Júlia Varga

Labour market success of Hungarian higher education graduates in 2011

Introduction

Based on the data of Higher Education Graduates' Survey 2011 (Graduates 2011) this chapter investigates early labour market success of young higher education graduates. The survey collected data on the labour market situation of graduates of higher education from 2008 and 2010. The analysis focuses on two questions: first, what are the differences in labour market success of graduates by field of study at the beginning of their career? Second: are there differences in labour market success at labour market entry between the two groups, those who graduated in 2008 and those who graduated in 2010?

Previous works for other countries and for Hungary have found large variation in labour market success of higher education graduates by field of study. Grubb (1992), Rumberger–Thomas (1993) for the US, Finnie–Frenette (2003) for Canada, Bratti et al. (2005), Chevalier et al. (2002), Walker and Zhu (2005), Chevalier (2011) for the UK, Buonanno–Pozzoli (2007), Brunello–Cappellari (2005) for Italy, Livanos–Pouliakas (2009) for Greece, and Machin and Puhani (2006) for France, Germany and the US investigated the question for example. All of these studies have found that there is large variation in labour market success of graduates. In most cases it has been revealed that returns to engineering, economics and business and in some cases to medical studies and social studies are significantly higher than those of the arts, humanities or education. Earlier studies for Hungary, those that used data of FIDEV survey (Galasi, 2002, 2004a, 2004b, 2007; Galasi–Varga, 2006) and those that used data of Hungarian Higher Education Graduate Career Tracking 2010 (Varga, 2010) investigated the effect of field of study on labour market success of graduates. The results show that there were small if any changes in the rank order of labour market success by fields of study between the late 1990s and 2007. Comparison of the two cohorts, those who graduated in 2008 and those in 2010 is interesting because we have no other information about whether or not the economic crises have had different effects on early labour market success of young graduates by their subject degree.

Labour market success in 2011

Labour market success of higher education graduates – a descriptive analysis

In 2010, 78% of young graduates was employed 7.5% of them defined themselves as un-employed 9% studied at full time education and 5.7% was other inactive (on childcare subsidy, homemaker or other dependent). In the sample some of the graduates finished their studies in 2008, while others in 2010. The two groups – those who graduated in 2008 and those who graduated in 2010 – have different potential years of experience. The members of the latter group finished their studies 6 or 7 months before the survey while the members of the first group might have graduated 32 months before the survey. Due to the fact that the chances to find employment of the members of the two groups seems to be different, the distribution of the two groups by employment status will be studied separately. Figure 1 shows the distribution of young graduates by employment status by the year of graduation and their field of study.

The employment rate of the 2008 cohort is higher; the unemployment rate is lower than the employment and unemployment rates of the 2010 cohort. The share of full-time students is lower in the 2008 cohort than in the 2010 cohort. The share of those who are in other inactive status is much higher among 2008 graduates than among those who graduated in 2010. The employment rate is rather high among 2008 year graduates it was 85% in 2011. There are two fields of studies that show a much lower employment rate than the average: only 73% of those who studied natural sciences and mathematics and graduated in 2008 were employed in 2011, and only 66% of the same cohort who studied arts was employed. The low employment rate of the first group can be attributed to the fact that the rate of graduates of natural sciences and mathematics who are studying in full-time education three years after graduatin is much higher than the average. In February 2011 18% of them were full time students. The share of the other inactive was extremely high among graduates of art management.
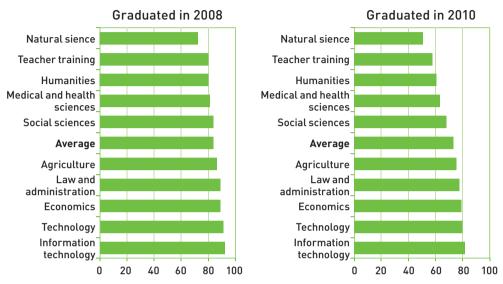
The average employment rate of the 2010 cohort was 71% in 2011. Graduates of teacher training, law and administration, information technology, and medical and health care studies have above average employment rates. The lowest employment rates characterize graduates of natural sciences, humanities, social sciences and art management. The reason for the low employment rates of the first three fields is that graduates with these degree subjects are studying in full time education in above average ratio, while graduates of art management are unemployed in the 2010 cohort in an extremely high ratio. 4% of 2008-year graduates and 10% of 2010-year graduates said that they were unemployed in 2011. Comparison of unemployment rates in the two cohorts by field of study shows that graduates of agricultural, humanities and social sciences are unemployed in above average ratio in both cohorts. Among graduates with the degree subjects of art and art management only those have above average unemployment rates who graduated in 2010. It seems that graduates of these fields of studies leave the labour market and became 'other inactive' haven't they found an appropriate job before.

Figure 1a. Distribution of graduates by labour market status (%)

Ratio of employed

Graduated in 2008

Category	
Natural sience	
Teacher training	
Humanities	
Medical and health sciences	
Social sciences	
Average	
Agriculture	
Law and administration	
Economics	
Technology	
Information technology	

0   20   40   60   80   100

Graduated in 2010

Category	
Natural sience	
Teacher training	
Humanities	
Medical and health sciences	
Social sciences	
Average	
Agriculture	
Law and administration	
Economics	
Technology	
Information technology	

