

Did Bologna reform improve school-to-work transition of graduates? Evidence from Slovenia

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Abstract

Purpose: This paper investigates the school-to-work transition of graduates in a framework of a quazi experiment. In a predominately tuition free system we use differences in probability of employment after graduation to infer about the causal effect of different field of study and type of study program.

Design/methodology/approach: By using a probit regression we calculate the probability of employment for graduates in different fields of education and different type of study program, where we control for the innate ability and effort during schooling.

Findings: We find that graduating from a particular field of study affects the probability of employment in three consequent observed years. In general we find, that regardless of the field we observe decreasing probabilities of employment over the years of 2008 and 2009. We also find that new graduates holding a diploma from new vocational or academic Bologna programs face lower probability of employment comparing to graduates having a pre-Bologna degree.

Practical implications: In the absence of price competition, performance indicators such as employability can provide relevant information to student choice or a management tool for efficient distribution of education funds to measured performance.

Originality/value: By covering the entire population of full-time graduates in 2007, 2008 and 2009 that entered labor market for the first time after graduation we calculate probability of employment in the three consequent years allowing us to first infer about the effect of the new Bologna-harmonized programs and second infer about the crisis impact. In addition we investigate the effect of the quarter of year on the probability of employment.

Keywords: school-to-work transition, employability, Bologna Declaration

1. Introduction

This paper investigates the determinants of school-to-work transition of higher education graduates in Slovenia. Unique dataset of the entire population of full time graduates that enter labor market for the first time provides a framework of a quazi experiment, where in tuition free system we investigate the effect of different fields of study on the probability of employment with special attention to the effect of different study programs (professional vs. academic education and new Bologna programs). Based on three consequent cohorts of graduates we observe how the probability of employment according to field of study varies over time.

Sound educational system represents an important layer for sustainable economic growth by equipping potential employees with knowledge and skills they will need in active labor market participation. Unemployment in one way represents poor match between vacancies and supplying human capital but on the other hand a bad start in a young person's working life has immediate and long-lasting economic, personal and social costs. Therefore there has been an increased attention in last decade analyzing the reasons of youth unemployment within the school-to-work transition framework. Our paper provides additional empirical evidence on school-to-work transition of young people immediately after graduation. First we investigate probability of employment in the first three months after graduation and in two later points in time, namely 6 and 9 months, respectively. Unique to this paper is that we are able to investigate the effect of the year quarter or how the month of graduation affects the probability of employment.

In our analysis we exploit the rich dataset covering the entire population of graduates. The data refer to students graduating in 2007, 2008 and 2009. Matched with employment outcome it offers us rich information on the student's higher education record (including institution and graduation data), previous schooling and personal characteristics as well as date of first employment. This paper adds to the literature by providing effects of different field of study in school-to-work transition in Slovenia as well as in the context of transition and tuition free system. This paper is distinctive as it also analyses the effect of different study programs that and first to our knowledge investigates the effect of new Bologna-typed study programs on employability of graduates. Consequent data on graduates including also the most recent cohort of graduates allows us to investigate variation in the probability of employment in the time of economic downturn. The school-to-work studies of post-transition countries are scarce (except for Kogan and Unt, 2005) and to our knowledge there is no study of school-to-work transition that focuses on the effect of field of study and study program.

In the absence of price competition, performance indicators such as employability typically intend to provide relevant information to student choice. It is in particular important to construct school performance indicators based on students' employment outcomes. The outcomes of this research might also serve as a management tool for Ministry of Higher Education for efficient distribution of education funds to measured performance.

After introduction this paper is organized as followed: we first describe the relevant literature on school-to-work transition and continue with description of the method used. Then we briefly describe the higher education system in Slovenia and continue with more detailed description of the sample. In part 4 we present our results and conclude in part 5.

2. Literature Review

Based on a review of the literature Hillage and Pollard (1998) suggest that employability is about being capable of getting and keeping fulfilling work. More comprehensively, employability is the capability to move self-sufficiently within the labour market. Individual employability depends on the knowledge, skills and attitudes they possess, the way they use those assets and present them to employers and the context (eg personal circumstances and labour market environment) within which they seek work.

The majority of the literature focuses on the labour market outcomes predominately on earnings regarding different level of education or different school quality (Loury and Garman, 1995; Brewer, Eide, and Ehrenberg, 1999; Monks, 2000; Berg Dale and Krueger, 2002, Long, 2010). However labour market outcomes also vary by field of study (James et al., 1989; Altonji, 1993; Lin, 2010; Kelly, O'Connell and Smyth, 2010). For example James et al. (1989) control for the college major when investigating earnings and find that Business and Engineering major receive large positive returns of 10 and 30 percent, respectively, but Education a large negative return of about 15 percent. Also Kelly, O'Connell and Smyth (2010) find that relative to Humanity and Arts base case, higher returns to Medicine and Veterinary, Engineering and Architecture, Education, Science and Computers and IT.

