Evaluation of Investment in Human Capital Economical Effectiveness

Vilda Giziene, Zaneta Simanaviciene, Oksana Palekiene

Kaunas University of Technology
Kestucio st. 8-203, LT-44320, Kaunas, Lithuania
e-mail: vilda.giziene@ktu.lt, zaneta.simanaviciene@ktu.lt, oksana.palekiene@ktu.lt

According to human capital theory the higher education is considered as an investment decision. In order to be beneficial from economic point of view and in comparison with other investment opportunities, investment in education should give a higher rate of return on investment. Knowledge about the return on investment can help to make competent decisions, which would have an economic benefit in the future. Evaluating the investment in human capital (education) as an individual decision, since the vast majority of individuals for gained education should pay themselves and only a part of the price shall be covered by the state, the rate of return on investment becomes an increasingly important evaluation criterion. Making an investment decision it is very important to allocate resources properly. For the individual the costs of this investment include poor wages and direct costs. It can be assumed that individuals with higher education will be paid more than the others without education. Thus, the investment in higher education (human capital) is useful as long as there is a positive difference between marginal benefit and marginal costs. Higher education is a guarantee of a higher life quality. But, in order to ensure the higher life quality, such main factors as individual skills and labour productivity should be eximined.
Investment in human and physical capital doesn't only promote the growth of labour market. The investment such as lower inflation rates and freer trade (lower limits) also stimulates the economic growth. The ability to absorb easily technological change increases labour productivity and efficiency.
Education, lifelong learning and health are very important investment in human capital. The foreign scientists performed researches and proved that income growth of individuals depends on the level or degree of education the individual has gained. Rate of return on investment in human capital is positive even after direct and indirect costs estimation. The individuals with higher education have higher incomes in comparison with individuals with college education.
Education is one of the most important development factors of the modern knowledge based economy. However, educational and scientific development requires the long-term and huge investment. This investment also should be assessed from the social aspect. On the one hand investment in human capital should be stimulated; on the other aspect it should assess their effectiveness. As the investment in human capital is a complex problem from both practical and scientific aspect, so the practice of such evaluation and applied methods do not give an unambiguous answer. It is very important to evaluate the effectiveness of this investment, to estimate the detention of the time, the money flows: incomes (revenues) and outcomes (expenditures).

Keywords: *human capital, investment in human capital, rate of return on investment, internal rate of return (IRR), short-period return on revenue.*

Introduction

The evidence of ongoing globalization processes increases the value of human capital as the most essential factor of public economy, thus offering priority to human capital, consisting of knowledge, abilities and skills, against material or financial resources. Recently, accumulation of non-material assets (scientific achievements, the increasing level of education) is gaining priority. The accumulated human capital is an important factor of the individual's income and employment-related perspectives.

Baier et al., 2006; Becker, 1964; Haveman, et al., 2003; Kendrick, 1976; Kuznets, 1961; Mankiw, Romer, Weil, 1992; Mincer, 1958, 1962, 1974; Mulligan, Sala-i-Martin, 2000; Schultz, 1971; Weisbrod, 1961; Benhabib, Spiegel, 1994; Hanson, 1996; Globerman, Shapiro, 2002; Noorbakhsh, et al., 2001; Warner, 2002; Psacharopoulos, 1995; Hiroshi Ono, 2001; Mincer, 1974; Kazlauskaite & Buciuniene, 2008; Liepe & Sakalas, 2008; Giziene & Vasiliauskaite, 2007; Sakalas & Venskus, 2007; Girdauskiene & Savaneviciene, 2007; Sedziuviene & Vveinhardt, 2009; Melnikas, 2008, Daugeliene & Marcinkeviciene, 2009; Ciarniene et al., 2007; Dubra, Kasalis & Purmalis, 2008; Stukalina, 2010; Dubra & Gulbe, 2008 provide a comprehensive analysis on the human capital, investment in human capital (investment in higher education is the most significant part of human capital evaluation), its efficiency and pay-back, coherences with the knowledge economy and the labour market.

Education is considered as one of the most important factors of modern knowledge economy development. The development of education and scientific spheres requires long-term huge investment. This investment should be analyzed from social approach. On the one aspect,

investment in human capital should be encouraged; on the other hand, its efficiency should be assessed. Neither the evaluation experience nor methods applied offer an unambiguous solution, thus evaluation of investment in human capital is a complex problem both from the practical and scientific aspect. It is essential to assess the efficiency of investment, establish the time ratio and probability of error, cash flows: incomes (revenues) and outcomes (expenditures). Much funding is assigned for higher education, however, there is "brain drain"; therefore it is very important in order to evaluate both individual and public benefits. In modern economy non-material resources are gaining value; experienced, competent, skilled and well-educated employees increase the organization's value (Makstutis, 2007). Loss of human capital due to emigration has a negative impact on the national economy growth (Cekanavičius, Kasnauskiene, 2009). However, none coherent evaluation on relationship between the labour market and education system indexes and investment in higher education, which could serve as basic for specifying individual and public benefits of investment in human capital, has been provided either in works of foreign or Lithuanian authors.

Investment in higher education, as the basic form of human capital, offers both personal and public benefits. Within modern economy, environment investment in human capital is increasing. At the state level human capital affects economic growth and increases advantageous national competitiveness (Drucker, 1997; Nehru et al., 1995; Porter, 1998). Increasing investment increases the importance of pay-back on investment. Many countries calculate the efficiency indexes of investment in higher education, as the basic form of human capital (Lemelin, 1998; Blaug, 1972; Wahrenburg, Weld, 2007; Psacharopoulos, 1995; Marsikova, 2004; Hiroshi Ono, 2001; Mincer, 1974; Appleby et al., 2002; Davies, 2004). With reference to efficiency indexes in higher education, it is possible to explain differentiation of remuneration by age, profession, gender, also distribution of resources between scientific research, education, professional training as well as establish the efficiency of investment in one or another trend can be described and regulated. The investment process involves both the individual and the state; thus, the investment efficiency should be analyzed from the individual and public perspective. Evaluating efficiency of investment in human capital from the public perspective, it is essential to consider the "brain-drain" problem which has recently become urgent in modern economy.