0   20   40   60   80   100

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

Figure 1b. Distribution of graduates by labour market status (%)
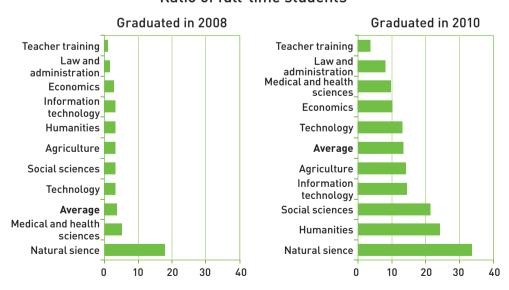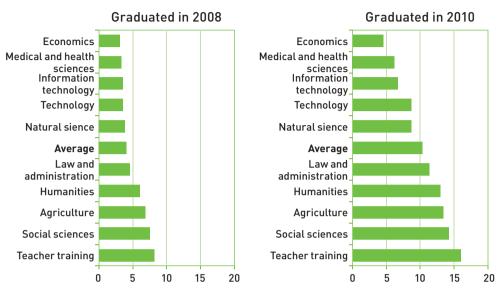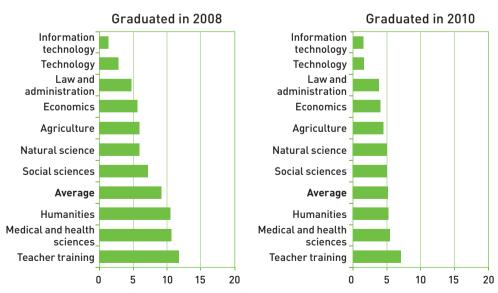
Ratio of full-time students

Graduated in 2008

Category	
Teacher training	
Law and administration	
Economics	
Information technology	
Humanities	
Agriculture	
Social sciences	
Technology	
Average	
Medical and health sciences	
Natural sience	

0   10   20   30   40

Graduated in 2010

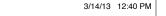| Category	
Teacher training	
Law and administration	
Medical and health sciences	
Economics	
Technology	
Average	
Agriculture	
Information technology	
Social sciences	
Humanities	
Natural sience	

0   10   20   30   40

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

Figure 1c. Distribution of graduates by labour market status (%)

Ratio of unemployed

Graduated in 2008

Graduated in 2010

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

Figure 1d. Distribution of graduates by labour market status (%)

Ratio of other inactives

Graduated in 2008

Graduated in 2010

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

The difference in the distribution of young graduates by employment status may be caused by two factors. First, the two cohorts those who graduated in 2008, and those who graduated in 2010 have different potential years of experience. The transition from education to work is first characterized by a searching period, which might involve postponing entry into employment, but later on labour market state of graduates may become more stable. As time passes by after graduation the share of unemployed and full time students' decreases among graduates and the share of employed increases. At the same time, as time passes by, more graduates establish a family and become parents so they shift to other inactive status (childcare subsidy, homemaker). The better labour market position of the 2008-year cohort may be simply the result of these changes. Nevertheless, the reason for the difference between the two cohorts may also be due to the worsening of labour market prospects of graduates and young career beginners between 2008 and 2010. As we do not have data on what was the labour market position of the 2008-year cohort after one year of graduation we cannot separate the two effects.

We know from the survey for both groups how much time it took to find their first job and the lengthening of this period may reflect the worsening of labour market prospects of young career beginners.

Employment rates for both cohorts, the 2008-year graduates as well as the 2010-year graduates been was 81%, but the average duration for finding a first job after graduation was longer for the 2010-year cohort than for the 2008-year cohort. 30% of graduates who graduated in 2010 have found their first job in one month after graduation, while 36% of 2008-year graduates. The average duration of finding a first job is longer for the 2010-year graduates, 3.6 months as opposed to 3.2 months of 2008-year graduates.

Changes in the average duration of finding a first job by field specialization show that for most specialisations the average duration has increased, for those graduates who have BA/BSc or college-level degree in a larger extent than for graduates with MA/MSc, or university degree. The increase in the duration of finding a first job was extremely high for graduates of teacher training and social sciences. For graduates of some specialisations with different levels of degree the duration of finding a first job has changed in the opposite direction. For graduates of humanities and technical science the duration of finding a first job has increased for career beginners with higher-level degrees and decreased for graduates with BA/BSc, or college-level degrees. The opposite changes took place for graduates of information technology. While the duration of finding a first job has increased for graduates with BA/BSc or college-level degrees it has decreased graduates with MA/MSc, or university level degree with this degree subject. Finally, the duration of finding a first job for graduates of law and administration and information technology was shorter for the 2010-year cohort than for the 2008-year cohort both for graduates with BA/BSc or college-level degrees and for graduates with MA/MSc or university-level degrees.

Table 1. Duration of finding a first job (months)

Field of study	BA/BSc or college-level degree		MA/MSc, or university-level degree	
	graduated in 2008	graduated in 2010	graduated in 2008	graduated in 2010
Humanities	3.7	3.3	2.8	3.6
Economics	2.8	3.8	3.1	3.7
Information technology	2.6	3.4	4.1	2.6
Law and administration	4.0	3.1	3.8	3.1
Technology	4.5	3.5	3.3	3.9
Medical and health science	2.6	3.2	2.8	3.9
Teacher training	2.6	4.3	2.7	4.7
Social science	1.9	3.5	2.4	3.3
Natural science	2.8	3.4	3.2	3.6
Average	3.3	3.5	3.4	3.6

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

In addition to employment status and the duration of finding a first job the most important indicator of labour market success of fresh graduates is earnings. We investigate earnings of the two cohorts separately, as earnings usually increase with experience and those who graduated in 2008 have two more potential years of experience than those who graduated in 2010, so we expect lower earnings for the latter group.

According to the data of the survey the net monthly earnings of the 2008 cohort was 172,000 HUF at the beginning of 2011 and 148,000 HUF for the 2010 cohort. Net monthly earnings of graduates with BA/BSc or college degree was 157,000 HUF for the 2008 cohort and 137,000 HUF for the 2010 cohort, while of graduates with MA/MSc degree was 193,000 HUF for the 2008 cohort and 162,000 for the 2010 cohort.

Simple comparison of average earnings (Table 2) of young graduates shows that in both cohorts the highest earnings were gained by career beginners who graduated from informatics, engineering, defence and military studies, economics and business, and the lowest earnings by graduates of art management, teacher training, social sciences and agricultural sciences. Graduates of field specialization natural sciences and mathematics have below average earnings in both cohorts, but the lag behind the average was smaller for the 2010-year graduates than for the 2008-year graduates.

