Doctoral (PhD) Dissertation Summary for Pre-Defence

MASS TERTIARY EDUCATION AND ITS EFFECT ON THE LABOR MARKET

Ágnes Kotsis

Supervisor: Dr. Prof. István Polónyi

University of Debrecen
Doctoral School of Economics

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1. INTRODUCTION AND RESEARCH HISTORY

After the system change, the great increase in the tertiary education entailed a debate in the literature of economics of education. Around 2000 some experts claimed that too many students graduate from universities and there was over-education others said the opposite (*Polónyi-Tímár 2001, Galasi 2004, Köllő 2005, Kertesi – Köllő, 2005)*. Nowadays thanks to the change in educational policy of the government this issue became highlighted in policy and in the media. We can find many "deterrent" statistics about the increasing number of graduated students and young qualified persons without jobs. (see for example MTI 2011) We also hear that some professions are not in demand on the labour market.

After the changes in the economic and political system, between 1990 and 2010 the number of students in tertiary education increased about three and half times: the number of full-time students is three times greater, while the number of correspondence students is five times greater than it was around the time of the system change (KSH Stadat 2011). While in 1999 the 19-year old cohort enrolment rate was 21%, and the 20 year-old cohort enrolment rate was 24%; in 2007 these percentages were 34% and 38% (OECD 2009a). Thus, according to Throw (Hrubos 1998) we are close to 'mass higher education'.

However these numbers do not give us an appropriate basis to evaluate overeducation. Overeducation is a relative term: the number of students is too high compared to something. After the Second World War in many countries educational planning on the basis of market demand was a commonly used method (see Timar 990, Bertrand 1993, and Polónyi 2002). This method still exists today (the European Union has supported similar projects), but, according to research findings,[1] apart from giving recommendations, it was hardly typical of governments to determine framework numbers for education. Current research, instead of using this approach, aims to focus on the labour market situation of qualified persons.

One possible method of evaluating overeducation is if we examine the employment attributes of graduated students, for example the difficulty of finding job. If there are too many graduated students supplied by higher education, then they will only find employment after a long time or not at all. Thus, to determine whether there is overeducation, we can examine the unemployment rates. Nevertheless, it does also matter what type of job they will

[1] The Institute of Economics of the Hungarian Academic Sciences started a project in the spring of 2010 (entitled Establishing Labour Market Forecasts and Foreseeing Structural Changes), whose main objective is to establish a reliable forecast and to help institutions that aim to gauge and mediate labour market demands and to support job-seekers' aims (MTA 2011)

occupy, namely will the job match their level of education or not? In the following paragraphs we will explain these phenomena.

When we take a look at the unemployment rates of educated people, we find that it is lower than the unemployment rate of the less educated. In international comparison Hungary has a good position as the unemployment rate of educated persons is the lowest among OECD countries. So the situation is not so bad. However, it can be also seen that the employment rates for those under university level are always lower than the employment rate of university graduates. So it can happen that qualified workers are *crowding out* less qualified people from jobs and even from the labour market as well (see Kotsis 2009).

If this is true, than those graduated students who occupy a job that previously requires lower education, have been studying needlessly. There is, however, also the possibility that the content of these jobs has changed and even if previously they could be filled by individuals with a secondary level education, nowadays workers need the kind of skills and knowledge in these jobs that they can get only in the university. Thus in my paper I will examine skill biased technological change and its effect on the labour market.

Skill biased technological change (SBTC) according to the most commonly used definition is: "a kind of technical change that leads to an increase in the demand for skilled workers and a decrease in the demand for low-skilled workers and generally increases the wage differences among skilled and unskilled workers" *(Heitiger – Stehn 2003:5),* although there are opinions which maintain that SBTC increases the demand for unskilled workers (see Falusné 1997, 2000). The occurrence of the second case depends on many factors, for example the philosophy of the management as well as the levels of, and the difference between, the wages of skilled and unskilled labour, while the increasing demand for skilled labour stems from the need to be able to take one's bearing in modern society, and to use modern technology every day. A good example is the service sector, where the rise in customers' education levels demands a higher level of education from the service providers. (Rimler 1999).

