BUDAPEST WORKING PAPERS ON THE LABOUR MARKET
BWP – 2008/8

The effect of educational mismatch on wages for 25 countries

PÉTER GALASI

INSTITUTE OF ECONOMICS, HUNGARIAN ACADEMY OF SCIENCES
DEPARTMENT OF HUMAN RESOURCES, CORVINUS UNIVERSITY OF BUDAPEST
BUDAPEST, 2008

Budapest Working Papers On The Labour Market
BWP – 2008/8

Institute of Economics, Hungarian Academy of Sciences
Department of Human Resources, Corvinus University of Budapest

Author:
Péter Galasi
Department of Human Resources
Corvinus University of Budapest
E-mail: emberi.eroforrasok@uni-corvinus.hu

August 2008

ISBN 978 963 9796 30 0
ISSN 1785 3788

The effect of educational mismatch on wages for 25 countries

Péter Galasi

Abstract

By making use of the Duncan&Hoffman model, the paper estimates returns to educational mismatch using comparable microdata for 25 European countries. Our aim is to investigate the extent to which the main empirical regularities produced by other papers on the subject are confirmed by our data base. On the basis of tests proposed by Hartog&Oosterbeek, we also consider whether the observed empirical patterns are in line with the Mincerian basic human capital model and Thurow's job competition model. Using Heckman's sample-selection estimator, we find that results are rather consistent with those found in the literature, and that the job-competition model could be accepted, whereas the Mincerian human capital model could be rejected for most of the countries.

JEL: J21, J23, J24, J31

Keywords: job-education matching, overeducation, undereducation, returns to over- and undereducation, international comparison

Acknowledgement: The author wishes to thank Péter Róbert for his help with the data base.

A túl- és az alulképzés bérhozama 25 országban

Galasi Péter

Összefoglaló

A tanulmányban 25 európai ország, kétezres évek közepi állapotot tükröző, reprezentatív keresztmetszeti mintáin egyrészt a Duncan – Hoffman modellre támaszkodva megvizsgáljuk, hogy adatbázisunk milyen mértékben tükrözi az illeszkedés bérhozamával foglalkozó irodalom legfontosabb empirikus következtetéseit, másrészt - a Hartog - Oosterbeek által javasolt statisztikai próbák segítségével – azt elemezzük, hogy empirikus modellünk eredményei alapján mit mondhatunk az emberi tőke minceri alapmodelljének és a thurowi állásverseny modelljének érvényességéről. A becsléseket Heckman szelekciós torzítást kiküszöbölő becslőfüggvényével végeztük, s azt találtuk, hogy eredményeink többnyire egybecsengenek az irodalomban található empirikus szabályosságokkal. A statisztikai próbák az országok többségében cáfolják a minceri és megerősítik a thurowi modell empirikus érvényességét.

Tárgyszavak: a munka és az iskolai végzettség illeszkedése, túlképzés, alulképzés, bérhozam, nemzetközi összehasonlítás

1. INTRODUCTION

Recently, a growing number of studies[1] have been concerned with the labour market consequences of inadequate education. The paper estimates returns to educational mismatch using comparable microdata for 25 European countries. It complements the literature[2] on the effect of underschooling and overschooling on wages. First, using Duncan&Hoffman (1981) model we try to investigate to what extent the main empirical findings of the literature are valid for our samples. Bauer (2002), drawing on Hartog (2000), summarises the main empirical results as follows: the returns to attained years of schooling are lower than the returns to required years of schooling (Result 1 – *R1*); the returns to overeducation are positive but smaller than the wage premium associated with a year of required education (*R2*); the returns to years of undereducation are negative (*R3*), but their absolute value is smaller than the returns to required education (*R4*), and smaller than the returns to overeducation (*R5*); the estimated returns to overeducation are always significant (*R6*), whereas those to undereducation are not so (*R7*). Second, applying the statistical tests proposed by Hartog&Oosterbeek (1988), we also consider whether the observed empirical patterns are consistent with the standard Mincerian human capital model (Mincer 1974) or Thurow's job-competition model (Thurow 1975).

The paper is divided into five sections. Section 2 presents the Duncan&Hoffman model and the Hartog&Oosterbeek tests, Section 3 provides information on data, definitions, variables, and estimation techniques, Section 4 reports the main empirical findings, Section 5 concludes.

2. THE MODEL

The Duncan&Hoffman model decomposes attained years of education (S) into years of education required on a job (R), years of over- (O) and underschooling (U): $S = R + O - U$. This implies $S = R$ for an adequately educated individual, $S = R + O$ ($O > 0$) if the worker is overeducated, and $S = R - U$ ($U > 0$) in the case of undereducation. For a sample of individuals and using linearised specification, the earnings equation estimating the (constant) average returns to a year of required, over- and undereducation can be written as

[1] Theoretical and measurement problems are summarised in Hartog (2000), Green&McIntosh&Vignoles (1999), van der Velden&van Smoorenburg (1997), Borghans&de Grip (1999). Groot&Maassen van den Brink (2000). Hartog (2000) and Rubb (2003b) report many empirical results.

[2] For example Chevalier (2003), Cohn&Khan (1995), Cohn&Ng (2000), Daly&Büchel&Duncan (2000), Dolton&Vignoles (2000), Groot (1996), Mendes de Oliveira&Santos&Kiker (2000), Rubb (2003a), Vahey (2000)).

$$w = \alpha_0 + \alpha_R R + \alpha_O O + \alpha_U U ,$$

where w denotes log earnings, $\alpha_R = \partial w/\partial R$, $\alpha_o = \partial w/\partial O$, and $\alpha_U = \partial w/\partial U$ stand for the returns to educational (mis)match to be estimated. If the expected estimation results hold then $\alpha_O > 0$ and $\alpha_R > \alpha_O$ (*R2*); $\alpha_U < 0$ (*R3*); $\alpha_R > |\alpha_U|$ (*R4*); $\alpha_O > |\alpha_U|$ (*R5*); and $\alpha_R > \alpha_O > |\alpha_U|$ (*R2*, *R4*, *R5*).

According to Hartog&Oosterbeek, since in a Mincerian setting the educational requirements of the job do not affect wages, then the equality of the following parameters should hold: $\alpha_R = \alpha_O = |\alpha_U|$; as for Thurow's model, wages are determined by the marginal-productivity requirements of the job, individuals' assets are irrelevant, thus the estimation should produce $\alpha_O = |\alpha_U|$. Note that if the Mincerian model is accepted, *R2* and/or *R4* and/or *R5* have to be rejected, if Thurow's model seems to be valid, then *R5* cannot hold.

