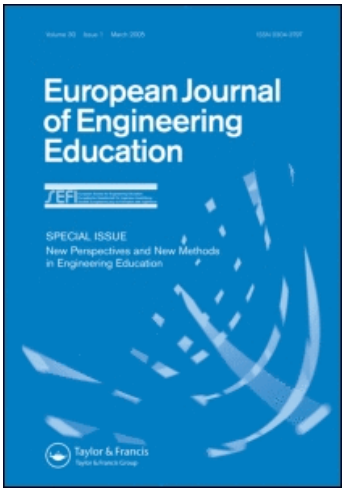

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Graduation and attrition of engineering students in Greece

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Graduation and attrition of engineering students in Greece

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Greek engineering Schools have a high status and attract good students. However, we show that in the leading institution, the National Technical University of Athens, only 27% of the students admitted in 1992–2003 graduated after the nominal five years study: the median graduation time was 73 months (reaching 93 months in one School) and 12% are predicted never to graduate at all, most without withdrawing officially. Results differ between Schools, between routes of admission and by gender (females being better than males). Systematic study of reasons for not completing or delay in completing studies is urgently needed. Overall, 4% of the students withdraw officially during their first year. The percentage of withdrawals by School is negatively correlated with the percentage that gave that School as first choice in the entrance procedure, indicating problems in the admission system.

Keywords: engineering education; attrition; graduation; Greece

1. Introduction

1.1. *Study objective*

University Schools of engineering enjoy a very high status in Greece. Most of the best high school science graduates – apart from those intending to study medicine – are expected to head for the engineering departments of the country's technical universities. Thus, engineering in Greece does not face the problem of declining enrolments that is a serious concern in many countries (Prieto *et al.* 2009). However, there is ample evidence worldwide that these students' success in high school will not guarantee their success at university. In the Greek higher education system, which will be explained below, there is no direct failure at the university level, but it appears that many students take a very long time to complete their studies, or even never graduate at all (without necessarily withdrawing officially from their course). A study by Kalamatianou and McClean (2003) in a Greek social sciences university estimated that as many as 27% of the students who had entered in the years 1983–1992 would never graduate and they found that the median graduation time was 62 months compared with the nominal four years of study in that university. More recently, Katsikas (2009) found that fewer than 30% of the students in a Greek university of economic and social studies graduated on time. Such high rates of dropping-out and late graduation

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imply an alarming waste of time and resources from the points of view of the university and the individual. In science subjects requiring laboratory equipment, the direct costs incurred because so many students drop out would be very high. The purpose of the present study is to examine the situation concerning the engineering students of the country's leading technical university, the National Technical University of Athens (NTUA), in respect of time to graduation and the percentage of students who will never graduate. Furthermore, the analysis looks at some factors that affect graduation and attrition. There are no similar studies of engineering students in other Greek universities nor, in such detail, in other countries. The findings should provide important evidence for debates about higher education in Greece in general as well as in engineering in particular. Following Baillie and Fitzgerald (2000), we believe that it is important 'to identify the potential non-completers at an early stage and also to work out if there are any intervention strategies possible'.

1.2. *University education in Greece*

The transition from school to university in Greece takes place through a national system of university entrance examinations. Before 2000, these were separate from the examinations that give the high school graduation certificate, but one set of examinations now serves both purposes. High school students who wish to go on to higher education submit to the Ministry of Education a list of university departments in order of preference. They are then allocated a place automatically according to their marks and their preferences. The universities have no say in selection and students can only enrol in the department to which they have been allocated as a result of this procedure. There is the possibility of going through the entrance procedure again the following year. There are other modes of admission for much smaller numbers: students from outside Greece, people with severe medical conditions, champion athletes and occasional special circumstances such as victims of earthquakes and forest fires. There is some possibility of transfer between equivalent departments of two universities, usually from a provincial university to one located in a major city. Immediate transfers are available automatically to members of large families and to orphans from low-income families. A restricted number of places are also available on other social grounds such as severe parental illness; these competitive transfers take place later. Higher education in Greece is free but very few students receive any state support for living costs, so these transfers are intended to reduce the problems of poorer families by allowing the student to live at home or with another family member. The high status of NTUA and its location in Athens lead to heavy demand for transfers to it and for entry to the limited number of places reserved for special categories of applicants.