SBTC is commonly measured by the increase in the education level within industries. The rise of the education level can be divided into two parts, an increase in education level thanks to structural changes between industries (a shift toward knowledge-intensive industries), and an increase in the education level within industries, which is identified as SBTC*(Rimler 2003)*. However these numbers alone can show not just changes in demand, since the increasing supply of educated workers who then 'take' jobs from lower educated workers can also cause the increase of schooling level within industries. So these studies often

use other factors (see Machin – Van Reen 1998) and examine the wage differences between skilled and unskilled workers or measure the proportion of those educated workers who are employed in jobs which need a lower level of education than they actually have (*Gottschalk-Hansen 2003).*

Between 1980 and 2005 in Hungary the increasing education level within the employment categories was the main factor that had a significant role in increasing the education level in the labour market, except between 1996 and 2002. However, other studies (Kézdi 2002) found that around the system change, it was the shift toward knowledge intensive industries, while after 1995 it was SBTC, which played the main role in increasing the education level in the labour market.

The observation of wage premiums and the proportion of workers in lower level jobs showed that after 1995 the increasing demand for skilled workers and the relatively strict supply led to the increase of wage premiums for educated workers (Kézdi 2002). After 1998 this premium started to decrease, and around 2000 it stabilized at a high level (Galasi 2004). After this period we found - on the base of AFSZ data - that white collar workers' wage premiums were decreasing.

This means that, in that time, the increased supply of educated workers was not compensated by increasing demand caused by SBTC, thus educated workers had to accept jobs with lower educational requirements. However, another observation also found a rising proportion of educated workers employed in an occupation that "requires other higher or secondary education". While in 1980 the proportion of higher educated workers in this occupation category was only 5.7%, in 2005 it was 20%.

Even in the 80's in the United States studies appeared which examined the wages of educated people filling jobs that did not require staff at their education level, because wages can show how effective they are in these jobs, if we assume that employers pay their employees on the basis of their productivity.

The basis of these measurements was the so called ORU specification, which is the improved form of the Mincerian earning function. The Mincerian earning function shows the relationship between earnings and other influencing factors. In this equation the depending variable is the logarithm of earnings, while the dependent variables include the number of schooling years. Thus the coefficient gives the relative change in earnings relating to a one year increase in the years of schooling (see 3.1.2.3. chapter for more information). On the contrary, with the ORU specification the year of schooling is divided into three groups,

depending on whether it is required, over- or under education. Thus the model can measure the wage effect of each of the three factors (Duncan Hoffman 1981).

During the last three decades studies found that those were who employed in a job for which they are overeducated earn more than those who fit that job, although their wage premium is lower than their counterparts in a 'proper' job *(Verdugo – Verdugo 1989, Sichermann 1991, Cohn – Khan 1995, Kiker et al 1997, Mendes et al 2000, Hartog 2000, McGuinnes 2006).* However, researchers concluded that investment in education is not totally wasted

In sum, to evaluate overeducation we can examine unemployment rates, or the incidence and wage effect of the excess education of individuals.

However the studies mentioned above were criticized because they assumed that graduate students are equal in their abilities (each year of education increases abilities by the same unit). However, the enormous increase in the number of students in universities also entails an increase in the dispersion of abilities, so even those who have lower abilities than the average can graduate *(Halaby 1994, Buer 2002, Chevalier 2003)*. Those lower ability workers' performance at work will be lower as well, and if we do not take into consideration these lower abilities, this will result in a biased estimation of the wage premium overeducation.

These new studies tried to distinguish the different groups of graduated students according to their abilities. *Chevalier (2003)* distinguishes two groups, the so called genuinely overeducated, who are the same as the overeducated in the earlier studies, and the so called apparent overeducated, who seem as overeducated, but who, because of their lower abilities will match their work. That is why their wage premium will be lower than the premium of the genuinely overeducated as they do not have the abilities to do their job in a better or more effective way.

These tendencies also appeared in Hungary. The 19-20 year-old cohort's involvement rate in the last decade increased by 10% according to OECD data. In the light of this we can assume that even students with lower abilities can attend higher education (assuming abilities follow a normal distribution and the upper segment takes part in university courses). Besides this, the number of students per teacher has also increased in the last decades. This shows that during education students acquire "fewer" abilities (both soft skills and hard skills). This can even be seen globally, since there are big differences among universities and even fields of studies. In the case of the University of Debrecen the economic field is the most affected as

the number of students per teachers has increased the most *(DE 2010)*. Thus we assume that among students of economics apparent overeducation is more likely.

