ECONOMIC CONCEPTION OF ADDED VALUE OF TERTIARY EDUCATION

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Abstract

The article deals with the expression of the tertiary school (university) graduate contribution to the national economy. The paper compares the situation in the CR, Germany and Poland, and provides a retrospective view of the returns of a university education by simulating the added value within a five-year period. The example of the Czech Republic is used to model the average added value of an individual and the state using some available identifiers such as gross income, net income and individual income tax. The added value is simulated as the difference between the average salary of average tertiary and secondary school graduates, and as the difference between their direct tax liabilities.

Introduction

A university graduate represents increased study costs for the economy (compared to a secondary school graduate). We would like to ask the question if and in which form he also represents added value for the economy. This issue is very topical, particularly in the context of the debate on the introduction of tuition fee at public universities. The fee could be partial compensation for the "damage" that a university graduate causes to the economy [5]. There is another question to answer: "Who benefits from a university education?" If we differentiate non-monetary benefits [3], [1] from revenues as purely economic categories [6], [9], we can study the economic side of this benefit at both the individual and state level.

As the university educated population has been growing in all three of these countries, it is necessary to also study the economic impact of this phenomenon [8].

In this paper, attention is focused on the economic benefits of a university graduate through a retrospective view of the revenues of university education in the CR within the last eight years and by simulating this added value.

1 Methodology

The size of the average added value of an individual and the state was modeled by available identifiers such as gross income, net income and individual income tax within an eight-year period. The added value was expressed as the difference between the average salary of the average university and secondary school graduates, and as the difference between their direct tax liabilities. Only three branches were chosen from the vast range of classified economic activities (NACE). The choice was intentional, as the branches should represent average, above-average and below-average values of all the identifiers. The manufacturing industry was chosen to represent average values, financial intermediation represented above-average

values and the education sector was selected to represent below-average values. A weighted average of the three selected industries was always investigated to express the trends of the observed university graduate and secondary school graduate identifiers.

When constructing the model, it was assumed that the income of an individual (gross income, net income) and the state revenue (income tax) are significantly determined by the achieved level of education and that other influences were neglected. Generally, it is estimated that education influences only around one-third of the development of wages and salaries, the other two-thirds are determined by the personality and abilities of an individual, which are not affected by education [4].

2 Situation in Euroregion Nisa

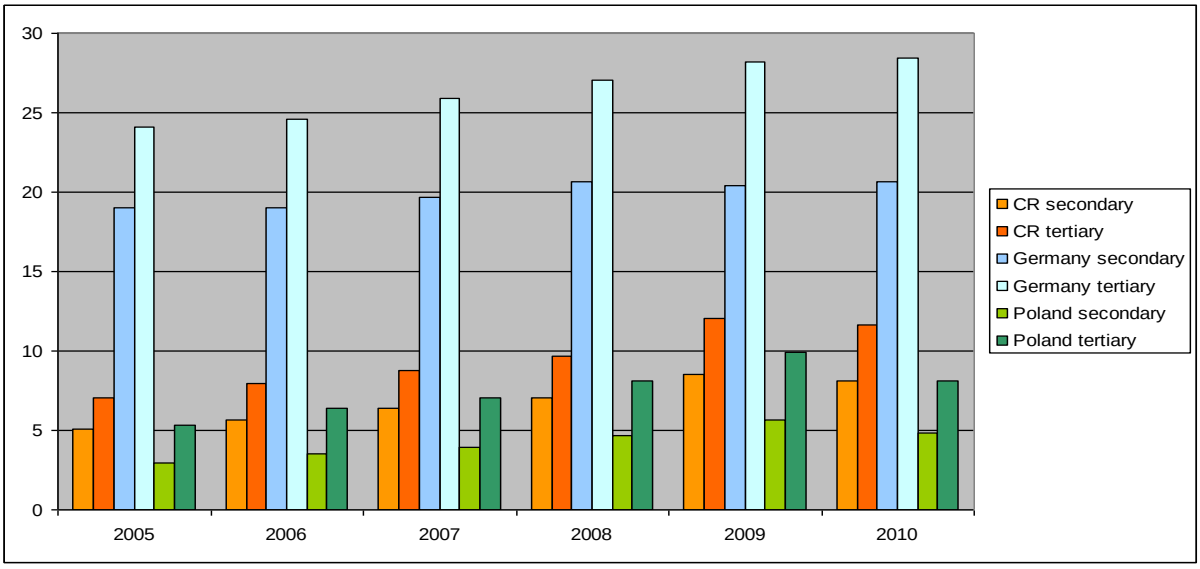
The indicator of mean equivalized net income [11] was used to compare upper secondary and post-secondary non-tertiary education (levels 3 and 4) and the first and second stage of tertiary education (levels 5 and 6).

