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Student Status and Academic Performance: an approach of the quality determinants of university studies in Greece

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Elias Katsikas[#] and Theodore Panagiotidis[*]

ABSTRACT

This study employs administrative and survey data to assess the impact of students' socioeconomic background on educational outcomes. The academic and social profiles of 867 students, studying in a university of Economic and Social Studies, are analyzed by means of Ordinary Least Squares and Quantile Regression Methods. We take into account of the existing institutional framework which gives rise to substantial differentiation in the duration of studies among students. Thus, besides examining the influence of students' status – working and non-working – on degree grades we also examine whether the documented negative influence of long duration of studies on grades is associated to students' status. The findings reject both hypotheses; working students do not achieve lower grades than their non-working peers; the negative impact of the length of studies on grades is not linked to status, and affects both working and non-working students in the same way. The prolonging of studies seems to be an institutional effect deriving from the conditions of schooling rather than from students' financial circumstances.

Keywords: working students, academic performance, duration of studies, educational settings.

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1. Introduction

The expansion in the number of university students across the OECD countries in the last two decades has raised a number of concerns regarding the quality of studies in the higher education institutions. Research has drawn attention on three possible negative influences. The first is the fall in the entry qualifications. Less motivated and/or less able students, considered unsuitable for higher studies in the past, are now given an opportunity to access higher education institutions (Cuthbert, 2003; Hampshire, 2009). The second concerns falling resources. In many countries spending in higher education did not keep apace with the rising number of students (OECD, 2007); thus spending per student has declined, with implications on the quality of teaching (Ghosh and Rodgers, 1999; Rodgers and Ghosh, 2001). The third stems from potential changes in the students' social composition. The expansion in the number of students may have increased the participation of students from lower socioeconomic background. Thus, the fraction of students who have to work in order to finance their studies may also have increased impacting adversely on academic performance (Bratti, Checchi and de Blassio, 2008; Metcalf, 2003).

These three concerns are also relevant in the context of higher education in Greece. Over the last 25 years Greece, following the example of its European partners, has expanded the number and the diversity of higher education entrants substantially. Taking into account both types of tertiary education institutions, Universities and Technological Institutes, the number of new students, passing through the traditional mode of general examinations, quadrupled; from 21,642 in 1980 it went up to 40,840 in 1994 and then to 82,225 in 2000 (ME, 2008). The expansion in the number of entrants in association with the dramatic fall in the number of school leavers has brought Greece into the group of countries with the highest enrolment rates[1]. In 2009, for example, 91,320 candidates competed for 83,490 available places (91%) divided roughly equally between universities (40,180 places) and Technological Institutes (43,310 places) (ME, 2009b). At the same time there was a parallel increase in the number of students entering universities through other modes. Today, non-traditional qualifications students represent about 15% of the student body but their allocation between institutions and subjects varies considerably (Lakasas, 2007; ME, 2009a).

[1] In the year 2006 the Ministry of Education (ME), reflecting public concerns about falling entry qualifications, introduced a new clause stating that candidates in order to be considered for a place in higher education should achieve in the entry examinations an average score of 10 (out 20) over all tested subjects. This entry constraint affected primarily the number of entrants in the Technological Institutes. Thus, in the entry examinations of 2008 the available places for the Technological Institutes were 43,310 but only 26,004 of the candidates managed to exceed the minimum required score. Unlike Technological Institutes, the number of university intakes increased from 14,200 in 1980 to 40,205 in the year 2000 and fell slightly to 39,210 in 2008.

The purpose of this study is to assess the impact of students' socioeconomic background on educational outcomes in Greece[2]. The study focuses on the relative performance between working and non-working students but the relevance of other socioeconomic variables is also examined. The findings of this exercise are used to explore further the long duration of studies, one of the main characteristics of the Greek university system. To accommodate unfamiliar readers and position the research question into context, it would be useful to provide a brief account of the institutional framework and the recent research findings in the area.

Since the restoration of democracy in 1974 Greek students enjoyed a highly permissive regime which allowed for an unlimited time frame for the completion of studies. There were no rules in place for students to show progress in each semester or year. In practice, once students had succeeded in entering a university department they acquired an attribute that accompanied them for life. Moreover, students had the right, until attaining a pass mark, to repeat the exams of a course unlimited times. The repetition of the exams did not presuppose repeating the course since for the overwhelming majority of university studies attendance at lectures was, and still is, not compulsory.

[2] There exists an extensive literature in Greece regarding the equality of opportunities in accessing higher education institutions. Several authors have suggested that candidates coming from families of more educated parents and of higher socioeconomic background concentrate higher probabilities of tertiary education entry (see for example, Chryssakis, 1991; Chryssakis and Soulis, 2001; Katsikas and Kavvadias, 1994; Kiridis, 1997). These findings, however, have been challenged by studies which rely on detailed (micro-) data, use directly economic variables instead of social proxies, and adopt a tighter methodological and analytic frame (see for example, Papas and Psacharopoulos, 1991; Patrinos, 1992; Psacharopoulos and Tassoulas 2004; Tsakloglou and Cholezas, 2005). As a matter of fact these studies provide evidence of opposite effects, namely that the higher the family income the lower the probability of university entrance.

This framework became synonymous with two symptoms. First, for a large number of students university studies turned out to be studies at a distance. Absenteeism was a widespread phenomenon and on occasions it could reach levels as high as 90% (Psacharopoulos, 1988).

