

OVEREDUCATION AND EARNINGS – LABOR MARKET MISMATCH

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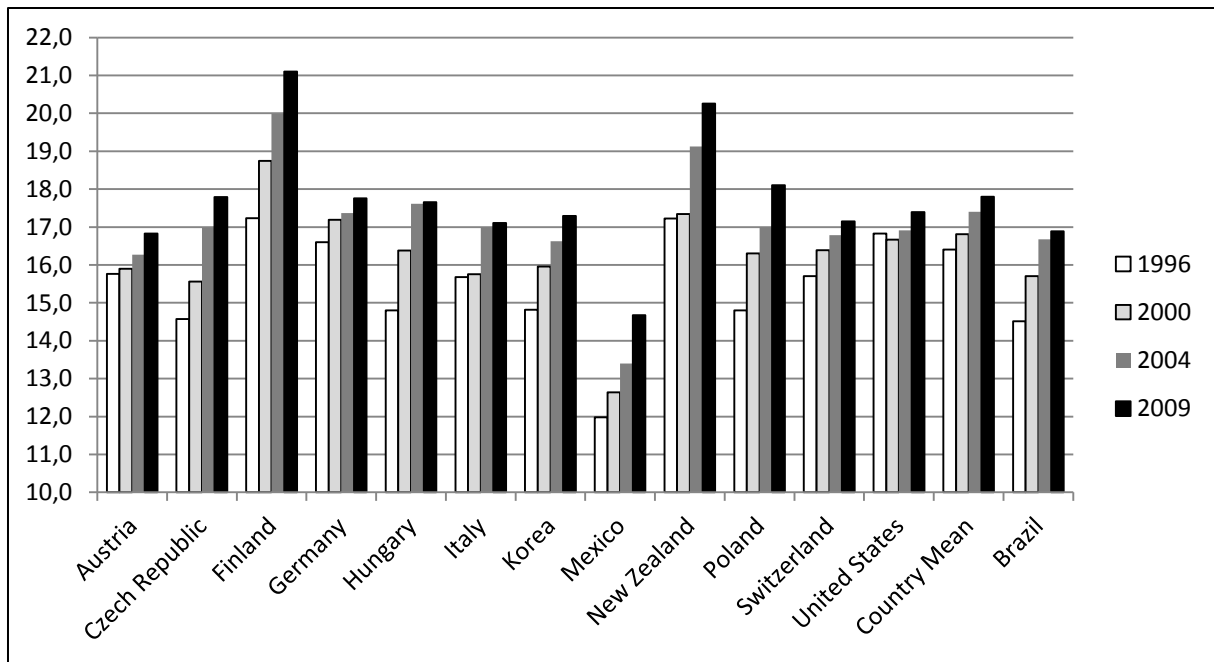
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Abstract

Growing numbers of higher education graduates and persistent demand for further education in the population lead to concerns about mismatch between jobs requirements and workforce qualifications, both in the sense of overqualification and sometimes also underqualification. This paper deals with the overeducation of graduates because the proportion of graduates in the workforce has risen in almost all developed countries (including the Czech Republic) over the last 20 - 30 years. There seems to be conflict in public policies that while numbers of enrolled students at public universities and consequently numbers of graduates are rising, there could be shortage of graduate level jobs in the future. First parts of the paper deal with various methods that are used to measure required level of education for the job and with the theories (searching and matching, human capital theory, assignment theory etc.) which can be used for interpretation of overeducation. Last chapter deals with empirical results of the impact of overeducation on earnings. Results of this research are important for both higher education policy makers and management of universities especially in time when public budgets from which public universities are mostly financed, are under pressure.