Several studies have also focused on the duration of unemployment when entering the labour market after higher education and how it differs according to different fields of study. For example Chuang (1997) estimates the determinants of the unemployment duration for college graduates in Taiwan, Lassibille et al (2001) in Spain, Nguyen and Taylor (2005) in USA, Betts et al. (2000) investigates the time to find a job that lasts at least 6 months. Beside evidence in different duration of unemployment for graduates of different fields of study in Netherlands (Van der Klaauw et al., 2005) and Italy (Biggeri et al., 2001) Salas-Velesco (2007) uses duration or hazard models and infers about transition from university to work in nine European countries. Smith, McKnight and Naylor (2000) find significant marginal effects associated with the subject studied at the university on the early career paths of UK

graduates. Also Alen and van der Velden (2009) compared employment history across different fields and find evidence that graduates from the fields of health care and engineering on average exhibit a shorter school-to-work transition than their peers (social science, business and law), while graduates from the humanities and the arts face longer transition periods.

Our findings are in line with results in investigating school-to-work transition in France where Canals and Diebolt (2002) find that Law, Economics, Social Sciences graduates (in our sample these graduates represent the reference group) as well as Humanities graduates have the greatest problems in finding work.

Apart from the effect of different field of study, many empirical studies have explored sex differences in college majors where they compare gender differences in rates of return in different fields of study (Angle and Wissmann, 1981; Eide, 1994; Machin and Pochani, 2003) or selection of majors due to different gender (Blakemore and Low, 1984). However, studies investigating the gender differences in the school-to-work transition show mixed results. Using Spanish data Lassibille et al. (2001) finds that female graduates are less likely to find their first job in less than 10 months after graduation compared with male counterparts, which was also supported by Genda and Kurosawa (2000). Whereas Chung (1999) finds the reverse trend and Franz et al. (2000) reports no difference.

Another personal characteristics that affects school-to-work transition is also the age of the graduates when entering labour market. Using Taiwanese data on graduates Chaung (1999) finds that unemployment after graduation is longer for the graduates that are older. Beside extensive debate about the effect of family background on returns to education (Ashenfelter and Rouse (1998) and Altonji and Dunn (1995) the effect of family background in the school-to-work transition is mixed. Salas-Valesco (2007) finds that graduates whose father has compulsory school or less have a slower transition from university and whereas Chueng (1999) finds little effect and Nguyen and Taylor (2005) find insignificant correlation between family background and time to first job after graduation.

Students tend to attend a university that matches their ability (Hoxby, 1997) and large ability differences exist also across majors (Arcidiacono, 2004). To control for ability Solmon (1975) used Scholastic Aptitude Test score (SAT) and Astin test Berg Dale and Krueger (2002) also used SAT scores, Chevalier and Conlon (2003) used A-test scores in UK and Black and Smith (2004) used ASVAB (Armed Services Vocational Aptitude Battery). Several studies controlled for ability by using data on siblings (Altonji and Dunn, 1996, Lindahl and Regner, 2005) or twins (Ashenfelter and Krueger, 1994). Using data on Italian graduates Biggeri et al. (2001) find that academic ability measured by final grades has a positive effect on the probability of obtaining the first job.

3. Methodology

The methodology is somehow divided in using several forms of the survival analysis (Chuang, 1999, Inkmann, Pohlmeier, and Zimmermann, 2000, Biggeri et al., 2001, Bradley and Nguyen, 2003) or the probability models (Lassibille et al., 2001; Smith, McKnight and Naylor, 2000). Following Smith, McKnight and Naylor (2000) and Johnston and DiNardo (1997) we calculate probability of employment

$$\Pr_t(y_i = 1 | X_i) = \Phi(X_i\beta)$$

where dependent variable (employment) is a binary random variable described by $y_i = \{0,1\}$, where $y_i = 1$ indicates employment and $y_i = 0$ indicates unemployment. Independent variables X_i are vector covariates of personal characteristics and institutional characteristics, t indexes time and takes values $t = \{0,1,2,3\}$ indexes time and where 0 represents graduation, $t = 1$ represents three months after graduation, and $t = 2$ six and $t = 3$ nine months after graduation, respectively. i indexes individuals, Φ is the standard cumulative normal probability distribution and $X_i\beta$ is called the probit score or index. To calculate the probability of employment we use a probit model¹.

An individual is observed to be employed ($y_i = 1$) whenever the index value is greater than ε :

$$X_i\beta + \varepsilon_i > 0$$

where ε_i is a stochastic normally distributed error term (Johnston and DiNardo, 1997).

The coefficients from the probit model are difficult to interpret therefore we report marginal effects as the slope of the probability curve relating X_k to $\Pr(Y = 1 | X)$, holding all other variables constant.

Based on estimated coefficients we calculate graduate's probability of employment as a first labour market outcome. We calculate the probability of employment in the first three months after graduation, first six months and first nine months after graduation. Our framework resembles experiment as students enter the higher education institution with facing only opportunity costs in the sense of forgone earnings. They decide for a particular field of study based on their preferences and are sorted to schools based on their performance in secondary school (measured by scores on matriculation exam). Therefore after controlling for the ability using the same criteria of sorting (matriculation exam) we investigate the causal effect of the field of study and type of study program on the probability to get employment in specific time after graduation. Data on graduates from the period of 2007-2009 that corresponds with first

¹ Alternatively logit can be used where instead of normal distribution logistic distribution is assumed. However as Hahn and Soyer (2005) summarize and point out that unless in case of multivariate response models, both methods in most applications give the same conclusions (e.g., Maddala, 1983; Davidson and MacKinnon, 1993; Long, 1997; Greene, 1997).

labor market entrance of new Bologna graduates in specific fields competing for the same vacancies with graduates from the previous, pre-Bologna, program enable us to assess new programs in terms of employability but controlling for institution, innate ability, previous education and fields of study. Recent study by MacLeod and Urinqla (2009) emphasize the importance of the education system in the context of the perceived quality of job seekers that is closely related to the quality of the education institution and the programs they are offering. Finally, we are also interested how the employability varies over different higher education institutions.