Tab. 1: *Comparison of average income of a secondary school graduate and a university graduate in Euroregion Nisa in 2005-2010 (in thousand Euro)*

	CR		Germany		Poland	
	secondary	**tertiary**	**secondary**	**tertiary**	**secondary**	**tertiary**
2005	5,055	7,087	19,032	24,115	2,914	5,334
2006	5,623	7,941	18,976	24,628	3,504	6,407
2007	6,418	8,777	19,684	25,897	3,942	7,078
2008	7,082	9,637	20,661	27,087	4,692	8,127
2009	8,537	12,071	20,378	28,175	5,678	9,907
2010	8,114	11,653	20,664	28,436	4,850	8,080

Source: [11]

The income of secondary school graduates and tertiary school graduates differs in all three countries. The difference is increasing slightly in the Czech Republic and Germany, while in Poland we can observe a modest trend of convergence, as shown in Fig. 1.

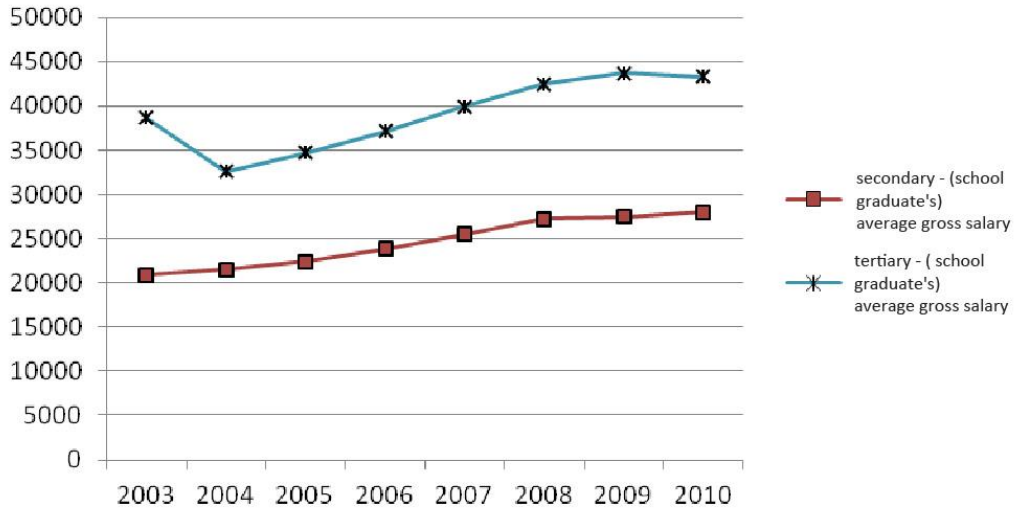


Source: [11]

Fig. 1: *Comparison of average income of a secondary school graduate and a university graduate in Euroregion Nisa in 2005-2010 (in thousand Euro)*

3 Identifier of gross income

The identifier of gross income was used for the initial modeling of the added value of an individual. Graph 1 shows the development of the added value of a tertiary education by comparing the weighted average gross income of a university graduate to the weighted average gross income of a secondary graduate. This graph demonstrates the difference between the two levels of education in all the years. In 2003, the weighted average gross salary of a university graduate in all three branches studied was 185% of the average gross salary of a secondary school graduate, and it was decreasing gradually to 155% of the average gross salary of a secondary school graduate in 2010. Despite the reported decline, this difference belongs to the highest values seen within the OECD [2].



Source: own calculation

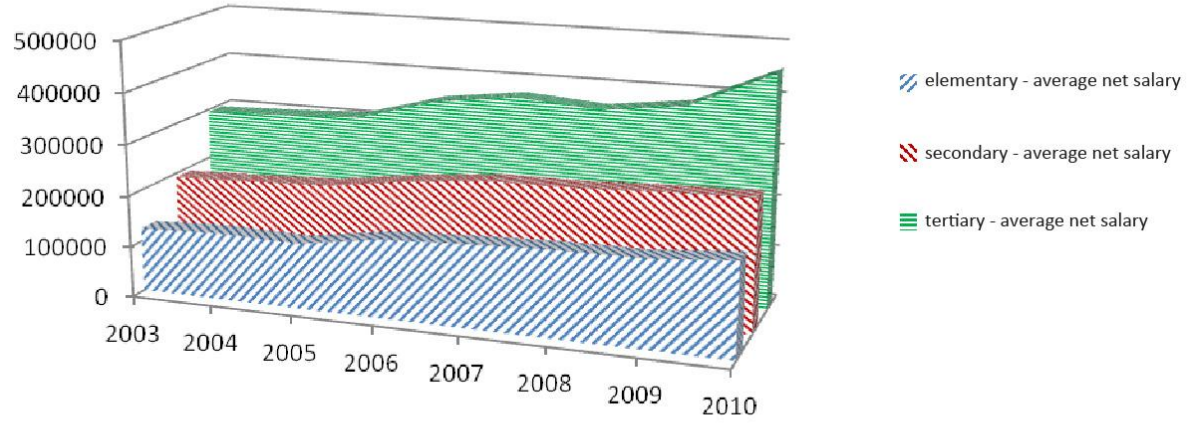
Fig. 2: *Development of average gross salary of secondary and tertiary school graduates in 2003-2010 (weighted average for the three branches)*

