Management approach regarding education’s role over the national economic growth

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Abstract

The paper highlights the massive role of education in the national economical growth. For this, after a study made in Resita, we elaborate an economical growth model, following successively more steps. We used a small number of variables considered as significant in demonstrating human capital – economical growth correlation. Based on statistical data for 1990 - 2006, we tried to build several variants of a mathematical model that correlate the IBP comparing to previously year level, function of a serial of determining variables for measuring the education’s role in human capital.

Keywords: Education; study; sample; survey; IBP

1. Introduction

It has been argued that high rates of education are essential for countries to be able to achieve high levels of economic growth. In theory poor countries should grow faster than rich countries because they can adopt cutting edge technologies already tried and tested by rich countries. But economists argue that if the gap in education between a rich and a poor nation is too large, as is the case between the poorest and the richest nations in the world, the transfer of these technologies that drive economic growth becomes difficult, thus the economies of the world's poorest nations stagnate.

The purpose of the paper is to highlight the massive role of educational variable in economic growth of Romania, following the ”part to whole” concept, by making a study in Resita city regarding the impact of education over the population in this region, and after that we tried starting from the data obtained by the researches all over the world to point out the influence of education in Romania, going from a small number of variables that influence the human capital role in economical growth and going forward by using a large number of variables (in witch the education...
variable is very important) that influence the human capital and determine how the economical growth is influenced by the variables that determine the human capital role.

The research made in Resita city is divided in two components: a quality study (a made pre-research) and a quantity study. The investigated subjects are the population of Resita city. The research questionnaire is made with 10 question witch from three of them are identification question, referring to sex, age and occupation of the questioned subjects. The sample for the quality study, are 60 persons. The validity of the quality study is realized by the quantity study by using a survey in which the building of the sample is made by benchmarks method. In our case the sample obtained is 158 persons.

Starting from the data obtained by the researches all over the world we want to point out the influence of education in Romania, going from a small number of variables that influence the human capital role in economical growth and going forward by using a large number of variables that influence the human capital and determine how the economical growth is influenced by the variables that determine the human capital role.

2. Education’s role regarding national economic growth

The quality study consist in collecting and analyzing the psychical and sociological elements that allows explaining of the attitudes, motivations and the behaviour of all implied in the study.

The questioned subjects are population of Resita city compressed in a representative sample. A quality study precedes a quantity study because the information obtained is not enough for elaborate hypothesis.

The results of the quality study depend of the number of questioned persons, sampling, effective display of the study, and presentation and interpretation of the data obtained. For making a correct sampling we have to list the main criterions and for each criterion we list the possible levels. By listing the criterions and making a junction between them we have obtained a sample for 60 persons. The questioning of the 60 persons is considered a pre-research made with the purpose of finding out witch is the percent of persons who believes that the quality of public management is good. Function of this percent, witch represents the appearing frequency of studied phenomenon; we will determine the size of the sample at the city of Resita level, sample that is used in the quantity study.

For a better representatively we questioned the population of every quarter in Resita city. For this the statistical data have been used, more exactly the census made in 2006.

The validation of hypothesis formulated by the quality study is made through the quantity study. For this we can use two categories of investigation, the census and the questioning. As main steps in elaborate an investigation through a questioning we remind: building the sample, determining the size of the sample, making the questionnaire, administrating the questionnaire, analysis of obtained data, making the synthesis rapport.

The determining of the sample is made different function of polling rate:

\[ R = \frac{n}{N} \times 100 \] (1)

\[ R = \text{poll rate} ; n = \text{studied population} ; N = \text{mother population} \]

If the sounding rate is less then 14, 3% we have the situation of a non exhaustive poll, and if the poll rate is more then 14, 3 we have an exhaustive poll.

In this case it has been determined a non exhaustive poll, whom size is given by the relation:

\[ n = \frac{t^2 \cdot p \cdot (1-p))}{\Delta \omega^2} \] (2)

\[ n = \text{minimal size of the sample} ; t = \text{coefficient that correspond to the probabilities whom with it is guaranties the results} ; p = \text{proportion in the sample that posses the studied characteristic}; \Delta \omega = \text{accepted limited error}. \]

The sample used in our quantity study is:

\[ n = \frac{[1,96^2 \cdot 0,8833 \cdot (1-0,8833)]}{0,05^2} \approx 158 \text{ persons} \] (3)
From the questionnaire we see that 53 persons have chosen variant “a” at question number 7, meaning a percent of 88.33. Dividing with 100 we obtain 0.8833 (the p from the formula).