3. DATA, VARIABLES, ESTIMATORS

We use European Social Survey data[3] (Jowel et al. 2005).[4] The data were collected in 2004 to 2006[5] for a large number of countries using a common questionnaire. The overall sample used in the paper consists of 25 European countries out of which 20 and 2 are members of the EU,[6] and the European Economic Area,[7] respectively. The remaining countries are Switzerland, Turkey, and Ukraine. The size of the pooled sample, for which earnings equations can be estimated - that is, that the number of persons with non-zero earnings – is about 13500. Individual countries' sample size varies between 200 and 900 that might adversely affect the precision of estimations, especially in the case of smaller samples.[8]

The first key variable we use here is the usual before-tax monthly wage (in Euro). The original variable refers to different time periods for different countries. As regards the number of persons with non-zero wage in the pooled sample, about 74 per cent have monthly earnings data. For 13, 8, and 5 per cent of the respondents the periods are a year, four weeks, and one or two weeks, respectively. Thus in the case of 26 per cent of the observations the

[3] ESS round 2; the data file used in the paper was released on 12-12-2006.
[4] The data archive and distributor of ESS data is the *Norwegian Social Science Data Services*; for information see http://ess.nsd.uib.no.
[5] 62 per cent of interviews were done in 2004, 34 per cent in 2005, four per cent in 2006.
[6] Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden.
[7] Iceland and Norway.
[8] For sample sizes see Table A1.

original variable was recoded.[9] The average worker of the pooled sample earns 1218 euros (standard deviation: 3.53) and the country averages range from 47 (Ukraine) to 3300 euros (Denmark).[10]

Schooling is measured as years of full-time education completed (highest level).[11] Since the survey provides no information about part-time education, it is likely that education attainment is underestimated and as a consequence returns to education will be overestimated.

Educational mismatch depends on how education required on a job is measured. Out of the three standard methods (job-analyst method, subjective method, and the method based on realised matches),[12] here we can use the second one that relies on self-reporting. Two variables are available to produce the required education variable. The exact wording of these questions is as follows: 1. if someone was applying nowadays for the job you do now, would they need any education or vocational schooling beyond compulsory education?, and 2. about how many years of education or vocational schooling beyond compulsory education would they need? The second variable is not fully continuous and it is truncated from above. The truncation does not seem serious since only four per cent of workers report the highest number of years (at least 10 years of required education beyond compulsory school). In case of interval coding we use interval midpoints.[13] Required years of education are reported in relation to compulsory education, so we need to know the years of compulsory education. They are available from the UNESCO statistical data base and the information refers to 2004.[14] The years of required education variable is produced with the help of the two original required education variables and the UNESCO data. Then, years of under and overeduation are computed using the required and attained education variables.

Table 1 presents the incidence of educational mismatch. The proportion of properly educated workers amounts to 8 per cent for the pooled sample varying between one (Turkey) and 19 per cent (Austria); when the samples are pooled 33 per cent of workers are overeducated, and this ranges from 15 (Netherlands) to 79 per cent (Estonia). On average, the number of the undereducated is 59 per cent with important cross-country differences; Estonia represents the lowest value (13 per cent), and Netherlands do the highest one (82 per cent).

[9] Weekly and bi-weekly earnings were multiplied by 4.4, and 2.2, respectively. Wages referring to four weeks were multiplied by 1.075, annual earnings were divided by 12.
[10] For means and standard deviations see Table A1.
[11] Means and standard deviations are reported in Table 2.
[12] see Hartog (2000), Green&McIntosh&Vignoles (1999), van der Velden&van Smoorenburg (1997), Borghans&de Grip (1999).
[13] The variable is coded as: less than 1 year (beyond compulsory school); about 1 year; about 2 years; about 3 years; about 4-5 years; about 6-7 years; about 8-9 years; 10 years or more (beyond compulsory school).
[14] See Table A1 in the Appendix

Table 1

The number of properly, over- and undereducated workers (per cent)

Country	Properly	Over-educated	Under-	Together
Austria	18.8	46.7	34.5	100
Belgium	12.6	25.1	62.3	100
Czech Republic	6.2	49.5	44.3	100
Denmark	8.4	52.6	39.1	100
Estonia	8.2	78.9	12.9	100
Finland	8.4	52.6	39.0	100
France	8.0	26.6	65.3	100
Germany	9.1	19.5	71.3	100
Great Britain	9.2	28.2	62.6	100
Greece	4.8	77.1	18.2	100
Hungary	5.2	31.1	63.7	100
Iceland	4.7	47.7	47.7	100
Ireland	10.7	67.4	21.9	100
Luxembourg	5.6	45.1	49.3	100
Netherlands	3.3	14.7	82.0	100
Norway	7.6	41.3	51.2	100
Poland	4.1	59.1	36.8	100
Portugal	17.5	33.3	49.2	100
Slovakia	15.1	46.7	38.2	100
Slovenia	4.8	17.5	77.7	100
Spain	5.6	50.2	44.3	100
Sweden	8.9	40.1	51.0	100
Switzerland	10.0	22.4	67.6	100
Turkey	1.4	27.9	70.8	100
Ukraine	11.5	24.1	64.4	100
Pooled sample	8.0	32.9	59.1	100
N	13488			

The number of properly educated is low, and that of undereducated is high when compared to the results of other surveys. As regards studies based on the self-reporting method, Hartog (2000), reviewing the empirical results of the literature, finds that the lowest value for the properly educated is 47 per cent, and the highest one for the over- and undereducated are 33 and 32 per cent, respectively. In Groot&Maassen van den Brink (2000)'s paper focussing on meta-analysis the upper limit for overeducation incidence is 42 and that for undereducation amounts to 20 per cent in the case of studies applying the subjective method.

Years of attained, required, over-, and undereducation, and their standard deviations are shown in Table 2.