Table 2. Net monthly average earnings by field of study, year of graduation and level of degree (1,000 HUF)

Field of study	Graduated in 2008			Graduated in 2010		
	Total	BA/BSc, or college-level degree	MA/MSc, or university-level degree	Total	BA/BSc, or college-level degree	MA/MSc, or university-level degree
Agriculture	147	141	149	135	126	140
Humanities	198	183	238	164	152	188
Economics	252	207	294	192	166	227
Information technology	173	162	179	145	129	153
Law and administration	208	186	241	176	162	193
Technology	137	112	173	126	105	148
Arts	101	101	–	93	93	94
Arts management	200	171	221	165	148	195
National defence and military	166	133	236	142	125	165
Medical and health sciences	114	113	129	118	113	128
Teacher training	127	126	132	137	138	133
Sport science	151	138	166	128	126	134
Social sciences	143	118	154	139	117	148
Natural sciences	172	157	193	148	137	162
Average	**172**	**157**	**193**	**148**	**137**	**162**

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

The average lag in earnings behind the average of graduates for the worst-paying specialisations were higher for graduates who finished their studies in 2008 than for those who graduated in 2010, while the average gain for the best paying fields was higher for those who graduated in 2010 than for those who graduated in 2008. It seems that not only starting wages are higher for the best-paying specialisations than the average, but later on earnings are increasing more for graduates of the best-paying fields while the increase of earnings is smaller with years of experience for specialisations which provide below average starting salaries. As a consequence the lag behind the average earnings is increasing for the latter group. For instance, grad-

uates who finished their studies in teacher training with BA/BSc or college-level degree earned 82% of average earnings of graduates with the same level of degree while career beginners who graduated in 2008 earned 72% of the average. There is even a higher difference for graduates with MA/MSc or university level degree. The earnings of graduates who finished their studies in 2010 with MA/MSc or university-level degree were 79% of average graduate earnings and the earnings of graduates who finished their studies in 2008 were 67% of average graduate earnings.

Those specialisation assure the best labour market prospects which provide above average earnings, and where the duration of finding a first job is below average. Figures 3 and 4 show average earnings of graduates by field specialization as a ratio of average graduate earnings and average duration of finding a first job by field specialization as a ratio of average duration of finding a first job.

BA/BSc or college level degree graduates in informatics, economics and defence and military had the best labour market position out of the 2008 year cohort. For them the above average earnings were coupled with below average duration of finding first job (Figure 2).

Graduates of field specialization informatics and defence and military studies of the 2010 cohort were still in the best labour market position. From this cohort graduates whose degree subject was engineering have got into the best group also because their duration of finding first job has decreased below the average. On the contrary duration of finding first job for graduates from field specialization economics and business has increased and although they still earned above average earnings their labour market position has slightly worsened. In both cohorts graduates from art management were in the worst labour market position as for them the below average earnings were coupled with above average duration of finding a job. There are some field specializations which have got into the worst group by 2010, as not only the earnings were below average in that year as in 2008, but the duration of finding first job has also increased above average. Graduates of teacher training and agricultural studies belong to this group.

There was only one field specialization of graduates with MA/MSc or university-level degree who had better position than the average in both labor market success indicators both in 2008 and in 2010, graduates with degree subject defence and military (Figure 3). In the 2008 cohort graduates from field specialization economics and business and medical studies are also in the best group. It is worth mentioning that the above avarage earnings of graduates with degree subject medical studies are due to the above average earnings of those graduates who are working abroad. In the 2010 cohort graduates from field specialization defence and military and informatics had better than the average position in both labour market success indicators. Gradutaes from engineering, economics and business and medical studies still had higher earnings than the average but the duration to find first job has increased for them.

Graduates with MA/MSc or university degree from agricultural studies and arts were in the worst position both in the 2008 and the 2010 cohort, their earnings
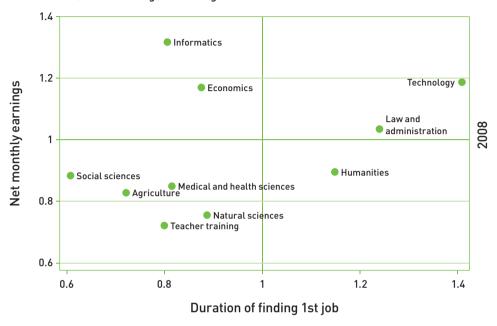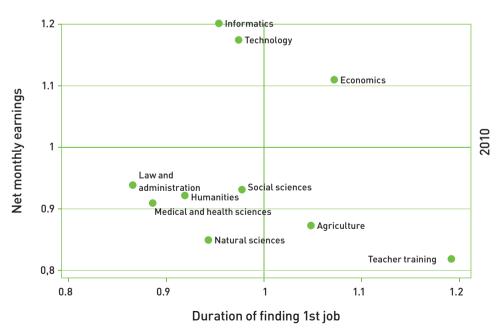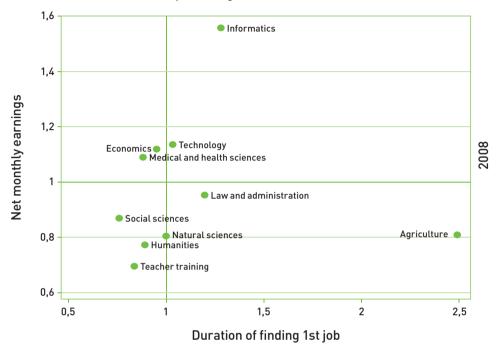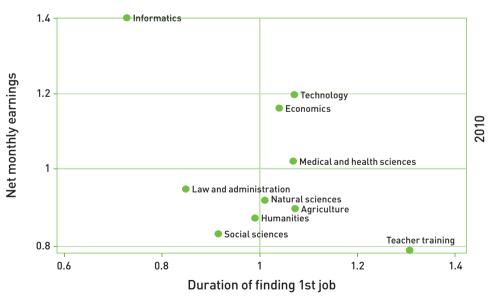
Figure 2. Average net monthly earnings of graduates from different fields of study as a ratio of net monthly earnings of graduates and average duration of finding first job of graduates from different fields of study as a ratio of average duration of finding first job of graduates
BA/BSc or college-level degree

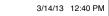Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

Figure 3. Average net monthly earnings of graduates from different fields of study as a ratio of net monthly earnings of graduates and average duration of finding first job of graduates from different fields of study as a ratio of average duration of finding first job of graduates
MA/MSc or university level degree

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

were below average and duration of finding first job was above average. In the 2010 cohort graduates from some other field specializations also got into that category: teacher training and sport studies because in 2010 not only earnings were below average of graduates from these field specializations but the duration of finding first job has incresed above the average for them.