In absolute values, there was the largest discrepancy between the average gross salary of a university graduate and a secondary school graduate in 2003 (CZK 17,782) and the smallest one appeared immediately the following year (CZK 11,134). Afterwards, the difference was continuously increased up to CZK 16,245 in 2009. The value of the difference once again exhibited a decreasing tendency in 2010 (CZK 15,346).

This identifier allowed the individual economic benefit of university education to be estimated at CZK 1.4 million, covering the whole period studied. According to Taubman's study [7], the influence of a tertiary education provides only one third of the calculated value. This means that the absolute amount of the added value of one average university graduate within the eight-year period will be worth less than half a million Czech crowns.

4 Identifier of net income

As gross income is not the net amount available for personal disposal according to particular needs, a similar retrospective study was carried out to locate the net income identifier. It is the net income, which would be debited if the study fee were transferred to the account of the university where the graduate had studied. Graph in Fig. 3 shows the hierarchical course of development in net earnings over the period studied.



Source: own calculation

Fig. 3: *Course of development of average net income in CZK (weighted average of the three branches)*

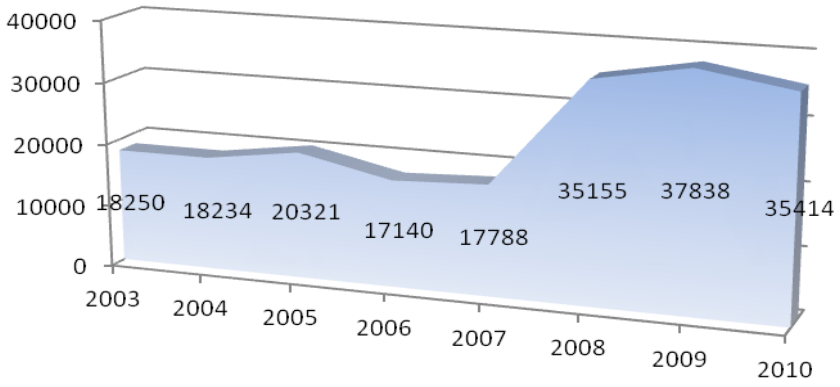
The graph illustrates the level of average monthly net income over the period (weighted average of the three branches) according to the highest attained education. Income earned by secondary school graduates, when compared to employees with elementary education, was about 49% higher while university graduates earned on average 56% more than secondary school graduates. For example in 2003, the net average salary of a university graduate equaled 1.54 times the net earnings of a secondary school graduate; till 2008 it was decreasing gradually to 1.48 times (since 2009 it has been growing again).

The identifier of net income expresses the economic benefit of tertiary education at the individual level of an average person more accurately. The added value expressed as a difference between the net salary of average university and secondary school graduates exceeded 1 million Czech crowns in the period 2003 – 2010. However, according to Taubman, the amount should be reduced to under CZK 340,000.

5 Identifier of income tax

Together with the added value of an individual, the added value of the state was modelled. To do that, the identifier of income tax was used. It is the difference between the income tax of an average university graduate and an average secondary school graduate. This difference can be seen as the state revenue from tertiary education (considering the above-mentioned restrictions).

The state added value was defined at 200 thousand crowns for each economically active university graduate (weighted average for the three studied branches) over the entire period 2003 – 2010 (see Graph in Fig. 3). The model diagram shows (based on real data and tax methodology valid in the period) how much more an average economically active university graduate contributed to the state budget when compared to a secondary school graduate [10]. The higher tax burden of university graduates is demonstrated by a sudden increase in tax in the last three years, which was caused by the introduction of super-gross salary.



Source: own calculation

Fig. 4: *Average yearly "added value" of education to the state as the difference in tax between university graduate and secondary school graduate (weighted average of three branches)*

The change in methodology of calculating the direct tax significantly influenced the conception of added value of the state, which is shown in the last three years. University graduates contributed about twice as much in comparison with the previous years. There is a question whether or not already in these years (2008 – 2010) a hidden form of study fee which the state received existed.