Second, students who complete studies at the expected length of degrees represent a minority. Research at three university institutions has shown that the proportion of these students ranges from 12% to 27%; the majority prolongs studies beyond the expected duration of the programme, some times by many years (Chatzipantelis, 2004; Kalamaras and Kalamatianou, 2006; Kalamatianou and McClean, 2003; Katsikas and Katranidis, 2006). Further, it has been documented that the prolonging of studies is strongly associated with degree grades. It has been estimated that each additional year of staying at the university is associated with a fall in students' grade-point average (GPA) by half of a unit. The longer the time a student needs for the acquisition of his/her degree the lower the grade-point of the degree (Katsikas and Dergiades, 2009).

The subject of this research has been largely prompted by the above evidence; to explore the relationship between long duration of studies and falling grades. The research question raised in this paper is whether the two variables are linked through the incidence of working students. The paper is structured in the following way. In section 2 we discuss the data and the relevance of the variables used in the context of the Greek university system. Section 3 deals with a methodological question and briefly reviews the literature. The model

and its method of estimation are presented in section 4 while section 5 presents and discusses the results; section 6 offers an alternative interpretation for the duration of studies and section 7 concludes.

2. Data and background information

Our data set refers to a sample of students that entered the *University of Macedonia, Economic and Social Studies* (UoM) in two consecutive academic years 1998 and 1999. Students of these two cohorts have already completed 10 years of studies, thus providing us with sufficient time-span for assessing the academic progress of each one of them i.e. whether they have already acquired their degree, the years required for the acquisition of the degree, and the average grade of the degree for those who have completed studies. Although in principle the time-span of our research could be increased by going further backwards, such an increase would have been achieved at the cost of reducing the number of the departments included in the research. Between 1996 and 1998 three new departments were added to the already existing (five) departments of UoM. With the exception of one department − *Music Studies and Art* − the subject of economics is a major or joint major. Of the ten departments operating in UoM today eight are included in the sample. Two departments have been in existence for less than six years and for this reason they were excluded from the study.

To assess the impact of status on students' grades we combine information from both administrative and survey sources. The information concerning the academic profile of students comes from the secretariat of the departments and includes:

The *GPA* achieved by the graduates. It is measured in the scale of 0 to 10 (maximum); the pass mark on all courses is 5.

The actual *duration of studies* for each one of the graduating students measured in additional years over the expected duration of the programme which is 4 years. Students who failed to graduate within 8 years will be considered as drop-outs. The choice of 8 years as a dividing line reflects the maximum time a student can stay at the university, following legislation put forward in 2007[3].

Gender; our sample comprises 319 male (37%) and 548 (63%) female students and is fairly close to the gender composition of the student population which is 38.4% and 61.6% respectively.

The *permanent family residency*; it gives an account of the differences in the private cost of studies among students. No tuition fees are charged in the Greek system; food, traveling expenses and above all, rent for house accommodation, comprise the greatest bulk of private expenses (Psacharopoulos and Papakonstantinou, 2005). In our sample 37% of students' families live within

[3] According to the legislation enacted in 2007, students will drop out from universities if they fail to graduate after 2*n* years of studies, where *n* is the expected length of degrees and it is varying between disciplines from 4 to 6 years , or if they fail to pass a single course after 8 attempts. The drop-out rate for our sample is 7.4% after 8 years of studies (see Table 1).

the university's region and 63% come from the rest of Greece. The sample and the population distributions on this account are identical.

The *entry score* in the university entry examinations; it plays the role of student's initial qualifications.

The *rank of the department of entry*; candidate students rank the courses they want to follow; they are asked in advance to express (rank) their preferences in descending order. This was done prior to their university entry examinations. It has to be noted that the process of ranking concerns preferences among relative courses, that is courses falling within the chosen direction (broad disciplines) on which candidates have decided while at the secondary school.

The *age of the student when entering in the university*; prospective students take the university entry exams immediately after finishing the secondary school. Thus, their university entry age rarely exceeds 20 years; for the vast majority of entrants age ranges from 17 to 20. Those who fail to pass the exams in their first attempt or pass to a department ranked low in their preferences may take a second or a third attempt. It is interesting, therefore, to see whether the number of attempts to enter university affects subsequent degree performance.

The *department of study*; all students admitted in our institution take the same entry exams; thus, their educational background is similar. Their allocation however in the various departments depends on a combination of their ranking

on the one hand and the achieved score in the exams on the other. Given that the number of students that are admitted in each department is centrally determined, it follows that departments with high demand maintain high entrance thresholds − defined as the minimum required score to enter a department − and receive accordingly a high proportion of relatively better candidates.

The information concerning the *status* of students – working or non-working – comes from a survey conducted by means of a structured questionnaire (phone interviews). University leavers were asked to provide information on the following questions: Whether they worked alongside studying and the type of employment specified as part time or full time. Fewer hours than the normal working day or fewer days than the 5-days week were classified as part time employees. Ex-students were also asked about the stage (year of study) at which employment commenced; they were also invited to give their judgment as to whether their engagement in paid employment affected negatively the process of studies. Finally, respondent students were asked about the level of education of their parents.

To preserve the homogeneity of our sample we have included only students that entered UoM through the system of general examinations. All other categories of students, with non traditional qualifications, were excluded. This second group of students is highly heterogeneous with regard to their qualifications and hence abilities to pursue a university degree.