We report probability of employment for our base group which are male university graduates that graduated at Public University 1 from Social Sciences, Business and Law, which represents group 3 according to ISCED 97 (UNESCO, 2006). Then we report marginal effects of different fields of study.

Successful labour market entry for first time job seekers also depends on factors influencing labour demand that might be proxied by general economic conditions (McGinnity et al., 2005). Therefore we are interested how the probability of employment differs through time, especially in the time of economic crisis. As unemployment critically depends also on relative abundance of labor supply over labor demand we control for month of graduation as it is evident that the highest supply of new graduates is usually in the third quarter of the year.

4. Data description

The number of students and graduates in Slovenia has been increasing significantly in the last two decades similarly as in other “post-transition” economies. From 68,126 students in 1997 and 8,920 graduates respectively to 114,872 students and 18,103 graduates in 2009 (by 170 and 200 percent increase respectively). Regarding the field of education the majority of students graduated from Social sciences, Business and Law (49.65 % in 2007, 49.88 % in 2008 and 48.08% in 2009) followed by graduates from Engineering, Manufacturing and Construction (12.61% in 2007, 13.57% in 2008 and 13.45% in 2009). Regarding the gender in the last three years female have prevailed as in 2007 61.76 % of all graduates were female, 62.76% in 2008 and 61.82% in 2009, respectively.

Higher education in Slovenia is regulated by the Higher Education Act (1993, amended 1999, 2001, 2003 and 2004). The Act creates a structure for higher education over three levels: the undergraduate level that lasts either 3 or 4 years, the master’s level; and the PhD cycle. Professionally-oriented or vocational undergraduate programs are usually shorter than the academic ones (usually 2 or 3 years). The majority of faculties harmonized their programs with the Bologna Declaration. In addition to old programs students could graduate from new vocational (3-year professional Bologna-harmonized program) and new academic (university Bologna-harmonized) program.

Higher education is provided by four state universities that offer both academic and professional/vocational degree programs, one private university and 29 private institutions that either offer vocational or academic programs. Several private schools offer only 2-year professional programs (in Table 1 are called 2-year professional schools). Predominately free tuition system allow students to study free of charge. Students apply to their preferred university and program and are accepted based on the number of applicants and their achievement in secondary school measured uniformly by matriculation exam. Part time students or those that were not accepted to their preferred school need to pay tuition.

This study uses micro data on the entire cohort of graduates in three sequential years from 2007 onwards gathered by the Statistical Office of the Republic of Slovenia. The data includes year and month of graduation, higher education institution, International Standard Classification of Education field of study, level of study completed, university and faculty of study, type of study (full-time or part-time), year of first enrolment and personal characteristics (gender, year of birth, nationality). Apart from data on graduates, the same data on students has been collected and in addition the survey on students also provides data on type of exam after completing secondary education and the score on the exam. A student can either take a matriculation exam, that usually follows after gymnasium or a vocational matriculation/matura exam that follows after four year vocational secondary schools. After completing a three year vocational school one can also take a so called final exam that enables the successful candidates to apply for university education. The type of exam and test scores allow us to observe heterogeneity of students' abilities. Based on an identical individual number assigned to each graduate we matched graduates with their scores on exams. The matched dataset is then again matched with data from the Statistical Register of the Labour-Active Population ("SRDAP") which includes the entire employment history. Based on this matched dataset we could correctly identify each individual's employment history (date of starting employment or unemployment, job classification, part-time or full-time work, number of shifts). The described dataset is truncated at the end of September 2010, which allows us to examine the employment of 2009 cohort and their employment status 9 months after graduation at the latest.

Part time and full-time students in Slovenia differ significantly and part-time have to pay tuition. Usually part time students resemble those individuals that have been employed for certain period of time and want to upgrade their educational attainment. As our paper focuses on school-to-work transition of young graduates we included only the full-time graduates that did not pay tuition which allows us to treat the collected data in a framework of a quazi experiment, where student choose their school based on their preferences and are selected based on their final exam score (either matura, professional matura or final exam) that signal innate ability and effort during secondary school. Our sample includes three cohorts of graduates from three consequent years namely 2007, 2008 and 2009 in different fields of education. We also included different type of programs and study their effect on the

probability of employment.² By calculating the above average time to graduate, we infer about the effort invested during study.