Taubman's approach can be also applied for this identifier [7] and the above mentioned amount of the added value of the state can be cut to a third. The total difference between the income tax of an average university graduate and a secondary school graduate would be reduced to less than 70 thousand crowns within the entire period. It is obvious that the amount is about 5 times lower compared to the added value created by an average individual university graduate. Therefore, it can be concluded that the state added value (measured by the difference between a university graduate's income and a secondary school graduate's income) from education is about one fifth of an individual university school graduate (measured by the difference between a university graduate net salary and a secondary school graduate net salary).

Conclusion

The development of the component, herein called the added value of university education, was observed in the period when the saturation of the Czech labour market with university graduates peaked. During this period (2003 – 2010), a relatively significant shift in the income of university graduates was confirmed as well as a change in the income tax on employees with lower education. The presented development of added value of an individual as the difference between the net and gross income of university and secondary school graduates confirmed the economic advantage of a university education in the CR in the period studied, despite the minor influence of education on the amount of income. The economic discussions concerning the development of Czech tertiary education involve topics connected to added value as well as the influence on centripetal and centrifugal forces in a comparison

of the incomes of tertiary and secondary school graduates in the future. If the CR follows the world's developed nations, the trend of convergence will prevail.

In terms of the added value to the state (expressed as a difference between the income tax liability of a university and secondary school graduate), the economic profit of the state from tertiary education was confirmed. In this case, the apparent influence of the methodology which considerably increased the state revenue from tertiary education – see the last three years in Graph in Fig. 3 – has also been documented. In reality, a university-educated labour force has become more expensive. This fact will also affect the labour market.

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EKONOMICKÉ POJETÍ PŘIDANÉ HODNOTY VYSOKOŠKOLSKÉHO VZDĚLÁNÍ

Článek se zabývá vyjádřením přínosu vysokoškolsky vzdělaného člověka pro národní ekonomiku. Příspěvek srovnává situaci v ČR, Německu a Polsku a poskytuje retrospektivní pohled na výnosy z vysokoškolského vzdělávání pět let prostřednictvím simulované přidané hodnoty. Na příkladu České republiky modeluje průměrnou přidanou hodnotu jednotlivce a státu na dostupných identifikátorech typu hrubá mzda, čistá mzda, daň z příjmů fyzických osob. Přidanou hodnotu simuluje jako rozdíl průměrných mezd průměrného vysokoškoláka a středoškoláka a jako rozdíl přímé daňové povinnosti průměrného vysokoškoláka a středoškoláka.

DIE ÖKONOMISCHE AUFFASSUNG DES MEHRWERTES DER HOCHSCHULBILDUNG

Der Artikel beschäftigt sich mit dem gesellschaftlichen Beitrag eines akademisch gebildeten Menschen für die nationale Ökonomie. Er vergleicht die Situation in der Tschechischen Republik, Deutschland und Polen und gewährt einen Rückblick auf die Erträge einer fünfjährigen Hochschulbildung mittels eines simulierten Mehrwerts. Am Beispiel der Tschechischen Republik wird ein durchschnittlicher Mehrwert eines Einzelnen und des Staates an zugänglichen Identifikatoren vom Typ Bruttolohn, Nettolohn sowie Lohnsteuer physischer Personen modelliert. Der Mehrwert wird als Unterschied zwischen Durchschnittslöhnen eines durchschnittlichen Hochschulstudenten und Mittelschülers und als Unterschied zwischen den direkten Steuerverpflichtungen eines durchschnittlichen Hochschulstudenten und Mittelschülers simuliert.

EKONOMICZNE UJĘCIE WARTOŚCI DODANEJ WYKSZTAŁCENIA WYŻSZEGO

W artykule opisano pożytek, jaki przedstawia osoba z wyższym wykształceniem dla gospodarki krajowej. W opracowaniu porównano sytuację w Czechach, Polsce i Niemczech oraz zaprezentowano retrospektywne spojrzenie na korzyści wynikające z wykształcenia wyższego w okresie pięciu lat za pośrednictwem symulowanej wartości dodanej. Na przykładzie Republiki Czeskiej przy zastosowaniu metody modelowania przedstawiono przeciętną wartość dodaną osoby wykształconej i państwa, wykorzystując dostępne wskaźniki, takie jak wynagrodzenie brutto, wynagrodzenie netto, podatek dochodowy od osób fizycznych. Wartość dodana przedstawiana jest jako różnica przeciętnych wynagrodzeń statystycznych osób z wyższym i średnim wykształceniem oraz jako różnica bezpośredniego zobowiązania podatkowego osoby z wyższym wykształceniem w porównaniu z osobą o wykształceniu średnim.