The total number of students that entered the eight departments of UoM via the mode of general examinations in 1998 and 1999 is 1,728 students. Of these students 128 or 7.4% failed to graduate after 8 years of studies. Of the remaining 1,600 we managed to contact and compile questionnaires for 867 students, that is, 54.2% of the reference population. This number (867) represents our final sample on which estimation is conducted and is composed by 303 working and 564 non-working students, 35% and 65% respectively. The proportion of working students found in this survey is slightly higher than that reported by two other studies conducted at different places and in different times; they both converge on the conclusion that the proportion of working students is above 30% (Katsikas, 2009; Papadimitriou, 1991). Neither of these studies deals with the question of how students' employment impacts on their performance.

The failure to contact the entire population of the graduated students is due to a variety of reasons: lack or not accurate recording of phone numbers; changed phone number either because they changed also domicile or for some other reason (privacy for example); failure to achieve a response after several call trials; refusal of a small number of ex-students to participate in the survey; no further effort to contact ex-students living or studying abroad.

We have no reasons to believe that the above introduces a bias into our sample. Table 1 reports the descriptive statistics of our sample. The GPA of the graduated students (second row in the table) is close to the score of students

incorporated in the sample (third row in the table). The data do not display differences in performance between working and non-working students. By way of contrast, the rest of the reported variables, duration of studies, rank of the department, age, and department of study seem all to have a strong impact on achievement. It remains to be seen whether these effects persist after controlling for students' initial qualifications.

Table1. Summary statistics on key variables

Variable		Males	Females	All
Completion rate (after 8 years of studies)	(N=1,728)	89.5%	94.3%	92.6%
Average grade of the graduated students	(N=1,600)	7.08	7.26	7.20
Average grade of the contacted students	(N= 867)	7.03	7.22	7.15
Degree grade over the status of students				
Working 303 (35%)		7.00	7.20	7.12
Non-working 564 (65%)		7.04	7.22	7.16
Degree grade over the duration of studies				
4 years (the expected length of degrees)		7.48	7.59	7.56
5 or 6 years		6.95	7.01	6.98
7 or 8 years		6.29	6.73	6.54
Degree grade over the rank				
1-3		7.17	7.31	7.26
≥4		6.92	7.14	7.06
Degree grade over the age of entry				
17 or 18 years		7.23	7.33	7.29
>18 years		6.87	7.11	7.06
Degree grade over the department of study				
Economics		6.75	6.96	6.90
Business Administration		6.82	6.92	6.89
Accounting and Finance		6.94	7.07	7.01
Applied Informatics		7.50	7.44	7.47
Education and Social Policy		7.38	7.72	7.68
European and International Studies		7.61	7.77	7.71
Balkan and Slavic Studies		7.42	7.43	7.43
Music Studies and Art		8.20	8.55	8.43

3. A caveat on the methodology

Since we focus on degree grades as a means of comparing performance between working and non-working students our sample has been drawn from the population of students who have graduated within 8 years of studies; those who failed to do so were left out of the investigation. Proceeding in this way may raise two types of questions; the first concerns the choice of the index. From a socio-economic point of view, the effect of status on students' withdrawals is probably more noteworthy than that on grades (MacFarlane, 1993; Powdthavee and Vignoles, 2008; Yorke, 1998). This is evidenced in the relative volume of literature; students' financial and social circumstances have been analyzed more extensively in relation to retention and completion rates than in relation to grades (see for example, Davies and Rudden, 2000; Dynarski, 2005; Ishitani and Desjardins, 2003; Jones, 1990; Singell, 2004; Martinez, 2001; Martinez and Munday, 1998. A recent exception focusing on grades is Callender, (2008).

The choice of the appropriate index of performance cannot be abstracted from the institutional framework in which the research is conducted. The emphasis of the literature on drop out rates is associated with the implicit mechanism through which the effect takes place. It is the rising tension between the time spent on work on one hand and studies on the other that drives students to withdraw (Bennett, 2003; McNabb, Pal and Sloane, 2002). In this respect the focus on drop out rates is justified by the fact that the highest rates of attrition

in most western countries take place during the first or second years of studies (Johnes and McNabb, 2004; MacMillan, 2005; Yorke and Thomas, 2003).

In the Greek university framework, however, tension in time is not an operational mechanism. The unlimited timeframe allowed students to take a slower path to their studies, that is, to participate in the exams of as many courses per semester as required in order to cope successfully with both employment and studies. Consequently, students' withdrawal takes place at much later stage than it does in other countries. As a matter of fact it is difficult to draw a line between active and withdrawn students. Even students that stay at the university longer than 10 years cannot be considered as definite withdrawals. It has been estimated that approximately one out of three of those students staying at university longer than 10 years will manage to acquire his/her degree at a later stage (Katsikas and Dergiades, 2006). Failure rates, therefore, defined here in accordance with the new legislation at eight years of studies, i.e. after 4 years beyond the expected length of degree, cannot be regarded as the effect of the rising tension between work and studies (see also note 3).

Degree grades, on the other hand, might be more sensitive to students' status than drop out rates. This may stem from the institutional nature of our programmes. University studies in Greece are assumed to be full time. Formally speaking, part-time status of students and programmes does not exist. The implication is that working students are usually unable to attend lectures

and classes. This internal inconsistency of the system – full-time programmes and part-time students – might be the causal factor behind the strong association between grades and duration of studies. Students who need many years to acquire their degree are probably the working students; they try hard but nevertheless face difficulties in passing the course exams; these difficulties are reflected in their low degree grade.

If this hypothesis is correct, i.e. working students achieve lower grades than non-working students, then, status may also be related to failure rates. This may occur in an indirect way. Bennett (2003) describes an iterative procedure through which employment may affect drop out rates; high levels of stress, caused by students' efforts to balance long periods of paid employment and academic study, might adversely affect students' grades; in their turn, low grades may act as a de-motivating factor leading, potentially, to students' withdrawing.