27,875 full-time graduates graduated in the years from 2007 to 2009, where due to missing data on their final exam after secondary school we had to drop 3,083 observations. Out of those 28.41 percent of graduates in 2007 were employed before graduation, 32.23 percent of the cohort 2008 and 27.48 of 2009, respectively. In order to investigate school-to-work transition of graduates that enter the labor market after graduation and not in the time of studying, we identified 17,529 observation of graduates for our further analysis. Number of observations by year and percentages of graduates in particular field of education, type of program, higher education institution and quarter of year of graduation are presented in Table 1.

Table 1: Sample characteristics: sample size, gender in percent, quarter of year of graduation, Field of Study, Type of Study Program, Higher Education Institution, Type of Final Exam in percent.

	2007	2008	2009
Observations	5730	5355	6444
Female	65.31	65.34	67.29
<i>Quarter of year of graduation</i>			
First quarter (January to March)	16.56	15.85	13.23
Second quarter (April to June)	29.56	28.09	24.19
Third quarter (July to September)	28.13	31.8	38.56
Fourth quarter (October to December)	25.39	24.25	24.00
<i>Fields of Education</i>			
Education	11.17	11.32	9.90
Humanities and Arts	8.45	7.02	7.69
Social Sciences. Business and Law	39.16	38.36	40.81
Science	6.11	6.21	5.79
Engineering. Manufacturing and Construction	15.22	16.25	14.29
Agriculture	3.94	4.28	3.91
Health and Welfare	10.66	11.07	10.44
Services	5.29	5.49	7.15
<i>Type of Program</i>			
2-year professional degree	6.11	6.87	7.09
3-year professional degree	28.85	27.32	22.55
3-year professional degree, Bologna-harmonized	0.28	0.88	3.81
University	64.45	61.96	53.1
University, Bologna-harmonized	0.26	2.76	13.35

² The fact that study program is also important was shown by Tuor and Backes-Gellner (2010), for example, that investigate rates of returns by distinguishing a purely academic educational path from a purely vocational path and a mixed path with loops through both systems.

<i>Higher Education Institution</i>			
Public University 1	68.06	66.87	63.71
Public University 2	21.73	22.45	23.94
Public University 3	2.69	2.48	3.30
Private University	0.19	0.07	0.20
2-year Private schools	6.11	6.87	7.09
3-year Private schools	1.22	1.25	1.74
<i>Final Examination</i>			
Matura	24.50	40.24	55.8
Mean Matura Score	19.98	20.31	20.23
	(5.24)	(5.09)	(5.11)
Professional Matura	15.85	23.28	27.81
Mean Professional Matura score	15.67	15.92	16.27
	(2.69)	(2.85)	(3.02)
Final exam	59.65	36.47	16.39
Mean Final Exam Score	3.82	3.75	3.70
	(0.89)	(0.89)	(0.88)

Source: Statistical Office of the Republic of Slovenia (2009), own calculations

Note: Standard errors are reported in parenthesis for mean values

From the Table 1 we can observe how the percentage of graduates in Bologna-harmonized programs increased over the years and consequently the percentage of graduates in pre-Bologna study programs (3-year professional degree and university degree) decreased. Due to very low number of observation that graduated from Bologna-harmonized study programs, we excluded them from the analysis in 2007 and 2008. The same argument applies for the graduates of Private University.

5. Results and discussion

Results show that probability of employment differs according to different field of study in all the observed years. When entering the labour market for the first time after graduation male university graduates of Social Sciences, Business and Law field of study that completed secondary school with Matura in 2007 faced 0.44 probability of employment in the first three months after graduation. Lower probability had graduates in the fields of Humanities and Arts, and not significantly lower in the field of Services. The highest probability of employment in the first three months after graduation in 2007 had graduates in the field of Health and Welfare followed by graduates of Engineering, Manufacturing and Construction and graduates of Science. Comparing to 2008, the probability of employment in the first three months after graduation for graduates of base group slightly fell to 0.408, whereas the highest probability again had graduates in the field of Health and Welfare followed by Engineering, Manufacturing and Construction graduates, but was also lower comparing to 2007. Apart from graduates of Humanities and Arts and Services also graduates of Agriculture faced

insignificantly lower probability of employment comparing to base group. In 2009 probability of employment in the first three months after graduation for graduates of Social Sciences, Business and Law fell to 0.255 where again positive changes of probability comparing to the base group were the highest for graduates of Health and Welfare. Interestingly graduates from Education have higher probability of employment than Social Sciences, Business and Law.³ Over the period under study we can observe narrowing the gap in employability between graduates from Social Science and Humanities on one side and widening the gap if compared to graduates of Science and Education. This effect signal the lower employability of graduates from reformed Bologna-type of program that was first introduced in the field of Social Science. As other fields are lagging behind with implementing new programs increasing employability of graduates from other fields is an expected result.

Looking at the effect of different field of education on probability of employment for the graduates that took professional matura or final exam, we can again observe similar differences in the probability regarding the field of education.⁴ Again graduates of the field Health and Welfare have the highest probability of employment followed by graduates of Engineering, Manufacturing and Construction. Comparing the probability of employment for the base group, the graduates that finished secondary school with matura were better off in the first three months after graduation in year 2008 and in all years when focusing on probability of employment six months after graduation.