Table 2

Years of attained, required, over-, and undereducation

	Attained		Required education		Over-education		Under-education	
Country	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Austria	12.6	2.9	12.2	2.8	2.4	2.0	1.5	1.2
Belgium	13.5	3.5	14.9	2.0	2.2	1.7	3.1	2.7
Czech Republic	12.8	2.3	12.6	2.5	2.1	1.2	1.6	0.9
Denmark	14.5	3.2	13.9	3.1	2.7	2.1	2.0	1.9
Estonia	13.1	2.9	10.9	2.2	3.1	2.1	1.6	1.0
Finland	14.1	3.6	13.6	2.7	2.7	1.9	2.2	1.5
France	12.9	3.8	14.5	2.8	2.1	1.7	3.3	2.4
Germany	13.7	3.1	15.7	2.5	2.3	1.7	3.1	1.7
Great Britain	12.9	3.0	13.7	2.4	2.6	1.7	2.4	1.8
Greece	12.8	3.7	10.5	2.1	3.7	2.1	2.9	1.4
Hungary	12.8	2.6	14.2	3.1	1.6	1.0	2.7	1.6
Iceland	14.3	4.0	14.9	3.6	2.8	1.9	3.5	3.3
Ireland	13.4	3.2	12.3	2.5	3.0	1.8	2.4	2.1
Luxembourg	12.2	4.5	12.7	3.2	2.9	2.1	3.4	2.7
Netherlands	13.6	3.4	16.6	2.5	1.9	1.7	3.9	2.4
Norway	14.1	3.4	14.4	2.7	2.4	1.8	2.5	1.8
Poland	12.9	2.9	12.0	2.9	2.8	1.9	1.7	1.3
Portugal	9.2	4.4	10.5	2.7	3.0	1.7	3.6	1.7
Slovakia	12.9	2.7	12.4	2.9	2.9	2.0	1.9	2.0
Slovenia	12.5	3.3	14.3	2.7	1.8	1.4	2.7	1.9
Spain	13.3	5.1	12.9	2.8	4.3	3.4	3.4	2.6
Sweden	13.2	3.1	13.5	2.7	2.3	1.5	2.2	1.6
Switzerland	10.9	3.3	12.9	2.8	2.0	1.6	3.6	2.1
Turkey	9.6	3.9	11.5	3.4	2.5	1.4	3.7	2.5
Ukraine	12.4	2.4	13.5	2.0	2.1	1.3	2.2	1.4
Pooled sample	13.0	3.5	13.8	3.0	2.7	2.1	2.9	2.1
N	13488		13488		4443		7971	

Years of over- and undereducation were computed for the over- and undereducated

The average worker in the pooled sample has completed 13 years of schooling. The data exhibit a great deal of cross-country heterogeneity, however. Education attained is less than 10 years in Portugal and Turkey, and it is higher than 14 years in four Scandinavian countries (Denmark, Finland, Iceland, and Norway). On average, required education exceeds attained education by 0,8 years; for ten countries, however, the opposite holds, the former is lower than the latter.[15] For the typical Dutch worker required education amounts to 16.6 years, whereas the value of the same indicator seems much lower for the Greek worker (10.5 years). The average overeducated worker of the pooled sample has 2.7 years of surplus schooling. The values range from 1.6 (Hungary) to 4.9 (Spain) years for individual countries. As regards years of underschooling, the data exhibit 2.9 years of undereducation and country means fall within the interval of 1.5 (Austria) to 3.9 (Netherlands) years.

[15] Austria, Czech Republic, Denmark, Estonia, Finland, Greece, Ireland, Poland, Spain, Slovakia

Testing *R1* requires estimating earnings functions so as to obtain parameter estimates for the attained education variable. In addition, we need earnings equations to be estimated with educational mismatch variables formulated according the Duncan&Hofmann model. The equations are of the standard Mincerian type. The dependent variable is the log monthly wage, the key explanatory variables are years of education attained - for the earnings functions, and the three matching variables (years of required, over- and undereducation) as regards the earnings equations with the educational mismatch variables. Sex (female =1), and potential labour market experience and its square are also inserted in all the equations. When the samples are pooled a series of country dummies are present in the equations in order to control for cross-country differences (reference category: Austria). The equations are estimated by ols[16] and Heckman's (1979) selectivity-bias-corrected estimator.[17] As regards participation equations, estimated by probit, and needed for the Heckman model, control variables include a female dummy, age, age-squared, the number and the sex of dependent children in the family. Participation equations are estimated for ILO's able-bodied persons (aged 15-74).

4. RESULTS

As for the earnings equations with the educational-mismatch variables, the sign of the estimated coefficients for the selection variable is negative (except for one equation), implying that wages would be overestimated by ols. In addition, for 17 countries and the pooled sample the estimation yields parameter estimates for the selection variable that are significant (at the p = 0.05 level). Thus, the selectivity-bias assumption can be accepted.[18] Out of 78 estimated coefficients, the selectivity-bias-corrected estimates of the three educational-mismatch variables[19] produce 51 parameters that are significantly different from zero (at the p = 0.05 level), and for 28 coefficient estimates, Heckman's estimator yields at least a 0.5 percentage-point high difference in returns to educational mismatch compared to ols estimates.[20] Therefore, selectivity bias is detected for 68 per cent of the countries, and

[16] Although the main empirical tool relating to the effect of educational mismatch on wages is still ols, some authors choose other estimators even for cross-sectional data. For example, Budría&Moro-Egido (2008), and McGuinness&Bennett (2007) use quantile regression; Guironnet&Peypoch (2007) and Jensen&Gartner&Rässler (2006) apply stochastic production frontier models. Note that a growing number of estimates are based on panel data (see Battu&Belfield&Sloane 1999, Bauer 2002, Daly&Büchel&Duncan 2000, Dolton&Silles 2008, Dolton&Vignoles 2000, Rubb 2006).

[17] The estimator has rarely been used in this literature. Exceptions are Sloane&Battu&Seaman (1999), Dolton& Vignoles (2000), and di Pietro&Urwin (2006).

[18] For parameter estimates of the selection correction variable and the independence of earnings and participation equations see Table A2.

[19] Estimation results are presented in Table 4.

[20] Ols estimates for the educational mismatch variables are reported in Table A3.

using Heckman's estimator, as opposed to ols estimates, results in sensible differences in returns to educational mismatch for about one third of the estimated parameters.

The results of selectivity-bias-corrected estimations are mixed, and reporting practice is not unanimous in the literature. Sloane&Battu&Seaman (1999) arrive at non-significant parameter estimates for the selection-correction variable, but the authors report only estimates produced by the Heckman's estimator. Dolton&Vignoles (2000), in their study on higher-education graduates, estimate selectivity-bias-corrected regression for women only, and they conclude that while there is some sign of the presence of sample selection, the effect of self-selection on returns to educational mismatch is negligible; therefore they do not report results from selectivity-bias-corrected estimations. Di Pietro&Urwin (2006) find that the parameter estimates for the selection variable is significantly different from zero, but the coefficients estimated by ols and Heckman's estimator are not significantly different; thus parameters estimated by ols are not reported.

