Understanding the transition to work for first degree university graduates in Portugal*

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resumo

Uma forma tradicional de aferir a importância das universidades assume que estas são fontes de efeitos positivos do ponto de vista dos *inputs*. De acordo com esta perspectiva, a importância de uma universidade pode ser medida pelos seus efeitos multiplicadores, a nível regional/nacional. Esta perspectiva pode ser complementada através da análise das questões associadas à transição para o emprego pelos seus diplomados. O artigo analisa os factores que poderão ser importantes para explicar o tempo de obtenção do primeiro emprego por parte dos estudantes de primeiro ciclo, para tal utilizando uma amostra de alunos de uma instituição de ensino superior portuguesa, a Universidade de Évora. Assim, estimam-se diversas especificações de modelos de duração a tempo discreto. Os resultados mostram que existem diferenças significativas entre os estudantes dos diversos cursos e destacam a importância da classificação final do curso. No entanto, em particular, pode concluir-se que não existem diferenças significativas entre a área de Economia e Gestão e a área de Engenharia, e que estas áreas de estudo são as mais bem sucedidas na transição para o mercado de trabalho. Também não encontram diferenças significativas, neste aspecto, entre estudantes do sexo masculino e feminino. Conclui-se, igualmente, que existem diferenças significativas na probabilidade de saída do desemprego, entre os vários anos considerados na amostra, o que reflecte o ciclo económico.

résumé / abstract

A traditional way of looking at the importance of universities assumes that these are sources of positive effects from the viewpoint of the inputs. In accordance to this perspective, the importance of a university can be measured by its regional/national multiplier effects. This perspective can be complemented with the analysis of the issues associated with the transition to work by their graduates. The paper thus analyses the factors that may be important to explain the time to obtain the first job by first degree students, using a sample of students from one university in Portugal. In doing so, we estimate several specifications of discrete-time duration models. The results show that there are significant differences among the students from the several courses and highlight the importance of the final mark in the course. Nevertheless, in particular, we conclude that there are no significant differences between the area of Economics and Management and the area of Engineering and that these study areas are the most successful ones. We also did not find any significant differences between male and female students. Finally, we also conclude that there are significant differences on the probability of leaving unemployment among the several years considered in the sample, which reflects the business cycle.

Classificação JEL: J64, I23, C41.

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1. Introduction

A traditional way of looking at the importance of universities assumes that these are sources of many positive effects from the point of view of the inputs, i.e. from a demand side perspective. In accordance to this perspective, the importance of a university can be measured by its multiplier economic effects, at a regional or national level (Thomas 1995; Brown and Heaney 1997). Plainly, this perspective can be complemented with the importance of the many outputs that result from the functioning of a university (Blackwell et al. 2002), in particular the level of knowledge that graduates acquire in their university degrees in order to face (a possible entrance in) the labour market (Drucker and Godstein 2007; Wilton 2008; see also Beeson and Montgomery 1993).

As a matter of fact, in the assessment of the quality or performance of universities, the issues associated with the graduates' success in finding a job are supposed to gain importance after developments made in the legal setup of universities (for a related matter see Herrington and Herrington 2004). For instance, van Nijlen and d'Hombres (2008) clearly point out for the increasing importance of the labour market outcomes of graduates, namely for the ranking of universities, which traditionally ignore these issues by considering only scientific outcomes (see also Smith et al. 2000, and Stock and Alston 2000).

Moreover, in the last few years, and particularly in the period of time that we analyse in this paper, it has been increasingly difficult for first-degree graduates to find their first job, following the worsening of the labour market conditions in general. In Portugal, according to Conselho Nacional de Avaliação do Ensino Superior (2004), the unemployment rate for new university graduates was 2.2% in 2001 and 4.9% in 2003. Since then unemployment rates have been increasing considerably, and by 2009, according to Eurostat (2010a), the unemployment rate for young (less than 25 years old) university graduates in Portugal was about 24,5%, much higher than the EU average (15,4%). The situation of University of Évora´ graduates seems to be no different from the rest of the country as the difficulties to find the first job have been growing in recent years[1]. Taking these figures into account, the importance and significance of the analysis of the process of transition into labour market for university graduates are to be increased.

The relevance of the issues related to the employability of the university graduates is clearly being also acknowledged by the agenda of institutions in charge of the Bologna process. Just as an illustration of this fact, the London Communiqué of May 2007, "Towards the European Higher Education Area: responding to challenges in a globalised world", of the Ministers responsible for Higher Education in the countries participating in the Bologna Process called the attention for[2]: "Building on our rich and diverse European cultural heritage, we are developing an EHEA based on institutional autonomy, academic freedom, equal opportunities and democratic principles that will facilitate mobility, *increase employability* and strengthen Europe's attractiveness and competitiveness."

In the particular case of small universities, such as it is the case of the University of Évora, which is located in an economically depressed region, the employability of its graduates also relates to social cohesion (Prokou 2008). In fact, social cohesion is to be achieved when graduates become employed in the region where the university is located and therefore contribute for a smaller unemployment rate in that particular region. This link between employability and social cohesion is an essential matter on the Bologna process. For instance, in the communiqué

1 Data from the European Student Barometer, available at http://www.qi.uevora.pt/, reveal an increase in the number of months to find the first job for both Engineering and Business students in Portugal and also in the University of Évora.