The survey asked young graduates what level of degree and what field specialization would be adequate for their current job. With the help of these answers I have created two indicators. The first one shows the qualification and job match in terms of level of degree. Those were classified to the non-matching category who answered that their job needs a lower qualification than the qualification obtained by them. It means that the share of graduates in non-matching occupations shows the share of graduates who feel to be overeducated for their current job. The other indicator shows whether the current job of the graduate fits to the field of study of him or her. Those answers were classified as 'matching' when the graduates thought that the adequate field specialization for their current job was their degree subject or related subjects. The non-matching group consists of graduates who thought that other or any subjects fit to their current jobs. Table 3 shows the share of graduates in matching jobs in terms of degree of qualification in the 2008 and 2010 cohorts, and Table 4 shows the share of the graduates in matching jobs in terms of field of study in view of graduates.

Table 3. Share of graduates in 'matching' jobs by field of study and year of graduation
In terms of level of degree (%)

Field of study	Graduated in 2008	Graduated in 2010
Agriculture	75.2	72.7
Humanities	80.5	72.0
Economics	81.8	78.9
Information technology	89.9	89.7
Law and administration	90.2	86.7
Technology	86.5	83.5
Medical and health sciences	83.2	83.1
Teacher training	80.4	84.9
Social sciences	86.3	73.2
Natural sciences	86.7	75.4
Average	**83.7**	**79.0**

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

Table 4. Share of graduates in 'matching' jobs by field of study and year of graduation
      In terms of degree subject

Field of study	Graduated in 2008	Graduated in 2010
Agriculture	69.8	69.5
Humanities	67.1	63.6
Economics	81.3	79.3
Information technology	90.2	90.3
Law and administration	91.0	85.0
Technology	85.2	85.2
Medical and health sciences	93.6	90.9
Teacher training	78.4	84.7
Social sciences	77.1	67.9
Natural sciences	76.9	68.7
Average	**80.5**	**77.3**

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

83.7% of the 2008 cohort and 79% of the 2010 cohort thought to be working in a job which fits to their level of degree. In both cohorts – according to graduates' self assessment – graduates with degree subject informatics and law and administration were working in a 'matching job' in above average ratio, and graduates from agricultural studies in below average ratio.

80.5% of the 2008 cohort and 77.3% of the 2010 cohort answered that he/she was in a job which matches to his/her degree subject. Graduates from medical studies, informatics, law and administration answered in an above average ratio that their job is a matching job in terms of degree subject while graduates from, agricultural studies, humanities, sport studies, social sciences and natural sciences found their job to be a non-matching job in above average ratio.

The difference in the ratio of graduates working in a matching job may be the result of the previously discussed two effects. On the one hand it might be the consequence of the nature of the first period of transition from school to work, when searching may lead to the transient acceptance of a non-matching job in terms of level of degree or subject of degree and later on graduates may succeed in finding a matching job. This searching period is a characteristic of the transition from school to work, so we expect that we will find graduates from the earlier cohort in a larger share in matching jobs than graduates from the later cohort even if labour market prospects of graduates

have not changed. On the other hand the difference in labour market success of the two cohorts may be a sign for changing equilibrium of demand and supply in other words for worsening of the labour market prospects of graduates. Again we are not able to separate these two effects, but the differences in rate of changes by field specializations may signal what are the reasons for the difference in the labour market position of the two cohorts. There are some field specializations where the change in the ratio of graduates working in 'matching' jobs between the 2008 and the 2010 cohort were much above the average change. In terms of level of degree, an above average increase in the share of graduates working in non-matching jobs could be observed in case of graduates from humanities, arts and arts management, sport studies, social sciences and natural sciences. An above average change can be observed in the share of graduates working in matching jobs in terms of degree subject between the 2008 and 2010 cohorts in the case of graduates from arts and art management, sport studies, social sciences and natural sciences. It worth mentioning that among graduates of the 2010 cohort with degree subject teacher training a larger share is working in 'matching jobs' both in terms of level of degree and in terms of degree subject than among graduates of the 2008 cohort with the same field specialization.

Labour market success of higher education graduates – multi-variable analysis

The descriptive statistics have highlighted that labour market success of graduates differ by subject, however the simple comparison of the average earnings of graduates by fields of study may be misleading. The composition of graduates from different degree subjects, their observable and unobservable characteristics may vary by fields of study and the differences in the labour market success of graduates may reflect these differences and not the effect of the degree subject. For example, there are differences in the composition of the graduates of different fields of studies by gender, age, level of degree and there might be differences in ability of graduates also. For controlling these effects, the effect of field of study on earnings was analyzed by multivariable methods too.

First, I estimated Mincer-type earnings functions with simple OLS regressions where the dependent variable was the natural logarithm of the earnings of the individual. The earnings function was estimated by using different specifications. The first specification (F1) shows the raw wage differentials compared to law and administration graduates. In specifications F2–F6 we control for more and more individual and job characteristics. In specification F2 we add gender, age, level of degree, year of graduation as independent variables. In specification F3 we control for some characteristics of the job: hours of work, tenure in months, a dummy variable indicating if the sector of employment is public or private and another dummy variable indicating if the graduate is working abroad. In specification F4 we add the matching indicators: (if the job is matching in terms of field of study and in terms of

level of degree), a dummy variable indicating if the graduate has been unemployed and two proxy variables for measuring the 'ability of graduates'. The first one is showing if the individual has been studying in 'cost-priced education' on a paying – as opposed to state-funded – education, the second one indicates if the graduate has finished his/her studies 'in time' or has gained his/her qualification with delay. In specification F5 we control for family background of the individual: marital status, if the graduate has children, categorical variables describing the educational attainment of the graduates' parents and dummy variable indicating if someone in the family has qualification in the same or related fields, and the type of secondary school the individual had finished his/her secondary school studies. These characteristics may have an effect on the labour supply of the graduate or his/her chances to find an appropriate job. The quality of the institution where the individual has graduated may have an impact on the labour market prospects of graduates. For controlling this we put institution fixed effects in specification F6.