As regards our standard earnings equations, estimates for the selection variable are significant for the pooled sample and 15 countries, and they are mostly negative.[21] Using Heckman's[22] or ols[23] estimator result in only slight differences in returns to education for the majority of the countries; only one fifth of the estimated coefficients show at least 0.05 percentage point differences. Note that as for the returns to education variable, all parameter estimates produced by both estimators are significant (at the p = 0.05 level).

Our ols estimates for returns to education are in general higher than those estimated by ols and reported in Trostel&Walker&Woolley (2002), and in Flabbi&Paternostro&Tiongson (2007). Putting aside difference in time periods for which the data are collected, this may be due partly to the specification of the independent variable. Both papers work with after-tax wage rates, whereas our measure of remuneration is before-taxes and monthly. Using before-tax earnings yields higher returns when there is a progressive income tax system (as might be the case for most of the countries in our database). Making use of monthly earnings would produce higher wage premium for the better educated than wage rates do, if higher levels of education are associated with longer working hours.

Most of the empirical regularities found in the literature seem to hold for our samples. As regards *R1*,[24] the expected results are observed for 22 countries; the exceptions are the Czech Republic, Slovenia and Ukraine. Estimates for the pooled sample also show higher returns to required than to attained education; an extra year of required schooling yields 2.5 percentage point higher wages than an additional year of observed schooling (see Table 3).

[21] For details, see Table A4.
[22] See Table A4.
[23] See Table A5.
[24] returns to attained education are lower than returns to required education

A brief inspection of coefficients in Table 4 also provides some support for the empirical results found elsewhere. As for *R2*,[25] returns to overeducation are positive but smaller than the wage premium associated with a year of required education for each country. Our estimations based on ESS data also confirm *R3*[26] in the case of 23 countries – only the Irish and Slovene samples fail to exhibit the general empirical pattern, since the sign of their estimated parameters are positive. *R4*[27] holds for all countries, meaning that returns to required education are always higher than the absolute value of those to undereducation.

Table 3

Returns to required and attained education, per cent

Country	Required education	Attained education
Austria	7.5	6.2
Belgium	9.4	3.5
Czech Republic	7.1	7.1
Denmark	6.7	4.6
Estonia	13.8	8.8
Finland	8.7	5.4
France	15.0	7.6
Germany	11.2	7.6
Great Britain	14.3	9.7
Greece	9.3	3.4
Hungary	13.5	12.5
Iceland	7.6	4.0
Ireland	8.7	6.7
Luxembourg	10.0	5.7
Netherlands	12.9	7.3
Norway	6.9	5.3
Poland	9.7	8.2
Portugal	16.4	8.0
Slovakia	9.1	6.4
Slovenia	8.5	8.7
Spain	8.6	5.1
Sweden	7.4	5.8
Switzerland	8.5	5.5
Turkey	10.9	8.6
Ukraine	6.2	8.6
Pooled sample	9.7	7.2

Parameters estimated by Heckman's selection-correction estimator
All estimates are significant at least at the p=0.05 level
For returns to observed education see Table A4
For returns to required education see Table 4

[25] returns to overeducation are positive but smaller than returns to required education, $\alpha_R > \alpha_O$

[26] returns to undereducation are negative, $\alpha_U < 0$

[27] the absolute value of the returns to undereducation is smaller than returns to required education, $\alpha_R > |\alpha_U|$

As regards *R5*,[28] it holds for 16 countries. In order to obtain *R6*[29] we would need significant parameter estimates for the overeducation variable in each of the countries, but only more than a half of them exhibit this pattern. The estimated coefficient for the years of undereducation variable is not significant for 14 countries, thus *R7*[30] is also supported by the data. By taking a look at the parameters for the pooled sample we can conclude that *R2* to *R6* hold true, and that the parameter estimated for returns to undereducation significantly differs from zero (see Table 4).

We also have run Wald tests in order to check whether the expected results involving two coefficients hold or not; this concerns *R2*, *R4*, and *R5*. The null hypothesis is that the two coefficients are equal (see Table 5).

As regards *R2*, the equality of the coefficients could not be rejected for four countries, but we can accept observed differences in the parameter estimates in the case of 16 countries and the pooled sample at the p = 0.05 level, and five countries at the p =0.1 level.

[28] the absolute value of the returns to undereducation is smaller than returns to overeducation, $\alpha_O > |\alpha_U|$

[29] returns to overeducation are always significant

[30] returns to undereducation are not always significant

Table 4

Returns to educational mismatch, per cent

	Required education			Overeducation			Undereducation		
Country	Coefficient	%	z	Coefficient	%	z	Coefficient	%	z
Austria	0.072	7.5	6.60	0.030	3.1	1.79	-0.025	-2.5	-0.97
Belgium	0.089	9.4	6.29	0.027	2.8	1.58	-0.028	-2.8	-1.67
Czech Republic	0.069	7.1	5.78	0.065	6.7	3.38	-0.002	-0.2	-0.07
Denmark	0.065	6.7	6.41	0.015	1.5	1.17	-0.034	-3.4	-1.96
Estonia	0.129	13.8	13.25	0.044	4.5	3.72	-0.022	-2.2	-0.74
Finland	0.083	8.7	14.40	0.008	0.8	0.80	-0.025	-2.5	-2.23
France	0.139	15.0	12.77	0.035	3.5	1.41	-0.078	-7.5	-6.93
Germany	0.106	11.2	9.78	0.049	5.1	2.31	-0.033	-3.2	-2.75
Great Britain	0.134	14.3	5.20	0.013	1.3	0.54	-0.025	-2.4	-1.16
Greece	0.088	9.3	5.03	0.072	7.4	4.67	-0.046	-4.5	-1.72
Hungary	0.127	13.5	7.50	0.051	5.2	1.71	-0.069	-6.7	-3.25
Iceland	0.074	7.6	7.41	0.027	2.8	1.54	-0.001	-0.1	-0.11
Ireland	0.083	8.7	3.66	0.035	3.6	1.52	0.015	1.5	0.49
Luxembourg	0.096	10.0	11.92	0.081	8.5	6.74	-0.005	-0.5	-0.67
Netherlands	0.121	12.9	11.58	0.008	0.8	0.34	-0.034	-3.3	-3.36
Norway	0.067	6.9	9.58	0.030	3.1	2.67	-0.014	-1.4	-1.11
Poland	0.092	9.7	8.91	0.061	6.3	4.75	-0.006	-0.6	-0.28
Portugal	0.152	16.4	15.72	0.066	6.8	4.43	-0.028	-2.8	-2.00
Slovakia	0.087	9.1	10.18	0.050	5.2	2.21	-0.010	-1.0	-0.64
Slovenia	0.082	8.5	4.24	0.014	1.4	0.32	0.002	0.2	0.06
Spain	0.083	8.6	7.85	0.039	4.0	3.77	-0.035	-3.5	-2.72
Sweden	0.071	7.4	16.14	0.020	2.0	2.03	-0.023	-2.3	-2.71
Switzerland	0.081	8.5	8.95	0.030	3.1	1.70	-0.026	-2.5	-2.32
Turkey	0.103	10.9	4.15	0.042	4.3	1.23	-0.058	-5.6	-2.26
Ukraine	0.060	6.2	2.32	0.002	0.2	0.05	-0.051	-5.0	-1.26
Pooled sample	0.093	9.7	12.93	0.028	2.8	4.12	-0.021	-2.1	-3.06