2 See http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/MDC/London_Communique18May2007.pdf (accessed on 31/5/2010).

"Realising the European Higher Education Area" of the Conference of Ministers responsible for Higher Education in Berlin on 19 September 2003[3]: "Ministers reaffirm the importance of the social dimension of the Bologna Process. The need to increase competitiveness must be balanced with the objective of improving the social characteristics of the European Higher Education Area, aiming at *strengthening social cohesion* and reducing social and gender inequalities both at national and at European level."

Indeed, the impact of the Bologna process on several aspects of higher education institutions has already been acknowledged by some authors. For example, Cañibano (2008) analysed the evolution of the process of adaptation of Spanish universities to the Bologna principles. Concerning Portugal, Cardoso et al. (2008) concluded that the university programs that were restructured in order to follow the Bologna principles were subject to higher demand than comparable programs that did not restructure, as well as those that considered an integrated master degree (see also Vieira and Coimbra 2006 and Alexandre et al. 2009).

Having said that, this paper thus analyses the factors that may explain the time spent by first degree students of a small university in Portugal, the University of Évora, in order to enter the labour market. We employ a sample of 767 students, graduated between 2000 and 2004, and estimate discrete-time hazard models, considering several specifications, with and no control for unobserved heterogeneity.

The results reveal the existence of significant differences among the several subject areas of graduation, with economics, management and engineering being the most successful subjects. Moreover, the results highlight the importance of the final mark students obtain in the course to their success in the labour market. We also conclude that younger graduates seem to be in a disadvantageous situation in relation to more mature graduates, but that there are no significant differences between male and female students.

The rest of the paper is structured as follows. Some results of the previous literature are presented in Section 2. The data and the methodology used in the paper are presented in Section 3. This is followed by the analysis of the results, which is done in Section 4. Section 5 concludes by presenting the main results and some of possible avenues for further work.

2. Empirical findings in the literature

The transition to employment of university graduates is an issue that has deserved some attention from recent literature. The attention on graduates' success has risen given the increase in unemployment that characterizes many economies. In effect, according to Eurostat (2010a) the unemployment rate of university graduates is at worrying levels in Europe, particularly for some countries like Portugal, Italy or Greece, where the unemployment rate for young university graduates has been higher than for other educational levels. In this sense, it is of no surprise that authors turn their attention to the analysis of the issues related with the time (and its explanatory factors) that university graduates take in order to enter the labour market and obtain a job.

The literature has given special attention to certain (European) countries, which are somehow different in what concerns the institutional settings of universities and labour market functioning. In doing so, different methodologies have been used. These two facts make it difficult to compare the results. In this section we proceed by offering the results that are of interest for several countries.

Italy seems to be one of the countries where the employability of university graduates is attracting most interest from the literature[4]. Biggeri et al. (2001) consider the year of 1992, when

3 See http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/MDC/Berlin_Communique1.pdf (accessed 0n 31/5/2010).
4 The Canadian case is also well documented (see Ferrall 1997, Finnie 1999, and Betts et al. 2000).

the unemployment rate for young graduates was around 33%, and use a three-level discrete time survival model in order to analyse the time to obtain the first job by graduates, taking into account not only the graduates' characteristics but also the characteristics of universities and course programmes. The authors conclude that the variability in the success in obtaining the first job depends much more on the course programmes than on the universities. In what concerns the characteristics of the graduates, the authors find out that: the military service is relevant in explaining the male pattern; the estimated hazard functions for females and males without military service have similar shapes although at a higher level for males – this gender difference in favour of males is more pronounced for those graduates with lower final marks (see Finnie 1999, Joy 2000 and McMillen and Singell 2001 for analyses of gender issues); that the final mark has a slightly positive effect on the probability of obtaining a job in a certain time; that students that take less time to graduate also take less time to obtain a job; that the occupational status and education level of the parents exert a significant effect; and that graduates with a previous working experience are more likely to obtain a job but also that mature graduates seem to be in a disadvantageous situation in relation to younger graduates.

Also, for the specific case of labour market performance of Italian university graduates see Quintano et al. (2004), who consider the case of the graduates in Economics at the University of Naples "Parthenope". Through the use of a multinomial logit model the authors do not find neither a gender nor a parents' professional condition effect but rather a strong cohort effect, which is compatible with the (expected) result that the entrance of the graduates in labour market increases as years from graduation increase. As an aside result, Quintano et al. (2004) also conclude that the probability of being unemployed is highly dependent upon the duration of the university degree.

The Italian case is again considered in Pozzoli (2009) by the use of non parametric discrete-time single risk models to study employment hazard. The author analysis Italian graduates in 1998, when Italy displayed one of the highest youth unemployment rates for university graduates in Europe (around 38%). The results indicate that, after a short initial period of negative duration dependence, there is a general evidence of true positive duration dependence, this being explained by the fact that graduates, as time goes by, become less selective as well as adjust their search effort and methods during the unemployment spell, which allows also for an increase in the level of information about job opportunities. With regards to the effects of covariates, older and female graduates, those who graduated in Humanities and Social Sciences, those who have parents with the lowest level of education and finally those who live in Southern and Central Italy are found to have particularly lower hazard of getting their first job.