For the analysis some fields of studies were contracted in the 'Other' category. The base category is law and administration; wage differentials are compared to this category. Table 3 displays the OLS regression detailed estimation results are reported in Annex Table A1.

Table 5. Effect of field of study on earnings (OLS regression coefficients)

Field of Study (ref.: Law and administration)	(F1)	(F2)	(F3)	(F4)	(F5)	(F6)
Agriculture	−0.131	−0.128	−0.186	−0.140	−0.123	−0.129
Humanities	−0.149	−0.120	−0.133	−0.096	−0.097	−0.083
Economics	0.123	0.225	0.135	0.140	0.140	0.090
Information technology	0.279	0.233	0.161	0.147	0.155	0.136
Technology	0.180	0.168	0.087	0.090	0.094	Not significant
Medical and health sciences	−0.098	−0.012	−0.069	−0.063	Not significant	Not significant
Teacher training	−0.261	−0.182	−0.155	−0.136	−0.129	−0.105
Social sciences	−0.162	−0.080	−0.091	Not significant	Not significant	Not significant
Natural sciences	−0.143	−0.134	−0.157	−0.121	−0.114	−0.097
Other (arts, arts management, sports science, national defence and military)	−0.165	−0.101	−0.108	Not significant	Not significant	Not significant

Source: Results of OLS regressions presented in Annex Table A1

Comparing the results for specification F1 and F2 shows that a large part of the raw wage differentials are simply the results of differences in the composition of graduates by level of degree, year of graduation gender and age between fields of studies. Those graduates who have BA/BSc or college level qualification earn 15–19% lower wages than graduates with MA/MSc or university degree. Wages of graduates of the 2008 cohort are 10–12% higher than wages of graduates of the 2010 cohort, male graduates earn 15–19% higher wages than female graduates, and earnings increase with age (Annex Table A1).

As for the effect of field of study the results show (Table 4), that raw earnings differentials are decreasing with controlling for more and more effects but not in the same measure for the different field specializations. Graduates from agricultural studies earn 12–13% lower wages than base category in all specifications. Those individuals who studied humanities have 8% lower earnings than graduates from law and administration after controlling for all individual and job characteristics. The earnings advantage of graduates with field specialization economics reduces substantially after controlling for the other effects, but graduates with this degree subject still have 9% higher earnings than graduates from the reference category. The 27% raw wage premium of informatics drops to 14%, but this field specialization still assures the highest wages. The 18% wage premium of engineering pulls out if we control for individual and job characteristics. In specification F6 the wage advantage of engineering is only 3% and the coefficient is insignificant. Similarly we do not find significant wage differentials between graduates from medical and health care studies and graduates of law and administration if we control for the effect of other factors. The substantial wage disadvantage of graduates from teacher training drops to 10%, and there is no significant effect of field of study concerning graduates from social sciences. Finally the wage disadvantage of graduates with degree subject natural sciences slightly decreases, but is 10% in specification F6.

It's worth summarizing the effect of the other variables in the models. As it were expected earnings increase with hours of work. Graduates who are working in the public sector have 14–16% lower wages than graduates who are working in the private sector. Graduates who have found a job abroad earn 75–78% higher wages than graduates who are working in Hungary if we control for all observable characteristics. Graduates who said to be working in a 'matching job' in terms of level of degree have 20–21 higher wages than graduates who answered that their job does not need higher education qualification. It is worth mentioning that to work in a 'matching job' in terms of field of study do not has significant effect on wage differentials between graduates, in other words graduates who are working in a job that requires other field of study than the graduate holds do not suffer wage loss. Earnings of graduates who have studied in cost-priced education have 3–4% higher wages than graduates who have studied in state-funded education if we control for field specialization and other observable characteristics. The delayed graduation results 3–4% lower wages. Out of the variables describing family background and the secondary school of the gradu-

ate only one has significant effect on wage differentials between graduates. Individuals who have studied in a 6 or 8-grade secondary grammar school have 4–5% higher earnings than individuals from the reference category (4-grade secondary grammar school).

Regression results suggest that graduates from agricultural studies have the worst earning prospects and graduates from teacher training, natural sciences and humanities can expect below average earnings. Graduates from information technology and economics have significant earnings advantage.

OLS estimates show the mean effects of field of study on earnings and do not capture the heterogeneity in wages within fields of study. Nevertheless, there is large variation in earnings within fields of studies. Figure 4 and Figure 5 shows variation in earnings within field of study by level of degree and year of graduation with the help of box-plot diagrams. The box itself contains the middle 50% of the data. It illustrates where the interquartile range falls. The lower hinge indicates the 25th percentile; the upper hinge indicates the 75th percentile of the data set. The line in the box indicates the median value of the data. The marks above and below show the 5th and 95th percentile of the data. Outliers are not indicated.

The figures show that there are large differences between fields of studies at the different points of the distribution for both cohorts and levels of degree. In some field specialization for instance teacher training or medical studies the range of earnings is quite small, because most of the graduates of these specialisations find a job in the public sector as teachers, doctors or nurses where their earnings are determined by centrally set wage scales, promotion is based on seniority and where wage compression is higher than in the private sector. In some other specialisations for instance informatics, engineering or economics and business the range of earnings is much larger. There are some specialisations where earnings of the 75th percentile are smaller than earnings of the 25th percentile in some other fields. Differences between the earnings of graduates of different specialisations are larger for graduates with MA/MSc or university degree than for graduates with BA/BSc or college level degree.