Introduction

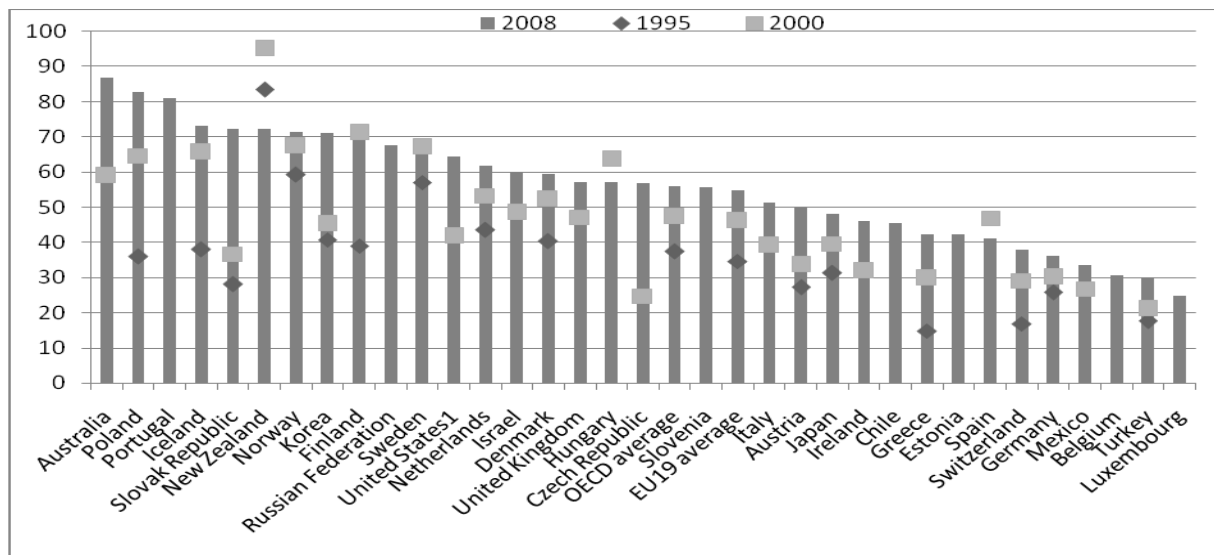
There is little such remarkable developments as the increase of educational attainment of population in the last decades of twentieth century and first decade of this century. Enrollment to schools, vocational institutions and universities is growing, as can be seen on the growth of the education expectancy which is calculated by adding the net enrolment rates for each single year of age from five onwards. The chart (Figure 1) shows the increase of the average number of years a 5-year-old can expect to be formally enrolled in education during his or her lifetime, in selected countries, between years 1996 – 2009. In the Czech Republic, five years old child could expect to be enrolled during 14.6 years over her or his lifetime in the year 1996. However, in the year 2009 education expectancy for five years old child in the Czech Republic increased to 17.8 years. Similar trends can be seen in almost all developed countries and education expectancy increased by around 11% between 1996 and 2009 in all OECD countries for which comparable trend data are available, showing a general increase of participation in education.



Source: [15], [16], [17], [18], [19], [20], [21], own calculations

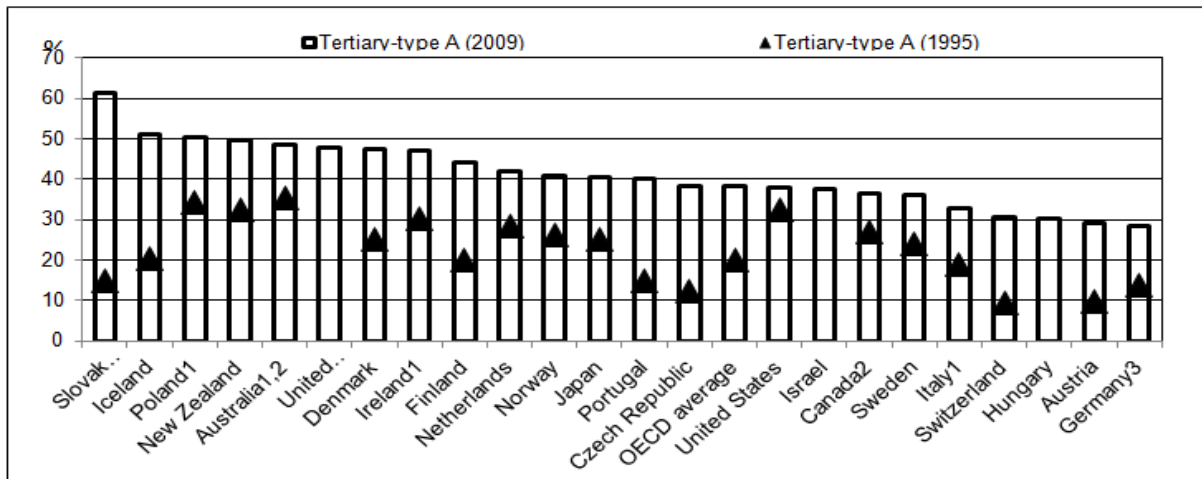
Fig. 1: Increase in education expectancy between years 1996 – 2009, selected countries