At the question “Are you familiar with educational offer in Resita city?” 94.9 % of questioned persons have answered affirmatively, this thing maintaining over the criterions of age, gender and occupation. Asked about educational stage that they think is most important, 47.4 % choose university stage, and they are over 50 years old and less of them 3.7 % choose post university. When asked “How do you appreciate the scholar curriculum?”, 49.3 % of them said that this is good, and they are persons between 20-30 years old, while 15.2 % of them considered the scholar curriculum not so good. Referring to the efficiency of human resources, 51.8 % from the questioned persons said that they are efficient, while 7.6 % of them considers the civil servants not well trained comparing to the asked responsibilities, and they are persons between 20-30 years old. Asked about the help of educational system in future career, 39.8 % of investigated persons have answered “I believe so”, and they are persons between 20-30 years and those who are between 30-40 years old. Let’s remind that a percent of 31.7 answered that the educational system will help young people in future career. Questioned about the cost of educational system, 55.2 % of those investigated said it is normal, and less of them, 9.4 % of them said that this is big.

Referring to the quality of management in public administration, 83.1 % of questioned people have said that this is good, while only 7.5 % of them considers that this is satisfying.

Starting from the data obtained by the researches all over the world we want to point out the influence of human capital in Romania, going from a small number of variables that influence the human capital role in economical growth and going forward by using a large number of variables that influence the human capital and determine how the economical growth is influenced by the variables that determine the human capital role.

Trying to point out the human capital role over the economical growth in Romania, we used a serial of statistic data for the period of time between 1990 and 2006 (official and available data) and we build several variants of a mathematical model that correlate the IBP comparing to previously year level, function of a serial of variable considered determined for measuring the human capital.

In the first model variant we putted the following variables function of we calculated IBP of the current year.

\[
\ln IBP_i = \alpha + \beta \ln \% INV_{i-1} + \gamma \ln EDUC_{i-1} + \Delta \ln BOOKS_{i-1} + \xi \ln STUD_{i-1}. \tag{4}
\]

\( IBP_i \) – the level of internal brute product on citizen from current year; \( \alpha \) - The coefficient of the other factors correlation that isn’t in the equation; \( \beta, \gamma, \Delta, \xi \) - pondered coefficients; \( \% INV_{i-1} \) – the rate of fixed capital brute formation in IBP (%), for previous year; \( EDUC_{i-1} \) – public expenses for education (%) from IBP, for previous year; \( BOOKS_{i-1} \) – number of typed books (titles) at 100.000 citizens, in previous year; \( STUD_{i-1} \) – number of students / 100.000 citizens, in previous year;

The used equation in the first model, because of the obtained results, according to Neuman test and Durbin–Watson test, does not satisfy autocorrelation demands, so we can not obtain satisfactory results.

These conclusions are sustained even by the deviation values that are larger and larger on the period and changes unjustified theirs sign.

The trust grade of the model given by R² variable is complete unsatisfying.

If it doesn’t logarithm the data, although the algebras sign maintains, the obtained values haven’t got enough good attributes, hereby the variant 1 modified represents a demonstration of the necessity in using a semi logarithm model, because of the proportional dependency between variables.

\[
\ln IBP_i = \alpha + \beta \% INV_{i-1} + \gamma EDUC_{i-1} + \Delta BOOKS_{i-1} + \xi \ln \ln STUD_{i-1}. \tag{5}
\]

The second tested model include as a variable of human capital, the percent of research expenses, activity that should patented accumulated knowledge and contribute at sustaining the durable economical growth. Unfortunately, an analysis of the values given to this activity, as a percent in IBP, demonstrates a small preoccupation of
macroeconomic policies in this area. With that given, the obtained values for the research activity coefficient, points out the important percent of this variable in IBP evolution.

\[ \ln \text{IBP}_i = \alpha + \beta \ln \% \text{INV}_{i-1} + \gamma \ln \text{EDUC}_{i-1} + \Delta \ln \text{BOOKS}_{i-1} + \xi \ln \text{STUD}_{i-1} + \tau \ln \text{RESEARCH}_{i-1}. \quad (6) \]

RESEARCH \(_{i-1}\): the percent of expenses with scientific research in total IBP expenses in previous year.

Using a program in Pascal system, the equations system is undetermined, the obtained values being significant for this variant model.

In the third variant of the model, using information that was given by some authors and because of the multiple effect of external trade over the human capital, we have introduced a new variable- the dependency grade of external grade.

Introducing in the model this variable we obtained the values in coefficients table.

\[ \ln \text{IBP}_i = \alpha + \beta \ln \% \text{INV}_{i-1} + \gamma \ln \text{EDUC}_{i-1} + \Delta \ln \text{BOOKS}_{i-1} + \xi \ln \text{STUD}_{i-1} + \tau \ln \text{RESEARCH}_{i-1} + \varsigma \ln \text{DEP. EXT. COM.}_{i-1} \quad (7) \]

DEP. EXT. COM. \(_{i-1}\): exports + imports (%) from IBP, for previous year.