 As OLS estimates presented before capture only the mean effects of field of study on earnings I also estimated earnings function by quantile regression which estimates the field specific wage premium at various quantiles of the conditional wage distribution (Koenker–Bassett, 1978, Chamberlain; 1994). Quantile regression method has the advantage that the effect of a given covariate is not assumed to be fixed across the distribution; the wage premium of field of study may vary at different points of the earnings distribution. Quantile regression estimates were made by using specification F5, the estimations were made at the 10th, 25th, 50th , 75th and 90th percentile. The detailed results are presented in Annex Table A2.
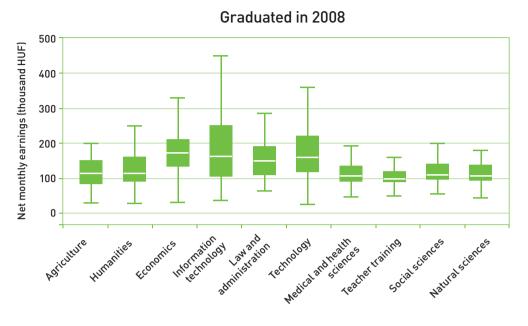
Graduates of economics and business, and informatics can expect significant higher wages than graduates of the reference category (law and administrattion) at all points of the earnings distribution controlling for individual and job specific characteristics. At the 10th , 25th and 50th percentilewage premium to economics and business is the highest, higher that that of informatics or engineering. A gradu-

Figure 4. The distribution of earnings by fields of study, level of degree BA/BSc or college-level*

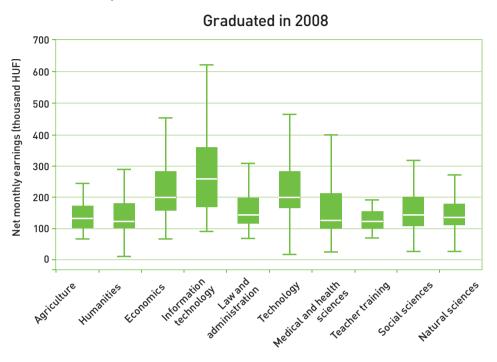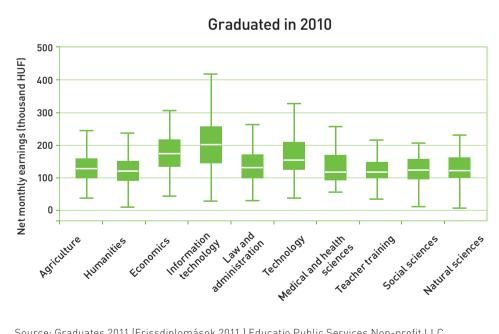Graduated in 2008

Graduated in 2010

*extreme values are excluded
Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

Figure 5. The distribution of earnings by field of study, level of degree MA/MSc or university-level

Graduated in 2008

Graduated in 2010

Source: Graduates 2011 (Frissdiplomások 2011) Educatio Public Services Non-profit LLC

ate from economics and business studies earn 26% higher wages at the 50th quantile than a graduate at the 50th quantile of the reference field specialization. At the top quantiles of the distribution, at the 75thand 90th quantile informatics assures the highest earnings. Graduates of engineering earn significant higher wages than graduates of the reference field specialization up to the median, but at the 75th and 90th percentiles the effect is not significant. For most of the degree subjects there is no significant wage differentials between graduates with the given field specialization and graduates of the reference category up to the median. On the contrary the earnings disadvantage is high at the upper end of the distribution although for most of the degree subjects but teacher training showing decresing differentials through quantiles. The earnings lag of graduates with degree subject Humanities and Langues is 13% at the 75th percentile and 10% at the 90th percentile. The wage loss of graduates of medical studies is 9% at the 75th percentile and 10% at the 90th percentile, the wage loss of graduates with degree subject natural sciences and mathematics is 15 and 14% respectively. Graduates with field specialization agricultural sciences have 11% lower wages at the 50th percentile, and 17–17% lower wages at the 75th and 90th percentile than graduates of law and administration. The earnings disadvantage if graduates of teacher training is the highest at the top quantiles of the distribution. They earn 19% lower wages at the 75th percentile and 26% lower wages at the 90th percentile than graduates of reference category (Annex Table A2).

Figure 5 shows the predicted log wages at different quantiles for a set of specialisations. The predicted earnings are incresing in quantile. Up to the 25th percentile specialisations with above average earnings prospects (informatics, economics and business and engineering) assure equal wages for graduates, from 75th percentile graduates of informatics can expect the highest earnings. Amongst the subjects reported in Figure 5 teacher training assures the lowest wages in all quantiles while the remaining fields ensure lower but equal wages at all quantiles than that of the well-paying subjects. There is a considerable large variation in predicted earnings within specialisations. The interquantile range of predicted log earnings is reported for each field specialization in the last column of Annex Table A2. Informatics is the field specialization with the largest range and teacher training with the lowest range.

Quantile regression results suggest that the reason for that on average graduation with field specialization informatics assures the highest wages for young career beginners is that earnings advantage of graduates with this degree subject are very high at the top of the distribution. In other word graduates with degree subject informatics who have high earnings earn much higher wages than the well paid graduates with other degree subjects. Studying business and economics seems to be the less risky decision as graduates of this field specialization have significant earnings advantage at all points of the earnings distribution. The average earnings advantage of engineering is the result of that this field specialization assures high wages at the lower tails of the distribution. Graduates of teacher training have significantly lower wages at all points of the earnings distribution.

Figure 6. Predicted earnings by quantiles by fields of study

Source: Based on quantile regression results presented in Annex Table A2

References

Bratti, M.–Naylor, R.–Smith, J. (2005): Variations in the Wage Returns to a First Degree: Evidence from the British Cohort Study 1970, IZA Discussion Paper No. 1631.

Buonanno, Paolo–Pozzoli, Dario (2007): Early Labour Market Returns to College Subject. Società italiana di economia pubblica. Dipartimento di economia pubblica e territoriale, Università di Pavia

Brunello, G.–Cappellari, L. (2005): The Labour Market Effect of Alma Mater: Evidence from Italy. IZA Discussion Paper, No. 1562.