The time required to obtain a degree in Greece is four or five years depending on the subject. Each academic year is divided into two semesters. The courses taught in each semester are examined at the end of the semester, with a further examination period in September for all courses. There is no penalty attached to failing courses. The number of times that an examination can be taken is unlimited and entry to one year of study does not require passing the previous year's courses. Students may officially withdraw at their own request, but this usually happens only if he or she wishes to register in another public university or college. Otherwise, as there is no cost attached to being registered, students tend to remain enrolled even if they are not active.

The NTUA consists of the nine schools listed in Table 1. Each School is one entity for university entrance, even if different degree specialisations are offered (for example, Applied Mathematical and Physical Sciences offers degrees in mathematics and physics, the separation taking place after the first two years of study). The time required to obtain a degree is five years in every school. Courses are taught in the first nine semesters and the student undertakes a substantial project in the 10th semester. Unlike other NTUA graduates, the graduates of the School of Applied Mathematical and Physical Sciences do not have the title of engineer.

Table 1. Rates of official withdrawal from NTUA by school and mode of admission, among students admitted 1992–2003 (for categories omitted, see text), and % of students admitted to their first choice of School.

		Official withdrawals (%)		
	Admissions	Year 1	Years 1–5	First choice (%)[a]
Total	15,541	4.0	5.1	
Architecture	1786	0.8	1.0	93.9
Electrical and Computer Engineering	2973	1.1	2.5	89.3
Civil Engineering	2501	1.9	2.5	64.4
Mechanical Engineering	1985	3.0	3.8	41.1
Chemical Engineering	1982	4.2	5.2	64.3
Naval Architecture and Marine Engineering	689	4.9	5.2	30.6
Applied Mathematical and Physical Sciences	1345	7.0	9.8	n/a
Rural and Surveying Engineering	1333	7.1	8.0	17.0
Mining Engineering and Metallurgy	947	17.5	19.2	11.8
Large families[b]	586	2.3	3.5	
Entrance exams	13,942	4.0	4.8	
Greeks from overseas	522	4.7	7.3	
Others	501	6.6	11.4	

n/a, not available.
[a]Source: Papagiannakis (2007)
[b]Students from families of 3+ children (4+ in earlier years) who transferred to NTUA after admission via the entrance exams to an equivalent department elsewhere.

The Greek higher education system is almost perpetually under debate. Current indications are that a dialogue towards reforming the universities recently announced by the government will revolve around issues of administrative independence and the possible merging of institutions. Drastic structural reforms of courses are not expected. For example, the changes made in Italy to conform with the Bologna system, in part as a response to the problem of lengthy completion times (Agasiasti 2009), are not up for discussion in Greece. Indeed, the climate within Greek universities is against shortening the first degree course, because of the insistence on maintaining higher status than the technical tertiary education institutes, in which the basic course lasts three years. The 'perpetual student' who takes excessive time over his or her studies appears frequently in these debates, although without statistical data. What should be done to improve completion times is largely missing from the debate, although the most recent law regarding university education did impose a limit on a student's enrolment of twice the nominal duration. If this law is in fact implemented, which seems uncertain at the time of writing, it would mean that a student in NTUA would be obliged to complete his or her degree in 10 years or be struck off the register.