Table 2: Probit estimates of the probability of employment in the first three months after graduation (marginal effects)

	Matura	P. Matura, FE	Matura	P. Matura, FE	Matura	P. Matura, FE
Number of observations	1403	4300	2153	3186	3591	2843
Average probability for male, Public University 1, university program	0.446	0.406	0.408	0.374	0.255	0.258
Personal Characteristics						
Female	-0.02 (0.032)	-0.080 *** (0.017)	-0.082 *** (0.025)	-0.053 ** (0.020)	-0.068 *** (0.018)	-0.056 *** (0.020)
Final Exam Score	-0.003 (0.003)	-0.001 (0.002)	-0.002 (0.002)	-0.000 (0.002)	0.002 (0.001)	-0.000 (0.002)

³ Also Ireland Kelly, O'Connell and Smyth (2010) find higher returns to education for Education graduates comparing to Humanities and Art. They explain this finding by specific characteristics of the wage system that exists in public sector

⁴ Products of matura or final exam school and field of study were also included in one specification of the model. However the results were insignificant, there we do not report them here.

Taking Final Exam		0.035 (0.026)		-0.005 (0.027)		-0.042 (0.027)	
Graduation Characteristics							
Duration	-0.003 *** (0.001)	-0.002 *** (0.000)	-0.001 (0.000)	-0.001 ** (0.000)	-0.001 *** (0.000)	-0.001 *** (0.000)	-0.001 ** (0.000)
Second quarter (April to June)	-0.091 * (0.047)	-0.103 *** (0.022)	-0.128 *** (0.037)	-0.075 *** (0.024)	-0.076 *** (0.024)	-0.050 *** (0.024)	-0.050 ** (0.024)
Third quarter (July to September)	-0.045 (0.047)	-0.069 *** (0.022)	-0.037 (0.038)	-0.094 *** (0.025)	-0.027 (0.025)	-0.077 *** (0.024)	-0.077 *** (0.024)
Fourth quarter (October to December)	-0.007 (0.047)	0.005 (0.023)	-0.097 ** (0.038)	-0.086 *** (0.025)	-0.019 (0.026)	-0.018 (0.025)	-0.018 (0.025)
Field of Study							
Education	0.013 (0.039)	-0.058 ** (0.029)	0.099 *** (0.033)	0.011 (0.038)	0.110 *** (0.027)	0.152 *** (0.047)	0.152 *** (0.047)
Humanities and Arts	-0.215 *** (0.058)	-0.196 *** (0.024)	-0.169 *** (0.043)	-0.209 *** (0.029)	-0.070 *** (0.026)	-0.085 ** (0.035)	-0.085 ** (0.035)
Science	0.132 ** (0.058)	0.096 *** (0.035)	0.146 *** (0.043)	0.077 * (0.045)	0.234 *** (0.037)	0.158 *** (0.053)	0.158 *** (0.053)
Engineering, Manufacturing and Construction	0.241 *** (0.042)	0.183 *** (0.024)	0.217 *** (0.035)	0.166 *** (0.028)	0.203 *** (0.031)	0.204 *** (0.032)	0.204 *** (0.032)
Agriculture	0.138 (0.112)	-0.085 ** (0.035)	-0.056 (0.077)	-0.085 ** (0.037)	-0.064 (0.050)	-0.050 (0.036)	-0.050 (0.036)
Health and Welfare	0.381 *** (0.059)	0.263 *** (0.025)	0.387 *** (0.043)	0.265 *** (0.028)	0.324 *** (0.038)	0.325 *** (0.033)	0.325 *** (0.033)
Services	-0.059 (0.089)	-0.118 *** (0.034)	-0.060 (0.086)	-0.118 *** (0.035)	-0.071 * (0.041)	0.000 (0.035)	0.000 (0.035)
Type of Study Program							
2-year professional degree	-0.329 *** (0.067)	-0.155 *** (0.033)	-0.158 ** (0.076)	-0.195 *** (0.031)	-0.182 *** (0.036)	-0.188 *** (0.024)	-0.188 *** (0.024)
3-year professional degree	-0.131 ** (0.058)	-0.056 *** (0.020)	-0.146 *** (0.043)	-0.090 *** (0.024)	-0.062 * (0.033)	-0.099 *** (0.026)	-0.099 *** (0.026)
3-year professional degree, Bologna-harmonized	-0.142 (0.170)	0.011 (0.141)	-0.362 *** (0.027)	-0.166 ** (0.070)	-0.170 *** (0.050)	-0.169 *** (0.029)	-0.169 *** (0.029)
University, Bologna-harmonized					-0.270 *** (0.015)	-0.191 *** (0.033)	-0.191 *** (0.033)
Higher Education Institution							
Public University 2	-0.073 ** (0.032)	-0.037 * (0.021)	-0.043 (0.027)	-0.047 * (0.024)	-0.059 *** (0.018)	-0.070 *** (0.021)	-0.070 *** (0.021)
Public University 3	-0.105 (0.076)	0.082 (0.067)	0.081 (0.081)	0.158 ** (0.065)	0.095 * (0.052)	-0.007 (0.048)	-0.007 (0.048)
3-year Private schools	0.073 (0.154)	-0.006 (0.068)	0.203 * (0.118)	-0.009 (0.075)	-0.002 (0.099)	0.022 (0.058)	0.022 (0.058)

dy/dx is for a discrete change of the dummy variable from 0 to 1, standard errors are reported in parentheses.