The focus of van der Klaauw et al. (2005) is the process of job search that graduates undertake, sometimes even before the graduation date (see also Bowlus et al. 2001, Ferrall 1997, and Wolpin 1987). They use of a discrete-time job search model, for the Netherlands for the years 1995 to 2001, when the overall unemployment rates ranged from 7.1% to 2.5% (youth unemployment rate was higher – according to Eurostat it was around 11% in 1996). The authors' main finding relates to the common fact that a great share of graduates starts working immediately after the graduation, which is explained by a job search initiated before leaving the university.

Vanoverberghe et al. (2008) consider a duration model using data on Flemish school leavers. The speed of the transition process from the school-leaving date and the start of the first job is found to be a function of three kind of factors: (a) those that are controllable at relatively low cost, such as search intensity, (b) those that are manageable at large investments cost, such as the level of education, and (c) those that are outside of control, such as ethnicity.

Livanos (2009) ads up to the literature by calling the attention for the fact that the employability of higher education programmes depends upon the kind (i.e. private or public) of sector that usually absorbs the graduates. This fact allows the author to explain why (in Greece) graduates in areas that have high levels of private sector employment, such as Polytechnics and Computer Science,

enjoy higher employability rates than those, such as Sociology and Humanities, that are traditionally related to the needs of the public sector.

Jaunky and Khadaroo (2007) analyse the case of the graduates from the University of Mauritius during the period 1995-2000. Quite interestingly the authors show that the job search time, which is not significantly different among males and females, is positively related to the age of the graduate and to the education of the graduate's father whereas is negatively related to the education of the graduate's mother and to postgraduate training. Moreover, the place of residence seems to matter as graduates from urban areas have a lower job search time than their rural counterparts.

To sum up, as above mentioned, a comparison of the findings for the different countries and periods seems to be complicated, given the differences in the institutional settings of universities, in labour market functioning, as well as the different economic conjunctures throughout the different time periods. Nevertheless, in explaining the transition to work by graduates, differences among the students from the several courses, the importance of the final mark in the course as well as differences between male and female students emerge as important matters. This motivates our model, for a not so well documented case, i.e. Portugal.

3. Data and Methodology

3.1 The data

The University of Évora is a public institution of higher education whose origins date back to 1559. After being closed in the 18th century, the university reopened in 1979. At the present time, it is organized in departments which are grouped in three schools: (i) arts; (ii) social sciences; (iii) technological sciences. The São João de Deus School of Nursing, a public polytechnic institute of higher education, became part of the University of Évora in 2004.

The University of Évora has around 5760 students enrolled in graduate courses, 1588 in Master's courses and 277 in PhD courses[5]. Moreover, it has a teaching staff of 577, of whom more than half hold a PhD degree, and an administrative staff of 406.

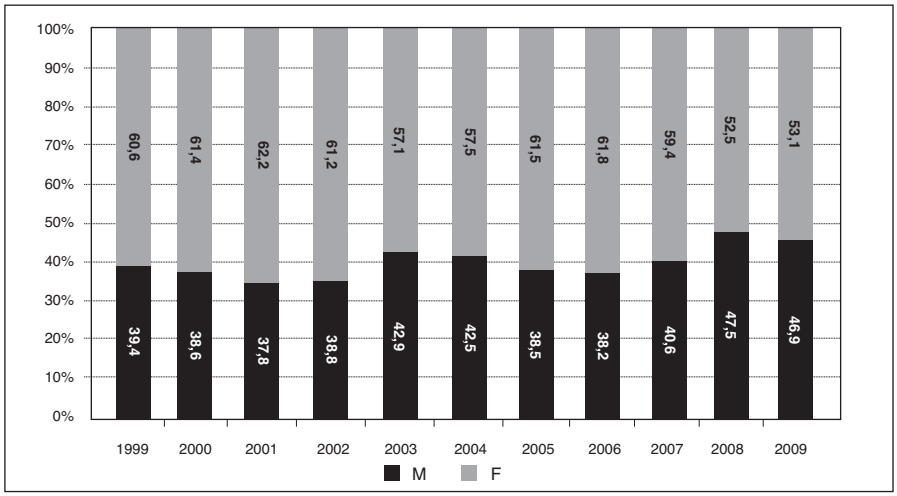
In what concerns the graduate students, in accordance to the general figures of the higher education in Portugal, females represent a greater share (around 60%) than males in all the sample period, despite a small decline in 2008 and 2009, allegedly due a marginal increase on entrances in courses where the share of males is traditionally higher (see figure 1).

As to the areas of study, in general, engineering is mostly attended by male students whereas areas such as education are mostly attended by female students. Most of the students are under 20 years despite being also evident an increase in the proportion of older students (over 30), in particular in the most recent years. In terms of the geographical origin of the students, the University of Évora attracts students essentially from the district of Évora (around 36%), as well as from the surrounding districts (of Alentejo). The Lisbon district also represents a relevant area of origin (around 10%).