Parameters estimated by Heckman's selection-correction estimator.
The equations estimated
earnings equation
dependent variable: log usual monthly before-tax earnings
control variables: sex, potential labour market experience and its square; country dummies in the case of pooled sample (reference: Austria)
participation equation
dependent variable: worker
control variables: sex, age, age squared, number of choldren in the family, sex of children; country dummies in the case of pooled sample (reference: Austria)

We arrive at *R4* for 21 countries and the pooled sample at the p=0.05 level, and two countries at the p=0.1 level. However, in the case of the remaining two countries, we cannot reject the hypothesis that the two estimated parameters are equal.

An important finding from the present estimations is that *R5* does not seem to hold as a general rule. As we can see from Table 4, the absolute value of returns to underschooling is not smaller than returns to overschooling for 9 countries. In addition, the statistical tests displayed in Table 5 show that the equality of the two coefficients cannot be rejected for 21

countries and the pooled sample, implying that for an overwhelming majority of the cases *R5* does not hold. That is, the wage penalty associated with a year of undereducation is not lower than the wage premium due to a year of overeducation.

Let us turn to the Hartog&Oosterbeek (1988) tests elaborated for the Duncan&Hoffman (1981) model. The job competition model can be accepted given that testing *R5* is tantamount to checking the validity of the Thurow's model and that the equality of the coefficients cannot be rejected for most of the countries. The opposite holds true with regard to the standard Mincerian model (see the last two columns in Table 5). The equality of the three coefficients is rejected for 23 countries and the pooled sample, thus the Mincerian model can be rejected.

Table 5

Wald tests for coefficients' equality

	R2		*R4*		*R5* (Thurow)		Mincer	
Country	χ^2	p	χ^2	p	χ^2	p	χ^2	p
Austria	5.38	0.020	3.68	0.055	0.02	0.882	11.41	0.003
Belgium	7.20	0.073	16.35	0.000	0.00	0.985	22.10	0.000
Czech Republic	0.05	0.826	8.58	0.003	2.73	0.098	14.65	0.001
Denmark	11.82	0.001	3.26	0.071	0.72	0.396	15.53	0.000
Estonia	45.78	0.000	12.58	0.000	0.37	0.542	73.15	0.000
Finland	54.00	0.000	28.70	0.000	1.21	0.271	102.49	0.000
France	18.89	0.000	31.86	0.000	2.26	0.133	65.68	0.000
Germany	6.20	0.013	38.95	0.000	0.39	0.530	47.55	0.000
Great Britain	13.23	0.000	20.59	0.000	0.11	0.745	26.55	0.000
Greece	0.68	0.411	2.45	0.118	0.56	0.454	3.19	0.203
Hungary	6.23	0.013	12.26	0.001	0.22	0.637	26.99	0.000
Iceland	6.56	0.010	27.20	0.000	1.18	0.278	37.05	0.000
Ireland	3.31	0.069	24.51	0.000	1.96	0.161	32.82	0.000
Luxembourg	1.97	0.160	80.01	0.000	25.84	0.000	84.32	0.000
Netherlands	19.87	0.000	47.57	0.000	0.88	0.347	61.96	0.000
Norway	8.15	0.004	22.65	0.000	0.77	0.381	40.43	0.000
Poland	4.65	0.031	19.41	0.000	3.94	0.047	32.91	0.000
Portugal	38.87	0.000	63.29	0.000	3.56	0.059	94.40	0.000
Slovakia	3.68	0.055	23.82	0.000	1.91	0.167	42.02	0.000
Slovenia	2.74	0.098	14.60	0.000	0.09	0.765	22.53	0.000
Spain	11.36	0.001	6.25	0.012	0.04	0.846	13.92	0.001
Sweden	24.94	0.000	30.48	0.000	0.05	0.824	72.95	0.000
Switzerland	7.01	0.008	20.49	0.000	0.03	0.858	30.09	0.000
Turkey	3.51	0.061	4.15	0.042	0.13	0.714	9.53	0.009
Ukraine	1.90	0.169	0.06	0.799	0.67	0.413	2.27	0.322
Pooled	81.34	0.000	106.00	0.000	0.43	0.514	178.63	0.000

R2 null: $\alpha_R = \alpha_O$,

R4 null: $\alpha_R = \mid \alpha_U \mid$,

R5 null: $\alpha_O = \mid \alpha_U \mid$ (Thurow),

Mincer null: $\alpha_R = \alpha_O = \mid \alpha_U \mid$

Other studies draw different conclusions. Groot (1996), using ols estimates, rejects both models. Bauer (2002), using panel models, examines the parameter estimates for men and women separately. He concludes that the Mincerian model can be accepted for females only, and the job-competition model can be rejected for both sexes.

5. CONCLUSION

The paper investigates the wage effect of over- and undereducation using comparable microdata for 25 European countries. The results confirm most of the conclusions of the existing empirical literature. However, some earlier findings seem not to hold as a general empirical rule. Namely, the present estimations produce *R1*, *R2*, *R3*, *R4*, and *R7*, whereas *R5* and *R6* are not confirmed in our database. We have also found that the job-competition model can be accepted, whereas the Mincerian human capital model can be rejected for most of the countries.