This possibility brings us back to the second point noted above concerning the methodology adopted in this study. Excluding from the sample students who have not graduated, our analysis cannot take a full account of the impact of status on grades. We may think, for example, that some of the non-graduated students have already abandoned studies due to their low scores achieved in some tested courses. To take a full account of the effect of status on grades we should be able to incorporate the average score achieved by the non-graduated students as a grade outcome. We were unable to retrieve this information.

The importance of this analytical weakness should not be overestimated. The probability for Greek students to abandon studies because of low course grades is very small. The emphasis of university studies in Greece is on 'passing' the courses and 'getting' the degree rather than on the grade of the degree. Probably this is associated to the way that university degrees are evaluated by the labour market; the process of job attainment seems to be more important than personal ability in obtaining employment (Patrinos, 1995). At any rate the side effect of grades on attrition is provisional on the assumption that grades are, at first place, affected by students' work.

4. Model specification and estimation

Degree performance is measured by GPA and represents our dependent variable. This is calculated as a simple average of all grade courses the number of which ranges from 40 to 50 for each department. In the Greek grade system grades are given in numerical values that range from 5 to 10 and are fairly precise in the sense that it contains an integer number and a fraction of two decimal points (for example, 7.15). Thus, between two consecutive integers we can have, potentially, 100 different observations. This allows us to treat GPA as a continuous variable and apply standard regression techniques in the analysis of data. The general specification of our estimated model is represented by equation (1):

$$GPA = Constant + \beta_1 Years\ of\ Studies + \beta_2 (Years\ of\ Studies)^2 + \beta_3 Gender + \beta_4 Family\ Residence + \beta_5 Age\ of\ Entry + \beta_6 Score\ in\ Entry\ Exams + \beta_7 Rank\ of\ the\ Department\ of\ Entry + \beta_8 Department\ of\ Study + \beta_9 Status\ of\ Students + \beta_{10} Parental\ Education + error\ term. \quad (1)$$

The meaning and the relevance of all right-hand variables have been discussed in section 2. A quadratic term of the years of studies is included to capture the rate of fall of students' grades with the addition of years of staying at the university. Table 2 below summarizes all right hand-side variables included in the model as well as their specification.

Table 2. The right-hand side variables

Variable	Specification
Duration of studies	Actual years of studies minus 4. The derived estimate will measure the average fall in the grade of the degree for each additional year of studies. Thus, for students completing studies after four years we use the value of zero, for those needing 5 years the value of one and so forth up to 4 years of delay.
Gender	0 for Men, 1 for Women
Family residence	0 for Thessaloniki, the university's location 1 for elsewhere
Age of university entry	We create two age bands and give the value of 0 for ages of 17 and 18, 1 for the rest. It captures the effect of the number of attempts to university entry.
Score in entry exams	This is a continuous variable. To normalize score differences observed between the two cohorts we use relative entry scores. Thus, we divide the entry score of each student by the respective entrance threshold of the Department of Economics
Rank of the department of entry	We specify two rank bands: 0 for rank 1-3 1 for rank ≥ 4
Department of study	The dummy on the department of study has 8 levels. The Department of Economics is the reference category, and thus, omitted (value zero in estimation); D1, D2… D7 for the rest (Departmental names available upon request).
Parental education	We give the value of 0 for up to 6 years of schooling 1 for up to 9 years of schooling 2 for up to 12 years of schooling 3 for higher studies 4 for post graduate studies
Status of students (Working-non working)	0 for working students 1 for non-working

Equation (1) is estimated using Ordinary Least Squares (OLS) where each coefficient will provide the average response in the dependent variable as a result of a change in the independent, ceteris paribus. However in this case it would also be interesting to see what is the median response. For the latter we also employ a method that focuses on the distributional properties of the dependent variable (grades). Quantile Regression (QR), introduced by Koenker and Basset (1978), is based on the minimization of the asymmetrically weighted sum of absolute errors. Denoting y_t as grade, $\boldsymbol{X_t}$ a matrix with all the independent variables and $\boldsymbol{\beta}$ a vector with the corresponding coefficients, we can write the optimization problem as:

$$\min_{\beta} V_{\tau}(\boldsymbol{\beta}) = \tau \sum_{y_t \geq \boldsymbol{X}_t'\boldsymbol{\beta}} | y_t - \boldsymbol{X}_t'\boldsymbol{\beta} | + (1-\tau) \sum_{y_t \leq \boldsymbol{X}_t'\boldsymbol{\beta}} | y_t - \boldsymbol{X}_t'\boldsymbol{\beta} | \qquad (2)$$

where τ represents the quantile under study. For low quantiles, i.e. for τ = *0.05,…,0.45* of the dependent variable, the observations below the specific quantile are more heavily weighted. The opposite is true for higher quantiles (τ = *0.55,…,0.95)*. This is an immediate consequence of the fact that the *100τ%* (*100(1-τ)%*) of the probability mass of *y* locates below (above) the quantile τ. For the median, τ*=0.5*, the problem reduces to the minimization of the equally weighted absolute errors (known as the problem of Least Absolute Deviations-LAD).

