

Since 1994

Inter-University Consortium



ALMALAUREA

Connecting Universities, the Labour Market and Professionals

AlmaLaurea Working Papers - ISSN 2239-9453

ALMALAUREA WORKING PAPERS no. 38

September 2011

Does time-to-degree matter? The effect of delayed graduation on employment and wages

by

Carmen Aina, Giorgia Casalone

Università del Piemonte Orientale

This paper can be downloaded at:

AlmaLaurea Working Papers series

<http://www.almalaurea.it/universita/pubblicazioni/wp>

Also available at:

REsearch Papers in Economics (RePEC)

The **AlmaLaurea working paper series** is designed to make available to a wide readership selected works by AlmaLaurea staff or by outside, generally available in English or Italian. The series focuses on the study of the relationship between educational systems, society and economy, the quality of educational process, the demand and supply of education, the human capital accumulation, the structure and working of the labour markets, the assessment of educational policies.

Comments on this series are welcome and should be sent to pubblicazioni@almalaurea.it.

AlmaLaurea is a public consortium of Italian universities which, with the support of the Ministry of Education, meets the information needs of graduates, universities and the business community. AlmaLaurea has been set up in 1994 following an initiative of the Statistical Observatory of the University of Bologna. It supplies reliable and timely data on the effectiveness and efficiency of the higher education system to member universities' governing bodies, assessment units and committees responsible for teaching activities and career guidance.

AlmaLaurea:

- facilitates and improves the hiring of young graduates in the labour markets both at the national and international level;
- simplifies companies' search for personnel, reducing the gap between the demand for and supply of qualified labour (www.almalaurea.it/en/aziende/);
- makes available online more than 1.5 million curricula (in Italian and English) of graduates, including those with a pluriannual work experience (www.almalaurea.it/en/);
- ensures the optimization of human resources utilization through a steady updating of data on the careers of students holding a degree (www.almalaurea.it/en/lau/).

Each year AlmaLaurea plans two main conferences (www.almalaurea.it/en/informa/news) in which the results of the annual surveys on Graduates' Employment Conditions and Graduates' Profile are presented.

AlmaLaurea Inter-University Consortium | viale Masini 36 | 40126 Bologna (Italy)
Website: www.almalaurea.it | E-mail: pubblicazioni@almalaurea.it

The opinions expressed in the papers issued in this series do not necessarily reflect the position of AlmaLaurea

© AlmaLaurea 2011

Applications for permission to reproduce or translate all or part of this material should be made to:

AlmaLaurea Inter-University Consortium

email: pubblicazioni@almalaurea.it | fax +39 051 6088988 | phone +39 051 6088919

International Conference on
“Human Capital and Employment in the European and Mediterranean Area”
Bologna, 10-11 March 201

Does time-to-degree matter? The effect of delayed graduation on employment and wages.

by

Carmen Aina*, Giorgia Casalone**

[PRELIMINARY VERSION]

Abstract.

We use a sample of Italian graduates drawn from the Consorzio AlmaLaurea to study whether the time taken to attain a degree matters for employment and earnings after one, three and five years from graduation. The relevance of this topic arises from the observation that Italian tertiary education system is characterized by an average time to undergraduate degree that is longer than the prescribed period. In addition, this issue is important also because delay in college completion entails a waste of resources both at individual and at collective level, and deprives the economics system of new and up-to-date competencies, as graduates enter the labour market with partially obsolete skills. Our estimates highlight that the probability of finding a job is negatively related to the time taken to graduate only if such delay is greater than three years. Graduates with previous work experiences, then, take on average two months less to be employed and receive higher wages. We also find evidence that students who obtain a degree beyond the minimum period suffer a wage penalty not while entering the labour market, but in the subsequent years (especially 5 years after graduation). This finding suggests that time-to-degree along with work experiences are good proxies for employers to discriminate between the ability of graduates.

Keywords: time-to-degree, tertiary education, wage differentials

JEL classification: I20; J24; J31

* Università del Piemonte Orientale “A. Avogadro”, Italy

** Università del Piemonte Orientale “A. Avogadro”, Italy

Corresponding author: Via Perrone 18, 28100 Novara (Italy); email: giorgia.casalone@eco.unipmn.it

1. Introduction

This paper analyses early labour market returns of Italian graduates, focusing on a specific trait of their academic experience, namely time-to-degree. The investigation of graduates' labour market outcomes is a chief issue in modern economies, due to the large public resources devoted to higher education sector and to the necessity to rely upon a skilled and productive labour force. The relevance of the time-to-degree issue arises because of the tendency of students to graduate well beyond the prescribed duration of their studies in Italy. Prior to the introduction of the 3+2 system in 2001, the share of students who graduated within the minimum period was less than 10% (AlmaLaurea, *Profilo dei laureati*, several years), thus suggesting that it was common for Italian students to take longer than required to complete college. Although the introduction of the 3+2 system improved to a great extent students' performance with regard to this topic, around 60% of students does not still complete university within the prescribed time (AlmaLaurea, *Profilo dei laureati*, several years). The increase in time spent at university is not however a specific trait of the Italian university system, as in general it characterizes systems where students have the possibility of freely determining the length of their studies. According to Brunello and Winter-Ebmer (2003) in many European countries such as Sweden, Denmark, France and Germany the average time taken to earn the bachelor degree exceeds the legal duration. Bound et al. (2010) and Garibaldi et al. (2008) collect a wide evidence showing that even in the US, notwithstanding the unlike higher education system model, time-to-degree has been rising in the last decades turning out to be a noteworthy concern for the policy makers.

The delay in college completion represents a waste of resources both at individual and at collective level, thus affecting the returns to investment in higher education. From an individual viewpoint later completion decreases the rate of returns to college, because of the increase of the opportunity costs of graduation, and the potential penalties in terms of expected wages. Furthermore, from a collective point of view, in countries where tertiary education is highly publicly subsidized, students who postpone graduation contribute to the misallocation of such resources. In particular, what emerges is that university assets (classrooms, libraries, faculty time, discounted food and books, etc.) have to be shared by a higher number of students, thus contributing to congest university sites. Moreover, longer time-to-degree deprives the economics system of new and up-to-date competencies as graduates enter the labour market with partially obsolete skills.

Assuming that it is possible to compare individuals with similar abilities, heterogeneous times to degree can have several explanations apart from lack of motivations or the non ability to undertake university commitments. First, students who decide to have a part-time job in order to pay the costs of university necessarily devote less time to study, thus lengthening their studies' duration. Second, those who aim at obtaining a high leaving grade are more likely to schedule their exams less frequently. The previous behaviour is allowed by the Italian university system since students can decide rather autonomously when to sit an exam and they can even re-sit it if the achieved mark is unsatisfactory.