Our data is from a previous survey which was developed for a different research project (see Table 1). The students who completed undergraduate education in the University of Évora were asked to fill up a written questionnaire containing questions on University education, job search behaviour, work history and personal characteristics. Unfortunately, the data set does not include information on the students' background prior to their entry in the University.

5 A rich source of updated information are the annual reports of the Pró-Reitoria para a Política da Qualidade e da Inovação (2008,2010), available at http://www.qi.uevora.pt/ (accessed on December 14, 2010).

Figure 1 – The share of students in the University of Évora by gender



Sources: Pró-Reitoria para a Política da Qualidade e da Inovação (2010).

Table 1 – Descriptive statistics

	Arts and Humanities	Engineering	Scientific	Economics and Management	Other Social Sciences	All Sample
N	143	183	214	143	87	767
% Search duration <= 6 months	74%	77%	73%	85%	69%	76%
% Search duration = 0 months	14%	45%	19%	24%	15%	25%
Age	20.57 (5.33)	18.51 (1.97)	18.48 (2.89)	18.54 (2.74)	19.33 (4.31)	18.98 (3.55)
Final Mark	13.94 (1.06)	13.15 (1.02)	14.25 (0.98)	12.42 (1.23)	13.50 (1.17)	13.50 (1.27)
Course duration above average = 1	0.497	0.454	0.149	0.306	0.227	0.326
Male = =1	0.124	0.432	0.242	0.458	0.205	0.302
Search in Alentejo = 1	0.745	0.622	0.674	0.667	0.784	0.684
year 2000 = 1	0.110	0.141	0.121	0.167	0.205	0.141
year 2001 = 1	0.172	0.157	0.112	0.201	0.125	0.151
year 2002 = 1	0.186	0.232	0.191	0.194	0.091	0.189
year 2003 = 1	0.221	0.228	0.298	0.229	0.307	0.257
year 2004 = 1	0.310	0.243	0.279	0.208	0.273	0.263

Note: Standard errors are in parenthesis.

In our paper we focus on the students who have completed their first degree between 2000 and 2004, in the several courses degrees in the University of Évora. Since our model describes individuals who enter the labour market for the first time, we exclude individuals who were working before graduation. Our sample thus comprises a total of 767 students.

The sample employed in the analysis has several fields of study which we have further grouped into 5 main categories[6]: Scientific, Engineering, Arts and Humanities, Economics and Management, Other Social Sciences. From table 1 we can see that graduates in Arts and Humanities and Economics and Management each represent nearly 19% of the whole sample, while graduates in Scientific areas constitute about 28%. Those graduating in Engineering subjects represent nearly 24%. Finally, those who graduated in Social sciences consist of only 11,2% of the all sample.

Table 1 displays the sample descriptive statistics for the variables used in the econometric analysis. A full description of the variables can be seen in the Appendix. Most of the students in the sample are female students, especially in Arts, Humanities and Social Sciences, which is in accordance to what we should expect considering the characteristics of the students in the University. In all course categories, the majority of students find a job within a period of six months, with Economics and Management displaying the highest rate (86%), followed by Engineering. A significant percentage of the students also start working immediately after graduation (about 25% of all students). Again, Engineering (45%) and Economics and Management (24%) areas seem to be more successful[7]. The econometric analysis in section 4 will provide a better understanding on the differences in labour market success among the several study areas.

The average final mark is very similar for all course categories, but those in scientific areas display higher final marks in average. These are also the ones that present a smaller percentage of students with a course duration above average (only about 15%, in opposition to almost 50% in Arts and Humanities). Students in Arts and Humanities also enter the University, in average, at an older age than in other courses and display a higher standard error. Finally, as the University attracts most of its students in the Alentejo region, it is not surprising that the majority of those in our sample search for a job in the Alentejo.

3.2 The econometric methodology

Theoretically, the duration variable of interest (time to obtain the first job) is a continuous random variable. However, as often occurs in many empirical studies, in our case the duration variable is measured in groups of months[8]. Therefore, the appropriate approach for modelling the duration is a discrete-time hazard model (grouped interval data). Several specifications can be used to estimate a discrete-time hazard model. In this paper in order to check for the robustness of the results we consider two specifications: a complementary log-log model and a discrete time logistic model. The complementary log-log model is a popular and convenient formulation, which

6 The grouping in particular is the following: Scientific (Physics, Chemistry, Biology, Agricultural, Maths, Veterinary Medicine); Engineering (Engineering, Architecture); Arts and Humanities (Theatre, Music, Philosophy, Literature, Foreign Languages, Education); Economics and Management (Economics and Management); Other Social Sciences (Sociology, History and Psychology). In this grouping we have followed closely previous studies.

7 We have estimated two logit models, one for the probability of students finding a job with no unemployment and another for the probability of finding a job within a period of 6 months. The results reveal that Engineering is significantly better than Economics and Management in the first case while the opposite happens in the second case. This suggests the use of a different econometric approach, like the durations models, to take into account all unemployment durations and, therefore, to allow for a better comparison of the different areas of study.