Especially numbers of students enrolled into tertiary education has increased substantially in almost all developed countries (see Figure 2) and proportion of graduates has risen consequently (see Figure 3). Yet many various studies have indicated that these graduates are entering labor force with more education than is actually required for their jobs – they are overeducated. Although the increase in all educational levels has been accompanied by growth of high skill jobs demand, the rate of this growth was arguably slower than supply of qualified, i.e. graduated workers.



Source: [20]

Fig. 2: Entry rates into tertiary-type A education (1995, 2000 and 2008)



Source: [21]

Fig. 3: Entry rates into tertiary-type A education (1995, 2000 and 2008)

The result of this difference between higher supply of graduates and demand for them at the labor market leads to overeducation and allocation of skills may be less than optimal. Overeducation is a problem broadly discussed in the economic and sociological literature for last two or three decades and it has serious consequences for labor market effectiveness and educational investment.

1 Overeducation - measurement problems

Three alternative measurement methods can be used to find the degree of overeducation or undereducation ([11], [24]):

- 1) Systematic job evaluation by professional job analysts who specify the required level of education (degree) for the job and occupational classification. Overeducation or undereducation is difference between required and actual education. This type of measurement is referred to as an objective measure.
- 2) Worker self-assessment – the workers themselves specify the qualification required for the job answering the question as e.g. “What kind of education does a person need in order to perform your job?” Difference between actual and assessed education is over- or undereducation. This type of measurement is referred to as a subjective measure.
- 3) From realized matches, where required education is derived from actual level of workers' education as a mean (or sometimes mode) of their educational attainment. Overeducation then occurs when the level of education is more than one standard deviation above the mean; similarly undereducation is one standard deviation below the mean. This method of measurement is called empirical method.

Preference of one measure over the other usually depends on data availability. If there is a full freedom for research design and data is fully available then the best solution would be objective measure: job analysis by experts could bring best results ([11]). However, this data is rarely available and we can find subjective measure in most overeducation analyses ([9], [13], [24]).

From the meta-analysis of 25 studies of overeducation ([9], p.153) were obtained 50 estimates on the incidence of overeducation and 36 estimates for the incidence of undereducation. The unweighted average of the incidence of overeducation is 23.3% (standard deviation 9.9%) and unweighted average of the incidence of undereducation is 14.4% (standard deviation 8.2%).

In the study of U.K. graduate labor market ([6]), 38% of graduates were overeducated in their first job. This proportion fell to 30% after six years.

Results for the Czech Republic can be found in the study of 25 European countries ([8]) and are as follows: 49.5% overeducated; 44.3 undereducated.

2 Overeducation – theory

Workers are overeducated if the skills they bring to their jobs are higher than the skills required for this job. There is abundant literature on overeducation in the last decades, both in theoretical and in empirical fields (see for example meta-analysis of 25 studies on overeducation in an article by Groot et al. ([9], p.153). Peter Sloane notes that this field of research is coming of age ([24] p. 11) and this is reflected – among others – in a special issue of the *Economics of Education Review* on Overschooling ([7]). Substantial literature is also summarized in Sloane's article ([24]) and there are 33 articles and papers reviewed in this article. Generally speaking, the economic analysis of overeducation was started by Richard B. Freeman in his *The Overeducated American* from a macroeconomic point of view in the year 1976 ([3]). Freeman found that the rate of return to higher education had fallen in the seventies in the U.S.A. and attributed it to an excess supply of graduates. However, recent literature (as mentioned above) mainly focuses on the income effects of overeducation and on individual level.