1.3. *Factors associated with graduation and retention*

Over 30 years ago, it was already possible for Tinto (1975) to remark on the 'very extensive literature on dropout from higher education' and a huge amount has been added since. A recent review of factors associated with student retention in higher education by Thomas (2002) identifies seven topics that are perceived to influence student success. These are: *academic preparedness* for studying at higher education level; the *academic experience*; *institutional expectations and commitment*; the degree of *academic and social integration* into the higher education institution; *finance and employment*; *family support and commitments* and *university support services*. The area of institutional expectations and commitment covers items such as whether the student is attending his or her first-choice institution, whether they had made a well-informed choice and whether they believe that the quality and prestige of the university will help them to achieve their objective. This and academic preparedness are factors that can be measured at entry to higher education. Much of the literature focuses on these background factors and on sociodemographic

characteristics (Perkhounkova *et al.* 2006; Jones-White *et al.* 2010). Many studies have found factors such as age, place of residence, race or ethnicity and high school performance to be significant predictors of dropping out, as in Murtaugh *et al.* (1999), for example. The remaining topics in Thomas' list describe the interaction between student and institution or the student's current social circumstances. As these may change through the course of the student's university career, their inclusion makes a study more complex because they require frequent measurement (Ishitani and Snider 2006), although they undoubtedly make it far richer. On the other hand, the more straightforward study based on pre-university characteristics can identify early in their university careers the students who are at risk of dropping out and possibly lead to the provision of appropriate support.

The topic of retention of engineering students in particular has been examined extensively elsewhere (Ohland *et al*. 2008), especially in the USA, where 'considering the strong academic record of most students who choose to go into engineering, rates of attrition ... are dramatic' (Felder *et al.* 1998). MacGillivray (2009) quoted high rates from the UK (over 20% wastage in science and engineering) and Australia (48% attrition among males and 40% among females), and Morgan *et al.* (2001) reported that 20% of the entrants into engineering and architecture in Ireland failed to complete their studies. Wolffram *et al.* (2009) quoted about 50% withdrawal from engineering degrees in Germany. We do not expect to find in Greece the same situation that has been described in the USA. One major difference between the two countries is that the Greek system does not offer the possibility of transfer to a different degree course. Furthermore, it is rather difficult to enter a Greek university except for directly from school. Therefore, Greek engineering students know that they are unlikely to be able to obtain any degree except by completing the course they have started. We would also expect to find that the high ability and probably higher motivation of the entrants would lead to better results in engineering than in social sciences in Greece even though, for example, a large study in the UK (Smith and Naylor 2001) found the opposite, at least for males.

Dropping out in the sense of formal withdrawal from the university is important but not the major issue in Greece. More significant is the possibility already indicated, which is that a student will never graduate, although remaining registered, or will take a long time to obtain the degree. In many countries, students must pay for their university education so it is unlikely that they will remain registered but inactive. Furthermore, most education systems demand completion of the course within a certain time. The Greek phenomenon of the 'eternal student' is therefore uncommon elsewhere. However, the system in Spain is another that places few restrictions. Lassibille and Navarro Gómez (2008) investigated students' careers in a Spanish university and found that age, gender, delayed entry, pre-enrolment academic activity and financial support were factors involved in dropping out or continuing. They also noted the importance of whether or not the student had achieved entry into the desired course. Italy is another country where extension of studies beyond the normal length of the course is considered to be a major problem, so much so that a principal aim of recent reforms was to improve the performance of universities in this respect (Agasiasti 2009). Herzog (2006) has remarked that the body of research on time to degree completion is much less impressive than that on retention.

2. Data

Data were taken from the NTUA central database on all students whose initial registration took place in the academic years from 1992–1993 up to 2003–2004. Results on graduation were available up to the end of the calendar year 2009, so that all students who were considered had time to complete the five-year degree programme. In this period, 19,576 students were admitted, of whom 17,568 (89.7%) entered the first semester. The remainder were mostly transfers from

other Greek universities or abroad. Of the students who entered the first semester, 13,932 (79.3%) had passed through the normal channel of taking the national university entrance exams in a Greek high school. From the remaining 20%, we decided to omit from the analysis: (a) students from Cyprus, who have passed through a different educational system as well as another admission system (4.3% of those entering the first semester); (b) students by competitive transfer (4.1%) even though the record states that they started in the first semester at NTUA, because they must already have obtained course credits elsewhere; (c) entrants through a special system of examinations for graduates (2.2%), who are older than other entrants (average 26 years) and presumably with different motivation from school leavers and (d) foreign nationals from outside Greece and not of Greek background (0.9%), who may have language problems. After these omissions, the analysis commenced with 15,541 students.