Relevance of the topic. Much funding is assigned for higher education, however, there is "brain-drain"; therefore it is very important in order to evaluate both individual and public benefits.

Aim of the article. To evaluate the investment in human capital of Lithuania.

Objective of the article.

• Conduct theoretical analysis of the human capital concept and structure.

• Identify the indicators which describe the investment in human capital.

• Evaluate investment in higher education on the basic of theoretical investigation conducted.

Theoretical concepts of investment in human capital structure

The official date of human capital birth is related to „The Journal of Political Economy" publication of October 1962 when series of articles on the main problem of related to the human capital theory were included into its supplement „Investment in Human Being". The human capital theory is a modern economy theory concept which analyses problems of formation and quality of the labour power. American scientists S. Becker, B. Weisbrood, D. Mincer, F. Denison, T. Schultz are among the beginners of this theory development. In their works these economists have formulated the basics of the theory and made it the object of scientific research. The human capital term is based on production skills and knowledge implemented through labour resources, which have a certain service value on economic assets in the future.

Specifically, human capital is the economic worth measuring tool of people's skills, consisting of their knowledge, skills, abilities, attitudes and experience (Becker, 1964; Heckman, 2000; Jaw et al., 2006; Mincer, 1958; Schultz, 1961, 1971; Smith, 1776, 1937). Later, Schultz (1981) defined the human capital as "the features acquired by people are valuable and could be complemented by appropriate investment". The accent of human capital (compared with other forms of capital, for example, material (physical) and financial capital) is that it is a part of human life. The human because it is implemented by the human and capital because it is analyzed as the source of oncoming gains, income or both of these components" (Schultz, 1971).

Becker believed that human capital consists of features that will enhance the ongoing revenues of psychological and human resources, as well as the activity affecting the income – the investment in human capital (Becker, 1964). In other words, any acquired properties and abilities in order to help individuals or groups to be economically productive can be considered as a person or group human capital. The economic importance of human capital depends on the contribution developing the national competitive advantage, and therefore on the economic growth of the state (Drucker, 1999; Nehru et al., 1995; Porter, 1998). Analyzing the human capital in the context of all economic development indocators, such as infrastructure, political institutions, laws, business environment and etc., human capital is examined as the combination of two components: intellectual skills and knowledge. Therefore, the searching of the factors that determined the economic growth had a great interest in the evaluation of human capital reliability (Baier et al., 2006; Barro & Lee, 2000; Globerman & Shapiro, 2002; Haveman, Bershadker & Schwabish, 2003; Mankiw, Romer & Weil, 1992; Nehru et al., 1995; Schneider & Frey, 1985; Warner, 2002).

In the report of European education economic experts' network (Woßmann, Schutz, 2006) it is emphasized that *essential concept of human capital theory is based on the fact that everyone's education is an investment in yourself, which productively allows to contribute in order to improve the society position.* Like any investment, the investment in human capital requires the start-up costs, i.e.

direct costs and the possible costs during the studies hoping that in the future this investment will determine the higher level of productivity, higher wages for their work, the lower risk to be an unemployed, and so on. T. Schultz (1998) states that according to economic role the human is similar to natural resources and physical capital. Under primarily condition, the human, as well as the natural resources, does not provide any economic effect, but, after some special training, the human capital is formed and is able to give revenue and profit in the future. Therefore, it is important to mention two features of human capital formation (Paulaviciene, Seniunaite, 2002):

1. Patientce requires for waiting during the entire training period, when the learner doesn't produce the goods and services;

2. Production capacity is subsequently increased, because more educated person, in comparison with less qualified, is able to produce more and of higher quality products.

Analyzing human resources by some features they are similar to the natural resources, by others – to physical capital. Under primarily condition the human, as well as the natural resources, does not provide any economic effect, but after some special training the human receives the capital quality. Consequently, increasing the cost for labour quality improvement, the work, as a contributor of nature, gradually becomes the human capital (Schultz, 1971).

The history of human development proves the linkage between the level of education and economic development. The successful economic development more depends on what the investment will be in growth and development of human and intellectual potential, i.e. in human capital. The enormous resources for solving these issues should be directed in a long-term period. The results of such evaluation will be able to balance the education and training policies. It is very important to evaluate the effectiveness of this investment. In order to examine the ways investment in education is evaluated, the social issues could be analyzed. From one aspect, the investment in education could be encouraged, from another, their effectiveness could be evaluated. The grouping of investment in human capital is presented in Figure 1.
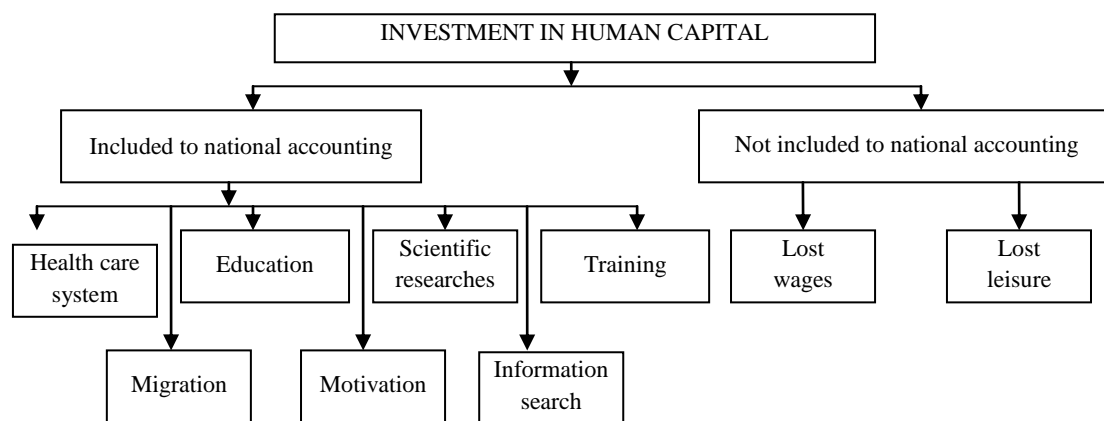