There are several possible explanations for the existence of overeducation ([10], [11], [24]): First, it can be a compensation for the lack of other human capital endowments (e.g. ability, experience, on-the-job training), or in other words overeducated workers are substituting formal for informal human capital or are less capable than adequately educated individuals ([13], p. 521). Also in this human capital perspective, overeducation can stem from the deliberate choice of overschooled worker entering low-skill job as an opportunity for initial experience as an additional human capital investment. This part of human capital explanation was tested by Sicherman ([23]) with good results.

Second explanation of overeducation is connected with a career mobility and in this sense overeducation is a temporary situation ([11]). "Searching and matching" process is an effect of imperfect information in the labor market environment and as such it can be temporary situation. It means that this explanation is not mutually exclusive with above mentioned additional human capital investment ([11]).

In extreme contrast to human capital theory explanation of overeducation is job competition model created in 1975 by Lester Thurow. In this model, it is assumed that marginal productivity is derived from the job rather than from the worker and the employers use personal qualities (incl. education) only for hiring. Wages are paid according to jobs and return to human capital over the level required for the job is zero. More educated workers are hired on supposition that for their training will be necessary fewer costs.

Finally, job assignment model is a strand of literature based on the proposition that there is an allocation problem in assigning workers to various jobs. Labor supply and labor demand are complex entities and measuring match quality is in line with attention for the assignment of heterogeneous workers to heterogeneous jobs ([11]). Earnings in this model are a function of both worker and job characteristics.

There is a possibility to create an equation adding together Mincer's (it means human capital theory model) and Thurow's job competition models. Sometimes this equation is referred to as the Duncan and Hoffman or the ORU model (ORU stands for **O**vereducation – **R**equired education – **U**ndereducation):

$$\text{Log } W_t = \beta_0 + \beta_1 q^r + \beta_2 q^s + \beta_3 q^u + \varepsilon_t, \quad (1)$$

where

$\text{Log } W_t$ is logarithm of earnings,

β_0 is a constant, $\beta_1; \beta_2; \beta_3$ are estimated coefficients of qualifications (or schooling) and

q are qualification variables

q^r for qualifications required to do the job;

q^s for surplus qualifications;

q^u for deficit qualifications.

The Mincer's human capital specifications implies that $\beta_1 = \beta_2 = -\beta_3$; Thurow's job competition specification implies that $\beta_2 = \beta_3 = 0$ ([24], p. 14).

Similar specification of earnings equation can be found in the study of U.K. graduate labor market in the article by Peter Dolton [6]:

$$\ln W_i = \beta_0 + \beta_1 X_i + \beta_2 X_i^2 + \beta_3 S_i^r + \beta_4 S_i^s + \beta_5 A_i + \beta_6 Z_i + \mu_i, \quad (2)$$

where

X_i is years of work experience,

A_i an indicator of ability,

Z_i is a vector of personal socio-economic characteristic.

Schooling variable S has been split into required (S^r) and surplus (S^s) schooling.

If human capital earnings equation holds then returns to both types of schooling should be equal: $\beta_3 = \beta_4$.

3 The impact of overeducation on earnings

Returns to education are usually calculated using equations similar to above presented equations (1) or (2). Results of 25 studies included in meta-analysis of overeducation in the labor-market ([9], p.153) show that return to a year of education required was 7.9% in 1970s and 1980s; in 1990s rate of return to a year of education required increased to about 12%. For all these years, rate of return to a year of overeducation was 2.6%, while the rate of return to a year of undereducation was -4.9%. Following Figure 4 shows detailed results of returns to overeducation and undereducation and also values of incidence of overeducation and undereducation. The study of Galasi ([8]) shows for 25 European countries results similar to Table 1, however for the Czech Republic the returns to education for required year is equal to return to education for attained year – both returns are 7.1%. Pooled sample data shows the returns to education for required year equal 9.7% and return to education for attained year equal 7.2%.