According to the negative tendencies observed the issue is current and is worth examining. Thanks to mass overeducation adoption of models that assume heterogenic abilities is also topical. The results can add interesting and extra information to the evaluation of overeducation.

2. THE STRUCTURE OF THE THESIS AND THE METHODS APPLIED

In my paper I introduce those theories that examine the role of education, such as human capital, screening, job competition and assigning models. (Chapter 3.1) Beside this I examine the topic of overeducation in order to collect different definitions. From these I choose the one which defines overeducation as the discrepancy between the educational attainment of workers and the educational requirements of their job (Chapter 3.2). The basis of the method used is the so called ORU specification, which is rooted in the Mincerian earning function. The Mincerian earning function explores the connection between wages and the education level. Thus it gives the relative change in wages when the education level increases by one unit (Chapter 3.1.2.3). On the contrary the ORU specification distinguishes the effect of over-, under- and required education on wages *(see Duncan-Hoffman 1981)*.

Although the ORU specification is rooted in the Mincerian earning function, the results seems to be in contrast with human capital principles. So the relationship between ORU and theories is an interesting question. Is it embedded into these theories' frameworks or not?

The topic therefore has a theoretical and an empirical importance.

The main goal of this paper is to answer the following question on a scientific basis: Has mass education led to overeducation in Hungary? Besides theoretical analyses, which provide a basis for examination, I conduct an empirical analysis. The empirical analysis can be divided into two parts: in the first part I introduce the results and statistical data from domestic and international empirical analyses, since I would like to give an overall picture of the employment of graduated students. I examine the change in both demand and supply on the labour market and introduce the change of employment status and wage premiums of educated workers (Chapter 4.1). These studies are appropriate to introduce the changes in the economic position of graduates; and it seems that after 2000 negative tendencies appeared regarding the wage premiums of these workers.

However to evaluate overeducation I conduct my own empirical analysis (Chapter 4.2). I examine the employment status of students graduating from the University of Debrecen (UD) who finished their studies in 2007 and 2009. The main reason is that the domestic statistical databases do not contain questions and data about the overeducation status of individuals.

Bias stemming from the regional nature of the sample must be considered, so I cannot make conclusions relating to the whole country. However, as one of the biggest universities in Hungary the case of the graduates of UD can help us to identify the phenomenon mentioned and its effect and make final conclusions. That is more important than examining the country-wide spread of overeducation; this can be a topic for another study.

In the case study I examine the wage penalty of the different categories of overeducated graduates relating to their matching counterparts. We must use wage penalty here, because those with a secondary school education are not represented in the database. So we can only determine the wage premium or wage penalty of higher education categories in relation to each other. However, if there is significant wage difference between higher educated workers, then this shows that education will not bring returns for everyone.

In addition, I identify those factors which affect the probability of being a genuinely or an apparently overeducated graduate. In the theoretical section, I identify these factors; in this section I use the UD database to test them.

The content of this study in brief:

Chapter 1. Introduction

Chapter 2. Questions of the research and hypothesis

Chapter 3. Theoretical review

Chapter 3.1: The introduction of theories about the role of education

Chapter 3.2: Definitions of overeducation at macro levels, and within this topic, introduction of models of overeducation (at a personal level)

Chapter 4. Empirical researches

Chapter 4.1: Introduction of empirical analysis and statistical data relating to economic position and employment status in order to identify trends

Chapter 4.2: Case study of the graduates of UD, incidence of overeducation, its effect on wages, and factors that affect being overeducated

3. QUESTIONS ADDRESSED IN THE DOCTORAL STUDY

The main question of the doctoral thesis:

Did the higher education expansion cause overeducation (at a macro level) after the change in the system?

To answer the main question we have to provide answers to the sub questions. To do this, we need to overview the related domestic and international literature concerning education and overeducation (at a macro level), the different definitions of overeducation, and the ORU specification chosen for measuring overeducation (at a personal level) and its developed version. The related sub question:

1. How could the definition of overeducation which is used to answer the main question be interpreted in the framework of different theories of education?