The path of students through the NTUA towards graduation was examined in respect of: (a) withdrawal rate, (b) time to graduation and (c) failure to graduate. Factors known at the time of entry that were examined for their association with these outcome variables were: (a) School of study, because the learning climate may vary between Schools and students' motivation might also depend on how they perceive the value of the degree in the labour market (for example, Electrical and Computer Engineering versus Mathematics); (b) mode of entry, because students of different categories may have different motivations and different levels of academic ability (for example, those who have succeeded in the entrance examinations versus athletes); (c) gender – the study by Kalamatianou and McClean (2003), which examined only gender as a factor associated with outcome, showed better outcomes for females than males and (d) the year of entry, because of the long period under study. Age at entry was not considered because of the homogeneity of the data (91.8% were 17–19 years old and 98.4% were 17–20 years old). The family's place of residence was not considered because it was not recorded for about a quarter of the cases, and in the rest, it was predominantly Attiki (89%), the region around Athens. It is unfortunate that no indicator of socioeconomic class, such as father's occupation, was available for investigation. Social class is widely regarded as an important correlate of withdrawal from university, for example, in the UK (Longden 2004). Although gender was investigated for possible association with completion, it should be noted that female entrants represented 35.1% of the total. Thus, the problem of female recruitment into engineering courses does not arise to the same degree as in some other countries (Wolffram *et al.* 2009).

3. Withdrawals

Although the large majority of the entrants to the Schools of Architecture and Electrical and Computer Engineering had made this their first choice, the same is not true of the other schools (Table 1).

Many entrants to the other schools would have preferred another engineering department, but did not obtain high enough marks in the entrance examinations. Thus, although society may believe that the student has excelled in entering such a high-profile institution as the NTUA, the truth may be that he or she has missed the principal target (electrical engineering, say) and entered an unsuitable course of study, with little idea of what the subject (mining engineering, say) is really about. This might contribute to the relatively high number of official withdrawals within the first year. (Some of these students withdraw just before the start of the second year, after repeating the entrance examinations and obtaining admission to another course that they believe to be more appropriate.) In total, 803 of the 15,541 students (5.2%) withdrew within the time span of this study, 789 of them (98.3% of withdrawals) within their first five years at NTUA and 625 (77.8% of withdrawals, 4% of entrants) in the first year. Table 1 shows the variation in withdrawal rates by School and mode of entrance. For comparison, the withdrawal rate among

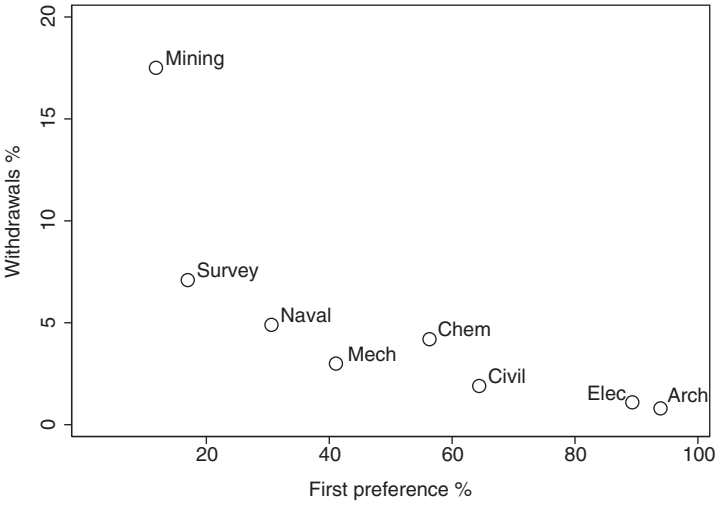

Figure 1. Percentage of students who withdraw in the first year by percentage who gave that school as first choice.

students from Cyprus, who are not included in the analysis, was only 0.5% in the first year and 1.2% in five years, and among competitive transfer students (likewise not included) 0.7% and 1.1%, respectively.