APPENDIX

Table A1

Sample characteristics

	No of workers	Monthly earnings				YCE
Country		log mean	sd	mean	sd	
Austria	415	7.5	0.51	1781	1.67	9
Belgium	519	7.7	0.69	2208	1.99	13
Czech Republic	544	6.1	0.42	429	1.52	10
Denmark	672	8.1	0.82	3316	2.26	10
Estonia	722	5.8	0.64	322	1.90	9
Finland	787	7.7	0.46	2148	1.59	10
France	641	7.5	0.79	1834	2.20	11
Germany	688	7.6	0.68	1962	1.98	13
Great Britain	601	7.4	1.05	1683	2.85	12
Greece	355	7.1	0.56	1252	1.75	9
Hungary	440	6.1	0.55	447	1.73	10
Iceland	239	8.1	0.58	3160	1.79	11
Ireland	609	7.5	1.01	1773	2.75	10
Luxembourg	438	7.8	0.67	2423	1.96	10
Netherlands	607	7.7	0.68	2175	1.96	13
Norway	910	8.0	0.58	3084	1.79	11
Poland	481	5.9	0.58	359	1.78	9
Portugal	265	6.5	0.55	685	1.74	9
Slovakia	332	5.8	0.46	327	1.59	9
Slovenia	433	5.3	0.51	202	1.66	10
Spain	418	7.1	0.70	1229	2.02	11
Sweden	923	7.8	0.39	2348	1.48	10
Switzerland	689	8.0	0.67	3049	1.96	9
Turkey	252	6.6	0.69	738	2.00	9
Ukraine	508	3.9	0.85	47	2.34	12
Pooled sample	13488	7.1	1.26	1218	3.53	

YCE: Years of compulsory education
Source: UNESCO Institute for Statistics
http://stats.uis.unesco.org/TableViewer/tableView.aspx?ReportId=210

Table A2

Parameter estimates for the selection-correction variable (lambda) and tests for independence of equations

		Wald test	
Country	Lambda	chi2	p
Austria	-0.428	16.98	0.0000
Belgium	0.839	114.58	0.0000
Czech Republic	-0.342	17.20	0.0000
Denmark	0.046	0.80	0.3717
Estonia	-0.284	8.30	0.0040
Finland	-0.153	2.35	0.1249
France	0.721	165.27	0.0000
Germany	-0.685	72.20	0.0000
Great Britain	-1.173	66.78	0.0000
Greece	0.711	27.15	0.0000
Hungary	-0.073	0.15	0.6991
Iceland	-0.071	0.39	0.5348
Ireland	-1.275	54.82	0.0000
Luxembourg	-0.623	38.88	0.0000
Netherlands	-0.103	1.23	0.2668
Norway	-0.370	7.15	0.0075
Poland	-0.157	4.25	0.0393
Portugal	0.659	138.73	0.0000
Slovakia	-0.015	0.02	0.8897
Slovenia	-1.260	370.83	0.0000
Spain	-0.064	1.47	0.2249
Sweden	-0.214	9.50	0.0021
Switzerland	-0.440	6.96	0.0083
Turkey	-0.058	0.17	0.6793
Ukraine	-1.196	98.56	0.0000
Pooled	-0.563	26.95	0.0000

Table A3

Returns to educational mismatch, ols

	Required education			Overeducation			Undereducation		
Country	coeff	%	t	coeff	%	t	coeff	%	t
Austria	0.077	8.1	7.27	0.031	3.2	2.05	-0.029	-2.8	-1.02
Belgium	0.078	8.1	5.00	0.019	1.9	1.14	-0.008	-0.8	-0.36
Czech Republic	0.076	7.9	7.32	0.072	7.5	3.85	-0.007	-0.7	-0.24
Denmark	0.063	6.5	6.28	0.013	1.4	1.07	-0.032	-3.2	-1.88
Estonia	0.136	14.5	13.92	0.049	5.0	4.30	-0.030	-2.9	-1.00
Finland	0.087	9.1	16.73	0.011	1.1	1.24	-0.031	-3.1	-2.85
France	0.129	13.8	10.67	0.017	1.7	0.68	-0.056	-5.4	-4.93
Germany	0.116	12.3	11.22	0.049	5.0	2.04	-0.039	-3.8	-3.09
Great Britain	0.147	15.8	3.96	0.054	5.5	1.93	-0.058	-5.6	-1.89
Greece	0.057	5.9	3.93	0.026	2.6	2.21	-0.011	-1.0	-0.30
Hungary	0.129	13.7	8.22	0.053	5.5	1.79	-0.071	-6.8	-3.21
Iceland	0.076	7.9	8.47	0.029	2.9	1.64	-0.003	-0.3	-0.25
Ireland	0.100	10.5	3.82	0.065	6.7	3.37	-0.023	-2.3	-0.74
Luxembourg	0.095	10.0	9.15	0.086	9.0	5.36	-0.004	-0.4	-0.34
Netherlands	0.124	13.2	11.84	0.009	0.9	0.35	-0.037	-3.6	-3.48
Norway	0.077	8.0	12.84	0.040	4.1	3.72	-0.021	-2.1	-1.98
Poland	0.099	10.5	9.81	0.068	7.0	5.31	-0.017	-1.7	-0.83
Portugal	0.133	14.2	14.85	0.048	5.0	2.94	-0.008	-0.8	-0.41
Slovakia	0.088	9.2	11.09	0.051	5.2	2.39	-0.010	-1.0	-0.65
Slovenia	0.095	10.0	4.53	-0.019	-1.9	-0.34	-0.097	-9.3	-2.65
Spain	0.084	8.7	7.88	0.040	4.1	3.86	-0.036	-3.5	-2.74
Sweden	0.076	7.9	18.16	0.023	2.4	2.50	-0.028	-2.8	-3.27
Switzerland	0.086	8.9	10.63	0.029	2.9	1.71	-0.029	-2.8	-2.82
Turkey	0.109	11.6	6.59	0.047	4.8	1.62	-0.062	-6.0	-3.38
Ukraine	0.069	7.1	2.98	-0.015	-1.5	-0.33	-0.110	-10.4	-3.25
Pooled	0.108	11.4	20.45	0.044	4.5	7.57	-0.041	-4.1	-7.05