Figure 1. Trends of investment in human capital

Source: Думова, И. И., Колесникова, М. В. (2001); Bagdanavicius (2009)

Gross investment in human capital involves the acquisition and maintenance costs, including the costs for children's nutrition, care, clothing, shelter, medical services and personal care. Based on scientific researches, 10 percent human health depends on the health care system, 20 percent - on ecological conditions, 20 percent – the health genetically is inherited, and as much as 50 percent is the most important factor that determines the human health, is a way of life and all the other factors directly related to human lifestyle (Bagdonienė, 2002).

The prime role in formation of human capital devolves not only for government organizations, but also for private companies. The role of these companies can accept many forms. The most popular are training courses and staff training in workplaces. The companies are interested in staff training due to economic interests. The companies suppose that it is profitable to increase their employees' human capital, because in the future such increase will raise the volume of production. In order to seek maximizing the profit, the companies organize staff trainings. The marginal profit, obtained from the trainings, will not be equal to the cost of trainings. In the situation if the marginal profit, due to trainings, increases the marginal costs, the training volume should be increased. The companies, which spent lot of money for staff training, use the following principle: the increasing employee's marginal productivity after trainings should be bigger than their marginal wages, but in the future it shoul exceed the incomes, that he will get working in another company. The cyclical character of human capital asserted when the employee will be redundant, i.e. on retirement.

The analysis of investment in human capital evaluation methods

The evaluation of investment in human capital has been distinguished by two ways:

● *the evaluation of human capital from the financial perspective* (Baier et al., 2006; Becker, 1964; Haveman et al., 2003; Kendrick, 1976; Kuznets, 1961; Mankiw et al.,

1992; Mincer, 1958, 1962, 1974; Mulligan & Sala-i-Martin, 2000; Schultz, 1971; Weisbrod, 1961);

• *the avaluation of human capital by evaluation of different variables* (Benhabib & Spiegel, 1994; Hanson, 1996; Globerman & Shapiro, 2002; Noorbakhsh et al., 2001; Warner, 2002; United States Agency for International Development [USAID]; United Nations Development Program [UNDP]).

The evaluation of human capital from the financial perspective involves analysis on the human capital value, return on investment in human capital. This method is based on the investment return indexes and present value of the planned profit. The definition of physical capital reflects the analysts' main economic concept, which is analogous to the assessment of physical capital in the country: "the value of human capital stocks is the discounted current value of productivity and referred to the potentially productive activities" (Haveman, 2003). In the case when the value of physical and human capital income flow is expressed as productive assets, the income flow of physical and human capital is measured similarly. The individuals' earnings reflect the value of human capital. Using this method the efficiency and earnings are evaluated. According to Becker (1964) the assessment of human capital value may be based on the rule when the value of assets is equal to the sum of discounted income flow.

It means that the assets value of human particular age should be equal to the profit of discounted sum in the future. Schultz (1961, 1971), using this investment method, sought to understand the investment process and to identify the incentives to invest in human capital. In order to achieve the objective mentioned above he calculated the returns of investment in higher education of the different social groups. Initially, he dealt with the formal higher education. Having obtained the progress in scientific researches, he developed a theory of human capital and renewed it by such factors as education, training in work place, health care system, migration, family factors and information about economic resources. Despite the fact that proposed different forms and techniques of higher education trainings, the modern scientists referred to this approach. In order to describe functions of human capital it is necessary to distinguish these functions according to the types and impact of investment, individual human abilities and the results of a single investment unit. The specific formation processes of human capital, which depend on the specific of individual abilities, are proper to each individual. The same resources, used for human capital formation, may provide different values of human capital for various individuals.

According to financial costs of investment, the evaluation of human capital is based on the assumption that the assessment of human capital should cover the areas of investments where people can earn themselves and help others to earn (Nehru, 1995). Kendrick (1976), the father of this approach, estimated the resources of the human capital as "reasonable costs" and stated that human property should be evaluated according to the costs of investment, rather than the rate of return, which they are able to create per the life. Kendrick found that resources of human capital are the sum of rising expenses, adding the costs of higher education, training and health care. In essence, this approach is used to estimate the costs of human capital. According to this method, the following variables have been distinguished:

• Higher education is financially estimated as the part of resources, which were used including predefined possible costs (for example, costs for primary, secondary, university and college education) (Schultz, 1971);

• Higher education is financially estimated as the costs of services, which should be covered by higher education institutions itself (Kendrick, 1976).

The assessment of human capital by evaluation of different variables. According to this method the human capital is analyzed from the development perspective, so, for more precise evaluation, it offers more possibilities. This method does not take into account actual economic results of human capital, the benefit of variables intensity is assessed instead. In order to evaluate a complex phenomena, the method of gathering the points, which is able to clarify the different issues, is used. Thus, the indicators of human capital are developed in such a way and are based on the present status of the specific circumstances. When the indicators of human capital are compared between the countries, the rank of variables contributed to human capital is analyzed and estimated (which is also known as positively correlated with economic prosperity).

