

## **Socio-Economic Effects of Education in the Context of Economic Return**

### **Abstract**

The article presents the issue of evaluation of economic and non-economic effects of education. We proceed from the basic educational terminology and methods for the evaluation of efficiency of education that may be used in this connection. We compare individual methods in terms of their advantages and disadvantages. In our methodology, we applied the selected methods used in evaluation of investments in the private sector to the environment of the public sector and the field of education. We applied the procedures elaborated in the analytical part of the methodological part to particular values, indicators and the environment of higher education institutions. The analytical part presents evaluation of individual efficiency of investments in all three degrees of higher education, as well as in education in branches of studies at higher education institutions.

*Keywords: education, effects, efficiency*

### **Introduction**

The final product of schooling is education as an intangible asset. To be able to ensure the objective expenditure of public funds and to evaluate the financial requirements of education institutions, we must be able to appreciate the outcomes and effects of education services they provide. We must study the relation between the expenditure of funds and the effects they should produce.

The main purpose of the article is to express in numbers the basic indicators of economic efficiency of higher education institutions based on the theoretical

analysis of economic and non-economic benefits of education and on the analysis of higher education institutions.

The theoretical analysis of the problems, constituting the content of the first part of the article, presents the starting point of the application part. In the application part, methods for the evaluation of economic benefits of education are presented on an example of evaluation of inputs and outputs of education at higher education institutions. Results of the analysis are summarized in the final part, which is the evaluation of the economic efficiency of higher education institutions in terms of expected benefits from their activities.

## **1. Socio-Economic Nature of Education and Process of Education**

Problems of education and training were dealt with by many domestic and foreign authors. The most distinguished include J. Benčo (1992, 2005), M. Hronec (2010), M. Uramová, E. Valach (2004), B. Knight (1983), I. Okenka (2003), N.K. Avkiran (2001), G. Kempkes (2006), S. Bradley et al., (2001), M. Abbott and C. Doucouliagos (2003), J. E. Stiglitz (1997), J. Vantúch (2002) and others.

“Education, as the final product of the process of education, is a part of the population’s standards of living and belongs to the basic determinants of the economic development of society“ (M. Hronec 2010, p. 44). “Education in the form of acquired knowledge and activities creates values and adopted values are involved in acquiring knowledge and activities. When acquiring knowledge, activities and values, one cultivates also character, emotional and will-power qualities as well as physical and intellectual ones representing non-economic effects“ (V. Pařízek, 1991, p. 34).

“Education is a process in which the information aspect prevails and in which the individual acquires and masters a system of information, knowledge, skills and habits as well as methods for acquiring them. This knowledge is intended for a specific function, e.g. for pursuing a profession, but it has also a cultivation nature – it shapes personality“ (L. Ďurič, V. Hotár, L. Pajtinka, 2000, p. 500).

For a better understanding of the effects and benefits of education, it is necessary to know also its specifics. Their characteristics were studied by G.S. Becker in his work “Human Capital” (1975). These attributes are important for understanding education and its benefits for the development of every society and economic growth.

Education is, to some extent, complementary with technology. An individual or an economy may use education best if there are facilities providing their users

with an opportunity to make use of their potential. Another specific of education is that it is non-transferable. It is tied to its carrier. Thus, human capital mobility is limited by the individual's physical mobility. As a result, the outcome of education, as a part of human capital, is slower and more difficult to allocate to places where it could be used more efficiently. Another characteristic of education is that it cannot be stored, or that it is difficult to store. The life of human capital is limited by the length of human life. This is the task for the economy to keep on providing for human capital reproduction (Meričková, 2008, 2010, 2011).

The return on investments in education is usually long-term. This characteristic follows from the fact that education is tied to a specific person. Similarly, the cycle from investment in education to perceivable outcomes takes a long time. The last specific of education is its measurability. Education outcomes are difficult to measure. It is due to the long cycle of creation and involvement of educated people in economic activity. Despite the existing methodologies, it is challenging to measure people's psychological competencies precisely (G.S.Becker, 1975, pp. 75–85).