The main question of the following study is to detect whether the gains arose from work experiences while still enrolled at university or from getting higher final grades are larger than the loss due to delayed graduation. If this is true, then the choice of postponing graduation would not affect students' performance in the labour market. As a consequence, we analyse if delayed graduation has any influence on the probability of finding a job and, once in the labour market, if it entails some wage penalty. Clearly, if getting a degree beyond the minimum period is only the result of poor motivations or of bad time allocation without providing any substantial benefits to students, the trade-off does not emerge.

The rest of the paper proceeds as follows. Section 2 reports the main results of the empirical literature on higher education returns. Section 3 describes the data and presents the empirical

strategy. Section 4 illustrates the empirical results and finally section 5 discusses the main results and concludes.

2. Literature review

A large number of studies have examined the economic returns to education in order to provide evidence on the motivations that drive the individual's choice of continuing to study, especially after compulsory schooling. According to the rational-behavioural model, people acquire more education only if their lifetime earnings expectations increase (Becker, 1964; Card 1995, 2001; Heckman and Honoré, 1990; Manski, 1990). In fact, it has been proved that people who invest in education, especially in tertiary education, have more job opportunities, and thereby a reduced probability of being unemployed, and they earn more during their entire working life than those who have spent less time in education. About the latter aspect, researchers agreed that human capital influences directly both the profile and the dynamics of the total work career of each individual as well as his/her income profile. At large, more educated people face low probability of being unemployed and at the same time have more chances of facing better labour market conditions from the start. Thus, a person decides to invest in education because of the greater expected monetary and non-monetary returns. Higher earnings prospects are the most obvious benefit and the consensus estimate is that the return to education is quite substantial. Recent researches, mainly using US data, indicate that an additional year of schooling typically raises an individual's earnings power (Trostel et al., 2002). In general it has been estimate that four years of college education in US raise earnings by about 65% (a return of about 13% compounded) (Card and Krueger, 1992). In order to explain the variation in the earnings across people, several aspects have been exploited. For instance, a large body of studies have analysed the link between the labour market outcomes and family background, as it has been proved that children's outcomes are highly correlated with parents' characteristics, especially with their level of education (Card, 1999). Then, since Tinto (1973), it has been shown a positive association between college proximity and college-going, especially individuals with financial constraints and/or with lower returns' expectations in the labour market benefit from universities availability in the area of residence (Lauer, 2002). Some others researchers have focused on the role of community colleges, especially in the US, finding that especially students who are from lower-income families feature more difficulties of arranging funding for universities and they are the group who benefit more from this type of institutions. Furthermore, community college have had the merit of increasing the aggregate educational attainment and of improving the labour market conditions - especially in terms of higher wages - of those individuals who would otherwise not attended tertiary education (Kane and Rouse, 1999; Mykerezzi et al., 2009). Additional sources of heterogeneity in terms of returns to education that have been studied are school quality and ability, the latter measured by IQ or aptitude test and final grade (Welch, 1973; Checchi, 1999). Also the earnings differentials between more and less educated workers (Buchinsky, 2001), females and males (Blau and Kahn, 2000; 2005; Dolton and Makepeace, 1986) and ethnicity (Blau, 1992; Altonji and Blank, 1999) have been investigated. Other research instead look at the differences in earnings across fields of study (Berger, 1988; Daymon and Andrisani, 1984; Paglin and Ruffolo, 1990; Blundell et al., 2000; Loury, 1997; Bonanno and Pozzoli, 2009). A convincing body of evidence examines the differences in earnings due to over-education, as it appears that individuals who are over-educated for their job are paid more than those who are correctly qualified, but less than individuals who have found the perfect match in the labour market (Lindley and McIntosh, 2010; Hartog, 2000; Duncan and Hoffmann, 1981; Dolton and Vignoles, 2000). Finally, there are several contributions on the "sheepskin effect", i.e. the existence of wage premiums related to credentials rather than the years of schooling achieved. In such papers the diverse income performance obtained in the labour market by individuals is explained looking the type of diploma/degree achieved instead of focusing on the

years spent in formal education (Brunello, Comi and Lucifora, 2000; Belman and Heywood, 1991). While the issue of returns to education largely explored all the links mentioned above, much less is known about whether and how individuals' earnings are related to study completion after the minimum period. For instance, Monks (1997) finds a negative correlation between age at graduation and entry-level wage, and Brodaty et al. (2008) show that, during the early work career, each additional academic year spent obtaining a degree entails a reduction in earnings of about 9%. Considering the poor number of studies on this topic, in this paper we aim at providing evidence for Italy on the impact of getting a degree not within the prescribed period on the labour market returns. Thanks to the data, we can examine several aspects, in particular we can look at the early graduates' performance in the labour market according to whether they graduated on time or not, but also to their career development, as we may highlight if the university completion beyond the legal period might affect also the entity of wages achieved three and five years later.

3. Data and empirical strategy

We use two waves (2002 and 2003) of the survey on Italian university graduates' collected by Consorzio AlmaLaurea. Graduates are interviewed three times: the first survey takes place one year after graduation, then three and five years later. According to the survey structure, 2002 graduates were interviewed for the first time in 2003, then 2005 and 2007; instead 2003 graduates were interviewed the first time in 2004, 2006 and 2008. Universities that join the Consorzio AlmaLaurea are 25 in the 2002 survey and 27 in 2003. Although the sample does not cover all the Italian universities, the advantage of using this dataset is that it tracks Italian graduates' outcomes for several years after graduation¹. The survey collects individual student data on variables such as pre-university enrolment characteristics (gender, age, type of high school, final grade, parents' background, late enrolment, region of residence), and information during enrolment at university (attended university and faculty, enrolment year, day of graduation, final grade, degree of class attendance, type of accommodation, and occasional jobs). Moreover it provides information on graduates' working condition (employment condition, wage, contract type, sector, etc.) as well as on other aspects of their life (marital status, family composition, etc.) after graduation.

The analysis in this paper is on a restricted sample. In order to make comparable the sample of graduates used in this analysis, graduates from private universities are excluded (IULM and LUMSA). Medical sciences graduates are also not considered as their transition to labour market follows different rules as compared with graduates from different fields of study. We then restrict the investigation to individuals who graduated up to 35 years old in order to eliminate outliers, namely people who were probably enrolled at university in their spare time. Finally, we dropped individuals who carry on the same job they had before graduation, as well. The reason of doing so is due to the fact that these graduates cannot be likened to either those who have never worked or to those who have worked, but in a different firm. The final sample is an unbalanced panel composed by 34,835 graduates; 87% of them (30,446) participated in all surveys, 10% (3,416) in two surveys and the remaining (973) only in one.