This method concentrates the features, which were proposed as those, that could have economic benefits for individuals, who have been seeking for these features. This approach is the only method that allows adding and evaluating non-tangible variables as the indicators of human capital. According to this method, the developed indicators could integrate the various social, political and economic variables to the entire unit. Booysen (2002) stated that the growing social, political and economic heterogeneity of the countries inevitably brings together both artificial and specialized indicators. Scientists and organizations of international cooperation and development exactly use this method (Hanson, 1996; Haveman et al., 2003; *Human* Development Report of UNDP, Globerman & Shapiro, 2002; Noorbakhsh et al., 2001; UN E-Government Readiness Assessment, UN World Public Sector Report; Warner, 2002).

In order to perform the assessment effectiviness of investment in higher education in Lithuania, three main methods are distinguished:

➢ Internal Rate of Return (IRR);
➢ Short-term period return on revenue (ROR);
➢ Functions of incomes (Mincer method).

Performing the assessment of investment in higher education effectiveness by IRR method, the following variables should be evaluated: the earning gap between those with and without higher education; number of years the individual spends studying; retirement age and the direct costs for higher education. Using this method the efficiency is calculated according to the individual's life-cycle age. IRR method is comparable to the discount rate, which compares the flow of the discounted benefits to the flow of costs in particular point of time.

In order to calculate IRR, G. Psacharopoulos proposed university education case model. In this model he used an

individual's life-cycle age. Describing this model he made some presumptions: the individual is over 18 years, after graduation the secondary school the individual is seeking for higher education and continiously spends studying five years. When the individual is 65 years old, he retires on the pension. So the working period of the individual is 42 years. Thus, the benefits from the investment in higher education could be received through these 42 years. Applying this model to the situation in Lithuania, we get:

$$\sum_{t=1}^{42} \frac{(W_u - W_s)}{(1+IRR)^t} = \sum_{t=1}^{6} \frac{(W_s + C_u)_t}{(1+IRR)^t} \qquad (1)$$

Where:

IRR –internal rate of return;

$(W_u - W_s)$ – the earning gap between the higher and secondary education;

C_u – direct costs for higher education (fees for education, books, etc.);

W_s – the earning of the individual with secondary education.

Performing the assessment of investment in higher education effectiveness using ROR method, the earning gap of the individuals with and without higher education, duration of study and direct costs for higher education is evaluated. This method estimates only the difference over particular periods, but does not evaluate the increase of annual earning. In this method the individual life cycle is not analyzed.

Psacharopoulos in 1987 proposed the method of short-period ROR between different countries.

$$ROR_{male} = \frac{Y_{c,male} - Y_{h,male}}{S(Y_{h,male} + d)}1 \qquad (2)$$

$$ROR_{female} = \frac{Y_{c,female} - Y_{h,female}}{S(Y_{h,female} + d)} \qquad (3)$$

Where:

ROR – rate of return;

Y_c – average earning of the individual with higher education;

Y_h – average earning of the individual with secondary education;

S – the duration of studies (i.e. years);

d – direct costs for individual over one year of study in the university.

In performed study S Hiroshi Ono (2002) calculated the number of years the individual spent when studying (depending on each country). In order to make it more easily, Hiroshi Ono (2002) offered the simplified formulas for ROR calculation:

$$ROR_{male} = \frac{1}{S}\left(\frac{Y_{c,male}}{Y_{h,male}} - 1\right) \qquad (4)$$

$$ROR_{female} = \frac{1}{S}\left(\frac{Y_{c,female}}{Y_{h,female}} - 1\right) \qquad (5)$$

The benefits from investment in higher education are continuing throughout the life. For this reason, it is not possible to calculate the exact rate of return.

$$\frac{Y_{c,male}}{Y_{h,male}} < \frac{Y_{c,female}}{Y_{h,female}} \qquad (6)$$

The study performed by Hiroshi Ono (2002) revealed that it is more advantageous to invest in higher education for woman in comparison with men.

IRR is calculated by comparing the earnings of men and women with higher education. Based on the performed research in OECD countries, the women earn less than men. However, IRR of higher education is higher for women than for men. This is explained by the fact that more women than man are seeking for higher education in these countries. But if we compare the earnings of the women and man with higher education, the IRR for women will be significantly less than that for men. The average earning of the women with higher education is lower than men with secondary education.

According to Hiroshi Ono (2002), the ROR depends on the type of group this benefit will be compared. After performing the calculations of IRR according to the statistical data of individuals with higher education in 17 OECD countries, Hiroshi Ono determined, that the average RORmale in OECD countries is 14,6 percent and RORfemale 15,2 percent. The average difference of earnings between genders is about 64 percent. This result showed that women earn 36 percent less in comparison with men's.

The advantage of short-term period method is that the statistical data of employees' earnings can be used for the calculation of investment ROR. This method records a difference of short-term period earnings of the individual with higher and the individual with secondary education. The individual himself can use this method and calculate which university and specialization he should chose for investment.

Mincer method is a logarithm of earning function which evaluates the years of studies during which the work experience, number of worked hours and other variables are acquired. This method requires accurate data on individual studies and work experience, therefore, in the research presented below it will be not applied.

The assessment of rate of return (ROR) on investment in Lithuanian higher education

In order to assess ROR on investment in Lithuania, the situation in Lithuanian labor market was examined, statistical data was collected and questionnaire survey was performed. The duration of performed study is 3 months, from January, 2011 to March, 2011. During non-probability sampling method (Kardelis, 2002) the people of three major Lithuanian cities (Vilnius, Kaunas, and Klaipeda) were interviewed. 91 men and 192 women were involved in questionnaire survey.