Education is a prerequisite factor of the ability of the labour force to adapt to changing conditions. As stated by M. Uramová and E. Valach (2007), the change in conditions for application of the labour force on the labour market follows, among other things, from macroeconomic and microeconomic changes in the structure of economy, changing the character of many types of work. Education fulfils many important functions in society.

“Development of the national economy is determined by the potential of education and qualifications of the labour force. The relation of economy and education is that of interaction. Good education is a significant motivational factor of economy development and, on the other hand, developed economy and financial investments in education condition its further development and increase its competitiveness also on the international market“ (M. Hronec, 2010, p. 45).

“Education as a part of knowledge plays a key role in the development of the economic structure. Individuals with a higher education, who meet market requirements, are able not only to initiate and make structural changes, but also to accept them and adapt to them on the labour market“ (M. Uramová, E. Valach, 2007).

In addition to economic effects, education has also non-economic effects including the development of personality, stockpiling of knowledge, and creation of the socio-cultural structure of society (M. Hronec, 2010, p. 49).

## **2. Problems of Evaluating the Efficiency of Education**

The basic attribute of any economy is efficiency, which may be studied from various perspectives; however, most frequently it is the perspective of input and output. The efficiency of education manifests itself not only in the fact that the qualified labour force produces higher use values in work processes, but also in several indirect forms in the process of education, in the science, research, design and manufacture of new technical equipment (J. Benčo, 2005).

Evaluation of the efficiency of provided public property in general is based on the recognition of two fundamental conditions. The first one is achievement of the so-called Pareto optimum for expression of the aggregate supply of efficiency. The other one is achievement of individual efficiency in creating a specific public property (V. Cibáková et al., 2006).

When studying the efficiency of education, it is necessary to categorize its possible effects or outcomes. One of them is economic and non-economic effects of education (J. Benčo, 2005).

Both economic and non-economic effects of education are of great significance both for an individual and society; they influence each other and should develop in harmony with each other. The efficiency of education must be a synthesis of both components.

Orientation on increasing the efficiency of education assumes that funds for the development of education are used purposefully and economically, and that they also ensure optimum development of education in terms of a longer-term perspective (J. Žižková, 1989).

### **2.1. Economic Evaluation of Efficiency of Education**

Individual methods of evaluation cannot be unified into one indicator, because more of them are interconnected and some are of a conflicting nature (J. Nemeč, G. Wright, 1997, p. 180). In the past, some research and empirical studies were conducted in an attempt to quantify the economic efficiency of education and thus to estimate the rate of return on investments in human capital. In his study, J.J. Heckman (1998) estimates the average rate of return on investment in human capital at the level of 10%. However, this rate of return is an average one. It includes revenues from investments in people with a various sum of accumulated human capital. Empirical studies found out that investments in people with a higher sum of accumulated human capital yield higher revenues than investments in people with a lower sum. It is also true that the rate of return on investments in human capital increases with the increase in investments in it. Increasing education of

the labour force in the USA during the last 50 years has increased productivity by about a third. He estimated the return on investments in human capital by an analogy to Okun's law: a one-percentage point increase in the proportion of workers with higher qualifications raises the annual output by between 0.42 and 0.63 % (R. Blundell et al., 2007). N. G. Mankiw, D. Romer and D. N. Weil (1992) state that a one-percentage point increase in investments in human capital raises the output per worker by 0.6 %. M. Kendrick (1994) states that the rate of return on investments in human capital is between 11.3–12.5%. The annual growth of human capital by 1% and concurrent growth of physical capital by 1% raise the annual output by 1%.

A. Čaplánová (1999) presents average results of studies on returns from education at the level of 5–15%. In this context, also the paper by A. Kamiač (1971) should be mentioned, who tried to determine the influence of costs of education on national income. Using the 1954 to 1966 data for the former CSSR, he estimated that national income grew by 10.99 crowns with each crown spent on education. However, he pointed out to the fact that it is necessary to take also other factors of economic performance into account. In the current conditions, however, such revenue is reduced due to change in the educational structure of the population and extension of the higher education market reducing the price of work of employees with higher education. The following table summarizes the rates of return on investments (ROI) in human capital presented by the authors.