P. Matura stands for Professional Matura, and FE for Final Exam.

Note: * significant at 10 %; ** significant at 5 %; *** significant at 1 %

Source: SORS (2010), own calculations

In the first six months probability of employment for the base group increased to 0.637 in 2007, 0.563 in 2008 and 0.398 in 2009, respectively (Table 3). The positive and negative effects on probability of employment regarding the field of study are similar that in the first three months, however in 2007 and 2009 Science graduates that took matura were better off than Engineering, Manufacturing and Construction graduates. In the first nine months the probability of employment for graduates of Health and Welfare that completed university was 0.985 in 2007, comparing to graduates 0.428 for graduates of Humanities and Arts.

Comparing different types of program we can see from the Tables 2, 3 and 4 that the university graduates exhibit the highest probability of employment. Graduates that completed either university or 3-year professional Bologna harmonized study program experienced significantly lower probability of employment and the differences increased over years if compared to graduates that completed pre-Bologna programs.⁵ Regarding the negative effect of 3-year professional Bologna-harmonized program we need to compare it with the effect of pre-Bologna 3-year professional degree. The effect of Bologna-harmonized 3-year professional degree in 2009, when the number of those program graduates increased, is significantly higher that from pre-Bologna 3-year professional degree. Same holds for Bologna-harmonized university degree that exerts significantly negative effect on the probability regardless of the type of final exam at the end of secondary school.

Table 3: Probit estimates of the probability of employment in the first six months after graduation (marginal effects)

		2007		2008		2009	
		Matura	P. Matura. FE	Matura	P. Matura. FE	Matura	P. Matura. FE
Number of observations		1403	4300	2153	3186	3591	2843
Average probability for male. Public University 1. university		0.637	0.593	0.563	0.546	0.405	0.398
Personal Characteristics							
Female	#	-0.042 (0.031)	-0.064 *** (0.017)	-0.057 ** (0.025)	-0.058 *** (0.021)	-0.078 *** (0.021)	-0.062 *** (0.022)
Final Exam Score		0.002 (0.002)	-0.003 * (0.002)	0.000 (0.002)	-0.002 (0.002)	0.003 (0.002)	0.001 (0.003)
Taking Final Exam	#		0.027 (0.026)		0.005 (0.029)		-0.033 (0.031)
Graduation Characteristics							
Duration		-0.003 *** (0.001)	-0.001 *** (0.000)	-0.001 * (0.000)	-0.001 ** (0.000)	-0.000 (0.000)	-0.001 (0.000)
Second quarter (April to June)	#	0.115 *** (0.044)	-0.014 (0.023)	0.052 (0.041)	-0.011 (0.027)	0.000 (0.031)	-0.004 (0.029)
Third quarter (July to September)	#	-0.028	-0.081 ***	-0.055	-0.134 ***	-0.051 *	-0.083

⁵ Insignificant result in 2007 is due to low number of graduates from Bologna program.

		(0.046)	(0.023)	(0.040)	(0.027)	(0.030)	(0.029)
Fourth quarter (October to December)	#	0.033	0.047 **	-0.087 **	-0.102 ***	-0.035	0.011
		(0.045)	(0.023)	(0.041)	(0.028)	(0.031)	(0.030)

Field of Study

Education	#	0.015	-0.022	0.142 ***	0.076 **	0.106 ***	0.173
		(0.037)	(0.029)	(0.031)	(0.038)	(0.029)	(0.046)
Humanities and Arts	#	-0.339 ***	-0.216 ***	-0.207 ***	-0.256 ***	-0.095 ***	-0.161
		(0.063)	(0.028)	(0.048)	(0.035)	(0.031)	(0.039)
Science	#	0.208 ***	0.116 ***	0.170 ***	0.119 ***	0.278 ***	0.196
		(0.042)	(0.031)	(0.038)	(0.043)	(0.036)	(0.051)
Engineering, Manufacturing and Construction	#	0.192 ***	0.153 ***	0.209 ***	0.197 ***	0.217 ***	0.230
		(0.035)	(0.022)	(0.031)	(0.026)	(0.031)	(0.031)
Agriculture	#	0.098	-0.039	0.035	-0.025	0.014	0.053
		(0.095)	(0.037)	(0.077)	(0.041)	(0.065)	(0.043)
Health and Welfare	#	0.338 ***	0.289 ***	0.400 ***	0.344 ***	0.477 ***	0.384
		(0.029)	(0.019)	(0.025)	(0.022)	(0.028)	(0.029)
Services	#	-0.209 **	-0.076 **	-0.210 ***	-0.095 **	-0.093 *	0.006
		(0.086)	(0.037)	(0.087)	0.039	(0.049)	(0.038)

Type of Study Program

2-year professional degree	#	-0.192 *	-0.204 ***	-0.184 ***	-0.265 ***	-0.274 ***	-0.251
		(0.108)	(0.038)	(0.090)	(0.037)	(0.050)	(0.032)
3-year professional degree	#	-0.136 **	-0.105 ***	-0.148 ***	-0.156 ***	-0.156 ***	-0.142
		(0.063)	(0.021)	(0.052)	(0.025)	(0.039)	(0.030)
3-year professional degree. Bologna-harmonized	#	-0.083	-0.132	-0.461 ***	-0.198 **	-0.297 ***	-0.226
		(0.169)	(0.143)	(0.037)	(0.087)	(0.052)	(0.038)
University. Bologna-harmonized	#					-0.414 ***	-0.295
						(0.018)	(0.040)