The age of respondents was divided into four main age groups: 20-30, 31-40, 41-50, and 51-60 years. Most of the respondents are distributed in the age group of 20-30 years (187 respondents), age group of 31-40 years (70 respondents), age group of 41-50 years (22 respondents) and only 4 respondents belong to the age group of 51-60

years. It can be concluded that individuals up to 40 years mostly invest in higher education.

Another very important criterion is the acquired higher education of individual. The distribution of the respondents according to acquired education is presented in Table 1.

Table 1

The distribution of the respondents according to acquired higher education

	Higher non-university education	University education: Bachelor degree	University education: Master degree	University education: Doctor degree	Total
Men	13	55	23	0	**91**
Women	31	90	67	4	**192**
Total:	**44**	**145**	**90**	**4**	**283**

Among all respondents participated in the questionnaire survey 44 graduated the colleges and gained higher non-university education (30 percent of men and 70 percent of women). As it seen from Table 2 the major part of respondents participated in the questionnaire survey graduated the universities and gained higher university education (239 respondents) - 145 of the respondents gained a Bachelor degree (38 percent of men and 62 percent of women), 90 gained a Master degree (26 percent of man and 74 percent of women) and 4 individuals gained a Doctor degree (100 percent women).

The average earnings, which men and women with and without higher education hope to earn during the period of 5 years; direct costs, which the individual had through all the years or within one year of studies (see Table 2) were calculated according to SPSS program. Both interviewed men and women studied or gained Bachelor degree. It means the duration of study is 4 years. Performing the study was established that, men's and women's expectations for earnings are different. The calculated results of ROR on investment for men and women are separately presented in Table 3.

Table 2

Summary of men's and women's answer results

	Men	Women
The number of years the individual was spent studying (average)	4	4
The retirement age, years	62	60
The duration of working time[*], years	36	34
Direct costs for studies during all years of studying, LTL	5945	5107
The annual costs of studies, LTL	990	851
The earning for individual without higher education, LTL	1750	1611
The earning for individual with higher education, LTL	2412	2382

[*]*The duration of working time = the retirement age - finished school age (18 m.) + the years of university studies (4)*

Table 3

ROR on investment in Lithuania, percent

	ROR_{male} with higher education	ROR_{female} with higher education	ROR_{female} /ROR_{male}
Lithuania	6,04	7,83	1,30

In order to compare the calculated results of ROR on investment in Lithuania with results of OECD countries, Hiroshi Ono (2002) short-term period method was

selected. In order to compare the ROR on investment in Lithuania with the OECD countries, ROR was calculated. For more effective ROR calculation the data according to profession, gender and education from Department of Statistics in Lithuania were used.

Comparing the average ROR on investment in higher education in OECD countries and Lithuania, we could state that, according to the received data due to questionnaire survey, ROR for women in Lithuania should be 1,9 times lower than the average ROR for women in OECD countries (Figure 2).
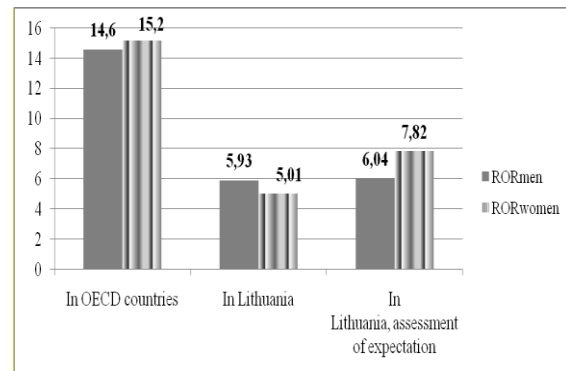

Figure 2. The average ROR on investment in Lithuania and OECD countires, percent

The data of ROR on investment in Lithuania is significantly less in comparison with OECD countries. If in OECD countries the average value of ROR_{male} is 14,6 % and ROR_{female} - 15,2 %, in Lithuania ROR_{male} only 5,93 % and ROR_{female} 6,04 %. After the calculation of ROR on investment in the education for men and women we could state that ROR on investment in Lithuania is higher for working women than for men.
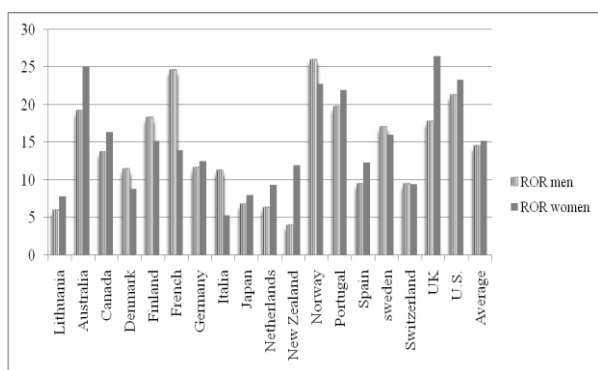
Figure 3. ROR on investment (men and women) in OECD counties and Lithuania, percent

In order to compare ROR on investment in the OECD countries according to occupation, gender and education caculation were performed. All data for calculations were gathered from Department of Statistics in Lithuania. Because in the website of Department of Statistics in Lithuania the data concerning the earning according education, profession and gender are presented just for 2002 and 2006 years, so ROR on investment is calculated just for these current years. The average payment for Bachelor studies (evaluating all specialties) is 4.500,00 LTL per year. The obtained results are presented in Table 4.