**Table 1.** Rates of Return on Investments (ROI) in Human Capital

Author	ROI (%)	Note
Heckman (1998)	10	-
Mincer (1993)	10–20	in Heckman (1998)
Kendrick (1994)	11.3–12.5	in Mueller (2000)

Source: Ludský kapitál a výkonnosť ekonomiky 2001 (Human Capital and Economic Performance 2001)

To analyze both the individual and macro behaviour in the field of investments in human capital, a model of investments in and revenues from human capital can be applied. For the sake of simplification, investments in human capital can be narrowed to investments in higher education (Gondová, 2009).

## 2.2. Education as an Investment

The basis for the evaluation of efficiency is the theory that employment earnings are a function of achieved education. Education is of investment character, which

results in higher work productivity determining higher income. Our study on the possible application of financial investment principles is based on numerous data of W.F.Sharp and G.J. Alexander (1994), practical experience gained from financial investment advisory services by R. C. Merton (2000), J. T. McClave and P. G. Benson (1988), B. Chovancová, A. Jankovská, J. Kotlebová (2002), V. Mlynarovič (2001), K. Vlachynský (2006) and M. Synek (2000).

Some elements and principles of fund investment in the private sector have been adopted and applied also in the public sector conditions. Domestic and foreign authors, such as F. Ochraňa (1999, 2001, 2002), J. Nemeč., G. Wright, (1997), N. R. Murray, (2001), J. Peková and J. Pilný (2002), and Y. Strecková, I. Malý (1998), use modified static and dynamic methods in their evaluation of private investment efficiency when addressing issues of the public sector and public funds. The methods applied in the public sector for the evaluation of public expenditure programmes such as CBA, CUA, CEA, etc. have evolved from them.

Every investment is made with a certain purpose, which may be a reduction of costs, increase in production or profit (benefits from consumption of public services - both economic and non-economic ones in the case of the private sector) (Synek et al., 2000, p. 307).

Since every investor focuses primarily on the period of time in which the invested funds return, all the authors recommend applying the costs payable period (depreciation and amortization) method in their evaluation. Of other methods, the authors (J. Porvazník, 2011; V. Strinková, 1995) recommend the break-even analysis or return of equity analysis (J. Fotr, 2005; J. Vysušil 1996). The methods can be divided into static and dynamic ones.

The static methods are usually used for less important investments with short-term life or a low discount factor. In selected criteria quantification, they take into account the effects of time, as illustrated in Picture 1.

**Picture 1.** Dynamic Conception of Investments in Education



Source: E. Tuhárska (1998). *Investičná teória a politika*. Bratislava: p. 58. (Investment Theory and Policy)

“Both income and expenses arising from investments in education are translated into a specific point in time – costing point, which may be the date of a graduate

starting to work, by means of capitalization or discounting. Using the discount enables to establish the translated value for a single time period" (1991, p. 120).

The basic dynamic methods for evaluation of the efficiency of expenditure on education include the method of net present value, internal rate of return, profitability index, and discounted payable period.

The net present value is defined by the difference between the discounted monetary income of the state from education and total expenditure on education of an individual in a specific branch of study. Monetary income means the expected value of cash flow.

The following table presents the net present value of individual groups of study branches and all 3 degrees of higher education.

**Table 2.** The Net Present Value of Study Branches and Degrees

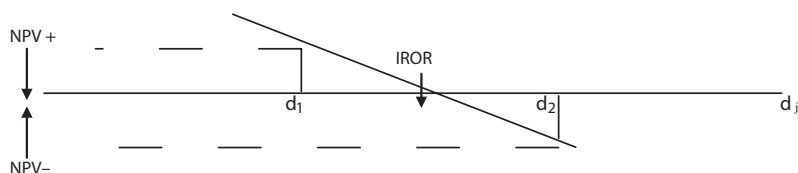
NPV (in € thousand)	Bachelor's degree	Master's degree	Doctoral degree
Humanities	102.51	188.93	282.18
Agriculture and Forestry	115.70	151.82	275.73
Technical branches and Medicine	144.31	204.12	388.73
Arts	75.28	134.60	323.90

Source: own elaboration

In terms of total return, the highest total revenue translated to the present value was achieved in technical branches and medicine and humanities in the third degree of study. The total revenue was translated by the expected development of salaries in relevant sectors of the economy.