We take into consideration three outcomes which may help to figure out the picture of the transition from university to labour market. First (Table 2), we estimate the probability of being employed after one, three and five years from graduation. The estimate is run on a restricted sample of graduates that are either employed or unemployed, thus excluding those who do not work but do not search a job². Second (Table 3), we analyse the determinants of the time needed to find the first job,

¹ The National Statistical Office (ISTAT) carries out on a regular basis a survey - the "Indagine campionaria sull'inserimento dei laureati" - on the transition from college to work of a representative sample of Italian graduates only three years after completion.

² This sample is composed for the most part by graduates who are still involved in some training activity, in a master or a PhD programme.

which is another indicator of the efficacy of the transition from university to labour market. Third (Table 4), we estimate a modified mincerian wage equation for each survey wave. The dependent variable is represented by the net monthly wage. The survey does not report the exact individual wage but only the corresponding wage interval³. The estimation takes account of the interval structure of the dependent variable. For outcomes 2 and 3 estimates are run only on graduates who are employed at the moment of the survey⁴. Additionally, with regard to the outcomes 1 and 3 we pool the three surveys and run estimates on the resulted dataset, including dummies for each corresponding interview and allowing errors to be correlated for the same individual.

Estimated specifications include only covariates measured at the graduation date, so we do not take account of potentially endogenous events occurred from graduation to the moment of the interview. Accordingly, information on the type of job and of contract, sector and other employers' dimensions are not used in the analysis.

To control for unobserved heterogeneity across individuals, we use standard proxies for their ability. Although we do not have a direct measure of graduates' ability, we can rely on a wide range of information on graduates' educational achievements both before and after the university enrolment. We include a dummy for the high school type and for the corresponding leaving grade. An additional well known indirect measure of individuals' ability is parents' educational background which is included in the estimates.

All individuals in the sample completed tertiary education; therefore they are homogeneous in terms of the achieved educational level⁵. However, they differ in terms of the field of study in which they graduated and of the corresponding leaving grade. We control for both these aspects.

Other two relevant experiences during university can shape graduates' outcomes in the labour market. First, work experiences do not have straightforwardly predictable effects. On the one hand, working while studying reduces the time devoted to the main student's activity, thus hampering the learning process and lengthening the time to degree. On the other hand, especially if the working activities are somehow related with the field of study, it can provide students with some practical experience that can be positively evaluated by future employers (Light, 2001; Hakkinen, 2006). Second, spending some months abroad to study in a foreign university with international programs such as Erasmus certainly enriches students' curricula and improves their linguistic skills. On the other hand, however, it can slacken students' study path, especially if they have to earn their living abroad. Existing literature finds that spending time abroad during studies enlarges graduates' labour market as it increases their probability to work abroad (Jahr and Teichler, 2001; Oosterbeek and Webbink, 2006; Parey and Waldinger, 2007). However, to the best of our knowledge, the only study focused on Italian graduates on this issue (Cammelli, Ghiselli and Mignoli, 2006) underlines that the national labour market does not adequately rewards experiences made abroad during university studies. As mentioned above, both experiences potentially affect the duration of studies. One of the aims of our analysis is to evaluate whether the gains in terms of labour market outcomes related to these experiences are greater than the losses due to the delay in graduation that they potentially entail.

Geographical area dummies (for the north, centre and south of Italy) are finally included in order to take account of local labour market fixed effects and of potential heterogeneous quality of university institution over the country.

To assess the effect of time-to-degree on the above mentioned outcomes we use two different measures of the time needed to complete education. In a first specification (I) we simply estimate the impact of a dummy which is 0 if the student graduates within the prescribed period and 1 if

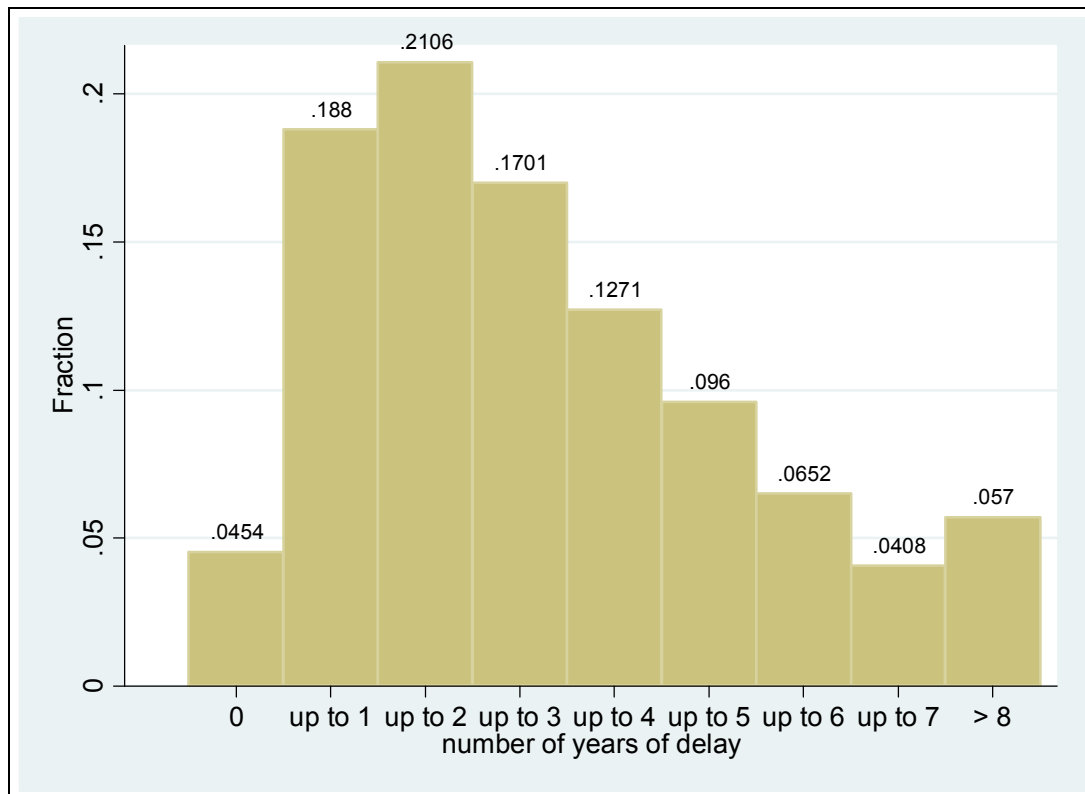
³ Intervals are of 250 euro each.

