Assessment of economic efficiency of investments into the human capital in modern conditions

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Abstract. Article is devoted to research of economic efficiency of investments into human capital. At the beginning of article there is characteristic of existing empirical researches of norms of benefit from education, made in Russia and abroad. Further on there are results of the calculation of payback of private investments to the higher education which show that in modern conditions of Russia investments in the higher education are extremely favorable. High norms of return from education and a short payback period of investments simplify the reasons of continuously accruing demand for it from population, especially young. The population education level in Russia is rather high, however the saved-up human capital is used insufficiently. Many people with higher education are compelled to take jobs which don't demand higher education. On retention of current situation there can be a decrease in those economic advantages which now gives accumulation of human capital.

Introduction

The theory of human capital was created in 1960th generally thanks to efforts of American economists – G. Becker, T. Schultz, J. Mincer (Becker, 1964; Schultz, 1963; Mincer, 1974). T. Schultz introduced into scientific circulation concept of "human capital" and suggested to consider expenses for education as investments into this capital [1]. G. Becker developed theoretical bases of the concept of human capital [2]. Wide scientific interest to problems of human capital in Russia arose after G. Becker in 1992 was awarded Nobel Prize on economy for distribution of the sphere of microeconomic analysis on a number of aspects of human behavior. J. Mincer offered a convenient way of an econometric assessment of return on education [3].

In scientific researches human capital is understood as a combination of economically significant qualities and abilities of person (education, health, mobility, mental and entrepreneurial ability, gender, age) which in case of effective use bring private and public return [4]. Investments into the human capital first of include expenses for education and vocational training. In a more comprehensive sense under the investments into human capital we understand the expenses directed on improvement of state of health, expenses connected with the birth and education of children, migration, information search on labor market.

Consideration of expenses on education, professional development, improvement of health as expenses of investment type forces to look at a problem of an assessment of economic efficiency of investments into human capital in a new way.

Private and public norms of return, measuring efficiency of investments in different types of education were repeatedly calculated abroad. According to available data, in economically developed countries for secondary education the of norm of return were at the level of 15–20%, for the highest – 10–15%, and for the steps connected with receiving ranks of the master or the doctor, – at the level of 5% [5].

There are private and public norms of return. Private norms of return reflect a ratio between expenses and benefits of education and other elements of human capital for the certain person (or the enterprises where he works). Public norms of return – a ratio between cumulative expenses and benefits which fall on society as a whole.

As a result of numerous empirical researches there were revealed following dependences: public norms of return are always lower than private; public and private norms of return from investments in primary education are higher than in secondary, and the last above, than in the higher education; private and public norms of return from investments into education in countries with low level of income per capita, are higher than in countries with high income. For example, by J. Psakharopulos and H. Patrinos's estimates in majority of countries with low level of income per capita public return of primary education was equal of 23%, secondary – 15%, and return of higher education – 11%. In the most developed countries of the world with high level of income public return of primary education was equal to 14%, secondary – 10%, the higher education – 8% [4].

Results of the empirical researches conducted by P. Gregory and J. Colhase in the late 1980 th on the basis of poll of the former Soviet citizens, emigrated to the USA, showed that in the Soviet Union salary poorly correlated with education level and other assets of human capital. By their estimates, the norm of return from investments into education in the Soviet Union varied from 2,3% for the secondary to 5% for the higher education, and return on length of employment was at the level of 2–3%. Women had higher norm of return from education, than men [6].

There were not many empirical researches of efficiency of investments into the human capital in post-reform Russia. One of the most interesting is the work performed in the mid-nineties by D. Nesterova and K. Sabiryanova. According to the Russian monitoring of economic situation and population health authors analyzed factors influencing level and dynamics of salary through assessment of norms of return from investments into human capital. The regression analysis of equation of salary of J. Mincer performed by Nesterova and Sabiryanova on the basis of 1994-1996 data, showed that the private norm of return from investments into education during this period made 6–8% of a gain of salary for each additional year of education; the norm of return from professional experience on labor market was equal to 1–3%; return from special human capital, i.e. experience which has been gained on this job, wasn't essential and isn't statistically significant [7].