Data on the student's preference for the school were not available in this set of data. In order to support the possible association between preference and withdrawal that was proposed above, data (Table 1) were taken from a survey of 1354 NTUA graduates in 1996–2001 (Papagiannakis 2007). Figure 1 shows clearly that the higher the percentage of students who gave their School of study as first preference, the lower the percentage of withdrawals in the first year. Another factor that might also contribute to more withdrawals in the Schools of lower preference is the lower average ability of their students. However, only the School of Mining Engineering and Metallurgy has markedly lower entrance standards than the others. (Further information on entrance standards can be found in the Discussion.)

More detailed analysis of the probability of withdrawal in the first year in relation to School, mode of admission, gender and year of entry was carried out by logistic regression. Besides the large differences between Schools and modes of admission, the analysis identified statistically significant differences between years but not by gender. There were also two statistically significant interactions, between school and year (time trends in withdrawal rates varied between Schools) and school and mode of admission (differences between modes were not the same in every School) but these were small and they do not affect the general picture.

Although most students who withdraw officially do so quickly, so that NTUA incurs only some administrative costs, their withdrawal from the NTUA represents a considerable cost to society. At least in the case of the students admitted through the entrance examinations, their admission denied a place to someone else. However, because the wrong choice of course of study is an indication of defects in an admission system into which the NTUA has no input, it seems appropriate for an analysis of students' progress within NTUA to omit those who withdrew in the first year. After this, 14,916 students remain for further analysis.

4. Time to graduation

The time to graduation was analysed using standard methods for lifetime data analysis (Lawless 2003). An item of basic interest is the survival curve $S(t) = Pr(T > t)$, where the random variable

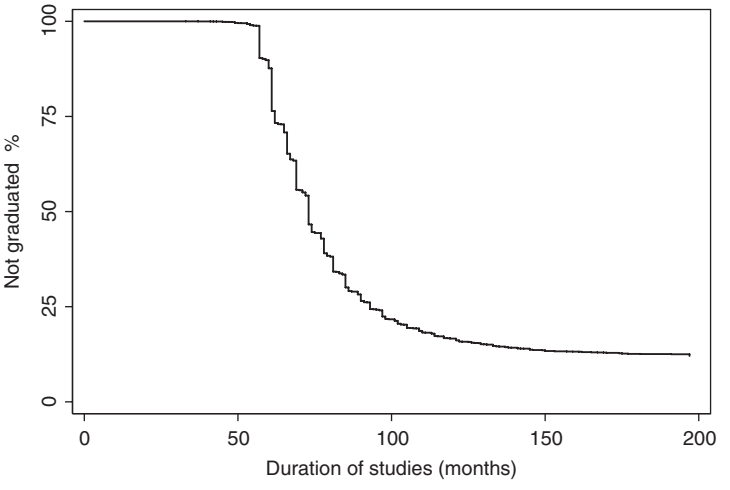

Figure 2. Kaplan–Meier estimate of proportion of students who have not graduated: total sample.

T represents the time until graduation. This is estimated not only from the observed graduation times but also from the times of students who have not yet graduated. A student who is still studying after time τ contributes information of the form $T > \tau$, instead of $T = \tau$; this is known as a right-censored observation and it must be incorporated into the estimation of $S(t)$. Students who have not yet graduated were treated as right-censored observations at the current duration of their enrolment. Students who withdrew after their first year were treated as right-censored at the end of the study period in 2009 so that they are counted among those who never graduate. The graduation date was the time of completion of all requirements, not the date that the degree was conferred.

Figure 2 shows the Kaplan–Meier non-parametric estimate of $S(t)$ for all 14,916 students. It can be seen that the median graduation time ($S = 0.5$) is about 73 months, compared with the official duration of five years. The upper quartile ($S = 0.25$) is about 93 months; in other words, a quarter of the students have not graduated almost eight years after enrolment. But what is particularly noticeable is that the curve does not appear to be tending towards the horizontal axis, but is levelling off at about $S = 0.12$. In other words, it appears that about 12% of these students will never graduate. The estimate is actually 12.4% with 95% confidence interval 11.6–13.1%.