Hypothesis 1. Overeducation (at a macro level) can be evaluated through the measure of graduates' employment attributes or overeducation; although this latter stems from human capital theory, it does not fit human capital theory, nor screening, nor job competition theory, because these theories came into being to explain other phenomenon.

In the theory part of this paper, I introduce the most important theories relating to education, such as human capital, screening, job competition and assigning models, while in the second part I overview the evaluation of the personal overeducation focus on the model I want to use in the following section. According to this method I evaluate overeducation at a macro level with the help of an examination of personal matching to jobs. After studying the wage premium of those who are well matched to their job and those who have surplus education compared to less educated workers, with the help of the evaluation method of human capital theory we can determine whether investment in education is totally worthless. The empirical results (the incidence of overeducation and the lower wage premiums of overeducated workers) seem to be in conflict with the principles of neoclassical theory. Thus the question arises of how this phenomenon could be inserted into neoclassical and human capital theory? Or is this the appropriate model for evaluating overeducation (at a macro level) in other theoretical frameworks? To define my thesis I use logical deduction.

2. How can we interpret the results of domestic empirical analysis and statistical data regarding tertiary education's expansion?

Hypothesis 2. In Hungary since 1990 the great expansion of tertiary education has affected the employment position of graduates in such a way that educated workers occupy jobs normally filled by people with a secondary education, and crowd out them from jobs that previously could be done with a secondary education. If the content of these jobs does not change (i.e. improve) it is inevitable that the wage premium of higher educated workers must decrease.

To define the thesis I examine the change in graduates' employment status/attributes and in the structure of professions. Using macro data I examine how the number of jobs that require higher education, the number of tertiary graduates and their ratio has changed. I introduce the literature and empirical analysis of skill-based technological change (SBTC) which affects labour market demand.

According to the evidence of domestic empirical analysis the labour market demand implied by SBTC had stopped increasing around 2000, while the wage premium of educated workers after a period of growth started to stagnate then slightly decreased alongside a growing labour market supply. After 2000, I examine wage premiums at an aggregate level, and thus the decrease (primarily in white-collar professions) could show that as demand remained high graduates needed to accept jobs that do not call on their educational experience.

3. Did the expansion of education affect wages according to the case of UD's graduates (those who finished their studies in 2007 and 2009) using the adopted model that was introduced in the theoretical part?

Hypothesis 3. The expansion of the higher education sector after system change has resulted in a situation in which those UD's graduates who are overeducated earn less than their counterparts abroad according to the international tendencies. However, according to the model used for the analysis, the group of overeducated tertiary graduates is not homogeneous in terms of their abilities and motivation, thus there is a significant difference between the wages of the different layers of overeducated workers such as the apparently and genuinely overeducated.

To define the thesis I used the database of the Graduated Students' Survey for the Centre of Arts, Humanities and Science and the Centre for Agricultural and Applied Economic Science. The survey was conducted in 2010, and contains 620 graduates' answers. For the analysis I also used a weighted sample according to the faculties and year of graduation. To measure overeducation I use self evaluation, in which candidates must answer the following question: *"Does your current/last job require a lower level of education than yours?"* I used linear regression, and tested three different models. The first model contains only personal attributes, the second model further variables relating to education, and the third further variables relating to work. I ran the analysis both on a weighted and non-weighted sample. The thesis was defined on the basis of the weighted sample according to the results of the three models.

4. Which factors determined by the literature affect personal overeducation during the expansion of domestic tertiary education according to the case of UD's graduates finishing their studies in 2007 and 2009?

Hypothesis 4. The fact that tertiary graduates accept jobs that require lower education than theirs for lower wages than the market rate is affected by the following factors (these factors could also have an influence on whether graduates are genuinely or apparently overeducated):
a) shorter work experience, because young graduates want to compensate their lack of work experience with a higher education level (substituting theory);
b) shorter job tenure, because the discrepancy between the educational attainment of workers and the educational requirements of the job can be realized within a short time, thus the overeducated change job/company sooner in order to improve their job-skills match (matching theory);
c) better carrier opportunities, because graduates will prefer to accept a job in which they will be overeducated at the beginning if the job offers a better carrier opportunity. For example we can assume that in the case of large companies among younger employees overeducation is more typical (carrier mobility theory);
d) lower mobility propensity, because graduates with lower mobility propensity search for jobs in a limited and narrower market, so they will face a higher chance of being overeducated;
e) lower commuting propensity, because as in the previous case, graduates with lower commuting propensity rate also search for jobs in a limited area;

f) market rigidity, because individuals in a labour market that has worse conditions face an increased chance of being overeducated. We can measure market rigidity with the unemployment rate of counties.
g) field of studies, because graduates with fields of studies that are not in demand on the labour market will have difficulties to obtain a matching job.