Table 3. OLS and Quantile Regression Results

	Model 1 OLS	*p*-value	Model 2 QR	*p*-value
C	6.279074	0.00	6.576357	0.00
GENDER	0.032109	0.43	0.049681	0.31
DURATION	-0.546279	0.00	-0.476148	0.00
DURATION^2	0.074806	0.00	0.056138	0.00
RESIDENCE	-0.028913	0.06	-0.042761	0.03
ENTRY SCORE	1.164595	0.06	0.689156	0.73
RANK	-0.094533	0.03	-0.035434	0.53
AGE OF ENTRY	-0.142214	0.00	-0.130674	0.01
STATUS	-0.022724	0.57	-0.006761	0.90
PARENTAL SCHOOLING	-0.002223	0.90	0.017148	0.44
D1	-0.100016	0.03	-0.057998	0.35
D2	-0.137759	0.06	-0.124929	0.33
D3	0.230237	0.00	0.323277	0.02
D4	0.534526	0.00	0.562368	0.00
D5	0.754229	0.00	0.834042	0.00
D6	0.34008	0.00	0.327086	0.06
D7	1.980791	0.00	1.977865	0.00
Adjusted R-squared	0.494		0.279	
F-statistic	53.749			
Prob(F-statistic)	0.00			
Quasi-LR statistic			455.093	
Prob(Quasi-LR stat)			0.00	

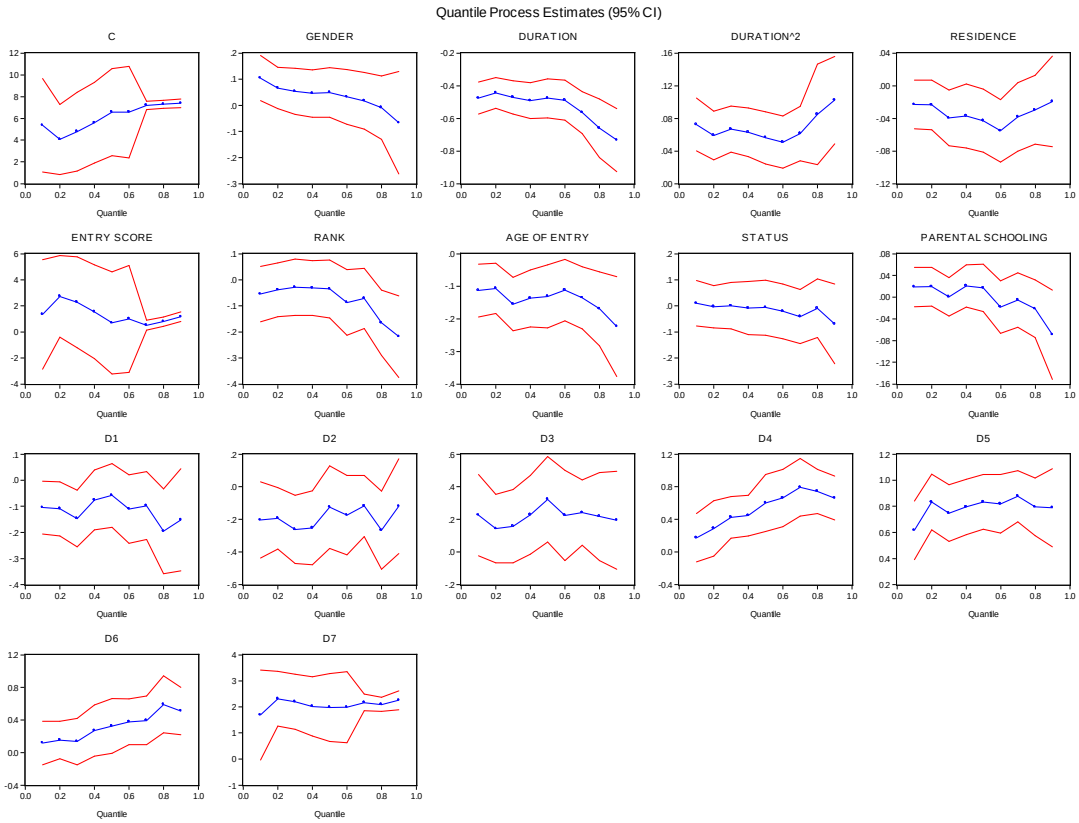
Notes: For the OLS estimates White Heteroskedasticity-Consistent Standard Errors and Covariance are employed whereas for the QR the Huber Sandwich Standard Errors and Covariance; *p*-values are reported in parenthesis below each coefficient

Minimizing (2) with respect to $\boldsymbol{\beta}$ is equivalent to a linear programming problem. In the present context, the parameter, say β_1, estimated at the specific quantile τ_1 is interpreted as the *change of grade at this specific quantile* (and not *at the conditional mean* as in the OLS case) caused by one unit change in the *years of studies*. Moreover, in a quantile framework, no distributional assumptions about the error term are required rendering it a distributionally robust method of modeling relationships among variables (see also the discussion in Koenker 2005). The approach would allow us to assess potential asymmetries in the relationship between the variables.

Before we proceed with the discussion of the results, we will comment on the econometric properties of the models although this is not the focus of the paper. With regard to the OLS regression there is evidence that some Heteroscedasticity is present through the White's test and this is why we have employed the White Heteroscedasticity consistent standard errors. The adjusted R-squared implies that 49% of the variability in grades can be explained by the regression line in the case of the OLS and 28% in the case of the quantile regression. The *p*-value of the *F*-stat for OLS and of the quasi-LR for the quantile regression denotes that the two regressions are significant.

With regard to the significance of the estimated coefficients gender is not significant under both specifications (OLS and QR) and so is status and parental schooling. The coefficients of duration, duration^2, residence, age of entry and most of the departmental dummies are significant at the conventional levels. Under OLS the coefficient attached to the entry score and rank seem to be significant (positive the former and negative the latter) and insignificant with QR. However this apparent disagreement is not accurate as when we move at higher quantiles (0.7, 0.8 and 0.9) these coefficients become positive and significant and negative and significant respectively under QR as well (Figure 1).