Figure 3 shows a substantial variation between the separate Kaplan–Meier estimates for each school. Graduation rates are lower for Marine Engineering and in the School of Applied Mathematical and Physical Sciences. Graduation rates in Architecture are very low initially but increase rapidly so that after 10 years that school has the highest graduation rate of all. These differences are seen more clearly in Table 2 showing the median graduation times in each School, the probability that a student has not yet graduated after five, six and 10 years and the estimated probability of never graduating. The nominal graduation time is five years. No School graduates even half of its students in this time (even though we counted graduations up to the next November in order to allow for not only the September examination period but also subsequent examination of the project). Overall, 73% of the students had not graduated after five years, ranging from 52% in Chemical Engineering to 98% in Architecture. Electrical and Computer Engineering starts with a relatively good graduation rate compared with most schools but rather unexpectedly ends with the highest estimated rate of non-graduation. The reason for this could only be identified by a study of reasons for non-completion, but we speculate that these students might have found adequate employment in the private sector and thereby have lost motivation for completion.

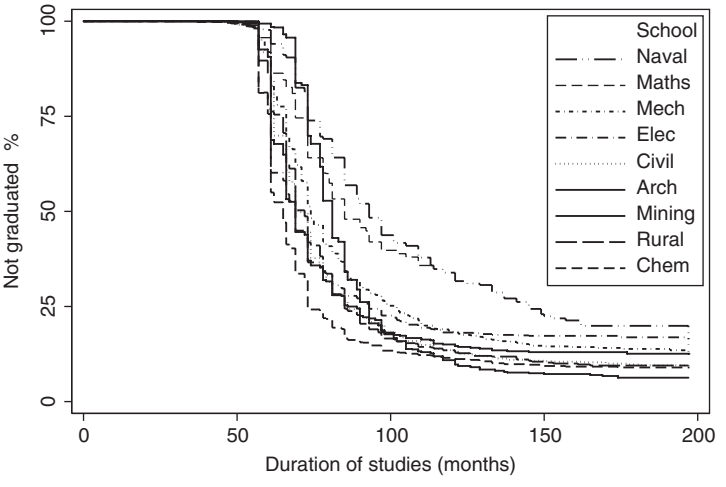

Figure 3. Kaplan–Meier estimate of proportion of students who have not graduated, by school. The order of schools in the key is the same as the order of the estimates at 100 months, from top to bottom.

Table 2. Kaplan–Meier estimates of times to graduation by school (standard errors in parentheses).

	Median Graduation time (months)	Percentage not graduated after			Probability (%) of never graduating
		5 years	6 years	10 years	
Total	73	73.3 (0.3)	44.6 (0.4)	15.9 (0.4)	12.4 (0.4)
Chemical Engineering	65	52.4 (1.1)	24.2 (1.0)	11.2 (0.8)	9.0 (0.8)
Electrical and Computer Engineering	69	60.2 (0.9)	36.6 (0.9)	18.1 (0.9)	16.4 (1.0)
Mining Engineering and Metallurgy	69	67.7 (1.7)	35.8 (1.8)	14.4 (1.4)	12.6 (1.4)
Civil Engineering	70	69.9 (0.9)	37.7 (1.0)	12.6 (0.8)	9.0 (0.9)
Rural and Surveying Engineering	72	75.4 (1.2)	41.0 (1.5)	12.7 (1.1)	9.5 (1.1)
Mechanical Engineering	74	80.4 (0.9)	48.2 (1.2)	17.8 (1.0)	12.8 (1.1)
Architecture	81	98.4 (0.3)	67.8 (1.2)	9.4 (0.9)	6.3 (0.9)
Applied Mathematical and Physical Sciences[a]	85	86.3 (1.0)	64.1 (1.5)	n/a	n/a
Naval Architecture and Marine Engineering	93	94.0 (0.9)	73.9 (1.8)	31.7 (2.2)	14.9 (3.5)

[a] In operation for less than 10 years. The rate after 9 years is similar to Marine Engineering.