8 The following intervals are available in the survey: 0 months, 0 to 1 month, 2 to 6 months, 7 to 12 months, more than 12 months. However, in the econometric modelling we considered the last two intervals as one due to the fact that there are no transitions to work for those with more than 12 months of unemployment.

can be interpreted as the discrete time model corresponding to an underlying continuous time Proportional Hazards model. Representing discrete times (durations) by t_j, the hazard function is given by:

$$h(t_j \mid x) = 1 - \exp(-\exp[\gamma(t_j) + x'\beta]) \quad (1)$$

where $\gamma(t_j)$ corresponds to the baseline hazard and x is a vector of explanatory variables.

The discrete time logistic model can be interpreted as a proportional odds model. In fact, the logistic model approximates a proportional model quite closely if the hazard is sufficiently small. In this specification, the hazard function is given by:

$$h(t_j \mid x) = [1 + \exp(-\gamma(t_j) - x'\beta)]^{-1} \quad (2)$$

again, $\gamma(t_j)$ corresponds to the baseline hazard and x to the vector of explanatory variables.

In both models, the baseline hazard can be specified following a parametric approach, assuming a specific form for the hazard function, or a semi-parametric approach, where there is no assumption about its shape. In this paper, we consider a semi-parametric specification (piecewise constant) as it is a more flexible approach[9].

Supposing $d_i = 1$ if there is no censoring (that is if the student *i* made a transition into work within the period of observation) and $d_i = 0$ if there is censoring, the corresponding likelihood, is given by:

$$L = \prod_{i=1}^{N} [S(ti + h \mid x_i)^{1-di}[h(ti + si \mid x_i)S(ti + si \mid x_i)]^{di} \quad (3)$$

where $S(ti + h \mid x_i)$ represents the survivor function, measuring the probability of no transition in the interval $(t, t + h)$, and $h(ti + si \mid x_i)S(ti + si \mid x_i)$ is the probability that the student exits unemployment at t+s ($0 < s < h$).

Alternatively, one can consider each survival or exit in each interval as an observation. Then, each student in the sample contributes with s_i "observations", leading to a sample size of $\Sigma_i s_i$. Indexing these observations by k and considering y_{ik} as one if the spell was completed in the interval (that is if student *i* made a transition into work) and as zero if not, one can rewrite the likelihood function as:

$$L = \prod_{i=1}^{N} \prod_{k=ti}^{ti+si} [h_i(k \mid x_i)]^{yik}[1 - h_i(k \mid x_i)] \quad (4)$$

This form of the likelihood is exactly the form of the likelihood for a discrete-choice model. Therefore, one can easily estimate the parameters of the model with several software packages available, by rearranging the data in a proper way. See Jenkins (1995) for details on the organization of the data and on the estimation of these models.

We are aware of possible existence of student specific unobserved characteristics, which may affect the duration of unemployment. Not controlling for unobserved heterogeneity could result in

9 We also estimated a parametric specification (cubic-polynomial). The coefficient estimates were quite similar which points to the robustness of our results. These estimates can be provided upon request.

inconsistent and downward biased estimates of the covariates' coefficients as well as in over-estimation of the degree of negative duration dependence, or under-estimation of the degree of positive duration dependence (Lancaster 1990; van den Berg 2001; Ridder 1987). Therefore, we also estimate the previous discrete time models considering the existence of unobserved heterogeneity. The most common method to deal with the problem of unobserved heterogeneity is to assume that the effect of omitted variables can be represented by a random disturbance. Following this approach, the complementary log-log model generalises to:

$$h(t_j \mid x) = 1 - \exp(-\exp[\gamma(t_j) + x'\beta + u]) \quad (5)$$

The logistic hazard regression model can be generalised in a similar way:

$$h(t_j \mid x) = [1 + \exp(-(\gamma(t_j) + x'\beta + e))]^{-1} \quad (6)$$

where the "error" term e (and u) represents the unobserved heterogeneity and is a random variable with mean zero and finite variance. In practice, the problem lies on the choice of the distribution of the random variable. In principle, any continuous distribution with positive support, mean one and finite variance, is a suitable choice. However, the choice of the distribution is limited to those that give a closed form expression for the survivor function. For the *discrete time* Proportional hazard model, the Gamma distribution has been the most used distribution. For these models it also straightforward to assume a Normal (Gaussian) distribution for u and e, respectively. In this work we assume a Normal (Gaussian) distribution.