Table A4

Parameters of returns to attained education from earnings functions estimated by Heckman selection-correction estimator, and tests of independence of equations

Country	Coefficient	Per cent	z	Lambda	Wald test of independent equations
Austria	0.060	6.2	6.2	-0.494	29.57
Belgium	0.034	3.5	3.7	0.854	122.19
Czech Republic	0.069	7.1	8.2	-0.322	10.35
Denmark	0.045	4.6	5.4	0.076	1.99
Estonia	0.085	8.8	10.2	-0.292	8.69
Finland	0.053	5.4	10.7	-0.024	0.05
France	0.073	7.6	7.3	0.743	129.15
Germany	0.073	7.6	9.9	-0.714	69.82
Great Britain	0.093	9.7	8.3	-1.189	62.14
Greece	0.033	3.4	3.9	0.684	26.25
Hungary	0.118	12.5	7.7	-0.086	0.39
Iceland	0.039	4.0	4.4	-0.156	1.83
Ireland	0.065	6.7	6.2	-1.273	53.86
Luxembourg	0.056	5.7	7.8	-0.618	24.73
Netherlands	0.071	7.3	8.5	-0.116	1.15
Norway	0.051	5.3	10.6	-0.374	6.91
Poland	0.079	8.2	9.3	-0.100	1.28
Portugal	0.077	8.0	8.0	-0.033	0.07
Slovakia	0.062	6.4	6.2	-0.381	8.00
Slovenia	0.083	8.7	6.6	-1.268	255.83
Spain	0.050	5.1	9.3	-0.059	0.92
Sweden	0.056	5.8	13.9	-0.194	3.27
Switzerland	0.053	5.5	8.9	-0.497	8.29
Turkey	0.083	8.6	6.6	0.000	0.00
Ukraine	0.082	8.6	4.7	-1.183	105.94
Pooled	0.070	7.2	21.4	-0.523	16.63

The equations estimated
earnings equation
dependent variable: log usual monthly before-tax earnings
control variables: sex, potential labour market experience and its square; country dummies in the case of pooled sample (reference: Austria)
participation equation
dependent variable: worker
control variables: sex, age, age squared, number of choldren in the family, sex of children; country dummies in the case of pooled sample (reference: Austria)

Table A5

Parameters of returns to attained education from earnings functions estimated by ols

Country	Coefficient	Per cent	t	R2
Austria	0.059	6.1	6.2	0.330
Belgium	0.029	2.9	2.2	0.103
Czech Republic	0.068	7.1	7.7	0.275
Denmark	0.044	4.5	5.4	0.063
Estonia	0.085	8.9	10.1	0.254
Finland	0.053	5.4	10.8	0.334
France	0.083	8.7	8.4	0.243
Germany	0.074	7.7	9.4	0.324
Great Britain	0.095	9.9	6.0	0.167
Greece	0.031	3.2	3.2	0.191
Hungary	0.117	12.5	7.4	0.334
Iceland	0.039	3.9	4.4	0.317
Ireland	0.059	6.1	3.5	0.044
Luxembourg	0.059	6.0	7.8	0.224
Netherlands	0.070	7.2	8.5	0.320
Norway	0.052	5.3	10.4	0.247
Poland	0.080	8.3	9.4	0.218
Portugal	0.077	8.0	9.1	0.394
Slovakia	0.060	6.2	5.5	0.240
Slovenia	0.079	8.2	4.2	0.063
Spain	0.050	5.2	9.2	0.237
Sweden	0.055	5.7	15.1	0.347
Switzerland	0.055	5.7	9.3	0.358
Turkey	0.083	8.7	7.1	0.279
Ukraine	0.069	7.1	3.5	0.035
Pooled	0.070	7.3	22.3	0.757

The equation estimated
dependent variable: log usual monthly before-tax earnings
control variables: sex, potential labour market experience and its square; country dummies in the case of pooled sample (reference: Austria)

REFERENCES

Battu, H. – Belfield, C. R. – Sloane, P. J. (1999): Overeducation among Graduates: A cohort view. Education Economics, Vol.7, p. 21-38.

Bauer, T. K. (2002): Educational mismatch and wages: a panel analysis. Economics of Education Review, Vol. 21, p. 221–229

Borghans, L. – de Grip, A. (1999): Skills and low pay: upgrading or overeducation? ROA-Research Memorandum, 1999/5E

Budría, S. - Moro-Egido, A. I. (2008): Education, educational mismatch, and wage inequality: Evidence for Spain. Economics of Education Review, Vol. 27, p. 232–341

Chevalier, A. (2003): Measuring Over-education. Economica, Vol. 70, p. 509–531.

Cohn, E. – Khan, S.P. (1995): The wage effects of overschooling revisited. Labour Economics, Vol. 2, p. 67–76.

Cohn, E. – Ng, Y. C. (2000): Incidence and wage effects of overschooling and underschooling in Hong Kong. Economics of Education Review, Vol. 19, p. 159–168.

Daly, M. C. – Büchel, F. – Duncan, G. J. (2000): Premiums and penalties for surplus and deficit education. Evidence from the United States and Germany. Economics of Education Review, Vol. 19, p. 169–178.

Dolton, P. – Silles, M. A. (2008): The effects of over-education on earnings in the graduate labour market. Economics of Education Review, Vol. 27, p. 125–139

Dolton, P. – Vignoles, A. (2000): The incidence and effects of overeducation in the U.K. graduate labour market. Economics of Education Review, Vol. 19, p. 179–198.

Duncan, G. J. - Hoffman, S. D. (1981): The incidence and wage effects of overeducation. Economics of Education Review, Vol. 1, p. 75–86.

Flabbi, L. – Paternostro, S. – Tiongson, E. R. (2007): Returns to Education in the Economic Transition: A Systematic Assessment Using Comparable Data. World Bank Policy Research Working Paper 4225, May 2007

Green, F. – McIntosh, S. – Vignoles, A. (1999): 'Overeducation' and Skills – Clarifying the Concepts. Centre for Economic Performance, Discussion Paper No 435

Groot, W. (1996): The incidence of, and returns to overeducation in the UK. Applied Economics, Vol. 28, p. 1345–1350.

Groot, W. – Maassen van den Brink, H. (2000): Overeducation in the labor market: a meta-analysis. Economics of Education Review, Vol. 19, p. 149–158.