Among modern researches considerable scientific interest is represented, in our opinion, by works of scientists of National research university of Higher School of Economics (further NIU VShE) – R. Kapelyushnikov and A. Lukyanova. They presented estimates of norms in the book "Transformation of the Human Capital in the Russian Society" the returns calculated on basis of the "mincer" equation of earnings. Authors used data of 6-18 rounds (1994-2008) of the Russian monitoring of economic situation and population health. By estimates of R. Kapelyushnikov and A. Lukyanova, norms of return from education fluctuated within these years in the range of 5-7%. In other words, increase in duration of education for one year provided gain of earnings approximately for 5-7%. Women's norm of return on education were about by half higher, than men's: 7,5% against 5% [8].

Method

Traditionally in scientific literature economic efficiency of investments into human capital (including in education) is defined with the use of indicators of the net present value (NPV), internal rate of return (IRR), index of profitability (PI), pay back period (PBP). In works of the Russian scientists

calculation of indicators stated above was carried out only for the purpose of determination of efficiency of investments into specific educational projects or comparisons of various investment projects in education and a choice of the best of them. It is possible to refer calculation of efficiency of receiving degree of MBA (Master of Business Administration) to works of this sort in Russia as a special case of investments into human capital.

The main objective of our research consisted in calculation of payback of private investments into higher education in modern conditions of Russia by means of indicators of internal rate of return and the pay back period. Statistical data of Inspection of a salary on the professions, conducted by Federal service in Russia in 2009 became information base of research. This inspection contained necessary data on average monthly salary of workers on an education level, including by gender. Also data published in collection "Social Status and Population Standard of Living" on average consumer prices of separate types of service in education system [9] were used. As a whole, our research was guided by official statistical data.

In classical model of assessment of investments into the human capital, benefit from education is expressed in higher level of earnings after education in comparison with level of salary of the persons who don't have education. Costs of education include direct costs (a tuition fee, expenses on acquisition of textbooks, etc.) and indirect expenses in the form of the "lost" earnings during training. The "lost" earnings are those earnings which students could receive if they didn't study, and worked. Calculations show what exactly these expenses make the main share of cumulative expenses on human capital.

At determination of economic efficiency of investments into the higher education we compared lifelong earnings of persons with senior secondary education to persons with higher education provided that receiving secondary education was paid by the state at expense of budgetary funds and formally was free for people, and was higher education was on the terms of a full recovery of expenses for training. Thus, the cost of stream of benefits from the higher education is equal to difference in lifelong earnings of persons with the higher education and the people who have received only senior secondary education. The "lost" earnings of the persons which get higher education, were equal total for years of training to average earnings of the Russians having secondary education. The cost of direct expenses on education included average training cost in higher education institution countrywide. The period of forthcoming

work corresponded to the period after graduation up to a retirement (i.e. 38 years – with 22 to 59).

When determining internal rates of return we considered the career growth of salary during the forthcoming labor activity of the worker. Calculations were carried out for two options of development of career. The average option of development of career assumes that due to career growth the worker will increase the initial salary twice during the forthcoming work. In this case average annual level of career growth will be equal 1,8%. The persons which have made successful career, will have their salary increased during the forthcoming work by 3 times with an average annual growth in 3%.

The internal rate of return (IRR) represents such interest rate at which the specified cost of future benefits from education is equal to the specified cost of its expenses. The higher is IRR, the more profitable an investment into the human capital is. In other words, the internal rate of return shows, on how many percent earnings of person increase at increase in duration of education for one year. The formula for definition of private rate of return from investments into higher education is given by:

$$\sum_{t=t_1}^{T} \frac{(B_t^1 - B_t^*)(1+j)^t 12}{(1+r)^t} = \sum_{t=0}^{t_1} \frac{B_t^*(1+j)^t 12}{(1+r)^t} + \sum_{t=0}^{t_1} \frac{C_t}{(1+r)^t},$$

where r – internal rate of return from investments into the higher education; B1t – average monthly earnings of persons with the higher education in year of t, rub; B*t – average monthly earnings of persons with senior secondary education in year of t, rub; T – the period of the forthcoming labor activity, years; t1 – training time in higher education institution, years; t – time index; j – average annual level of career growth, %, Ct – average countrywide training cost in a year in higher education institution, rub.

