These latter indicators are relevant to the state of the economy, about how it is successful (or not) to provide the space and conditions for economic activity (based on his own entrepreneurial spirit, and including jobs) to the nation citizens: this is an essential aspect-even if, of course, other reasons of emigration can be considered; with the existence of various and varied motivations for migration and for economic inactivity and vacancy, the essence of the phenomenon of emigration and unemployment do not start with the alleged discrepancies between the nature, quality and structure of education, on the one hand and the needs of the economy on the other hand: if the economy has little need for labor, for example high qualified, it does not mean that education should not educate people, in the sense of limitation in the direction of the instruction of high-nation concerned: the problem is, in our opinion, contrary to what is more in the spirit of a certain fashionable ideologies, of the economy rather than of education.

Very important-perhaps the most important in our vision-is the category of indicators related to education professionals, namely indicators related to human factors: teaching staff in higher education, employees involved in research and development activities in higher education (category/training levels), researchers in research and development (per millions of inhabitants).

Further we will refer to the indicators that describe facilities associated with education, such as: educational establishments (based on education levels), the number of classrooms and school offices, laboratories in schools, school gyms in education, school labs, school sports fields, swimming pools in education, the number of PCs in tertiary education; they describe the functionality aspects of education quality under certain conditions, some being defining for the national education system, such as the number of educational institutions (especially when it comes to higher education).

The next set of indicators expresses other material aspects – like those related to the nature of

the financing of education, such as: monthly average nominal gross wage in education (lei), the average monthly cost of manpower employed in education per employee(lei), expenditure per student (calculated as a percentage of GDP/capita), public expenditure in education (calculated as a percentage of government expenditure), expenses for education, from the structure of the overall consumption expenditure of a household, by type of expenditure and by main social categories.

We can add indicators which refer to activities related to education, in quantitative terms: school population, enrolled student (per total and per specializations).

Concerning the educational activities results, on short term, we consider first and foremost student results in international assessments (PISA and PIRLS) and student results in the national assessments, rate of passing the baccalaureate, and the number of graduates, per total and after different criteria, including graduates of higher education per specializations.

These data shall be supplemented with data concerning employment, which I already mentioned above, employed population with higher education.

Finally, we can mention indicators relating to the influence over time of educational services.

The number of students registered in tertiary education is an independent variable (factor, input), as well as the dependent variable: the number of registered students depends on the number of institutions of higher education, the existing body of teachers (number of people involved), number of classrooms, number of university laboratories etc.

For his part, teaching staff in university education (number of persons) depends, inter alia, on the salary, on the facilities made available for education and research in the universities (PC's and others), so it is a dependent variable; but in analysis may be considered as an independent variable (factor, input), which hall-marks the quality of educational process.

This brings us to monthly average nominal gross wage in education (lei) which, for the employees in question (as individuals), is an output, representing their marginal productivity. Education as a process (as a system), describes an aspect of education financing, so it is input. As a result, for productivity analysis, it should be considered a dependent variable (output), as well as an independent variable (factor, input).

Facilities such as the number of classrooms and school offices, school labs, PC's used in education etc. are, logically, determinant for the concrete manner in which the education process takes place and for its quality. On the other hand, the facilities are, however, also a resultant: depending on the GDP and, moreover, on the

concern of the ruling bodies (educational institutions and government) for the quality of education (on their concern and on their level/formation: the values of those people who decide for the country, for education, for the quality of education in the hierarchy of priorities that count in their decisions. In general, public expenditure on education (as a percentage of government expenditure) is both a factor, and a resultant. For example, they are influenced (even measured) by the level of education, culture and civilization, results from the level of the intellect (especially education and the level of understanding of the governing body, and, indirectly, of the general public).

The structure of the overall consumption expenditure of a household, is made by type of expenditure and by main categories (in percent), in which expenditure on education is both a resultant and a factor; for example, this structure depends on the GDP/capita.

The degree of coverage of school-age population is a dependent variable: it is usually a result of GDP; perhaps only over a very long term this indicator may have influence the criminality rate, the general condition of care, and, over a short term, hygiene, health of the population, etc. So in this instance, it can be considered an independent variable.

In many analyses of education, unemployment is seen as an effect of the quality of education, with reference to its quality, to the extent that is appropriate to "market needs" etc. although the blame for unemployment is not only to education (and certainly not in the first place) but rather is to the economy itself, if it is unable to ensure the nation's population, activity in the country. Or general condition of the economy, population size, facilities in economy (capital, assets) and everything related to the correlation between these main factors are not given (only) by education (see the conditions of the natural rate of unemployment, from the neo-liberalistic theory). For the Romanian economy, with all the fall of education in the last decade (at least), it is evident that the destruction of the economy after 1989 is the main cause for the lack of jobs. The reasons for this economic fallout are not a subject of our work, however, although we must admit that any educational system that has problems transfers negative effects on the economy of the country concerned, the state of education today is rather a consequence of economic degradation, than its cause.

The number of infant deaths is a dependent variable, having some connections with the level of schooling; but, in correlation with the field of education, it can be considered rather independent, impacting the school population.

The total number of emigrants is a dependent variable: it depends on the quality of education, GDP/capita; it is an effect of the economy in general (economics that does not ensure jobs), but it's a factor for the general level of civilization, crime etc.

3. Conclusions

Most of the indicators used in national and international statistics for calculating productivity in education emphasize the quantitative side, less on the aspects of the quality side (difficult to quantify, it is true), the time lag on manifestation of causalities and cross-relational complexity of strategic services such as national education.

An interpretation of the indicators available in the databases must be based on a deep knowledge of the specific domain operation and of the complexity of its implications, in order to allow the construction of appropriate models of analysis domain (this paper has not proposed a presentation of such a model, but only intuits some elements that can be used, for future papers).

The main factors that endanger the quality and relevance of educational systems are related, first of all, to a particular type of industrial vision and the fact that it puts too little emphasis on a proper measurement of the productivity of these services: the measurement has to be made complex, in the spirit of productivity as a performance in services; in addition, it's about fundamental services, with factorial and impact implications on a temporal and spatial range broader than in the case of the normal production activities that have immediate implications. In addition to issues related to the measurement of skills, the final results of the educational process must be imagined on a wide horizon; the issue raised in recent years by the smaller number of pupils/students, the allocation of few resources was not the most appropriate solution, too little to restore the attractiveness of the teaching profession – with effects on quality over a very long term.

That's why future reforms in education - focused more on retrieving of benchmarks (including traditions), rather than on changes at any cost, which, unfortunately, have become a kind of scope itself - are essential for ensuring the quality of education, by effectively encouraging, in terms of the market, innovation and performance of teaching or scientific research, that the educational system can create solid human and professional statutes to youngsters, including providing appropriate skills required by the labor market. Better management of education and, in general, the staff encourages innovation, competitiveness and productivity across the whole society, which is the key to the system functionality, including at the macroeconomic level.

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