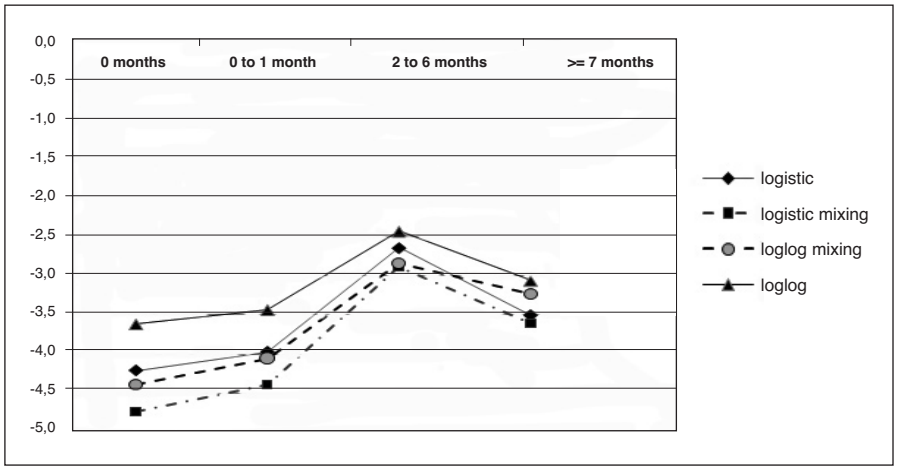
There has been much discussion in the literature about the extent of the effects of unobserved heterogeneity. In particular, the literature has focused on the choice of shape of the hazard function and on the choice of the distribution for the unobserved heterogeneity. The results from several papers (for example, Dolton and van der Klaauw 1995; Meye, 1990 and Trussell and Richards 1985) have suggested that if a flexible specification for the baseline hazard function is used (like the piecewise constant that we use in this paper), then the magnitude of the biases in the non-heterogeneity model are reduced.

4. Analysis of Results

Table 2 displays the estimates for the different specifications of the hazard function, with and without control for unobserved heterogeneity. The tests results reveal the existence of significant unobserved heterogeneity in both the logistic and the complementary log-log specifications. Therefore, as expected, those specifications with control for unobserved heterogeneity present a better fit (based on the value of the Log-Likelihood). Moreover, controlling for unobserved heterogeneity, the complementary log-log model seems to perform better, although the difference is small. Nevertheless, the results are quite stable in all specifications, as the sign and significance of the explanatory variables are very similar.

Referring to the baseline hazard in all cases the shape follows a similar pattern (see figure 2). In fact, the estimates of duration dependence suggest that an initial period of positive dependence is followed by the negative dependence. This indicates that after a period between 2 and 6 months it becomes more difficult for students to find a job as time goes by.

Figure 2 – Baseline Hazards



We considered as explanatory variables in this study several students´ characteristics as well as year dummies to capture possible business cycle effects. Among the students´ specific variables we included age at entrance in the University, final mark at graduation and several dummies representing the students´ gender, field of study, course duration and job search geographic location. As previously referred, we could not consider some other possible relevant variables like the students´ socioeconomic background or the students´ grade at entrance in the University, as these variables were not available in the data set we used.

In what concerns the effects of the explanatory variables, our results show the existence of significant differences among the several subject areas of graduation. In effect, we conclude that there are no significant differences between the area of Economics and Management and the area of Engineering, but these study areas are significantly more successful than the others. This result is in accordance to what happens at national level (see Inofor 2001 and Gonçalves et al. 2006). On the contrary, students in Arts and Humanities seem to be in the worst situation to find a job.

We do not find any statistically significant difference between male and female graduates. Nevertheless, the coefficient is positive indicating males to be marginally more successful. This is in accordance to previous studies which reveal women to face more difficulties in the labour market. In fact, in the particular case of Portugal, official statistics show the young female unemployment rates to be higher than those of young males (see, for example, Eurostat, 2010a).

As expected, the results highlight the importance of the final mark in the course to the success in the labour market: a higher final mark has a positive and significant effect on the probability of exiting unemployment. However, the time to graduate does not seem to affect the probability of finding a job, as the variable “course duration above average” does not display a significant effect in any of the specifications.

Younger graduates seem to be in a disadvantageous situation in relation to older graduates. This may be explained by the fact that older students signal themselves as more able to firms, due to higher maturity. On the other hand, it might be the case that younger students are more likely to be choosier with respect to job opportunities.

Table 2 – Hazard functions results – piecewise constant specification (All sample)