Table 4

ROR on investment in Lithuania according to occupation, gender and education, percent

Main profession group	Gender	ROR on investment in 2002, percent		ROR on investment in 2006, percent	
		With higher (university) education	With college education	With higher (university) education	With college education
Totally according professional groups	Total	**3,92**	**0,95**	**5,13**	**1,28**
	Male	4,79	1,17	5,93	1,37
	Female	3,62	1,14	5,01	1,64
Legislators, senior civil servants, managers of enterprises, institutions and organizations	Total	**5,65**	**1,42**	**6,80**	**1,72**
	Male	6,04	1,42	7,18	1,74
	Female	4,87	1,48	6,20	1,82
Specialists	Total	**2,24**	**0,69**	**2,88**	**0,43**
	Male	2,78	0,55	3,41	0,62
	Female	2,05	0,82	2,92	0,64
Junior specialists and technicians	Total	**2,05**	**0,02**	**3,67**	**1,60**
	Male	2,69	0,89	4,21	2,15
	Female	1,63	0,08	3,31	1,64
Junior civil servants	Total	**1,18**	**0,24**	**1,61**	**0,50**
	Male	0,96	0,17	1,52	0,94
	Female	1,25	0,31	1,77	0,55
The workers of service sector, shops and markets	Total	**1,39**	**0,40**	**0,87**	**0,16**
	Male	1,00	0,42	0,31	0,24
	Female	1,47	0,34	0,97	0,20
Qualified workers and craftsmen	Total	**1,47**	**0,59**	**1,42**	**0,57**
	Male	1,50	0,63	1,19	0,48
	Female	0,91	0,48	0,56	0,21
Non-qualified workers	Total	**0,14**	**0,16**	**0,06**	**0,11**
	Male	0,03	0,25	0,05	0,42
	Female	0,16	0,14	0,09	0,14

As it seems from Table 4, the highest ROR on investment (6,8 percent) belongs to legislators, senior civil servants, managers of enterprises, institutions and organizations with higher (university) education. Based on the performed calculations we could state, that when the price of studies is higher and the earning is lower, it is not worth and non-profitable to invest in education (higher university or college), because in this case ROR on investment is very low. ROR on investment of those individuals, who have gained higher education but have non-qualified work, is 0,06 percent.

In this case the investment in human capital (higher university and college education) doesn't have any meanings. For the individual before investing, therefore, it is advisable to evaluate the investment due to the employability, desires and abilities to work. It is not useful and effective to invest in education due to status, prestigue or any other psychological factors, because in this case the money will be lost and any benefits will be not received.

In order to calculate IRR in Lithuania, the G. Psacharopoulos university education case model is adapted. In Lithuania the individual finishes the secondary school at the age of 18 years. If in the future the individual will be seeking for higher education, he will spent studying 4 years. If a woman is retired to a pension at the age of 60 years (men at the age of 62 years), the working period for women is 38 years (for men accordingly 40 years). Thus, the benefits from the investment made in education the women can get over 38 years (men accordingly over 40 years). In order to reveal the dependence of IRR on different environmental factors, the following cases have been designed:

1. The calculation of the internal rate of return (IRR) is performed by evaluating just one indicator - annual study fee (4500 LTL), the living costs are not assessed. In this case it is assumed that the student lives with parents (the accommodation expenses are covered by his parents), i.e., the direct annual costs for higher education are composed of the annual study fee and lost annual earning due to studies (earning without higher education);

2. The calculation of the internal rate of return (IRR) is performed by evaluating both indicators - annual study fee (4500 LTL) and living costs. In this case the direct annual costs for higher education are composed of the annual study fee, annual living costs and lost annual earning due to studies (earning without higher education);

3. The calculation of the internal rate of return (IRR) is performed by evaluating just one indicator - annual study fee (1000 LTL), the living costs are not assessed. It is assumed that a part of study fee the individual must pay is coverend by the State and another part (1000 LTL) the individual should pay by himself. In this case the direct annual costs for higher education are composed of the annual study fee (1000 LTL) and lost annual earning due to studies (earning without higher education);

4. The calculation of the internal rate of return (IRR) is performed by evaluating both indicators - annual study fee (1000 LTL) and living costs. In this case the direct annual costs for higher education are composed of the annual study fee, annual living costs and lost annual earning due to studies (earning without higher education).

Table 5

IRR on investment evaluating different indicators, percent

Annual study fee (4500 LTL) is estimated, living costs are not assessed			
IRR with college education		IRR with university education	
IRR $_{male}$	IRR $_{female}$	IRR $_{male}$	IRR $_{female}$
5,09	6,41	17,95	18,20
Annual study fee (4500 LTL) and annual living costs (9744 LTL) are assessed			
2,79	3,54	13,72	13,01
Annual study fee (1000 LTL) is estimated, living costs are not essessed			
6,02	8,01	20,13	21,19
The individual pays only a part of study fee (1000 LTL) and living costs (9744 LTL) are assessed			
3,46	4,39	14,99	14,52

The performed calculations revealed that the lower value of investment, the greater internal rate of return (IRR). IRR for women (both investing in higher university and college education) is higher than for men, when the direct annual costs for higher education are composed of the annual study fee and lost annual earning due to studies (earning without higher education) and living costs are not assessed; IRR for men - vice versa. The retirement age for men (62 years) and women (60 years) and differences between earnings have an impact to the internal rate of return. The IRR on investment for individual with higher college education, in comparison with individual with higher university education, is very small. It can be assumed that it is more beneficial to invest in higher university in comparison with higher colleage education.

Conclusions

Education is a factor of the modern knowledge economy development which enhances the economic growth due to the increase in labour productivity, faster assimilation of technological changes (new technologies). In the country where major investment in human capital is assigned, intensity in the growth of the gross domestic product (GDP) increases.