⁴ We are aware of the well-know problem arising from the non random selection of this sub-sample of graduates. Further investigations will be devoted to this issue.

⁵ They are not perfectly homogeneous in terms of years of schooling as there are some degrees (for instance Engineering) which have a duration of five years.

he/she graduate later. Since only about 5% of the selected sample graduate on time (Figure 1), the probability to capture through this variable the effect of later graduation is limited and the following specification takes account of the heterogeneity of times to degree.

Figure 1. Distribution of the number of years taken to earn the university degree beyond the prescribed duration (2002 and 2003 AlmaLaurea graduates)



The dummy of later graduation is then interacted with a dummy indicating whether students had a part-time job at university in order to assess whether labour market returns of “non regular” graduates are affected by their working experiences. For each outcome we then estimate a further specification (II), where the delay in graduation expressed in years is grouped in five classes (0, from 0 to 1 year, from 1 to 2 years, from 2 to 3 years and more than 3 years). This specification allows to establish whether labour market discriminates between the different graduates according to the number of years they spent to get a degree beyond the minimum period. In addition we may analyse if there might be a potential penalty that monotonically increase with the graduation delay. Furthermore, grouping delays in classes enables to understand whether exists a delay considered as “common” by employers, and that consequently does not entail penalties in the labour market. Again, these dummies are interacted with the one indicating work experiences during studies. Table 1 reports a statistical summary of the explanatory variables used in our estimates

Table 1. Descriptive statistics

Variables	Total	Years from graduation		
		1	3	5
Female	0.59	0.60	0.60	0.59
<i>Geographical area</i>				
North	0.62	0.62	0.62	0.62
Centre	0.12	0.12	0.12	0.12
South	0.26	0.26	0.26	0.26
<i>High School Track</i>				
<i>Licei</i>	0.62	0.61	0.62	0.62
Technical and Professionals	0.27	0.28	0.27	0.27
Teaching	0.05	0.05	0.05	0.05
Others	0.06	0.06	0.06	0.06
High school final grade	48.28	48.18	48.26	48.38
Having a job	0.63	0.52	0.67	0.68
<i>Fathers' Education</i>				
Compulsory Schooling	0.01	0.01	0.01	0.01
High school diploma	0.29	0.30	0.30	0.29
University degree	0.17	0.16	0.17	0.17
<i>Mothers' Education</i>				
Compulsory Schooling	0.01	0.01	0.01	0.01
High school diploma	0.30	0.29	0.30	0.29
University degree	0.13	0.13	0.13	0.14
<i>Field of Study</i>				
Agricultural and Pharmacy	0.08	0.08	0.08	0.08
Architecture	0.05	0.06	0.05	0.05
Economic and Statistics	0.17	0.17	0.17	0.17
Engineering	0.12	0.13	0.12	0.11
Political Science	0.09	0.09	0.09	0.08
Psychology	0.05	0.05	0.05	0.05
Mathematics and Physics	0.07	0.07	0.07	0.07
The Humanities	0.23	0.24	0.23	0.22
Law	0.15	0.12	0.15	0.16
University final grade	102.83	102.80	102.82	102.86
Previous work experiences	0.53	0.54	0.53	0.53
Foreign work experiences	0.16	0.16	0.16	0.16
Graduation beyond minimum period	0.95	0.96	0.95	0.95
Number observations	89,298 (repeated)	26,840	30,210	32,248

4. Results

Several estimates are not very informative and serve mainly to confirm the results well-established in the literature. As a consequence, we only show the results which deserve greater interpretation efforts. For covariates which do not represent the main focus of our analysis we provide a joint comment on the results of all the estimates.

According to the estimates reported in Table 2, female's employment probability is not statistically different from the one observed for males; however women suffer a remarkable wage penalty, as their average monthly net wage is, *ceteris paribus*, lower by more than 250 euro after five years (Table 4). This result obviously depends on the different characteristics of the jobs undertaken by males and by females. For instance, females are more likely to be employed part-time than males. However, since we assume that the type of job and the corresponding contract is not an exogenous variable but depend on labour market conditions which are poorer for Italian females, especially in southern Italy, we believe that it makes more sense to compare graduates' outcomes on the basis of their characteristics at the moment of graduation, namely when they make their transition to the labour market. As expected, all employment outcomes indicators are worse for graduates in universities located in the centre and south of Italy. Poorer labour market conditions in those areas, together with the low willingness to mobility of Italian graduates are probably among the determinants of such result.

Study achievements prior to university as well as parents' background are not greatly related to graduates' employment outcomes, as they affect the field chosen at university, and the corresponding leaving grade. Concerning the type of course of study, estimates show that only graduates in engineering have better performances in all indicators than the reference group, represented by graduates in business and economics. It has to be noted that engineering is the only degree in our sample organized over five years of study, as the others are all four-year degrees. It is not surprising that, as argued by the human capital theory according to which wages depend on the accumulation of human capital (Becker, 1964), graduates in engineering on average earn more. Quite interestingly, the university leaving grade is positively linked to the probability of being employed, but according to our estimates it does not affect both the time taken to find a job and the wages, especially after five years. According to the literature on employer learning (Farber and Gibbons, 1996; Altonji and Pierret, 2001) suggesting that employers initially take their hiring decisions on the basis of candidates' education and afterwards they reward employees on the basis of the ability showed at the workplace, higher leaving grades are not good indicators of workers' ability. On the contrary, according to estimates, those who have been spending a period abroad during university are more rewarded once employed, as on average their monthly wage premium is of more than 100 euro after five years. This finding suggests that studying experiences in a foreign country are a good indicator of graduates' ability.

Concerning the main focus of our analysis, namely the analysis of the influence of time to degree and of other university experiences potentially correlated with it, results are separated on the basis of the three outcomes analysed. With regards to the first outcome, in specifications (I) where time to graduation is measured by a dummy for students who graduated beyond the legal duration of their degree programme, we find that there is no penalty in terms of employment probability from delayed graduation. On the contrary, students graduated with some delay have a greater probability to be employed after three and five years from graduation. As previously noted, a dichotomous variable taking the value one for students who did not graduate within the prescribed duration cannot capture the effect of heterogeneous times to degree, as almost all Italian students in the old university system graduated beyond the legal duration of their courses. Results of specification (II) confirm that a single dummy is not a suitable indicator for the time to degree. As expected, we find that the probability of being employed is negatively related to the time taken to earn the degree, but only if the delay exceed two years. Quite interestingly then, those who graduated within two years from the end of their courses, namely that increased by 2/3 the legal duration of their studies, are

not penalized in terms of employment chances. This evidence can have two different interpretations. On the one hand, employers could consider delay in graduation as a “common” behaviour in Italy, and consequently they would not discriminate graduates on the basis of their times to degree. On the other hand, students who graduate later have less expectations and are more willing to accept any job. Concerning other relevant university experiences that can shape graduates’ outcomes, we find that those who took a part-time job during university are more likely employed, especially after one year, thus suggesting that the gap existing between individuals with different working experiences during studies narrow when the likelihood of being employed is higher. Looking at interactions between times to degree and working experiences, we observe that the penalty in terms of employment probability almost halve for graduates who were involved in a working activity during studies. After five years, for instance, the likelihood of being employed for slowest students is lower by 7% for non worker and by 4% for part-time workers as compared with fastest students.