Figure 1: Quantile Process Estimates



5. Results

The above estimated model can be understood as the reduced form of a more general model comprising three composite variables. Each one of them is identified by the fact that allocates the relative responsibility of educational outcomes on three key factors. The first is student-innate ability and motivation. We inscribe to this factor the influence of the following variables: entry score, age, rank and gender. The second factor accords the influence of variables which describe the socioeconomic background of students; in our case they are: student status, residence, and parental education. The third factor

traces the responsibility of institutions. In the estimated model this is reflected in the impact of departmental dummies.

The only variable left out of this classification is duration of studies. In section 6 below, we shall argue that the effect of this variable is inscribed to the institutional factor as well.

5.1. Explaining the results

Four points are worth commenting here. The first concerns the impact of the duration of studies variable; its impact is the strongest among all variables (higher *t*-stat). The estimated effect suggests that each additional year of staying at the university is associated with a drop in GPA by 0.55 units. To give a concrete example, if a student takes 5 years to complete his/her studies and achieves a GPA of 7.55, the corresponding grade of a student needing 6 years to acquire his/her degree will be 7.00. This is a remarkable effect and confirms the conclusion drawn by an earlier study which stated that 'good students are those who complete studies early' (Katsikas and Katranidis, p. 84).

The second point concerns the institutional effect. With the exception of two departments, D1 and D2, whose negative effect, although statistically significant at the 10% level, is rather small (0.10 and 0.14 units respectively), the rest show notably higher scores with respect to the benchmark (Department of Economics). D7 awarding degrees by almost two units higher than those of

the reference department represents an extreme case while for the remaining four, D3, D4, D5 and D6 the difference ranges from 0.23 to 0.75 units.

It is difficult to tell at the outset what lies behind the effect of the institutional factor. International literature has suggested two explanations. The first raises the possibility of non-equivalence of degrees awarded by institutions and subjects (Crouse, 1985; Hanford, 1985; Elliott and Strenta, 1998). It is suggested that when academic standards are applied in a uniform way any variation in mean grades in the same subject from one institution to another should be random and insignificant (Bratti, 2002). By way of contrast, systematic differences in average performance over time and across institutions and subjects should call into question the assumption that a first class degree in one place or subject carries similar weight to a first class degree in any other (Hoskins, Newstead, and Dennis, 1997; Smith and Naylor, 2001).

According to the second interpretation differences in degree performance across schools and colleges are primarily the result of institutional practices. It is maintained that after controlling for the individual characteristics of students the remaining differences should be considered as measures of the effectiveness of the teaching process.There exist two variations to this approach which for the purpose of this analysis we treat as equivalent. The first emphasizes aspects of the institutional and course setting. In this respect, class size and the degree of its homogeneity have been identified as major influences on students' outcomes (Entwistle, 2004; Hounsell, et al, 2005; McCune, 2003;

Vermunt, 2007). The second variation conceives of education as a social process and of educational units as distinct communities of practice (Lave and Wenger, 2005). Depending on the nature of their members' participation, classified as core and peripheral, or even marginal, departments may function as strong or weak communities of practice (Wenger, 1998); the larger the department, perhaps, the weaker the community of practice. We come back to this point in section 6.

The third point draws on the effect of the four variables referring to students' personal characteristics; university entry score, age, ranking, and gender. Except for gender, which after controlling for duration of studies has no influence on grades, the remaining variables are statistically significant with the expected sign. The impact of the entry exams score is positive and the largest in magnitude among the three. According to our specification the estimated effect, leaving out D7 as an outlier, justifies a maximum degree grade difference between the highest and the lowest entry scores of 0.25 units (0.58 otherwise). Age, specified in a way to capture the impact of the number of attempts on subsequent performance, gives a premium of 0.14 units to students entering university in the first instance. Finally, students entering departments ranked high in their priorities receive also a premium of 0.09 units.

We come finally to the impact of students' status which is the main focus of this study. Contrary to popular belief in Greece, the engagement of students in paid employment does not seem to operate as a discriminating factor between

working and non-working students (both for the mean (OLS) and for the median (QR)). The same holds true for parental schooling which gives an insignificant estimate at all conventional levels of significance. Finally, residence, specified in a way to capture the effect of differences in the private cost of studies gives a meager result but of opposite sign. Students living with their families while studying achieve grades of 0.03 units higher than students living in rented apartments. If the private cost of studies played some role the effect should be the other way round; students living away from family home should, due to higher cost, complete studies earlier and get accordingly higher grades. In short, none of the variables which take account of students' financial and social circumstances seems to play any role on the formation of grades.

5.2. A Further Examination on the effect of status

One might think that the impact of working status on GPA works out in an indirect way, namely through affecting students' duration of studies (in other words that endogeneity is present in the model). This is indeed a possibility deserving further investigation. It has to be noted, however, that the association of status with grades through the length of studies requires the confirmation of two assumptions. The first is that working students take longer time to complete studies. We tested this hypothesis using information from the sample of working students (303 observations, 35% of the sample). The test relies on the rationale that the time a student needs for the acquisition of his/her degree

is associated to the time (year of study) at which she/he began to work. If indeed employment affects duration of studies, the expected relationship must be negative; the earlier a student begins to work the longer will be his/her time of completion. In this regard we estimated, by means of an ordered probit model, the impact of a student's initial year of work on his/her probability to complete studies after 0, 1, 2, 3, and 4 years of delay after controlling for gender, entry score, rank, age and department of studies[4]; Significantly, we allow also for differences in the type of employment between working students specified as part-time and full-time. The results are presented in Table 4 below.