Duration dependence:	Logistic		Complementary log-log	
	no-heterogeneity	heterogeneity-normal mixing	no-heterogeneity	heterogeneity-normal mixing
0 months	-4.209* (0.714)	-4.734* (0.813)	-3.622* (0.544)	-4.387* (0.683)
0 to 1 month	-3.971* (0.710)	-4.385* (0.805)	-3.438* (0.541)	-4.053* (0,673)
2 to 6 months	-2.644* (0.701)	-2.890* (0.793)	-2.433* (0.534)	-2.846* (0,663)
≥ 7 months	-3.503 (0.709)	-3.603* (0.799)	-3.066* (0.542)	-3.236* (0.666)
Age	0.033** (0.015)	0.040** (0.017)	0.023** (0.011)	0.034** (0.014)
Male == 1	0.093 (0.114)	0.103 (0.129)	0.084 (0.089)	0.098 (0.109)
Final Mark	0.219* (0.050)	0.243* (0.056)	0.172* (0.038)	0.206* (0.047)
Course duration above average = 1	0.176 (0.118)	0.219 (0.133)	0.136 (0.093)	0.196 (0.123)
Search in Alentejo = 1	-0.353* (0.110)	-0.402* (0.124)	-0.276* (0.085)	-0.348* (0.105)
Arthum	-0.870* (0.193)	-0.968* (0.218)	-0.697* (0.150)	-0.818* (0.184)
Engineer	-0.137 (0.162)	-0.098 (0.184)	-0.165 (0.124)	-0.087 (0.153)
Scientific	-0.754* (0.177)	-0.824* (0.200)	-0.606* (0.137)	-0.696* (0.168)
Social	-0.681* (0.198)	-0.767* (0.224)	-0.533* (0.155)	-0.648* (0.189)
year 2000 = 1	0.687* (0.173)	0.775* (0.195)	0.541* (0.132)	0.661* (0.163)
year 2001 = 1	0.442* (0.167)	0.503* (0.188)	0.330** (0.129)	0.411* (0.158)
year 2002 = 1	0.113 (0.152)	0.133 (0.172)	0.089 (0.120)	0.110 (0.146)
year 2003 = 1	-0.306** (0.140)	-0.340** (0.158)	-0.253** (0.113)	-0.307** (0.136)
LR test: unobserved heterogeneity = 0	–	$\chi^2 = 6.35$ *	–	$\chi^2 = 11.35$*
Log likelihood	-1172.548	-1169.371	-1173.958	-1168.2827
N	2016	2016	2016	2016

Notes: (*), (**) significant at 1% and 5%, respectively. The estimation was performed using STATA 9.

Some findings do not seem to be in accordance with previous studies, namely for Italy, which typically conclude that older graduates and graduates with longer course durations seem to be in a weaker position. This divergence in the results might be a consequence of the differences in the labour market between the two countries.

One can also argue that these previous results are a consequence of some misspecification of the model. Therefore, we have estimated some alternative specifications checking for the robustness of our results[10]. In table 3 we present separate results for those students who have entered the University at regular age (less than 20 years old) and those who entered the University at an older age, considering the complementar log-log specification, with control for heterogeneity[11]. As we can see, in both cases the shape of the baseline hazard is according to the previous model estimates. As to the effect of the explanatory variables, they are in general similar to the results obtained for the all sample. For those students entering the university at an older age, there are very few significant variables, which may be due to the small sample size. Nevertheless, all the variables display the same signal as in the other sub-sample estimates. In particular, the effect of course duration above average is still positive and not significant for both sub-samples, whereas the effect of age is positive but no longer significant for those students entering the University at a younger age[12], but is significant for the older students.

Table 3 – Hazard functions results – piecewise constant specification (Sub-samples)

Duration dependence:	Complementary log-log		Complementary log-log	
	Students that enter at University at with age < 20		Students that enter at University at age >= 20	
	no-heterogeneity	heterogeneity-normal mixing	no-heterogeneity	heterogeneity-normal mixing
0 months	-4.396* (1.133)	-5.050* (1.366)	-1.696* (1.108)	-3.108* (2.068)
0 to 1 month	-4.133* (1.131)	-4.628* (1.360)	-1.758* (1.110)	-2.548* (2,027)
2 to 6 months	-3.142* (1.126)	-3.432* (1.353)	-0.643* (1.102)	-0.749 (2,009)
≥ 7 months	-3.694 (1.126)	-3.730* (1.352)	-1.598* (1.137)	-1.070 (2.042)
Age	0.026** (0.05)	0.027** (0.061)	0.029*** (0.016)	0.049** (0.024)
Male == 1	0.133 (0.099)	0.161 (0.122)	-0.011 (0.212)	-0.088 (0.301)
Final Mark	0.227* (0.045)	0.269* (0.055)	0.018 (0.084)	0.024 (0.0122)

10 Besides the results presented in table 3, we have also estimated other models by considering different sub-samples (separate regressions for those students entering the University at regular age and finishing their studies within a normal duration and for those who took extra time to finish their studies) and including different variables (with and without age, with and without course duration above average and with and without duration dependence). In all cases, the estimates were quite stable, including those for duration dependence.

11 The results for the log-logistic specification were very similar.

12 This is to be expected due to the small sample variation of the age variable in this sub-sample: we are only considering 18 and 19 years old students.

Table 3 – Hazard functions results – piecewise constant specification (Sub-samples) (cont.)