Concerning the second analysed outcome (Table 3), we do not find evidence of statistically significant differences in terms of the time taken to find a job for students with different times to degree. According to estimates we find again that those who had a sideline job during university experience smoother transitions to the labour market, as they take around two months less to find a new job once graduated.

When we look at economic returns (Table 4), estimates evidence that students who graduated beyond the prescribed period (specification I) suffer a wage penalty, especially after three years from graduation. According to the empirical literature students’ employment outcomes are not reliable in the very first years after their transition to the labour market, as they often experience great job mobility in that phase of their career. Consequently, first-year estimates that evidence no wage penalty for late graduation are probably less reliable than the others. The finer specification (II) shows that the higher is the delay in graduation the higher is the wage penalty, especially after five years. According to estimates individuals who graduated with a delay of three years or more have a wage that is lower by about 85 euro per month than those who graduated within the prescribed period, corresponding to a yearly penalty of more than 1,000 euro. Concerning other relevant aspects, in this second specification we find that graduates who enter the labour market with some previous work experiences earn on average more. In particular, after five years from graduation they earn a monthly wage which is 43 euro higher than that gained by graduates who did not work while they were still enrolled at university. The corresponding coefficient suggests that labour market rewards human capital acquired through whatsoever work experience. Quite interestingly, estimates of previous work experiences are not statistically robust in the first specification where the effect of delayed graduation is only partially controlled. Once we take account of the heterogeneity across time-to-degree, also coefficients related to other university experiences - that potentially affect the time devoted to study - are more precisely estimated. When individual fixed effects are taken into account through the estimates run on the pooled sample, we indeed find that the wage penalty is statistically significant only if the delay exceeds three years, and is lower (26 euro per month) than in the previous cross section specifications. However, looking at interactions, the negative effect of delay seems to persist over year. Indeed, after five years the wage penalty reaches the value of 39 and 61 euro per month for a delay ranging from two and three years and above five years, respectively.

5. Concluding remarks

Staying at university longer than the prescribed duration of the courses can have several explanations ranging from the non ability to undertake university commitments within the legal time to the necessity of working part-time to finance studies. Postponing graduation can also be the result of a rational decision when labour market conditions are poor and employment prospects bad.

Although time-to-degree is well tracked and documented and represents one of the parameters of the university funding system in Italy, much less attention has been given to the factors affecting time-to-degree and to the influence of time-to-degree on graduates' employment outcomes. Nevertheless, the general raising of university fees and the increasing trend towards gaining job experience whilst still studying at college makes it necessary to assess whether gains from having a job during university are greater than potential loss related to entering the labour market later and older.

This study aims at fulfilling the gap existing in the literature on the analysis of the impact of time-to-degree on graduates' career outcomes. We find that postponing graduation have a small effect on the probability of getting a job, while having a job experience during university greatly increases graduates' chance to successfully entering the labour market. Quite interestingly, job experiences being equal longer times-to-degree does not penalize graduates either in terms of job opportunities either in terms of time taken to find the first job. One explanation of this result can be that students who graduate beyond (and even well beyond) the legal duration of their courses are more likely to accept job offers as they have less expectations. This interpretation seems to find confirmation in the other result of the analysis, namely that longer times-to-degree are associated with wage penalties, which tends to persist (and even to increase) over the graduates' career. Nevertheless, overall estimates show that only a long delay (over two years) seems to be perceived as a negative signal by the labour market, thus suggesting that graduating by two years from the prescribed courses' duration was considered as "normal". Previous working experiences have a positive impact on wages, but not in the very first years after graduation. According to the theory on employer learning arguing that employers reward employees on the basis of their actual ability only when it is revealed, namely after a period from hiring, our result suggest that both time to degree and job experiences are good proxies for graduates' ability.

References

- AlmaLaurea. Several years. *Profilo dei laureati*. AlmaLaurea: Bologna.
- Altonji, J.G. and C.R. Pierret. 2001. "Employer learning and statistical discrimination. *Quarterly Journal of Economics*. 116(1), 213-350.
- Becker, G.S. 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. New York: Columbia University Press
- Berger, M.C. 1988. "Predicted Future Earnings and Choice of College Major", *Industrial and Labor Relations Review*, 41, 418-429.
- Blau, F. and L.M. Kahn. 2000. "Gender Differences in Pay", *Journal of Economic Perspectives*, 14(4), 75-99.
- Blundell, R., L., Dearden, A., Goodman and H., Reed. 2000. "The Returns to Higher Education in Britain: Evidence from a British Cohort", *Economic Journal*, 110, 82-99.
- Bound, J., M.F. Lovenheim and S. Turner. 2010. Increasing time to baccalaureate degree in the United States. Working Paper 15892, National Bureau of Economic Research (NBER).
- Brodaty, T., R.J. Gary-Bobo and A. Prieto. 2008. *Does Speed Signal Ability? The Impact of Grade Repetitions on Employment and Wages*, Discussion Paper DP6832, Center for Economic Policy Research (CEPR).
- Brunello, G. and R. Winter-Ebmer. 2003. Why do students expect to stay longer in college? Evidence from Europe. *Economic Letters* 80: 247-253.
- Buchinsky, M. 2001. "Quantile regression with sample selection: Estimating women's return to education in the US", *Empirical Economics*, 26(1), 87-113.
- Buonanno, P. and D. Pozzoli. 2009. "Early Labour Market Returns to College Subject", *Labour*, 23(4), 559-588.
- Card, D. 1995. "Using Geographic Variation in College Proximity to Estimate the Return to Schooling" In *Aspects of Labour Market Behavior: Essays in Honour of John Vanderkamp*, ed. L. N. Christophides, E. K. Grant, and R. Swidinsky. Toronto: University of Toronto Press, 201-222.
- Card, D. 1999. "The causal effect of education on earnings", *Handbook of Labor Economics*, 3, chapter 30, 1801-1863.
- Card, D. 2001. "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems", *Econometrica*, 69, 1127-60.
- Card, D. and A.B. Krueger. 1992. "Does School Quality Matter? Returns to Education and the Characteristics of Public School in the United States", *Journal of Political Economy*, 100(February), 1-40.
- Daymont, T.N. and P. J., Andrisani. 1984. "Job Preferences, College Major and the Gender Gap in Earnings", *Journal of Human Resources*, 19, 408-428.
- Farber, H.S. and R. Gibbons. 1996. "Learning and wage dynamics", *Quarterly Journal of Economics*, 111(4), 1007-1047.
- Garibaldi, P., F. Giavazzi, A. Ichino, and E. Rettore. 2007. *College Cost and Time to Complete a Degree: Evidence from Tuition Discontinuities*. Working Paper 12863, National Bureau of Economic Research (NBER).
- Hakkinen, I. 2006. "Working while enrolled in a university: Does it pay?", *Labour Economics* 13(2), 167-189.
- Heckman, J.J. and B.E., Honoré. 1990. "The Empirical Content of the Roy Model" *Econometrica*, 58, 1121-49.
- Jahr, V. and U. Teichler. 2000. *Employment and Work of Former ERASMUS Students*, in Teichler U., J. Gordon and F. Maiworm (eds). *Socrates 2000 Evaluation Study*. Study for the European Commission, chapter 5, pp. 99.117.
- Light, A. 2001. "In-school work experience and the return to schooling", *Journal of Labor Economics*, 19(1): 65-93.
- Loury, L.D. 1997. "The Gender Gap among College-educated Workers", *Industrial and Labor Relations Review*, 50, 580-593.
- Manski, C.F., 1990. "Adolescent Econometricians: How Do Youth Infer the Returns to Schooling?" in *Studies of Supply and Demand in Higher Education*, edited by C.T. Clotfetter and M. Rothschild. Chicago, IL: University of Chicago Press, 43-60.
- Oosterbeek, H. and D. Webbink, D. 2006. *Does studying abroad induce a brain drain?* CPB Discussion Paper 64.
- Parey, M. and F. Waldinger. 2008. *Studying Abroad and the Effect on International Labor Market Mobility: Evidence from the Introduction of ERASMUS*. IZA DP. N°3430.
- Trostel, P., I. Walker and P., Wolley. 2002. "Estimates of the economic return to schooling for 28 countries", *Labour Economics*, 9(1), 1-16.