Table 4: Ordered Probit estimation for the Duration of Studies

Dependent Variable: DURATION	Coefficient	*p*-value
AGE	0.121	0.353
GENDER	-0.308	0.019
YEAR WORK COMMENCED	-0.0285	0.6244
ENTRY SCORE	-2.602	0.3534
RANK	0.072338	0.6292
TYPE OF WORK	0.446	0.001
D1	-0.336	0.083
D2	-0.227	0.044
D3	-0.475	0.1289
D4	-1.0642	0.0066
D5	-0.057425	0.8159
D6	-0.232	0.481
D7	-1.181	0.228
Pseudo R-squared	0.0534	

Notes: Method: ML - Ordered Probit (Quadratic hill climbing)

[4] In a way this exercise can also be understood as a test for causality between employment and duration of studies. A positive coefficient might be taken as an indication that employment itself is an effect of long duration of studies rather than its cause. Students anticipating longer staying at the university due to old standing academic obligations may respond to their family pressure by seeking an employment rather than by precipitating the acquisition of degrees. Ideally for causality we should have the number of courses that a student passed successfully prior to his/her engagement in paid employment. Unfortunately we were unable to retrieve this information.

The coefficient on the year that work commenced is insignificant suggesting that the length of the working period is irrelevant to the duration of studies. Students that work for one or four years while studying have the same probability to complete studies after 0 or four years beyond the expected length of degrees. The type (hours) of employment, on the other hand, exercises a significant effect on the duration of studies. Students involved in full-time employment (taking the value 1 in the dummy variable *Type of Work*) are more likely to remain longer at university than students working in part-time jobs (value zero in the dummy variable *Type of Work*). We shall see below whether this difference matters for grades.

The second hypothesis requires that working students achieve lower grades than non-working students. The truth is that we have already a negative answer in this regard. Results presented in Table 3 above suggest that the status of students does not impact upon grades. This finding, however, may be objected for two reasons; firstly, because it draws on estimation performed at mean and median-level grades. Such estimates cannot rule out the possibility that grades are asymmetrically distributed over the two groups of students. That is, working students may be systematically excluded from achieving relatively high or very high grades. For this purpose we employ a quantile regression framework, which allows estimating the marginal effect on grades across its distribution. Table 5 (next page) reports the results of the Quantile Regression Model for the coefficient of status (note here that the response for the median (0.5) is the same as the one that appears in Table 3). In effect we are putting

the coefficient of status under the microscope to examine how this variable is affecting low and high grades (see also Figure 1).

These results suggest that the student's status does not affect grades at any point of the empirical distribution of the dependent variable; working students may achieve high or low grades in a similar way as non-working students may do (*p*-values remain insignificant at all quantiles).

Table 5. Quantile Regression estimates for the coefficient attached to Status

	Quantile	Coefficient	Std. Error	t-Statistic	Prob.
STATUS	0.1	0.009997	0.044206	0.226151	0.8211
	0.2	-0.00347	0.041579	-0.08347	0.9335
	0.3	0.000122	0.045532	0.002678	0.9979
	0.4	-0.00887	0.052085	-0.17027	0.8648
	0.5	-0.00676	0.053893	-0.12545	0.9002
	0.6	-0.02056	0.053563	-0.38386	0.7012
	0.7	-0.04082	0.053023	-0.76987	0.4416
	0.8	-0.00944	0.057458	-0.16424	0.8696
	0.9	-0.06922	0.077988	-0.88755	0.375

Notes: See the notes of Table 3.

Secondly, the estimated effects presented in Table 3 do not take into account the differences in the type of employment (hours of employment) among working students. Given the differential impact of the type of employment on the duration of studies (table 4), it is important to examine whether the type of employment impacts also on grades. If it does, then students involved in full-time jobs must achieve lower grades than students in part-time jobs. To further explorer this, the initial model of degree grade determination is re-estimated only for the sub-sample of the working students (303 observations), while

allowing, additionally, for the type of employment and the year that work commenced (see Table 6).

Table 6. The determinants of grades of working students

	OLS	*p*-value
C	4.654757	0.0157
GENDER	0.079954	0.2445
DURATION	-0.52895	0.000
DURATION^2	0.071757	0.0021
RESIDENCE	-0.03696	0.1615
ENTRY SCORE	2.707833	0.1491
RANK	-0.13995	0.0605
AGE OF ENTRY	-0.13852	0.0291
PART TIME	-0.04087	0.5609
PARENTAL SCHOOLING	-0.01688	0.5952
YEAR WORK COMMENCED	0.034843	0.2486
D1	-0.12307	0.1808
D2	-0.27667	0.0806
D3	0.136044	0.4255
D4	0.381052	0.1138
D5	0.840132	0.00
D6	0.318515	0.0654
D7	2.516509	0.0002
Adjusted R-squared	0.504	
F-statistic	19.056	
Prob(F-statistic)	0.00	

Note: White Heteroskedasticity -Consistent Standard Errors

The results suggest that, neither the type of employment nor the length of the working period, exercise any effect on students' grades; both estimates are statistically insignificant. Therefore, the longer duration of studies of students involved in full-time jobs recorded above (table 4) does not show on their grades. What is more remarkable, however, in this model is that the estimated effects are similar to those of the entire sample (Table 3). The impact of the duration of studies, for example, in the initial model implied that each additional year of staying at university is associated with a fall of GPA by 0.55

units while for the sub-sample of the working students the corresponding effect is 0.53 units. As a matter of exercise we have estimated the same model for the sub-sample of the non-working students (564 observations). The effect of the duration of studies on GPA was -0.56 units for each additional year of staying at university (Results available upon request). These findings suggest that the effect of the duration of studies on grades is irrelevant to the status of students and works out in the same way for both working and non-working students.