The method of internal rate of return is, like the previous method, based on the concept of present value. This method is used to calculate a discount rate at which the present value of expected income equals the present value of expenditure on education (investments in education). The calculated rate must be compared with a required rate of investment efficiency, e.g. alternative expenditure.

**Picture 2.** The Principle of Internal Rate of Return



Source: J. Drábek, I. Pittnerová (2001). *Investičné projekty a náklady kapitálu*. Zvolen: p. 34. (Investment Projects and the Cost of Capital)

This method is the second most used method. Its application has some pitfalls calling for subsequent calculations using other methods (e.g. the net present value). Thus, this method is used to find a discount rate at which the net present value of expected income from education equals the present value of costs of education. This is a market interest rate, at which the CNV equals zero. The following table presents the internal rate of return of groups of study branches by 3 degrees of higher education.

**Table 3.** The Internal Rate of Return of Study Branches and Degrees

IROR (in %)	Bachelor's degree	Master's degree	Doctoral degree
Humanities	24.38	24.00	25.86
Agriculture and Forestry	28.50	20.33	23.67
Technical branches and Medicine	31.25	24.75	30.25
Arts	19.67	18.33	28.00

Source: own elaboration

As presented in Table 3, the best investments include technical branches of study and medicine. The highest rate was achieved in the Bachelor's study which is the least demanding in terms of funds and time. The least profitable studies include those for the Master's degree in arts.

The profitability index method is very closely related to the other methods and leads to the same decision as the NPV method. If the NPV equals zero, the index equals one. The state can invest in education, if  $PI > 1$ . The greater PI, the greater the benefit of education. The following table presents the profitability index of study for individual degrees.

**Table 4.** The Profitability Index of Study Branches and Degrees

PI	Bachelor's degree	Master's degree	Doctoral degree
Humanities	6.65	6.40	7.16
Agriculture and Forestry	7.54	4.88	5.71
Technical branches and Medicine	9.69	7.14	9.36
Arts	4.29	4.13	7.62

Source: own elaboration

Again, the highest profitability index can be expected in technical branches and humanities in the third degree of study. The profitability index reached the value of 9.36. The lowest profitability index was calculated in study for the Master's degree in arts.



The discounted payable period answers the question of how many years a graduate has to be employed for his/her education to be acceptable in terms of the net present value. A disadvantage of this method is that it neglects all cash flows after the expenditure payable period, which is why it should be used in combination with other evaluation methods.

**Table 5.** The Discounted Payable Period of Individual Study Branches and Degrees

DPP (in years)	Bachelor's degree	Master's degree	Doctoral degree
Humanities	6.03	6.29	5.84
Agriculture and Forestry	5.08	8.27	7.05
Technical branches and Medicine	4.29	5.50	4.54
Arts	9.54	10.05	5.96

Source: own elaboration

The fastest return can be expected in the Bachelor's and doctoral study of technical branches and medicine. The longest period of return was stated in the Master's degree in arts.

## Conclusion

Increasing efficiency of public expenditure on education includes the need to address several issues. In addition to establishing the adequate level of funds (e.g. by means of financial norms) necessary to ensure provision of educational services, it includes also problems of their redistribution, allocation and use, thus comprehensive management of available resources by the Ministry of Education. The most effective and fastest way for the state to achieve objective spending of funds is to leave the provision of education solely to the effects of market forces. However, increasing efficiency of expenditure through the effects of market forces is unacceptable due to the society-wide significance of education and its effect on socio-economic development of the country. However, application of certain market principles in the process of education funding is necessary, to exert pressure on effective spending of funds.

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