Figure 4 shows the Kaplan–Meier estimates for each mode of admission. The differences between modes are larger than the differences between Schools. As might be expected, the students who entered through the highly competitive entrance examinations have the best graduation rate, although it is estimated that even of these 9.9% will never graduate (95% CI, 9.1–10.6). The 'other' category has the lowest rate, with more than half (53.6%, 95% CI 46.7–60.6) failing to complete their studies. This category includes athletes, who do not necessarily have high academic qualifications, and people with severe health problems.

Separate Kaplan–Meier estimates were also constructed for each gender and each year of admission. These are not shown for economy of space. The curves by gender show that male and female graduation rates are almost the same up to about 75 months, after which the females have a higher percentage of graduation than males. The estimated percentages of students who fail to graduate are 8.0% of the female students (95% CI, 6.8–9.1) and 14.6% of males (13.6–15.6). The corresponding estimates among Greek social science students were 23.9% and 32.0%, respectively (Kalamatianou and McClean 2003). The curves by year of entry show much smaller differences than for the other factors and there appears to be no general time trend.

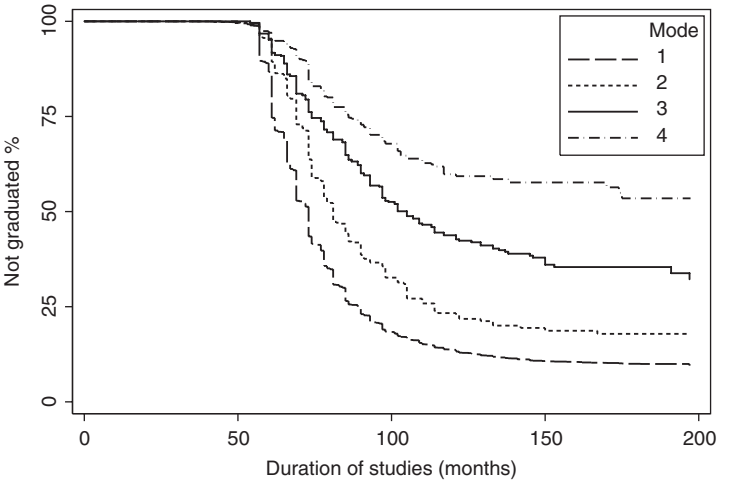

Figure 4. Kaplan–Meier estimate of proportion of students who have not graduated by mode of admission (1 entrance examinations, 2 large families, 3 Greeks from overseas, 4 others).

A semi-parametric Cox regression analysis (Lawless 2003) was carried out to examine the simultaneous effect of gender, school, year of entry and mode of admission on the time to graduation. For another application of this method in the context of time to passing first-year exams in a Dutch university, see Bruinsma and Jansen (2009). Apart from the statistically highly significant main effect of each factor, there was also an interaction between gender and School. This arose because the gender difference was smaller in the Schools of Civil Engineering and Mechanical Engineering than in other schools.

5. Discussion

Even though the unemployment rate among graduates in Greece is very high, demand for higher education has remained very strong (Liagouras *et al.* 2003). The demand for particular courses of study seems to reflect a mixture of perceptions of status and employment opportunities. An indicator of the demand for a course from good students is the 'base'; this is the lowest mark in the university entrance exams of the candidates who are admitted to that course and predictions for the year's bases are a prominent topic in Greek newspapers. Some of the highest bases are for courses in the military and police academies. This is presumably because graduation leads immediately to a career. Omitting these, which take only small numbers of students, most of the top 20 courses now as for many years previously are medical, dental and pharmacological courses. These lead to professions of high status, even though the career prospects are uncertain because of the very high numbers of doctors and dentists per capita in Greece. The NTUA Schools of Civil Engineering (3rd), Electrical and Computer Engineering (4th) and Mechanical Engineering (7th) occupy very high places in this list, while Naval Architecture and Marine Engineering is 18th. (Architecture would also be high, but cannot be compared directly because applicants take extra examinations.) Civil Engineering and Electrical and Computer Engineering at the University of Thessaloniki in Greece's second city are also in the top 20 (10th and 14th, respectively). The highest placed non-science course (17th) is the Law School of the University of Athens. Law is another profession of high status but seriously overcrowded. The top 20 is completed by two departments of primary school education. The fact that these departments attract such highly qualified students is surely attributable only to the fact that at the present time their graduates can