Chamberlain, Gary (1994): Quantile regression, censoring and the structure of wages. In: Sims, Christopher A. (eds.) Advances in Econometrics: Sixth World Congress. Vol 1, Econometric Society

Chevalier, A.–Conlon, G.–Galindo-Rueda, R.–McNally, S. (2002): The Returns to Higher Education Teaching. Research Report to the Department for Education and

Skills. Centre for the Economics of Education, London School of Economics, London

Chevalier, Arnaud (2011): Subject choice and earnings of UK graduates. IZA Discussion Paper No. 5652

Finnie, R.–Frenette, M. (2003): Earnings Differences by Major Field of Study: Evidence from Three Cohorts of Recent Canadian Graduates, Economics of Education Review, Vol. 22, No. 2, 179–192.

Galasi P.–Varga J. (2006): Hallgatói létszám és munkaerőpiac. Felsőoktatási Kutatóintézet, Budapest

Galasi P. (2002): Fiatal diplomások életpálya-vizsgálata. In: Társadalmi Riport 2002. Tárki, Budapest, 245–255.

Galasi P. (2004a): A felsőfokú végzettségű pályakezdők munkaerő-piaci sikeressége. In: Munkaerőpiaci tükör 2004. MTA KTI–OFA, Budapest, 110–118.

Galasi P. (2004b): Estimating wage equations for Hungarian higher-education graduates. Budapest University of Economic Sciences – Institute of Economics, Hungarian Academy of Sciences, Budapest Working Papers on the Labour Market 4/2003.

Galasi P. (2007): Pályakezdő diplomások keresetének alakulása: az iskolázottság, a képzettség, valamint a túlképzés/alulképzés szerepe. In: Munkaerőpiaci tükör 2006. MTA KTI–OFA, Budapest, 107–129.

Grubb, W.N. (1992): The Economic Return to Baccalaureate Degrees: New Evidence from the Class of 1972. Review of Higher Education, Vol. 15, No. 2, 213–231.

Koenker, R.–Basset, G. (1978): Regression Quantiles. Econometrica, Vol. 46, No. 1. 33–50.

Livanos, Ilias–Pouliakas, Konstantinos (2009): Wage Returns to University Disciplines in Greece: Are Greek Higher Education Degrees Trojan Horses? IZA Discussion Paper No. 4442

Machin, S.–Puhani, P. A. (2006). The contribution of Degree Subject to the Gender Wage Gap for Graduates: A Comparison of Britain, France and Germany. Report to the Anglo-German Foundation

Rumberger, R. W.–Thomas, S. L. (1993): The Economic Returns to College Major, Quality and Performance: A Multilevel Analysis of Recent Graduates. Economics of Education Review, Vol. 12, No. 1, 1–19.

Varga J. (2010): A pályakezdő diplomások keresete, munkaerő-piaci sikeressége a 2000-es évek elején. In: Garai O. et al. (eds.): Diplomás Pályakövetés IV. Frissdiplomások 2010. Educatio Társadalmi Szolgáltató Nonprofit Kft. Felsőoktatási Osztály, 59–81.

Walker, I.–Zhu, Y. (2005): The College Wage Premium, Overeducation, and the Expansion of Higher Education in the UK. Scandinavian Journal of Economics, 110. 695–709.

Annex

Table A1. The effect of field of study on (log) net monthly earnings OLS regression results

Variable	(F1)	(F2)	(F3)	(F4)	(F5)	(F6)
Agriculture	-0.1319* (0.0269)	-0.1284* (0.0251)	-0.1867* (0.0269)	-0.1408* (0.0262)	-0.1239* (0.0267)	-0.1291* (0.0280)
Humanities	-0.1498* (0.0204)	-0.1202* (0.0191)	-0.1338* (0.02105)	-0.0960* (0.0210)	-0.0972* (0.0218)	-0.0834* (0.0223)
Economics	0.1234* (0.0195)	0.1259* (0.0181)	0.1358* (0.0200)	0.1404* (0.0196)	0.1406* (0.0203)	0.0903* (0.0212)
Information technology	0.2796* (0.0281)	0.2333* (0.0273)	0.1618* (0.0279)	0.1475* (0.0274)	0.1554* (0.0281)	0.1367* (0.0284)
Technical	0.1801* (0.0214)	0.1688* (0.0204)	0.0877* (0.0216)	0.0909* (0.0212)	0.0948* (0.0222)	0.02695 (0.0250)
Medical and health care	-0.0984* (0.0262)	-0.0129* (0.0250)	-0.0696** (0.0238)	-0.0632** (0.0241)	-0.0630 (0.0252)	-0.0362 (0.02632)
Teacher training	-0.2619* (0.0202)	-0.1828* (0.0194)	-0.1558* (0.0218)	-0.1368* (0.0217)	-0.1293* (0.0228)	-0.1052* (0.02413)
Social Science	-0.1625* (0.0230)	-0.0801* (0.0220)	-0.0913* (0.0230)	-0.0558 (0.0227)	-0.0549 (0.0234)	-0.0640 (0.0238)
Natural science	-0.1431* (0.0246)	-0.1346* (0.0238)	-0.1577* (0.0254)	-0.1211 (0.0247)	-0.1145 (0.0253)	-0.0970* (0.0257)
Other	-0.1655* (0.0259)	-0.1011* (0.0248)	-0.1082* (0.0285)	-0.0736 (0.0281)	-0.0684 (0.0298)	-0.0760 (0.0313)
Male	–	0.1939* (0.0108)	0.1677* (0.0106)	0.1540* (0.0104)	0.1517* (0.0107)	0.1448* (0.0106)
Age	–	0.0123* (0.0005)	0.0118* (0.0008)	0.0098* (0.0008)	0.0098* (0.0009)	0.0102* (0.0009)