Appendix

Table 2. Estimates of the probability to be employed

VARIABLES	After 1 year		After 3 years		After 5 years		Pooled sample	
	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
Female	-0.019** (0.007)	-0.019*** (0.007)	-0.012* (0.006)	-0.011* (0.006)	0.012** (0.006)	0.013** (0.006)	-0.005 (0.005)	-0.005 (0.005)
Degree from a centre Italy univ.	-0.092*** (0.010)	-0.080*** (0.010)	-0.067*** (0.009)	-0.056*** (0.009)	-0.041*** (0.009)	-0.029*** (0.009)	-0.066*** (0.007)	-0.054*** (0.007)
Degree from a southern Italy univ.	-0.234*** (0.007)	-0.222*** (0.008)	-0.157*** (0.007)	-0.146*** (0.007)	-0.105*** (0.007)	-0.092*** (0.007)	-0.164*** (0.005)	-0.151*** (0.005)
Techn./Prof. high school	0.013* (0.008)	0.018** (0.008)	-0.002 (0.007)	0.002 (0.007)	0.009 (0.006)	0.013** (0.006)	0.006 (0.005)	0.010** (0.005)
Teaching high school	0.022 (0.015)	0.022 (0.015)	0.024* (0.012)	0.026** (0.012)	0.006 (0.012)	0.008 (0.012)	0.016* (0.009)	0.018* (0.009)
Other high schools	-0.021 (0.015)	-0.018 (0.015)	-0.034** (0.014)	-0.031** (0.014)	-0.029** (0.013)	-0.026** (0.013)	-0.028*** (0.010)	-0.025** (0.010)
Father upper sec. school	0.024*** (0.008)	0.022*** (0.008)	0.024*** (0.007)	0.022*** (0.007)	0.018*** (0.007)	0.016** (0.007)	0.022*** (0.005)	0.020*** (0.005)
Father univ. degree	-0.009 (0.012)	-0.011 (0.012)	-0.002 (0.010)	-0.004 (0.010)	-0.000 (0.010)	-0.003 (0.010)	-0.003 (0.007)	-0.005 (0.007)
Mother upper sec. school	0.007 (0.009)	0.004 (0.009)	0.030*** (0.007)	0.026*** (0.007)	0.034*** (0.007)	0.030*** (0.007)	0.025*** (0.005)	0.021*** (0.005)
Mother univ. degree	-0.034*** (0.012)	-0.039*** (0.012)	0.004 (0.011)	-0.000 (0.011)	0.025** (0.010)	0.019* (0.010)	0.002 (0.008)	-0.003 (0.008)
Degree group: Pharmac./agric.	0.078*** (0.013)	0.075*** (0.013)	0.006 (0.012)	0.001 (0.012)	-0.011 (0.012)	-0.015 (0.012)	0.022** (0.009)	0.018** (0.009)
Degree group: Architect.	0.070*** (0.016)	0.087*** (0.016)	0.032** (0.014)	0.047*** (0.014)	-0.053*** (0.014)	-0.034** (0.014)	0.014 (0.010)	0.031*** (0.010)
Degree group: Engineering	0.172*** (0.012)	0.179*** (0.011)	0.096*** (0.010)	0.101*** (0.010)	0.061*** (0.010)	0.067*** (0.010)	0.109*** (0.007)	0.115*** (0.007)
Degree group: Politic. studies	-0.085*** (0.013)	-0.084*** (0.013)	-0.053*** (0.012)	-0.051*** (0.012)	-0.076*** (0.012)	-0.074*** (0.012)	-0.072*** (0.009)	-0.070*** (0.009)
Degree group: Psychology	-0.181*** (0.016)	-0.192*** (0.016)	-0.036** (0.015)	-0.047*** (0.015)	-0.028* (0.015)	-0.039*** (0.015)	-0.078*** (0.011)	-0.090*** (0.011)
Degree group: Scientific	-0.023 (0.014)	-0.018 (0.014)	-0.035*** (0.013)	-0.032** (0.013)	-0.050*** (0.013)	-0.047*** (0.013)	-0.037*** (0.009)	-0.034*** (0.009)
Degree group: Literature	-0.050*** (0.011)	-0.043*** (0.011)	-0.071*** (0.010)	-0.064*** (0.010)	-0.107*** (0.010)	-0.100*** (0.010)	-0.079*** (0.007)	-0.071*** (0.007)
Degree group: Law	-0.258*** (0.011)	-0.249*** (0.011)	-0.164*** (0.011)	-0.156*** (0.011)	-0.077*** (0.010)	-0.068*** (0.010)	-0.152*** (0.007)	-0.143*** (0.007)
High sch. leaving grade	0.001* (0.001)	0.000 (0.001)	0.001*** (0.000)	0.001 (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)