Time for which the sum of additional benefits from higher education, counted as difference between earnings of persons with higher education and senior secondary education, will cover the sum of costs for education is called the period of payback (return) of investments into the higher education.

Results of our research of efficiency of private investments into human capital showed that in modern conditions of Russia investment in education (first of all the highest) are extremely favorable. The coefficient of payback of private investments in higher education (internal rate of return) makes from 17,2 to 18,4% depending on option of development of career. The average period of return on investment in the higher education makes about 2 years. Taking into account the size of the "lost" earnings – nearly 10 years.

Table 1. "Awards" on various education levels, 2009, % (% of excess over earnings of workers with senior secondary education)

Education	All workers	Men	Women
Higher education	76,3	63,6	91,9
Secondary professional education	14,2	8,2	21,8
Primary professional education	3,3	1,9	4,3
Have no secondary (full) general education	−8,3	−8,5	−8,4

Result

As an alternative indicator of payback of investments in human capital so-called educational awards can be also used. In this case we do not estimate how the salary increases at increase in education for one additional year and how it increases upon transition of person from lower to higher education level, for example, from secondary – to high. Estimates of awards are presented in the table on various education levels in comparison with senior secondary education. Source of information is mentioned earlier Examination of salaries by professions, conducted by Federal service in Russia in 2009. It appears that other things being equal persons with the higher education earn nearly 80% more, than persons with secondary education, i.e. the educational award for higher education in Russia makes about 80% (76,3%). For secondary specialized colleges graduates the award for education is equal about 14%. To those graduates who graduated from technical training colleges, it practically gives nothing, the prize in salary is about 3%. And those who didn't get even secondary education, lose about 8% in salary. The sizes of educational awards consistently increase upon transition from lower to higher steps of an educational scale both for men, and for women.

High payback of higher education, and also steadily high level of award for higher education considerably explains the reasons of continuously accruing demand for it from population and sharp increase in a share of students in the corresponding age cohort. Already now among Russian citizens at the age of 25–35 years the population share with the higher education makes 57%. It is one of the highest rates in the world, on 15 percentage points exceeding similar indicator in the USA. About 90% of families prefer the higher education for children, 66% of citizens are ready to pay for it. 75% of graduates of school plan to go at once to the universities, more than a half of students of colleges and technical schools also are going to get higher education.

No wonder that increase in demand for high school diplomas stimulates extension of the offer of the higher education, being accompanied with

decrease in its limit quality. At those observed economic advantages which are promised by existence of the higher education to his owners, it is difficult to count that young people will voluntary change the priorities in favor of primary or secondary professional education which pay off much worse. This tendency – growth of market value of the advanced general tertiary education in comparison with highly specialized professional – is characteristic for all developed countries of the world [10]. And Russia is not an exception.

Conclusion

Another thing is that sharp shift in educational behavior of Russians imposes new requirements to labor market. Workers of new generation look for the creative, interesting work connected with communications. They are ready to frequent change of job. Thus the most important characteristic of a choice of work as researches show, is not the salary, but the social status of the worker. At the same time free workplaces among office workers, in the trading companies, in the budgetary sphere are settled. "We will face the most serious challenge: people won't be able to find work in compliance with their already seriously adapting requirements, – the rector of NIU VShE Ya. Kuzminov warns. – Already today from 20% to 30% of people with the higher education declare that their professional skills will very seriously be underused – actually they are engaged in work which isn't demanding the higher education" [11, 12]. It is supposed, that by 2020 the share of such "socially unsatisfied" will make 10% of able-bodied population, and in large cities this figure will be twice more. On retention of current situation the gap between the accelerated accumulation of human capital and its inefficient use, between high quantitative and low qualitative characteristics of obtained education won't reduce and will increase. The result of it may be washing out of those economic advantages which gives accumulation of human capital, first of all in the form of higher education.

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