Higher Education Institution

Public University 2	#	0.057 *	-0.023	0.034	-0.054 **	-0.031	-0.070
		(0.031)	(0.022)	(0.027)	(0.025)	(0.022)	(0.025)
Public University 3	#	0.105	0.105 *	0.173 **	0.162 ***	0.099 *	0.029
		(0.066)	(0.059)	(0.067)	(0.058)	(0.055)	(0.056)
3-year Private schools	#	0.150	-0.079	0.269 ***	0.004	0.148	0.058
		(0.114)	(0.069)	(0.078)	(0.077)	(0.102)	(0.063)

dy/dx is for a discrete change of the dummy variable from 0 to 1, standard errors are reported in parentheses.

P. Matura stands for Professional Matura, and FE for Final Exam.

Note: * significant at 10 %; ** significant at 5 %; *** significant at 1 %

Source: SORS (2010), own calculations

Comparing the variation in probabilities to get employment in first nine months after graduation over the three observed years we find a trend of decreasing probabilities for the graduates of most fields of education. For example probability of employment in first nine months after graduation for graduates of Education that took matura fell from 0.725 in 2007 to 0.587 in 2009 and for graduates of Health and Welfare from mentioned 0.985 in 2007 to 0.860 in 2009. However the same probability for Education graduates that took final exam or professional matura slightly increased in 2009, comparing to 2007 and decreased for example for Science graduates. Beside the year of graduation also seasonal factors significantly affect

the employment success. In the first three and six months after graduation graduates that graduated in the first quarter of the year were better off than those that graduated from April to September and in 2008 also than the ones that graduated in the last quarter of the year. The probability of securing an employment in the first nine months was also significantly lower for graduates that receive diploma in the second half of the year.

Table 4: Probit estimates of the probability of employment in the first nine months after graduation (marginal effects)

		2007		2008		2009	
		Matura	P. Matura, FE	Matura	P. Matura, FE	Matura	P. Matura, FE
Number of observations		1403	4300	2153	3186	3591	2843
Average probability for male, Public University 1, university		0.709	0.686	0.635	0.642	0.480	0.495
Personal Characteristics							
Female	#	-0.030 (0.028)	-0.045 (0.016) ***	-0.056 (0.024) **	-0.045 (0.020) **	-0.044 (0.021) **	-0.042 (0.023) *
Final Exam Score		0.001 (0.002)	-0.007 (0.002) ***	-0.002 (0.002)	-0.005 (0.002) **	0.001 (0.002)	0.000 (0.003)
Taking Final Exam	#		0.054 (0.025) **		0.019 (0.027)		-0.034 (0.032)
Graduation Characteristics							
Duration		-0.001 * (0.000)	-0.001 *** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 * (0.000)
Second quarter (April to June)	#	0.059 (0.043)	-0.029 (0.022)	-0.036 (0.042)	-0.086 (0.027) ***	-0.006 (0.033)	-0.011 (0.031)
Third quarter (July to September)	#	-0.090 ** (0.045)	-0.116 *** (0.023)	-0.147 *** (0.040)	-0.221 *** (0.028)	-0.113 *** (0.031)	-0.139 *** (0.030)
Fourth quarter (October to December)	#	-0.012 (0.044)	0.000 (0.023) ***	-0.156 (0.043) ***	-0.159 (0.029) ***	-0.119 (0.032) ***	-0.053 (0.031) *
Field of Study							
Education	#	0.016 (0.035)	-0.020 (0.028)	0.119 (0.029) ***	0.077 (0.035) **	0.107 (0.029) ***	0.200 (0.043) ***
Humanities and Arts	#	-0.281 *** (0.067)	-0.197 *** (0.028)	-0.196 *** (0.049)	-0.254 *** (0.037)	-0.107 *** (0.033)	-0.161 *** (0.042)
Science	#	0.159 *** (0.038)	0.127 *** (0.027)	0.157 *** (0.035)	0.073 * (0.041)	0.247 *** (0.035)	0.186 *** (0.048)
Engineering, Manufacturing and Construction	#	0.171 *** (0.031)	0.129 *** (0.020)	0.150 *** (0.031)	0.171 *** (0.023)	0.210 *** (0.030)	0.219 *** (0.030)
Agriculture	#	0.200 *** (0.059)	-0.000 (0.034)	0.031 (0.074)	-0.004 (0.038)	-0.035 (0.065)	0.078 * (0.042)
Health and Welfare	#	0.276 *** (0.026)	0.262 *** (0.015)	0.349 *** (0.021)	0.313 *** (0.018)	0.435 *** (0.026)	0.365 *** (0.026)
Services	#	-0.197 ** (0.087)	-0.034 (0.034)	-0.111 (0.089)	-0.055 (0.037)	-0.087 * (0.051)	-0.032 (0.038)
Type of Study Program							
2-year professional degree	#	-0.227 ** (0.109)	-0.185 *** (0.039)	-0.227 ** (0.091)	-0.279 *** (0.040)	-0.308 *** (0.056)	-0.273 *** (0.037)
3-year professional degree	#	-0.098 (0.061)	-0.090 *** (0.020)	-0.205 (0.503)	-0.174 *** (0.025)	-0.201 *** (0.042)	-0.135 *** (0.031)
3-year professional degree, Bologna-harmonized	#	-0.092 (0.163)	-0.102 (0.142)	-0.542 (0.036) ***	-0.225 ** (0.091)	-0.360 *** (0.053)	-0.280 *** (0.043)
University, Bologna-harmonized	#					-0.469 (0.019) ***	-0.284 *** (0.054)
Higher Education Institution							
Public University 2		0.075 *** (0.028)	-0.025 (0.021)	0.037 (0.026)	-0.048 * (0.025)	0.004 (0.023)	-0.069 *** (0.026)
Public University 3		0.040 (0.064)	0.074 (0.054)	0.177 *** (0.057)	0.096 * (0.055)	0.100 * (0.053)	0.058 (0.056)