Guironnet, J.-P. – Peypoch, N. (2007): Human capital allocation and overeducation: A measure of French productivity (1987, 1999). Economic Modelling, Vol. 24, p. 398–410.

Hartog, J. (2000): Over-education and earnings: where are we, where should we go? Economics of Education Review, Vol. 19. p.131–147.

Hartog, J. - Oosterbeek, H. (1988): Education, allocation and earnings in the Netherlands: overschooling? Economics of Education Review, Vol. 7, p. 185–194.

Heckman J. (1979): Sample Selection Bias as a Specification Error. Econometrica, Vol. 47, p. 153-161.

Jensen, U. - Gartner, H. – Rässler, S. (2006): Measuring overeducation with earnings frontiers and multiply imputed censored income data. IAB Discussion Paper, No. 11/2006.

Jowell, R. - the Central Co-ordinating Team (2005): European Social Survey 2004/2005:

Technical Report, London: Centre for Comparative Social Surveys, City University (2005)

McGuinness, S. – Bennett, J. (2007): Overeducation in the graduate labour market: A quantile regression approach. Economics of Education Review, Vol. 26. p. 521–531

Mendes de Oliveira, M. – Santos, M. C., Kiker, B. F. (2000): The role of human capital and technological change in overeducation. Economics of Education Review, Vol. 19, p. 199–206.

Mincer, J. (1974): Schooling, Experience and Earnings. Columbia University Press, New York.

Di Pietro, G. – Urwin, P. (2006) Education and skills mismatch in the Italian graduate labour market. Applied Economics, Vol. 38, p. 79–93

Rubb, S. (2003a): Post-College Schooling, Overeducation, and Hourly Earnings in the United States. Education Economics, Vol. 11. p. 53–72.

Rubb, S. (2003b): Overeducation in the labor market: a comment and reanalysis of a meta-analysis. Economics of Education Review, Vol. 22, p. 621–629.

Rubb, S. (2006): Educational Mismatches and Earnings: Extensions of Occupational Mobility Theory and Evidence of Human Capital Depreciation. Education Economics, Vol. 14, p. 135–154

Sloane, P. J. – Battu, H. – Seaman, P. T. (1999): Overeducation, undereducation and the British labour market. Applied Economics, Vol. 31, p. 1437–1453.

Trostel, P. - Walker, I. – Woolley, P. (2002): Estimates of the economic return to schooling for 28 countries. Labour Economics, Vol. 9, p. 1 – 16.

Thurow, L. C. (1975): Generating inequality. Mechanisms of distribution in the U.S. economy. Basic Books, New York

Vahey, S. P. (2000): The great Canadian training robbery: evidence on the returns to educational mismatch. Economics of Education Review Vol. 19, p. 219–227.

van der Velden, R. K. W. – van Smoorenburg, M. S. M. (1997): The Measurement of Overeducation and Undereducation: Self-Report vs. Job-Analyst Method. ROA-Research Memorandum 1997/2E

Previous Issues of the Series

2006

Köllő János: A napi ingázás feltételei és a helyi munkanélküliség Magyarországon. Újabb számítások és számpéldák. BWP 2006/1

J. David Brown - John S. Earle - Vladimir Gimpelson - Rostislav Kapeliushnikov - Hartmut Lehmann - Álmos Telegdy - Irina Vantu - Ruxandra Visan - Alexandru Voicu: Nonstandard Forms and Measures of Employment and Unemployment in Transition: A Comparative Study of Estonia, Romania, and Russia. **BWP 2006/2**

Balla Katalin – Köllő János – Simonovits András: Transzformációs sokk heterogén munkaerő-piacon. BWP 2006/3

Júlia Varga: Why to Get a 2nd Diploma? Is it Life-Long Learning or the Outcome of State Intervention in Educational Choices?. **BWP 2006/4**

Gábor Kertesi – Gábor Kézdi: Expected Long-Term Budgetary Benefits to Roma Education in Hungary. **BWP 2006/5**

Kertesi Gábor – Kézdi Gábor: A hátrányos helyzetű és roma fiatalok eljuttatása az érettségihez. Egy különösen nagy hosszú távú költségvetési nyereséget biztosító befektetés. BWP 2006/6

János Köllő: Workplace Literacy Requirements and Unskilled Employment in East-Central and Western Europe. Evidence from the International Adult Literacy Survey (IALS). **BWP 2006/7**

Kiss János Péter - Németh Nándor: Fejlettség és egyenlőtlenségek, Magyarország megyéinek és kistérségeinek esete. BWP 2006/8

2007

Zsombor Cseres-Gergely: Inactivity in Hungary – the Persistent Effect of the Pension System. BWP **2007/1**

Szilvia Hámori: The effect of school starting age on academic performance in Hungary. **BWP 2007/2**

Csite András – Német Nándor: Az életminőség területi differenciái Magyarországon: a kistérségi szintű HDI becslési lehetőségei. BWP 2007/3

2008

Galasi Péter – Nagy Gyula: A munkanélküli-jövedelemtámogatások célzása Magyarországon 2004-ben. BWP 2008/1

Szilvia Hámori: Adult education in the European Union – with a focus on Hungary. **BWP 2008/2**

Galasi Péter: A felsőfokú végzettségű munkavállalók munkaerő-piaci helyzete és foglalkozásuk-iskolai végzettségük illeszkedése BWP 2008/3

Anna Lovász: Competition and the Gender Wage Gap: New Evidence from Linked Employer-Employee Data in Hungary, 1986-2003 **BWP 2008/4**

Zsuzsa Blaskó: Does early maternal employment affect non-cognitive children outcomes? **BWP 2008/5**

Galasi Péter: A túl- és az alulképzés bérhozama 25 országban BWP 2008/6

Galasi Péter - Nagy Gyula: Az aktív munkaerő-piaci programokba kerülés esélyei: képzés, bértámogatás, közhasznú munka 2008/7

A Budapesti Munkagazdaságtani Füzetek a Magyar Tudományos Akadémia Közgazdaságtudományi Intézetében működő Munkapiaci Kutatások valamint a Budapesti Corvinus Egyetem Emberi Erőforrások Tanszékének közös kiadványa. A kiadványsorozat angol nyelvű füzetei "**Budapest Working Papers on the Labour Market**" címmel jelennek meg.

A kötetek letölthetők az MTA Közgazdaságtudományi Intézet honlapjáról:
http://www.econ.core.hu