FROM ENROLMENT TO GRADUATION: EXAMINING THE TIME TO COMPLETE UNDERGRADUATE STUDIES

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─**Abstract**─

This paper provides an insight into the length of time taken to complete studies in higher education. In many countries a large number of students enrolled in tertiary programmes take longer to complete their studies than the official required duration of the degree.

This longer than necessary time to complete affects available labour resources and defers the entry from higher education into the labour market, reducing the labour supply and reducing tax revenues. This paper examines the determinants of this longer than necessary duration of studies and the techniques used in its analysis.

1. INTRODUCTION

1.1. Background and rationale

The length of time taken to complete studies is a widespread problem and in many countries a large proportion of students enrolled in tertiary programmes take longer to complete than the official required duration of the degree. Along with resource efficiency and associated cost considerations related to this situation, another concern is the relatively late age at which students enter the labour market. This longer than necessary time to complete delays the entry of graduates into the labour market, reducing the labour supply and reducing tax revenues. Furthermore there may be significant effects on the graduate wage premium. For example, Brodaty et al. (2008) estimate returns to education for more than 12,000 young French workers and use the time to complete as a regressor replacing the years-of-education variable. The authors find that a year's delay in completing the studies with respect to average completion times causes a significant 3 percent decrease in the graduate wage and a significant 15 percent decrease in the probability of employment in the first five years after graduation.

Brunello and Winter-Ebmer (2003) surveyed 3,000 Economics and Business College students in ten European countries in the academic year 1999/2000. The authors find that the percentage of students expecting to complete their programmes at least one year later than the required time ranged from 31.2 percent in Sweden, 30.8 percent in Italy, 17.1 percent in France, 10 percent in Germany to 4.6 percent in Portugal, 3.5 percent in the Switzerland, to almost zero in the UK and Ireland. In Italy, Dornbush and Giavazzi (2000) find that although completion in Italian HEIs is expected after four or six years of study (depending on the degree programme) when students are 23-25 years old, the average age at completion is markedly above this (27.7 years) and approximately two-thirds of students leave before the end of their programme. Furthermore, almost one in three Italians in the 25-29 age range are not in the labour force. Häkkinen and Uusitalo (2002) report that the problem of the length of time taken to complete HE studies has been on the agenda of the Finnish government since 1969. In the US, the Department of Education found that in 1999-2000 first time recipients of bachelor's degrees took on average about 55 months to complete the programmes that formally require 45 months (in Garibaldi et al., 2012) and the percent receiving a degree within four years dropped from 57.6 percent to 44 percent between the 1972 and the 1992 cohorts (Bound et al., 2012).

The problem is particularly serious at Ph.D. level. Higher Education Funding Council for England in 2005 (in Park, 2005) found that only 57 percent of UK's full-time (and 19 percent of part-time) students completed their programmes within five years and 71 percent of full-time (and 34 percent of part-time) students completed within seven years. In the United States Ph.D. coursework should take students four years to complete however, less than 20 percent actually obtain a degree within four years; the median time to complete in 2000 was around 5.3 years and the mean is around six years (Siegfried and Stock, 2001).

The above suggests that investigating the specific features that influence students' time to complete is important. How long it takes students to complete their higher education (HE) studies should be of considerable interest to prospective students, since as this time increases the costs of education rise and the expected future benefits fall. An analyisis of existing research is presented next and some of the main variables are presented.

2. LITERATURE REVIEW

The existing research in this area considers several reasons for increases in the time to complete. A large number of studies focus on the availability of financial aid to students both at the undergraduate and the Ph.D. level (Booth and Satchell, 1995; Ehrenberg and Mavros, 1995; Häkkinen and Uusitalo, 2002; Garibaldi et al., 2012). All of these studies with the exception of Garibaldi et al. (2012), used duration analysis. Duration analysis will be presented in more detail in section 2.1.

Four papers investigating specigically the time to complete HE studies are covered in the following critical review. These are the studies by Brunello and Winter-Ebmer (2003); Messer and Wolter (2010), Bound et al. (2012); Garibaldi et al. (2012).

The only cross-national study is the one by Brunello and Winter-Ebmer (2003). The authors try to explain the variation in the expected delay in completing the studies by students. The data is from a survey of more than 3,000 business students in ten European countries. The dependent variable is the expected delay in the time to complete calculated by combining students' self-reported information on the year when the completion of the HE studies is expected and public information on the required minimum number of years needed to complete

the studies in the country. They find that the average expected excess years range from 0.047 in the United Kingdom to 1.2 in Italy. They find that the expected excess number of years is higher for more mature students. More able (self-assessed) students expect to study for a shorter time period as do ones facing higher tuition costs and who expect a higher college wage gap. In terms of the country specific variables, the delay in the time to complete is higher in the following cases: in those countries with a higher unemployment rate for HE graduates, in countries where the share of public expenditures on HE is high and in countries with stricter employment protection.

The second study presented here on the time to complete is by Messer and Wolter (2010). From the dataset of Swiss university graduates in the period 1981-2001, using the Ordinary Least Squares estimation technique, the authors find that an increase in the unemployment rate, while in the third or fourth year of study, has a significant negative impact on the individual time to complete.

The third study is by Bound et al. (2012) for US HE where the authors investigate trends in the completion rates and the time to complete for two cohorts of students (from 1972 and 1988). The aim of the paper is to determine whether the increased time to complete and lower completion rates of the latter cohort are the result of a change in the student population or a decline in resources available. They find that changes in student characteristics (high school math test and reading test quartile, gender and race) and parental characteristics (degree obtained and income quartile) cannot explain the observed increase in the time to complete but these may explain the drop in the completion rates over the period from 1972 to 1988.