3-year Private schools	0.059 (0.120)	-0.082 (0.067)	0.243 (0.065)	***	-0.013 (0.073)	0.087 (0.101)	-0.000 (0.063)
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dy/dx is for a discrete change of the dummy variable from 0 to 1, standard errors are reported in parentheses.

P. Matura stands for Professional Matura, and FE for Final Exam.

Note: * significant at 10 %; ** significant at 5 %; *** significant at 1 %

Source: SORS (2010), own calculations

From tables 2, 3 and 4 we can observe that changes in the probability of employment due to graduating from a different higher education institution are rarely significant. Negative effect on the probability of employment in the first three, six and nine months after graduation, comparing to graduates of Public University 1 is for graduates of Public University 2. On the other hand graduates with a diploma from Public university 3 faced higher probability of employment. As 2-year private schools were the only ones offering 2-years professional degrees, for investigating their effect on the probability we need to take into account the effect of having a 2-year professional degree, comparing to university degree. As mentioned the effect is negative and persistent over all observed periods in time.

Similar to the developed countries researched by Salas-Valesco (2007) and Lessibille et. al. (2001) and negative gender difference in securing first job in favor of males, we find that female graduates on average exhibit lower probability of employment than their male counterparts, regardless of the year we observe. When controlling for ability we find that the score of any type of final exam rarely has a significant effect on the probability of employment. On the other hand we find that increased duration has on general a negative effect on the probability of employment.

6. Conclusion

There is growing concern regarding the situation of youth in the labor market. In last few years we are witnessing new phenomena in the form of increasing unemployment of highly educated young people in OECD countries. Although Bologna declaration, signed by 29 nations in 1999, clearly state common goal to be increased employability of young graduates our paper reports exactly the opposite: students that finished programs reformed according to Bologna declaration, exhibit lower employability then their colleagues that finished pre-Bologna programs. Moreover, in tuition free system there is a danger that government is supporting less efficient use of public money with financing students on programs with lower probability to get employment after graduation.

Our study complements existing empirical surveys on school-to-work transition by analyzing labor market outcome of young graduates with special attention to the causal effect of different fields of study as well as type of study program on the probability of employment. We find that graduates from Health and Welfare exhibit the highest probability of employment followed by graduates in Engineering, Manufacturing and Construction and Science graduates. The lowest probability of employment in the observed first nine months

after graduation have graduates of Humanities and Arts, graduates in the field of Service and graduates of Social Sciences, Business and Law. When comparing the results to findings of investigating the returns to education we find that our results are similar to results from some studies such as for example Kelly, O'Connell and Smyth (2010) reporting that relative to Humanities and Arts graduates, higher returns are evidenced in the fields of Medicine and Veterinary, Engineering and Architecture, Education, Science and Computers and IT. Our findings are supported also by results of Canals and Diebolt (2002) reporting that Law, Economics, Social Sciences and Humanities graduates in France have the greatest problems in finding work after graduation. If comparing to most developed countries in Europe included in a research of Salas-Valesco (2007) Slovenia as a post transition country shares similar trends.

Regarding the type of study program, we find that enrolling in a different program than university program statistically significantly affects the employability. Graduates from vocational programs are worse off than graduates from academic programs and graduates from new Bologna-harmonized programs are worse off than graduates who finished a pre-Bologna counterpart program.

By observing three consequent cohorts of full-time graduates that enter labor market for the first time, we find that the probability of getting employment in first three, six or nine months has decreased over three years. The probability of employment in the first three (nine) months after graduation for the largest group of graduates namely graduates from Social Sciences, Business and Law decreased by 42.82% (32.30%) for graduates that took matriculation exam and 36.45% (27.84%) for graduates that took either professional matriculation or final exam, respectively. Probability for the most employable graduates in the field of Health and Welfare decreased by 29.99% in first three months and 7.10% in first nine months respectively. Obviously the crisis had the highest impact on employment of most educated individuals that are usually employed in the business sector. Employability was lower also in public sector but the magnitude was lower if compared to business sector.

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