Variable	(F1)	(F2)	(F3)	(F4)	(F5)	(F6)
Level of degree: BA/BSc or college-level	–	-0.1869* (0.0095)	-0.1701* (0.0095)	-0.1387* (0.0094)	-0.1219* (0.0099)	-0.1138* (0.0114)
Year of graduation 2008	–	0.1202* (0.0087)	0.0935* (0.0088)	0.0882* (0.0086)	0.0921* (0.0088)	0.0931* (0.0087)
(log) hours of work	–	–	0.3333* (0.0240)	0.3353* (0.0234)	0.3413* (0.0243)	0.3446* (0.0250)
Tenure months	–	–	0.0011* (0.0002)	0.0006* (0.0001)	0.0006* (0.0001)	0.0005* (0.0001)
Public sector employment	–	–	-0.1413* (0.0100)	-0.1674* (0.0098)	-0.1632* (0.0102)	-0.1546* (0.0102)
	–	–	0.74950* (0.0305)	0.7803* (0.0306)	0.7729* (0.0310)	0.7693* (0.0307)
Working abroad	–	–	–	-0.0251* (0.0121)	-0.0247* (0.0124)	-0.02305* (0.0124)
Matching job in terms of field of study	–	–	–	0.2111* (0.0123)	0.2058* (0.0127)	0.2001* (0.0126)
Matching job in terms of level of degree	–	–	–	-0.1307* (0.0100)	-0.1246* (0.0103)	-0.1195* (0.0100)
Has been unemployed	–	–	–	0.0397* (0.0104)	0.0385* (0.0108)	0.0310* (0.0110)
Graduated in cost-priced educaion	–	–	–	-0.0527* (0.0095)	-0.0391* (0.0099)	-0.0305* (0.0098)
Delayed graduation	–	–	–	–	0.0243 (0.0118)	0.0267 (0.0116)
Married	–	–	–	–	0.0222 (0.0150)	0.0260 (0.0147)
Has children	–	–	–	–	0.0521* (0.0123)	0.03929* (0.01231)

Variable	(F1)	(F2)	(F3)	(F4)	(F5)	(F6)
Type of secondary school: 6- or 8-grade grammar school	–	–	–	–	-0.0103 (0.0106)	-0.0030 (0.0104)
Type of secondary school: vocational seconday school	–	–	–	–	-0.0353 (0.0173)	-0.0318 (0.0169)
Mother's educational attainment: at most lower secondary education	–	–	–	–	-0.0276 (0.0132)	-0.02212 (0.0130)
Mother's educational attainment: vocational training school	–	–	–	–	0.0138 (0.0116)	0.0053 (0.0115)
Mother's educational attainment: higher education	–	–	–	–	-0.0049 (0.0209)	-0.0054 (0.0207)
Father's educational attainment: vocational training school	–	–	–	–	-0.0215 (0.0111)	-0.0187 (0.0109)
Farher's educational attainment: higher education	–	–	–	–	0.0064 (0.0120)	-0.0045 (0.0118)
Qualification in similar field of study in close relationship	–	–	–	–	-0.0242 (0.0121)	-0.0152 (0.0120)
Institution fixed effects	No	No	No	No	No	Yes
Constant	49.467 (0.0169)	44.991 (0.0233)	2.8962* (0.1264)	2.8319* (0.1232)	2.7792* (0.1295)	27.168 (0.1669)
R^2	0.0964	0.1984	0.3659	0.4088	0.4121	0.4330
N	13 044	12 492	9 312	9 197	8 689	8 689

Robust standard errors in parantheses
*significant at 1% level, **significant at 5 % level
Reference field: Law and Administration
Reference category: female; MA/MSc or university level degree, graduated in 2010, private sector employment, working in Hungary, has not been unemployed, is not married, has no children, graduated in time, studied in state-funded education, mother's educational attainment upper secondary general school, father's educational attainment upper secondary general school, type of secondary general school, type of secondary school 4-grade grammar school

Table A2. The effect of field of study on (log) net monthly earnings, Quantile regression results

	Q10	Q25	Q50	Q75	Q90	Expected earnings Q90–Q10
Agriculture	0.0476 (0.0473)	-0.0882** (0.0302)	-0.1125** (0.0492)	-0.1715* (0.0274)	-0.1757* (0.0412)	0.630
Humanities	0.0219 (0.0439)	-0.0720 (0.0290)	0.0769 (0.0491)	-0.1295* (0.0273)	-0.1017** (0.038)	0.711
Economics	0.2224* (0.0401)	0.1730* (0.0260)	0.2579* (0.0407)	0.0812* (0.0179)	0.0814** (0.0352)	0.701
Information technology	0.1780* (0.0489)	0.1437* (0.0316)	0.1998* (0.0545)	0.1080* (0.0303)	0.1177 (0.0560)	0.855
Technical	0.2064* (0.0449)	0.1515* (0.0297)	0.2266* (0.0430)	0.0314 (0.0218)	-0.0093 (0.0406)	0.781
Medical and health care	0.0545 (0.0554)	-0.0372 (0.0332)	0.0639 (0.0462)	-0.0941* (0.0190)	-0.1003** (0.0510)	0.721
Teacher training	0.0699 (0.0442)	-0.0536 (0.0235)	0.0842 (0.0471)	-0.1898* (0.0164)	-0.2622* (0.0385)	0.474
Social science	0.0537 (0.0457)	-0.0386 (0.0293)	0.1150** (0.0529)	-0.0916* (0.0259)	-0.0689 (0.0437)	0.655
Natural science	0.0379 (0.0586)	-0.0548 (0.0299)	0.0562 (0.0473)	-0.1489* (0.0190)	-0.1367** (0.0529)	0.653
Other	0.0205 (0.0447)	-0.0662 (0.0377)	0.0520 (0.0543)	-0.146951* (0.0260)	-0.0979** (0.0373)	0.951

Robust standard errors in parantheses

*significant at 1 % level, **significant at 5 % level

Other conrol variables: male; age; BA/BSc or college-level degree; year of graduation 2008; (log) hours of work; tenure in moths; public sector occupation; working abroad; matching job in terms of field of study; job needs higher education qualification;has been unemployed;graduated in sost-priced education; delayed graduation; married; has childre; type of secondary school 6 or 8-grade grammar school; type of secondary school vocational secondary school; mother's educational attainment at most lower secondary education; mother's educational attainment vocational secondary school; mother's educational attainment higher education; father's educational attainment at most lower secondary education; father's educational attainment vocational secondary school; father's educational attainment higher education; qualification in similar field of study in close relationship