University. leaving grade	0.002*** (0.001)	0.001 (0.001)	0.002*** (0.000)	0.001** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Working while studying	0.125*** (0.030)	0.103*** (0.013)	0.071*** (0.026)	0.060*** (0.012)	0.082*** (0.025)	0.052*** (0.011)	0.093*** (0.019)	0.071*** (0.008)
Study abroad	-0.014 (0.009)	-0.018** (0.009)	-0.006 (0.008)	-0.007 (0.008)	-0.025*** (0.008)	-0.028*** (0.008)	-0.016*** (0.006)	-0.018*** (0.006)
Delayed graduation	0.005 (0.022)		0.032* (0.019)		0.039** (0.018)		0.010 (0.017)	
Delay: from 1 to 2 years		-0.013 (0.014)		0.002 (0.012)		0.006 (0.011)		-0.018* (0.011)
Delay: from 2 to 3 years		-0.039*** (0.015)		-0.025* (0.013)		-0.016 (0.012)		-0.036*** (0.012)
Delay: more than 3 years		-0.090*** (0.013)		-0.078*** (0.011)		-0.080*** (0.011)		-0.092*** (0.010)
3 years from graduation							0.124*** (0.017)	0.140*** (0.007)
5 years from graduation							0.141*** (0.017)	0.148*** (0.007)
<i>Interactions</i>								
Working while studying * delayed graduation	-0.028 (0.031)		0.005 (0.027)		-0.024 (0.025)		-0.017 (0.020)	
3 years from graduation * delayed graduation							0.031* (0.018)	
5 years from graduation * delayed graduation							0.021 (0.018)	
Working while studying * 1-2 years of delay		-0.034* (0.019)		-0.003 (0.017)		-0.008 (0.016)		-0.014 (0.012)
Working while studying * 2-3 years of delay		-0.010 (0.020)		0.006 (0.017)		-0.011 (0.017)		-0.005 (0.013)
Working while studying * > 3 years of delay		0.023 (0.017)		0.047*** (0.014)		0.037*** (0.013)		0.037*** (0.010)
3 years from graduation * 1-2 years of delay								0.024** (0.011)
5 years from graduation * 1-2 years of delay								0.027** (0.011)

3 years from graduation * 2-3 years of delay								0.013 (0.012)
5 years from graduation * 2-3 years of delay								0.017 (0.012)
3 years from graduation * > 3 years of delay								0.014 (0.009)
5 years from graduation * > 3 years of delay								0.011 (0.010)
Observations	26,840	26,840	30,210	30,210	32,248	32,248	89,298	89,298

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Estimates of the time (months) taken to find the first job

VARIABLES	Pooled sample	
	(I)	(II)
Female	0.164 (0.110)	0.166 (0.110)
Degree from a centre Italy univ.	0.914*** (0.150)	0.863*** (0.153)
Degree from a southern Italy univ.	3.489*** (0.139)	3.449*** (0.141)
Techn./Prof. high school	-0.647*** (0.111)	-0.666*** (0.111)
Teaching high school	-0.933*** (0.234)	-0.920*** (0.234)
Other high schools	-1.018*** (0.215)	-1.039*** (0.216)
Father upper sec. school	-0.191 (0.119)	-0.191 (0.119)
Father univ. degree	0.360** (0.169)	0.368** (0.169)
Mother upper sec. school	0.235** (0.119)	0.238** (0.119)
Mother univ. degree	0.559*** (0.181)	0.572*** (0.181)
Degree group: Pharmac./agric.	-1.174*** (0.189)	-1.153*** (0.188)
Degree group: Architect.	-3.005*** (0.184)	-3.054*** (0.187)
Degree group: Engineering	-2.758*** (0.149)	-2.796*** (0.150)
Degree group: Politic. studies	0.175 (0.181)	0.174 (0.181)
Degree group: Psychology	3.629*** (0.240)	3.704*** (0.240)
Degree group: Scientific	0.790*** (0.236)	0.767*** (0.237)
Degree group: Literature	-0.590*** (0.169)	-0.628*** (0.170)
Degree group: Law	6.907*** (0.230)	6.870*** (0.232)
High sch. leaving grade	0.049*** (0.008)	0.052*** (0.008)
University. leaving grade	0.050*** (0.008)	0.054*** (0.008)
Working while studying	-1.562*** (0.479)	-1.523*** (0.188)
Study abroad	-0.250** (0.125)	-0.238* (0.125)
Delayed graduation	-0.314 (0.370)	
Delay: from 1 to 2 years		-0.053 (0.212)
Delay: from 2 to 3 years		0.276 (0.236)
Delay: more than 3 years		0.003 (0.211)

Interactions

Working while studying *delayed graduation	0.293 (0.488)	
Working while studying * 1-2 years of delay		0.242 (0.270)
Working while studying * 2-3 years of delay		0.227 (0.297)
Working while studying * > 3 years of delay		0.380 (0.253)
Constant	0.917 (0.822)	0.084 (0.773)
Observations	56,479	56,479
R-squared	0.118	0.118