The new models give a major role to the international trade, in determining economical performances of different countries.

The conclusion is that in some conditions, opened economies will grow faster than the closed economies.

Generally, the new models concludes regarding the role of international trade function of the influence they have over the technical progress in countries that participate to exchanges, and we are talking about countries with similar or unequal level of development.

Considering that between IBP and dependency grade of external trade is a exponential dependency, we haven’t logarithm this variable, the obtained function having the following formulation:

\[ \ln \text{IBP}_i = \alpha + \beta \ln \% \text{INV}_{i-1} + \gamma \ln \text{EDUC}_{i-1} + \Delta \ln \text{BOOKS}_{i-1} + \xi \ln \text{STUD}_{i-1} + \tau \ln \text{RESEARCH}_{i-1} + \varsigma \ln \text{DEP. EXT. COM.}_{i-1} \quad (8) \]

Of course, the value and the evolution of IBP in a period of time depend, from the quantitative point of view, of demographical rate. That’s why we introduced this variable in the forth variant of model, the signs of the other variable maintaining unchanged, and as values, the changing are insignificant.

\[ \ln \text{IBP}_i = \alpha + \beta \ln \% \text{INV}_{i-1} + \gamma \ln \text{EDUC}_{i-1} + \Delta \ln \text{BOOKS}_{i-1} + \xi \ln \text{STUD}_{i-1} + \tau \ln \text{RESEARCH}_{i-1} + \varsigma \text{DEP. EXT. COM.}_{i-1} + \theta \text{Demographical rate}_{i-1} \quad (9) \]

Demographical rate – annual growing rate of citizens (%), for previous year.

Because of unfavourable economical and social factors, of diminution in level of living, of excluding some important category of young people from work market, and the temptations offered by developed countries that knows better how to evidence the work and creation potential, is more often a new tendency in human capital flux: emigration.

That is the reason why we considered this being the variant number five of mathematical model, witch illustrate better the proposed objective, the correlation between IBP and human capital variables.

\[ \ln \text{IBP}_i = \alpha + \beta \ln \% \text{INV}_{i-1} + \gamma \ln \text{EDUC}_{i-1} + \Delta \ln \text{BOOKS}_{i-1} + \xi \ln \text{STUD}_{i-1} + \tau \ln \text{RESEARCH}_{i-1} + \varsigma \text{DEP. EXT. COM.}_{i-1} + \theta \text{Demographical rate}_{i-1} - \psi \ln \% \text{Emigration}_{i-1} \quad (10) \]
The model is based on cross section data, which means that one of the problems that could appear is the presence of heteroscedasity.

By applying a t test for every variant of models proposed have resulted values who compared to the table values, for trust grade of 95 %, allows acceptance of the zero hypothesis, which means that there are not heteroscedasity, and so the model doesn’t have to be corrected.

3. Conclusion

As we seen from the research, the quality of educational system is connected to the efficiency of human resources. The educational manager has to be continuously in the know with people attitudes about the educational area, in order to improve the relationship between educational area and labor market. The positive outcomes are the propagation of efficiency while the negative outcomes means higher costs in training the human resources. Because of these, in the future, educational manager has to focus on people, because investment in people makes the institution efficient.

If the question “investment in human capital deserved to be realized?” is not a rhetoric one, then this answer is “Yes”.

Intellectual investment deserved to be realized according to the results of analyzed model.

Two restrictions must be taking care of in interpretation of these results. One motive lies outside the model itself: the statistics always contains observation errors, especially for educational variables.

In a weak economical environment and unequal restructured and reformed – like in Romania in the transition years – the efforts in replanting economical growth, modernizing economical structure, lead to oscillated revolution, to a periodical come back over the macro economical stabilization, maintaining inflation in control, increasing the trust of population in national coin, the reducing of structural deficits including the one of the consolidate budget.

On the other hand, the model has a objective deficiency, because of the fact the analysis in which the IBP is influenced by investments, education, research, number of books, emigration from the previous year, is difficult to express because any investments, as much in physical capital and in human capital it recovers after a time interval and not in the following year.

Of course a higher level of IBP means that more families can afford to spend more in education.

The results of the “t test” show the significant of regression equation.

Educational variable has a significant coefficient at a level of 5%. An increasing of 1% in the number of students at 100,000 citizens determines a increase of 1.89 % of IBP/citizen.

In conclusion, intellectual investment could be and should be considered as a separated part in total volume of investments for a country, as a determinant of the real output for that country.

Education should be included as an independent variable in economical growth models.

References

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