The performed analysis of assessment on investment in human capital have revealed that specific criteria include cash flows calculated as the difference between earnings received by the individual with or without higher education; working age; alternative expenditure – earning lost due to studies and payment for studies. Investment in human capital is assessed at the individual, organization and state level. Investment in human capital is described by stages; most frequently investment in higher education is distinguished. Two models of assessment of investment in higher education are revealed in the article: internal rate of return (IRR) and short-term period return on revenue (ROR).

During the assessment of investment by the rate of return (ROR) method it has been established that the efficiency of investment in college education is lower that in university education (1,55 percent for male and 2,3 percent for female). The higher is the investment rate of return, the more efficient it is.

The internal rate of return (IRR) method has confirmed the fact that the investment in university education is more efficient than in college education (college education: IRRmale is 2,79-6,06 percent, IRRfemale – 3,54-8,01 percent; the university education: IRRmale is 13,72-20,13 percent, IRRfemale – 13,01-21,19 percent).

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Vilda Gižienė, Žaneta Simanavičienė, Oksana Palekienė

Ekonominio investicijų į žmogiškąjį kapitalą efektyvumo vertinimas

Santrauka

Teorinėje literatūroje, nagrinėjančioje žmogiškąjį kapitalą, aukštasis mokslas yra vertinamas kaip investicinis sprendimas. Investicijos į švietimą turi būti naudingos ekonominiu požiūriu. Lyginant su kitomis investavimo galimybėmis akivaizdu, kad investicijos į švietimą turi duoti didesnę investicijų grąžos normą. Sukaupti duomenys apie šių investicijų grąžą gali padėti priimti kompetentingus sprendimus, kurie turėtų ekonominę naudą ateityje. Vertinant investicijas į žmogiškąjį kapitalą (švietimą), kaip individo sprendimą, investicijų grąžos norma tampa vis svarbesniu vertinimo kriterijumi, nes didžioji dalis individų už įgyjamą išsilavinimą turi mokėti patys ir tik dalį kainos sumoka valstybė. Priimant investicinį sprendimą labai svarbu tinkamai paskirstyti lėšas. Galima daryti prielaidą, kad individams, įgijusiems aukštąjį išsilavinimą, turėtų būti mokama daugiau, nei jo neįgijusiems asmenims. Vadinasi investicijos į aukštąjį išsilavinimą (žmogiškąjį kapitalą) yra naudingos tol, kol egzistuoja teigiamas skirtumas tarp ribinės naudos ir ribinių kaštų. Aukštasis išsilavinimas yra aukštesnės gyvenimo kokybės garantas, tačiau vien aukštojo išsilavinimo nepakanka, nes didelį vaidmenį turi ir individo gebėjimai, darbo našumas.

Investicijos į žmogiškąjį ir į fizinį kapitalą ne tik skatina augti darbo rinką. Šios investicijos, taip pat mažesnis infliacijos lygis ir laisvesnė prekyba (mažiau apribojimų) skatina ir ekonomikos augimą. Gebėjimas greičiau suprasti technologinius pokyčius, jų svarbą didina darbo produktyvumą bei našumą.

Išsilavinimas, mokymasis visą gyvenimą, rūpinimasis sveikata yra labai svarbios investicijos į žmogiškąjį kapitalą. Užsienio mokslininkų atlikti tyrimai parodo, kad asmenų, įgijusių aukštąjį išsilavinimą pajamos būna didesnės. Investicijos į žmogiškąjį kapitalą yra naudingos, netgi įvertinus patirtas tiesiogines ir netiesiogines išlaidas. Išsilavinusių individų pajamos yra aukštesnės už vidutines.

Išsilavinimas yra vienas iš svarbiausių šiuolaikinės žinių ekonomikos plėtros veiksnių. Tačiau švietimo ir mokslo sričių plėtrai reikalingos ilgalaikės ir didelės investicijos. Šias investicijas reikia įvertinti ir socialiniu aspektu. Viena vertus, investicijos į žmogiškąjį kapitalą turėtų būti skatinamos, o kita vertus – kartu turėtų būti įvertinamas ir jų efektyvumas. Tačiau tokio vertinimo patirtis ir taikomi metodai vienareikšmio atsakymo neduoda, todėl investicijų į žmogiškąjį kapitalą vertinimas yra sudėtinga problema tiek praktiniu, tiek moksliniu požiūriu. Kalbant apie investicijas į žmogiškąjį kapitalą, labai svarbu įvertinti šių investicijų efektyvumą, nustatyti laiko tarpą, pinigų srautus: įplaukas, išplaukas.

Globalizacijos procesų akivaizdoje vis aiškiau suvokiama, kad svarbiausias visuomenės ekonomikos veiksnys yra ne materialiniai ar finansiniai ištekliai, o žmogiškasis kapitalas, kurio sudėtinės dalys yra žinios, gebėjimai ir įgūdžiai. Nematerialus turtas: mokslo pasiekimai, išsilavinimo lygio kilimas, vis labiau įgyja pirmaeilę reikšmę. Sukauptas žmogiškasis kapitalas yra svarbus individo pajamų ir užimtumo perspektyvų veiksnys.

Straipsnio aktualumas. Didelės lėšos skiriamos aukštajam mokslui, protai nuteka, todėl yra labai svarbu išsiaiškinti investicijų naudą į žmogiškąjį kapitalą tiek asmeniškai pačiam žmogui tiek ir valstybei. *Tikslas:* įvertinti investicijas į žmogiškąjį kapitalą Lietuvoje.