Table 4. Estimates of the wage returns

VARIABLES	After 1 year		After 3 years		After 5 years		Pooled sample	
	(I)	(II)	(I)	(II)	(I)	(II)	(I)	(II)
Female	-120.766*** (7.045)	-121.307*** (7.045)	-185.000*** (6.991)	-185.458*** (6.991)	-256.491*** (7.474)	-257.449*** (7.465)	-197.327*** (5.572)	-197.905*** (5.564)
Degree from a centre Italy univ.	-56.084*** (9.753)	-54.411*** (9.888)	-48.891*** (9.711)	-43.462*** (9.827)	-74.422*** (10.461)	-62.212*** (10.568)	-60.942*** (7.391)	-53.652*** (7.472)
Degree from a southern Italy univ.	-130.442*** (8.500)	-128.367*** (8.648)	-102.903*** (7.959)	-97.348*** (8.116)	-155.322*** (8.370)	-142.000*** (8.536)	-132.473*** (6.306)	-124.387*** (6.399)
Techn./Prof. high school	6.207 (7.335)	7.084 (7.358)	-11.496 (7.508)	-9.273 (7.530)	-42.521*** (8.130)	-37.405*** (8.147)	-18.766*** (5.700)	-15.763*** (5.726)
Teaching high school	30.565** (15.042)	30.804** (15.042)	21.960 (14.814)	21.611 (14.809)	8.826 (16.134)	10.006 (16.114)	19.806** (9.575)	20.079** (9.584)
Other high schools	7.061 (15.114)	8.183 (15.136)	-27.587* (15.226)	-25.021 (15.234)	-14.178 (16.868)	-8.105 (16.864)	-12.679 (11.140)	-9.237 (11.154)
Father upper sec. school	12.108 (7.807)	11.563 (7.812)	4.954 (7.930)	4.159 (7.930)	21.890** (8.579)	20.339** (8.570)	12.718** (5.860)	11.667** (5.857)
Father univ. degree	-9.492 (10.950)	-9.706 (10.954)	-13.418 (10.936)	-14.490 (10.937)	6.857 (11.715)	4.592 (11.702)	-4.534 (8.421)	-6.001 (8.413)
Mother upper sec. school	-15.642** (7.813)	-15.833** (7.817)	3.490 (7.931)	2.625 (7.933)	-1.230 (8.584)	-3.655 (8.578)	-2.726 (5.877)	-4.069 (5.865)
Mother univ. degree	-26.325** (11.660)	-26.154** (11.665)	2.983 (11.647)	1.690 (11.649)	-5.634 (12.448)	-9.484 (12.440)	-6.266 (9.085)	-8.335 (9.082)
Degree group: Pharmac./agric.	-13.735 (12.291)	-12.784 (12.268)	-53.246*** (13.058)	-52.540*** (13.033)	-61.495*** (14.109)	-62.483*** (14.069)	-44.188*** (9.747)	-44.183*** (9.723)
Degree group: Architect.	-236.313*** (14.560)	-234.673*** (14.663)	-158.173*** (15.271)	-152.066*** (15.367)	-153.119*** (17.186)	-138.588*** (17.260)	-179.515*** (12.350)	-171.628*** (12.426)
Degree group: Engineering	12.466 (10.559)	12.819 (10.600)	77.208*** (11.279)	80.631*** (11.314)	119.468*** (12.403)	126.777*** (12.419)	70.170*** (8.512)	74.261*** (8.525)
Degree group: Politic. studies	-112.659*** (12.899)	-112.062*** (12.905)	-99.034*** (12.820)	-98.010*** (12.818)	-132.319*** (14.122)	-131.448*** (14.103)	-114.195*** (9.625)	-113.480*** (9.618)
Degree group: Psychology	-399.818*** (17.493)	-400.275*** (17.515)	-331.560*** (15.670)	-335.758*** (15.691)	-370.456*** (17.088)	-379.277*** (17.078)	-362.055*** (11.726)	-367.722*** (11.790)
Degree group: Scientific	-103.775*** (13.789)	-101.740*** (13.820)	-130.859*** (13.998)	-126.418*** (14.016)	-136.103*** (14.886)	-129.051*** (14.874)	-125.742*** (10.596)	-121.156*** (10.598)
Degree group: Literature	-210.337*** (10.863)	-209.503*** (10.884)	-247.822*** (10.976)	-244.036*** (10.996)	-282.655*** (11.875)	-276.002*** (11.879)	-250.294*** (7.720)	-246.169*** (7.732)
Degree group: Law	-124.563*** (14.416)	-122.678*** (14.502)	-229.055*** (11.870)	-224.423*** (11.932)	-195.728*** (11.860)	-186.503*** (11.900)	-199.934*** (9.989)	-193.576*** (10.037)
High sch. leaving grade	-0.064 (0.503)	-0.183 (0.511)	-0.883* (0.499)	-1.220** (0.507)	0.091 (0.537)	-0.646 (0.545)	-0.326 (0.385)	-0.764* (0.392)

University. leaving grade	-0.053 (0.494)	-0.163 (0.503)	1.883*** (0.493)	1.494*** (0.502)	3.405*** (0.526)	2.525*** (0.536)	2.011*** (0.388)	1.482*** (0.397)
Working while studying	27.375 (28.692)	17.826 (12.076)	-5.148 (28.922)	23.299* (12.238)	15.995 (30.289)	42.491*** (13.071)	10.722 (21.601)	28.598*** (8.746)
Study abroad	53.808*** (8.404)	53.030*** (8.423)	86.668*** (8.498)	85.291*** (8.507)	111.661*** (9.340)	108.301*** (9.338)	87.950*** (6.938)	86.016*** (6.949)
Delayed graduation	-39.134* (21.534)		-43.092** (21.072)		-47.864** (21.904)		-41.330** (19.901)	
Delay: from 1 to 2 years		-21.250 (13.368)		-11.775 (13.141)		-14.732 (13.873)		-9.312 (11.350)
Delay: from 2 to 3 years		-34.590** (14.912)		-42.133*** (14.518)		-50.923*** (15.323)		-23.691* (12.367)
Delay: more than 3 years		-31.163** (13.163)		-43.618*** (12.848)		-85.229*** (13.703)		-26.303** (11.265)
3 years from graduation							191.595*** (18.556)	206.045*** (7.067)
5 years from graduation							389.049*** (19.792)	410.861*** (7.864)
<i>Interactions</i>								
Working while studying * delayed graduation	0.551 (29.339)		28.730 (29.545)		21.208 (30.978)		19.231 (22.086)	
3 years from graduation * delayed graduation							2.870 (18.919)	
5 years from graduation * delayed graduation							-8.293 (20.220)	
Working while studying * 1-2 years of delay		2.868 (17.659)		-19.309 (17.724)		-25.622 (18.954)		-15.238 (12.832)
Working while studying * 2-3 years of delay		19.755 (19.151)		9.508 (19.206)		1.089 (20.519)		9.377 (13.828)
Working while studying * > 3 years of delay		20.041 (16.134)		10.671 (16.048)		13.148 (17.230)		15.300 (12.202)
3 years from graduation * 1-2 years of delay								-5.869 (10.360)
5 years from graduation * 1-2 years of delay								-11.231

3 years from graduation * 2-3 years of delay								(11.555)	-19.207*
5 years from graduation * 2-3 years of delay								(11.379)	-33.819***
3 years from graduation * > 3 years of delay								(12.593)	-20.163**
5 years from graduation * > 3 years of delay								(9.643)	-61.341***
Constant	1,165.991***	1,165.336***	1,231.655***	1,267.321***	1,269.497***	1,381.660***	1,008.254***	1,053.669***	(10.684)
	(51.714)	(49.577)	(51.767)	(49.848)	(54.839)	(53.210)	(42.282)	(39.955)	
Observations	13,120	13,120	19,578	19,578	21,159	21,159	53,857	53,857	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1