expect to be appointed immediately to posts in schools. The picture presented by these data is that prestige and employment opportunities are both important in Greek high school graduates' choice of university courses. Engineering has high prestige and the high demand for places in some departments could also be driven by the hope of better employment opportunities compared with graduates in, say, mathematics, physics, chemistry and biology, who may find that there are few openings in their subjects apart from teaching. On the other hand, some engineering departments (notably Mining Engineering and Metallurgy, 101st in the list) are not perceived as offering many career opportunities. Indeed, a very recent survey (TEE 2009) of qualified engineers reported an unemployment rate of 14%, twice the overall figure, among mining engineers, second only to chemical engineers (15%).

Our results show the serious dimensions of the problem of the 'perpetual student' even among students of very high ability who should have, in most cases, better employment prospects than the average Greek graduate. The even worse rates found by Kalamatianou and McClean (2003) in social sciences might be more typical of the picture throughout Greece. The possible imposition of a limit on a student's enrolment of twice the nominal duration is simply an administrative response to the problem. The law offers no new educational initiatives to support the student, instead it seems to assume simply that the solution to the problem lies in the students' own hands. We believe that a systematic investigation of reasons for not completing or for delay in completing is urgently needed in order to guide how studies in engineering and other departments in Greece could be reorganised.

Some of our observations relate directly to the admission system. Although the transition from school to university is always at the centre of debates about the educational system, the discussion mostly concerns the details of the system of school leaving/university entrance examinations. It is a surprise to find then, that direct admission to NTUA from school in this way accounted for only 13932/19576 (71.2%) of the entrants in the period under study. That is, nearly 30% entered by other routes. Among the direct entrants, it is well known that many students who enter NTUA have chosen the institution because of its high prestige and the fact that it is located in Athens, but are not in the School that they would have liked to be in. The relatively poorer results in some Schools could be correlated with this. Changing the admission system so that the Schools get the opportunity to exercise some choice, appears to have little support. A possibility that has been raised is giving students the opportunity to learn more about the subject through a preparatory year. Furthermore, the fact that students who enter NTUA through certain admission procedures have extremely poor prospects of graduating is something that also needs to be recognised and studied so that these procedures can be improved and the students provided with appropriate support.

No data on the student's career within NTUA were available for the present study. It should be possible in the future to extend the study by including year-by-year data on examination results. It might be, for example, that poor early results are a predictor of continuing difficulties later on. Many studies, for example, Hussey and Smith (2010), comment on the major transition that the student has to make in order to move successfully from high school to university education. However, a fuller understanding of the process of graduation seems to demand special surveys in order to obtain quantitative data beyond those that exist in administrative sources, as well as in-depth interviews with students in order to obtain qualitative data. Major factors affecting a student's graduation might be expected to include the changing financial, occupational and family circumstances as the student grows older. Studies elsewhere have repeatedly identified financial factors as major influences on student careers (Tinto 1982; Bennett 2003). The role of these factors in Greece is suggested by the results of a study by Xenos *et al.* (2002) of causes of dropping out from the Hellenic Open University. Although the Open University operates through distance learning, there is some similarity because most students of conventional universities who have gone well past the normal length of study are unlikely to be frequent attenders at their university. It was found that occupational reasons (such as heavy work load or changed work

requirements due to transfer or promotion) were given most commonly for dropping out, in 62% of the cases. It seems reasonable to suppose that occupational reasons are also a strong determinant of delayed graduation or failure to graduate from conventional Greek universities – and family socioeconomic status might be strongly involved through the provision of financial support – but this is only a speculation until further studies have been carried out.

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