	Incidence of overeducation (%)	Incidence of undereducation (%)	Rate of return education attained (%)	Rate of return education required (%)	Rate of return overeducation (%)	Rate of return undereducation (%)
All studies	23.3 (9.9)	14.4 (8.2)	5.6 (1.0)	7.8 (2.2)	3.0 (4.7)	-1.5 (5.8)
<i>Country</i>						
United States	26.3 (11.1)	15.6 (4.1)	5.5 (2.4)	8.1 (2.0)	3.9 (4.8)	-1.9 (3.8)
Europe	21.5 (8.8)	13.9 (9.4)	5.6 (0.8)	7.6 (2.4)	2.1 (4.6)	-1.2 (7.0)
<i>Year</i>						
1970s	28.7 (10.8)	16.0 (3.9)	3.8 (0)	7.9 (2.3)	4.6 (1.3)	-2.9 (1.2)
1980s	22.4 (8.2)	14.9 (7.0)	5.9 (1.1)	7.4 (2.4)	2.6 (5.7)	-2.1 (4.3)
1990s	21.0 (10.7)	13.3 (10.8)	5.7 (0.8)	8.2 (2.1)	1.4 (5.4)	0.85 (9.6)
<i>Definition of education^a</i>						
A	26.4 (9.2)	30.2 (12.4)		9.5 (2.4)	3.8 (1.5)	-5.3 (1.9)
B	13.1 (3.5)	9.6 (5.1)	5.8 (0.9)	7.4 (2.4)	-1.5 (7.2)	4.2 (8.5)
C	24.8 (8.2)	11.2 (3.3)		3.3 (0)	1.9 (0)	-3.3 (0)
D	28.6 (8.6)	15.5 (6.3)	5.0 (1.4)	7.9 (1.8)	4.9 (1.5)	-3.5 (2.1)
<i>Gender</i>						
Male	21.0 (8.5)	16.5 (11.0)	5.7 (1.1)	7.3 (1.9)	2.8 (4.3)	-1.3 (7.0)
Female	24.0 (11.5)	10.9 (6.3)	5.5 (0.5)	8.7 (2.4)	4.2 (3.4)	-0.7 (6.9)
Combined sample	24.8 (10.1)	15.4 (6.0)	5.5 (1.7)	7.4 (2.1)	2.0 (5.9)	-2.1 (4.4)
<i>Specification of the wage equation</i>						
With actual education	11.2 (3.7)	10.4 (7.9)	6.2 (0.8)		-8.4 (3.9)	11.1 (6.4)
With required education	24.4 (9.6)	14.9 (8.2)	5.4 (1.0)	7.8 (2.2)	4.5 (1.7)	-3.5 (2.0)

^a Definition of over/undereducation: A — based on job level or DOT classification; B — based on average years of education within occupation; C — self-report on skill utilization; D — based on self-report on skill requirements (for new workers) on the job.

Source: [9]

Fig. 4: Average values of the survey of the sample used in the study (standard errors in brackets)

Conclusions

Overeducation is seen as important issue in all developed countries and it is a great challenge to the relevance of more investment in the higher education. If many workers have more than required education or qualifications then continuing the expansion of higher education seems to be useless and inefficient. However, research overviewed in this short text addresses questions connected with measurement problems of overeducation and with consequences of overeducation for individual worker. Several studies show that overeducation is not as serious as presented and its incidence is overestimated when the heterogeneity of workers is not taken into account. Similarly, negative effect of overeducation on earnings is not so big when endogeneity of overeducation is controlled. Overeducation is also temporary situation when worker is beginning the career on labor market. On the other hand, at the macro level higher numbers of educated workers give rise to complementary high-skill production. All these questions deserve following research because efficient educational policy will be one of main factors supporting economic growth in the future.