To define the fourth thesis I also used the database of UD's Graduated Students' Survey conducted in 2010. I used multinomial logistic regression, where the depending variable is the different categories of graduates: 1- apparently overeducated, 2 – genuinely overeducated and 3 – matching.
I ran the analysis on both weighted and non-weighted samples, but models running on the weighted sample had higher explanatory power. In this case I also tested three different models: the first model contains personal attributes, the second model further variables relating to education, and the third further variables relating to work.

According to the analysis that I conducted in my paper, the following answer can be given to the questions, and I state the following:

Thesis 1. Measuring overeducation of graduates is a distinct model from the theories relating to education such as human capital, screening and job competition, thus it does not fit properly into these theories' framework. In the screening and job competition models, because of the motivation of individuals, the basis on which they make their decision about educational investment is such that overeducation at a macro level can only be evaluated by being benchmarked to a socially optimal level. Since the neoclassical and human capital theories assume market flexibility, overeducation cannot occur because of the conformity process of the market. However the condition of market rigidity can cause the incidence of overeducation and educated workers can take jobs from less educated workers. In this case with the help of the examination of wage premiums we can evaluate overeducation at a macro level.

Thesis 2. In Hungary since 1990 the higher education expansion has caused a change in the position of graduates such that educated workers take jobs from the less educated employees, and crowd them out from those occupations that previously required only a secondary level of education. However the cease of technical changes after 2000 this was not accompanied by

the changing content of these jobs. This means that those occupations that were qualified as secondary jobs could henceforth be filled by those with a secondary education. This also indicated by the decreasing wage premiums after 1998, although between 2000 and 2002 it remained stable, after 2002 decreasing was primarily observed among white collar workers. Beside this the wage premiums of overeducated workers were lower than their counterparts.

Thesis 3. The case study on the UD graduates also proves those domestic and international research results showing that overeducated workers earn less than their counterparts; the wage penalty was 12.2% and 16.3%. At the same time the graduate group is not homogenous; they differ both in ability and motivation. The reason is the increasing involvement rate of the relevant cohort, while the increasing number of students means that the acquisition of abilities is becoming less effective.

3a) According to this among the overeducated graduates two groups can be distinguished. First the so called apparently overeducated, who just seem to be overeducated. This can happen when the individual's education level is higher than that required but they have lower abilities and as a consequence they will be matched to their jobs. The second group is the so called genuinely overeducated, who have a higher level of education than required, but according to their abilities they are able to fill better jobs. These two groups differ in earnings. The apparently overeducated earn 9.8% less than their counterparts, while the genuinely overeducated have a wage penalty of 29.5%. These results are similar to Chevalier's (2003) results.

3b) When I distinguished between graduates with higher and lower abilities among the genuinely overeducated I found that the wage penalty of graduates with lower abilities increased to 31.6%, the genuinely overeducated graduates wage penalty did not change (9.5%), while the earning of those who have higher abilities are not significantly different from their counterparts. So it seems that among UD graduates there are students for whom the investment in higher education is not as beneficial as was previously assumed. However, we cannot claim that this investment is totally worthless without examining the wage penalty of high school graduates.