Tyrimo uždaviniai:
• atlikti žmogiškojo kapitalo koncepcijos ir struktūros teorinę analizę;
• identifikuoti rodiklius, charakterizuojančius investicijas į žmogiškąjį kapitalą;
• remiantis atliktais teoriniais tyrimais įvertinti investicijas į aukštąjį išsilavinimą Lietuvoje.

Tyrimo metodai: mokslinės literatūros analizė, dispersinė analizė.

Straipsnyje analizuojamos investicijų į žmogiškąjį kapitalą struktūros teorinės sampratos, atliekama šių investicijų vertinimo metodų analizė ir atliktų metodų empirinis pritaikomumas Lietuvoje. Išsilavinimas yra vienas iš svarbiausių šiuolaikinės žinių ekonomikos plėtros veiksnių.

Investicijos į aukštąjį išsilavinimą kaip pagrindinę žmogiškojo kapitalo formą, yra naudinga ne tik asmeniui, bet ir valstybei. Šiuolaikinės ekonomikos sąlygomis nuolat didinamos investicijos į žmogiškąjį kapitalą. Šalies mastu žmogiškasis kapitalas sąlygoja ekonomikos augimą, didina nacionalinį konkurencinį pranašumą (Drucker, 1997; Nehru, Swanson, Dubey, 1995; Porter, 1998). Didėjant investicijoms labai aktuali yra investicijų grąža. Daugelyje šalių skaičiuojami investicijų į aukštąjį išsilavinimą, kaip pagrindinę žmogiškojo kapitalo formą, efektyvumo rodikliai (Lemelin, 1998; Blaug, 1972; Wahrenburg, Weldi, 2007; Psacharopoulos, 1995; Hiroshi Ono, 2001; Mincer, 1974; Appleby, Fougere, Rouleau, 2002). Remiantis investicijų į žmogiškąjį kapitalą efektyvumo rodikliais galima paaiškinti darbo užmokesčio diferenciaciją pagal amžių, profesiją, lytį. Taip pat galima reguliuoti išteklių paskirstymą mokslui, švietimui, profesiniam rengimui, nustatyti, ar efektyvios investicijos į vieną ar kitą mokslo kryptį. Investiciniame procese dalyvauja ne tik individas, bet ir valstybė, todėl investicijų efektyvumą reikia vertinti ne tik individo, bet ir valstybės mastu. Vertinant investicijų į žmogiškąjį kapitalą efektyvumą valstybės požiūriu, svarbu atsižvelgti ir į protų nutekėjimo problemą, kuri yra labai aktuali šių dienų ekonomikoje.

Atlikus mokslinės literatūros analizę, išskirti trys pagrindiniai investicijų į aukštąjį išsilavinimą vertinimo metodai:

- ➢ Vidinės grąžos normos (IRR);
- ➢ Trumpalaikio periodo grąžos norma (ROR);
- ➢ Pajamų funkcijos (*Mincer* metodas).

Naudojantis vidinės grąžos normos metodu įvertinami šie kintamieji: uždarbio skirtumas tarp asmenų turinčių ir neturinčių aukštąjį išsilavinimą, metų skaičius, kurį individas praleidžia studijuodamas, išėjimo į pensiją amžius, tiesioginės išlaido, skirtos aukštajam išsilavinimui įgyti. Naudojantis šiuo metodu efektyvumas paskaičiuojamas įvertinus individo gyvenimo ciklo amžių. Vidinės grąžos normos modelyje investicijų grąžos norma yra prilyginama diskonto normai, kuri suvienodina diskontuotos naudos srautą su kaštų srautu tam tikrame laiko taške.

Trumpalaikio periodo metodo privalumas yra tai, kad skaičiuojant investicijų grąžos normą, galima pasinaudoti statistiniais duomenimis apie dirbančiųjų atlyginimus. Šis metodas užfiksuoja trumpo periodo atlyginimų skirtumą tarp turinčio aukštąjį išsilavinimą ir turinčio tik vidurinį. Individas, pasinaudodamas šiuo metodu ir statistiniais duomenimis, gali pasiskaičiuoti į kokį universitetą ir specialybę jam investuoti.

Mincer metodas tai yra uždarbio funkcijos logaritmas, kuris įvertina studijuojant praleistus metus, per kuriuos įgyjama darbinė patirtis, taip pat jau išdirbtų metų skaičių ir kitus kintamuosius. Naudojant šį metodą reikia tikslių duomenų apie individo studijų ir darbinę patirtį, todėl šiame tyrime jis nebus taikomas.

Epiriniam tyrimui pritaikyti vidinės grąžos normos ir trumpalaikės grąžos metodai. Apibendrinus gautus rezultatus darytinos tokios išvados: investicijos į aukštąjį išsilavinimą tiesiogiai priklauso nuo pradinių investicijų dydžio; nuo darbo užmokesčio dydžio įgijus aukštąjį išsilavinimą. Investicijos į aukštąjį universitetinį išsilavinimą yra efektyvesnės, nei investicijos į koleginį išsilavinimą. Egzistuoja darbo užmokesčio skirtumai vyrams ir moterims. Vyrų investicijos į aukštąjį išsilavinimą yra efektyvesnės nei moterų, nes vyrų darbo užmokestis visose profesijų grupėse yra didesnis už moterų (užimant tą pačią poziciją). Atliekant skaičiavimus nebuvo įvertintas darbo užmokesčio augimas. Gerėjant ekonomikai darbo užmokestis Lietuvoje turi augti, o tai turi padidinti investicijų grąžos normą ir grynąją esamąją vertę. Didėjant investicijų grąžos normai vis daugiau individų turėtų susidomėti išsilavinimu, kaip investicijų objektu.