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PŘEVZDĚLANOST – NESOULAD NA TRHU PRÁCE

Rostoucí počet absolventů vysokých škol a přetrvávající poptávka po dalším vzdělávání v populaci vede k obavám z nesouladu mezi požadavky na uchazeče o pracovní místa a kvalifikací pracovních sil, a to jak ve smyslu převzdělanosti a někdy i nedostatku vzdělání. Tento příspěvek se zabývá převzdělaností absolventů, protože podíl absolventů vysokých škol v posledních 20 – 30 letech vzrostl téměř ve všech vyspělých zemích (včetně České republiky). Zdá se, že existuje konflikt ve veřejné politice, že zatímco počet zapsaných studentů na veřejných vysokých školách, a tedy počty absolventů roste, v budoucnu by mohl nastat nedostatek odpovídajících pracovních míst. První části příspěvku se zabývají různými metodami, které se používají k měření požadované úrovně vzdělání, a teoriemi (vyhledávání a přiřazování, teorie lidského kapitálu, teorie přiřazování atd.), které mohou být použity pro interpretaci převzdělanosti. Poslední kapitola se zabývá empirickými výsledky vlivu převzdělanosti na výdělek. Výsledky tohoto výzkumu jsou důležité jak pro tvůrce vysokoškolské vzdělávací politiky, tak pro řízení vysokých škol, zejména v době, kdy jsou pod tlakem veřejné rozpočty, ze kterých jsou veřejné vysoké školy převážně financovány.

ÜBERERZIEHUNG UND EINKÜNFTE – ARBEITSMARKTDISKREPANZEN

Wachsende Zahlen von Hochschulabsolventen und die ständige Nachfrage nach Weiterbildung in der Bevölkerung führen zu Überlegungen hinsichtlich Diskrepanzen zwischen Arbeitsanforderung und Qualifikation, sowohl im Sinne von Überqualifizierung und manchmal auch von Unterqualifizierung. Dieser Artikel handelt über die Überqualifikation von Hochschulabsolventen; denn die Proportion von Hochschulabsolventen in den Kreisen der Erwerbstätigen ist in allen höher entwickelten Ländern inklusive der Tschechischen Republik während der letzten 20 – 30 Jahren gestiegen. Es scheint einen Konflikt in der Politik zu geben: Während die Zahlen der eingeschriebenen Studenten an öffentlichen Universitäten und folglich auch die Zahlen der Hochschulabsolventen steigen, könnten in Zukunft die Arbeitsstellen für Akademiker gekürzt werden. Die ersten Teile des Artikels beschäftigen sich mit verschiedenen Methoden, die zur Messung der benötigten Bildungsniveaus für die betreffenden Arbeitsstellen und mit den Theorien, die zur Interpretation der Überbildung verwendet werden kann. Das letzte Kapitel befasst sich mit den empirischen Ergebnissen der Auswirkung von Überbildung auf die Einkünfte.

PRZEEDUKOWANIE – ROZBIEŻNOŚCI NA RYNKU PRACY

Rosnąca liczba absolwentów uczelni wyższych i trwający popyt na dokończanie występujący w populacji prowadzi do obaw związanych z rozbieżnością wymogów stawianych osobom ubiegającym się o miejsca pracy a kwalifikacjami siły roboczej, zarówno w sensie przededukowania, jak również czasami niedoboru wykształcenia. Niniejszy artykuł poświęcony jest przededukowaniu absolwentów, ponieważ udział absolwentów uczelni wyższych w ostatnich 20–30 latach wzrósł także we wszystkich krajach rozwiniętych (w tym w Republice Czeskiej). Wydaje się, że istnieje konflikt w polityce publicznej, tzn. że liczba studentów zapisanych na publicznych uczelniach, czyli liczba absolwentów wprawdzie rośnie, ale w przyszłości mógłby się pojawić niedobór odpowiednich miejsc pracy. W pierwszej części artykułu omówiono różne metody, które stosowane są do pomiaru wymaganego poziomu wykształcenia, oraz teorie (poszukiwań i połączeń, teoria kapitału ludzkiego, teoria połączeń itd.), które można wykorzystać do interpretowania zjawiska przededukowania. W ostatniej części opisano empiryczne wyniki wpływu przededukowania na zarobki.