Hypothesis 4. Being apparently or genuinely overeducated is affected by the following factors in the case of UD graduates:

a) work experience has no effect on overeducation; thus there was no evidence of substitution theory according to which graduates substitute their lower work experience with a higher

education level. However, the sample contains mostly young graduates, so this may explain why it is not a significant phenomenon.

b) job tenure and the number of workplaces have no effect on overeducation. So in the case of UD graduates assignment theory - according to which bad matching is a result of information asymmetry - was not confirmed. Bad matching goes on until the graduate finds a matching job, thus overeducated graduates have lower job tenure and less work.

c) size of company affects overeducation. Apparently overeducated graduates are mostly employed by small and medium companies, while the genuinely overeducated are employed by large companies. The cause may be that higher ability graduates prefer to accept jobs with better carrier opportunities.

d) mobility propensity decreases the chance of being overeducated. So it was confirmed that individuals with lower mobility propensity search for jobs in a limited market and thus they can choose from fewer opportunities and face a higher chance of being overeducated.

e) commuting propensity does not have an effect on the chance of being overeducated.

f) market rigidity also not has an effect on overeducation, and the reason may be that it has an effect on the chance of being employed. These results are similar to Buchel – Ham (2003).

g) field of studies has also an effect on overeducation. With an engineering or agricultural degree individuals can easily find a matching job, while with business, arts and teacher training degrees they easily become apparently overeducated. There is generally a shortage of engineers on the market, while the latter fields are characterized by increased supply.

h) level of education; with a bachelor's degree graduates become mostly apparently overeducated, while graduates with a college degree are mostly genuinely overeducated.

i) public servants are not characterized nor by the apparently or genuinely overeducated.

j) innovation level of company; the more innovative a company, the higher the workers' chances of being in a matching job.

5. SUMMARY; FURTHER RESEARCH OPPORTUNITIES

The main question of the paper is the following: Was the expansion of higher education so excessive, that it caused overeducation at a macro level in Hungary?

According to the human capital theory, if there is a wage premium of overeducated graduates as opposed to less educated workers, investment in education is not worthless.

The statistical data and domestic empirical analysis show that there is a wage premium, although it is decreasing. This may indicate that the expansion is excessive.

With the help of the case study described we can get a detailed picture of the graduates' employment situation. According to this, the group of overeducated graduates is not homogenous, since by expansion students with lower abilities can attend higher education. If we differentiate these inner groups, we can find significant differences among wages: the worst group can earn 32% less than those who can find a job which requires their education level. This is more than the wage penalty of the overeducated as determined earlier: 13% according to *Chevalier (2003)* and 12-16% according to my analysis, as we assume that students with lower abilities start to attend to university under expansion. Thus, as a result of higher education expansion there appears a group of graduates who suffer from a significant and higher wage penalty.

Whether or not education is totally worthless for them is something we cannot claim, because in the sample there were no high school graduates, and we cannot compare wages. However, if we take a matching individual basic salary of 118 777 HUF (according to the third model on weighted sample), when we subtract 31.6% from this amount we get 81 244 HUF. This is appropriate for the average salary of workers with compulsory schooling *(AFSZ 2010)*. According to this, investment in higher education seems worthless.[2]

The most important scientific results of the research:

1. I determine a more exact applicability of theories from the viewpoint of overeducation: examining the subscribed theories' contradictions from the viewpoint of overeducation (at both an individual and macro level) I determine these theories' applicability from the perspective of the main question. (see thesis 1)

[2] However the example represents a university entrant's situation and starting salary and does not take into consideration the future increase in wages.

2. I connected the models which evaluate the change of graduates' economic status to those which examine the effect of technological changes.

3. I statistically confirm the statement that the group of university graduates is not homogenous:

By the adoption of Chevalier's (2003) model to a Hungarian sample I supported the idea that university graduates vary in their abilities and motivation, and because of this there are significant differences between the wages of the genuinely and apparently overeducated (see thesis 3).

4. Adaption of a test method to a Hungarian dataset:

Chevalier's (2003) model was developed for longitudinal data, in my study I modified it and employed it with cross sectional data. (Chapter 4.3.2.4)

5. Testing of those models and factors that explain why graduates become being overeducated:

I tested the following models and factors' validity: matching theory, substitutional theory, carrier mobility theory, mobility and commuting propensity, market rigidity, field of studies (see thesis 4).

Further research opportunities:

During this paper I frequently mentioned that the wage penalty cannot be compared to the wage penalty of lower educated workers. This comparison is not available with school leaving surveys of universities, so it would be important to conduct representative research which contains data for both university graduates and high school graduates.

The examination of results over a longer period of time can add further information to the observations. It would be interesting to know how wage penalties and factors that affect overeducation will change if attainment in higher education increases/decreases.

If the question about overeducation appeared in the nationwide survey, we could formulate a conclusion regarding the whole country.

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