The last study by Garibaldi et al., (2012) focuses on the effect of the tuition fees on students' time to complete in one private Italian university (Bocconi). The authors find that a tuition increase of 1,000 euro in the last (fourth) year of studies would reduce the probability of late graduation by 6.1 percent. This suggests that an upward sloping tuition profile is desirable in situations where student effort is suboptimally supplied due to e.g. public subsidies.

Overall, it may be concluded that some interesting theoretical and empirical approaches have been used. This relates to the technique and the level of investigation used. There are cross-country investigations (Brunello and Winter-Ebmer, 2003), comparisons of different time periods for one country (Bound et al., 2012), examination of the time to complete for several consecutive cohorts in one country (Messer and Wolter, 2010) and the analysis of the students from one

HEI (Garibaldi et al., 2012). However, given the extent of the problem of excessive time taken to complete it is surprising how little research has specifically examined this problem.

In the following section, to gain more insight into student (non)completion duration analysis is examined. In such a model, the probability is investigated that the student will complete/leave a degree in a given year conditional on him/her having 'survived' the programme up to that point. This may allow a wider analysis than the one previously presented as it captures both students who have and have not completed their studies and examines the impact of selected variables for the duration of student's HE course.

3. DURATION MODELLING

In this section some of the general characteristics of duration analysis and hazard functions are briefly presented. The focus in duration modelling is not the unconditional probability of an event occurring (e.g. the probability of a student completing his/her HE in exactly 5 years) but the conditional probability (e.g. the probability that a student will drop out in the fifth year of study given that he/she persisted for four years already).

Modelling the time-to-complete using duration or hazard models was first applied in the UK data to doctoral students (in Booth and Satchell, 1995). It was later applied to other levels of tertiary education however the application of duration analysis to PhD level education still dominates in the literature. For the application of duration analysis in HE two papers will be examined. One is by Arulampalam et al. (2004) for UK medical schools, and the second is Häkkinen and Uusitalo (2003) for Finnish HE.

Arulampalam et al. (2004) use use variables reflecting the student's personal characteristics (age, gender, marital status, nationality), prior attainment (A or H-level scores, A-level subjects), previous schooling (type of secondary school attended), socio-economic background (parental social class) and institutional characteristics. Their sample consists of two cohorts of medical students who enrolled in 1985 and 1986 and had completed/not-completed by 1993 when the last data was available. Their results suggest that that the decision to withdraw from medical school is strongly influenced by prior attainment and the student's personal characteristics i.e. students with a higher A-level score and science subjects were markedly less likely to leave their HE studies prior to completion.

Also, gender is statistically significant with male students being more likely to leave. On the other hand, the type of secondary school attended and socio-economic status were found not to be significant in influencing the probability of non-completion. Some of the limitations of their empirical model may be noted. This is primarily related to the method used in analysing non-completion where it is unclear how the authors are capturing students who completed, withdrew or who are still studying. The analysis used employs no time-varying covariates, thus, not capturing how the student environment changes and what effect it may have on the probability of (non)completion. Furthermore, there is a lack of variables that previous research in this area found to be relevant.

The next paper is by Häkkinen and Uusitalo (2003) who examine how the reform of a student aid programme has influenced the duration of studies of 9,350 Finnish students since 1992 when a loan-based system was replaced by a system that relies on student grants. The authors find that older, married and female students have higher completion hazards. The coefficient on the year dummies indicates that the cohorts that entered after the student aid reform of 1992 have significantly higher completion hazards. Also a higher local unemployment rate increases the completion hazard. The main problem related to this work is in distinguishing how the non-completers were defined in the dataset, since at one point the authors state that their dataset cannot define non-completers.

From the above presented literature review it may be concluded that duration analysis and hazard functions have rarely been applied to analyse of HE, though slightly more research exists at the PhD level. The few studies undertaken suffer from serious drawbacks and two main areas of limitations are evident. The primary limitations are related to the modelling technique and the variables used. The main problem here appears in distinguishing among three groups of interest/outcomes: students who are completing, not-completing and students who are continuing their studies with the latter group often excluded from investigation thus reducing the size of the sample. This is not a problem with the original use of hazard functions that were just concerned with survival times, but investigating non-completion in education there is the third outcome (students who are continuing) and this makes the estimation problematic.

4. CONCLUSION

Given the extent of the problem of excessive time taken to complete it is surprising how little research has specifically examined this problem. There are

very few studies using the time to complete or a similar variable as the dependent in empirical work. Furthermore, while there are studies focusing on financial incentives, the labour market situation and tuition fees and their effect on different aspects of the time to complete (e.g. Booth and Satchell, 1995; Ehrenberg and Mavros, 1995; Dynarski, 2003; Häkkinen and Uusitalo, 2003; Angrist et al. 2006; Groen et al., 2008, Garibaldi et al., 2012), they provide no or little evidence of the effect of other student and HEI related characteristics which is the concern in this research. Additional research in this area, other than those presented above, using other variables of the immediate student environment (peer effects, student effort, enrolment intensity, etc.) could not be found. It may be argued that this set of variables is important especially in identifying students who are more at risk of prolonging their studies. In terms of developing appropriate policy proposals it may further be argued that there are advantages in examining the effect of student characteristics on the time to complete in comparison to general economic variables such as the unemployment and wage levels because one cannot easily influence the latter.

Finally, the analysis of the time to complete and the development of the theoretical framework point to the importance of using variables from the immediate student performance and environment. This primarily relates to the variables on peer effects, fee status and student effort. Developing better databases on HE and using such analysis may enable the identification of types of students who are more likely to complete their studies on time and those who are more at risk at taking longer to complete. This may in turn serve to inform HE institutions and the government about the appropriateness of current practices, policies and incentives and to direct attention to the development of necessary support measures.

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