Duration dependence:	Complementary log-log		Complementary log-log	
	Students that enter at University at with age < 20		Students that enter at University at age >= 20	
	no-heterogeneity	heterogeneity-normal mixing	no-heterogeneity	heterogeneity-normal mixing
Course duration above average = 1	0.122 (0.108)	0.175 (0.133)	0.212 (0.203)	0.376 (0.289)
Search in Alentejo = 1	-0.303* (0.095)	-0.387* (0.118)	-0.141 (0.204)	-0.282 (0.294)
Arthum	-0.797* (0.178)	-0.939* (0.219)	-0.634** (0.315)	-0.809*** (0.451)
Engineer	-0.149 (0.139)	-0.053 (0.172)	-0.375 (0.288)	-0.421 (0.424)
Scientific	-0.690* (0.155)	-0.786* (0.188)	-0.742** (0.377)	-1.007*** (0.543)
Social	-0.541* (0.174)	-0.672* (0.213)	-0.498 (0.354)	-0.649 (0.516)
year 2000 = 1	0.505* (0.142)	0.612* (0.175)	0.784*** (0.412)	1.163*** (0.625)
year 2001 = 1	0.216 (0.147)	0.280* (0.181)	0.529*** (0.289)	0.823** (0.415)
year 2002 = 1	0.114 (0.136)	0.0003 (0.166)	0.364 (0.267)	0.597 (0.389)
year 2003 = 1	-0.280** (0.126)	-0.360** (0.153)	-0.226 (0.265)	-0.187 (0.374)
LR test: unobserved heterogeneity = 0	–	$\chi^2 = 10.69$*	–	$\chi^2 = 8.81$*
Log likelihood	-935.5501	-930.20624	-230.47505	-228.85475
N	1624	1624	392	392

Notes: (*), (**), (***) significant at 1%, 5% and 10%, respectively. The estimation was performed using STATA 9.

It is also of interest to note that, in all specifications, those students that search for a job in the Alentejo region are less successful on finding a job. This is certainly related to the characteristics of the region, which displays an underdeveloped industrial structure and poor labour market conditions, with rates of unemployment above the national ones (see, for example, the last figures for the regions of Portugal, provided by the Eurostat (2010b), which confirm the Alentejo as the Portuguese region with higher unemployment rates for 15-24 years old (20,7% in 2006 and 20,1% in 2007).

Finally, there are significant differences on the probability of leaving unemployment among the several years considered in the sample. This is a consequence of the differences in the labour market conditions in these years. In fact, in 2000 and 2001 the rate of unemployment was considerably lower than in following years. By 2002/2003 labour market conditions worsen considerably as a consequence of economic recession.

5. Conclusions

The relevance of the employability of university graduates is increasing, following the recent developments in the higher education area and in the youth labour market, in Europe in general and particularly in Portugal. In fact, the implementation of the Bologna process, the assessment of the universities performance, in consequence of recent reforms of the university system, as well as the worsening of the labour market conditions, turned the analysis of graduates' success in a crucial issue.

In this paper, we analyse the transition to work of first degree students in a small University in Portugal, the University of Évora, using a sample of 767 students. The focus is on the time to obtain the first job, considering the graduates' characteristics and the effect of the field of study. We estimate several different specifications of discrete-time hazard models and the results are quite robust. The results suggest the existence of negative duration dependence after an initial period of positive duration dependence. This implies that, after some period of time, the longer graduates stay unemployed, the less likely they find a job.

As for the effects of the explanatory variables, we conclude that there are significant differences among the several subject areas of graduation, with economics, management and engineering being the most successful subjects. Moreover, the final mark obtained in the course seems to be determinant to the students' success in the labour market. The results also reveal that younger graduates seem to be in a disadvantageous situation in relation to more mature graduates, but that there are no significant differences between male and female students. It is also obvious the regional influence in the probability of finding a job, as students that search in the Alentejo region take longer to find a job.

Some of our results are not in accordance to previous findings in similar studies for other countries, like Italy. Therefore, it seems there may be important differences among the countries on the graduates' process to find their first job that should be further analysed.

In terms of policy implications, our results call the attention for the fact that there are fields of study which are more likely to contribute for (structural) unemployment, thereby reinforcing the burden of state financing of universities. Despite this fact, one should not ignore all the demand multiplied effects associated with the existence of universities in economically depressed regions, such as the Alentejo. A cost-benefit analysis of the importance of universities, taking into account the objectives of regional cohesion, must consider the obvious costs of unemployment among their graduates, but also all the benefits (including the externalities, for instance in terms of diffusion of knowledge) for the region where the university is located.

In the particular case of Portugal, future research should also analyse the graduates' success in other Universities, both small and large Universities, in order to better understand the process of transition into the labour market for first degree graduates. As a matter of fact, a better understanding of that process also requires that the geographical (i.e. by regions) localisation of the universities must not be ignored. Besides, other measures of graduates' success should be considered, like the type of job graduates find or the wage levels. Also, future research should consider some other variables which might be important to analyse in the process of graduates´ transition into the labour market, like the socioeconomic background (see Blaskó and Róbert 2007).

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Appendix 1: Variables definition

Age	age in years at the time of entrance in the University
Male	dummy variable. Equal one if student is male
Final Mark	final course mark of the student at graduation (between 10 and 20)
Course duration above average	dummy variable. Equals one if the time to graduate is longer than average in each course.
Search in Alentejo	dummy variable. Equal one if the student search for a job in the Alentejo region
Arthum	dummy variable. Equal one if the course is in Arts or Humanities
Engineering	dummy variable. Equal one if the course is in Engineering or Architecture
Scientific	dummy variable. Equal one if the course is in Scientific areas
Economics and Management	dummy variable. Equal one if the course is in Economics or Management. (this is the reference category)
Social Sciences	dummy variable. Equal one if the course is in Social Sciences
year 200j j=1,2,3,4	dummy variable. Equal one if the student graduates at year j. 2004 is the reference category