With respect to grades, therefore, our findings suggest that to be working while studying does not imply that you are placed at a disadvantaged position with regard to your non-working peers. The inability of part-time working students to attend lectures and classes does not reduce their probability to complete studies at the expected length of degrees and achieve also competitive grades. Even students who are engaged in full-time jobs and stay at university longer than the rest of their peers may also achieve competitive grades. Surprising enough this conclusion might be it may have a simple explanation; in a system that is centered on textbooks, final exams, and private individual study, attendance at lectures may not play a decisive role on outcomes. Indeed, 234 or 77% of the working students reported that employment did not affect adversely the process of their studies.

6. A different perspective for the duration of studies

It has to be stated at the outset that the evidence we provide in support of our interpretation is rather limited and it serves more as a guideline for future research rather than as a rigorous description of the phenomena. Following research in the UK over the last decade that emphasizes the influential role played by university institutions on outcomes and especially on retention rates (Davies, 1999; Davies and Rudden, 2000; Martinez, 2001; Martinez and Munday, 1998; Yorke and Thomas, 2003), we took a closer look at the differences in performance between the departments in UoM. Within this framework, we examine whether differentiation in performance corresponds to inter-departmental differences in educational settings. We traced the following evidence.

Firstly, departmental mean-GPAs are poorly associated (in fact they are marginally negatively correlated, -0.06) with the respective entrance thresholds. This suggests that in UoM departmental mean-grades seem to be formed independently from the quality of the student intake. Another manifestation of the same evidence is given by the model; if we do not control for the department of study (results available upon request) the coefficient on entry scores turns out to be negative, implying that the lower the entry score of a student the higher his/her GPA. Inside departments, however, the correlation coefficients between entry scores and grades are all positive ranging from 0.11 to 0.24 and with one exception they are statistically significant at the conventional levels of significance.

It might be useful to be reminded that this apparent paradox was the corner stone on which the questioning of the equivalence of degrees was founded. In the USA for example it was observed that the SAT-GPA correlation was better when applied in single courses and classes than it was when applied in larger aggregates of courses and subjects (Goldman and Widawski, 1976). The suggested explanation was that aggregates consist of courses which apply different grading standards mainly as a function of field concentration.

Secondly, there seems to be a strong reverse association between department size, measured by the number of annual enrolments, and departmental mean-GPA; the larger the department the lower its mean GPA. The size of the respective coefficient is -0.81 and turns out to be significant at the 1% level. Although the number of departments included in this study is limited (eight) the reverse association between size and grades is too strong to be neglected.

The decisive role of the size of the department, thirdly, is further enforced by its influence on the duration of studies. The proportion of students that complete studies within any timescale, that is four, six or eight years, is negatively associated with the size of the department. Focusing on the timescale of six years (completion rate 1) ─ beyond which students cease to enjoy certain fringe benefits ─ the correlation coefficient between size and the respective completion rate is -0.79 and it is statistically significant at the 2% level.

Fourth, there exists an even stronger association between the student composition of the departments and their completion rate within six years of studies. Department composition refers to the proportion of students that entered university through the mode of general examinations and is used here as an index of homogeneity. The correlation coefficient between this index and six-years completion rates is 0.97; the higher the proportion of students entering through the mode of general examinations the higher the completion rate of the department.

It has to be remarked, of course, that the exceptionally high size of the last correlation coefficient is, to some extent, artificial for it combines two effects: firstly, the homogeneity effect and secondly, the relatively better performance demonstrated by students coming from general examinations (Katsikas and Dergiades, 2010). Nevertheless, and this is our fifth point, even if we consider only the graduation rate of the general examinations students (completion rate 2) as a proportion to their own group the correlation coefficient between homogeneity and graduation rate is 0.64 and it is also significant at the 10% level. The positive sign of the coefficient suggests that the higher the proportion of general exams students admitted to a department the higher the completion rate for these same students of the department. This may be taken as an indication that mixing students of substantially varying qualifications and incentives in the same courses affects negatively the performance of the most qualified students.

This information is summarized in Table 7. From the latter we constructed Figure 2 comprising three parts, each one depicting the association between size and mean grades; between size and 6-year completion rate 1; and between the homogeneity index and the 6-year completion rate 2.

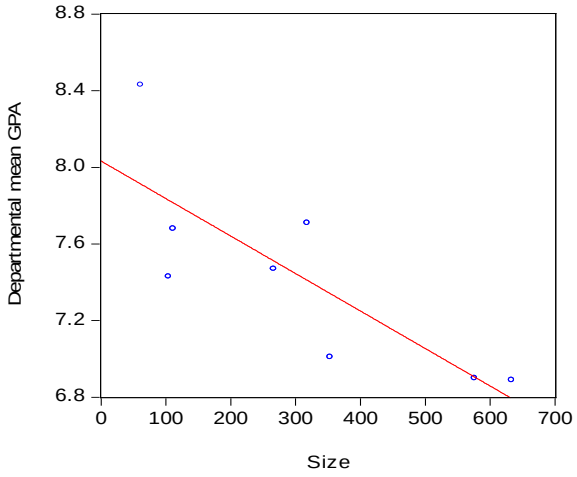
Table 7: Department characteristics and indices of performance

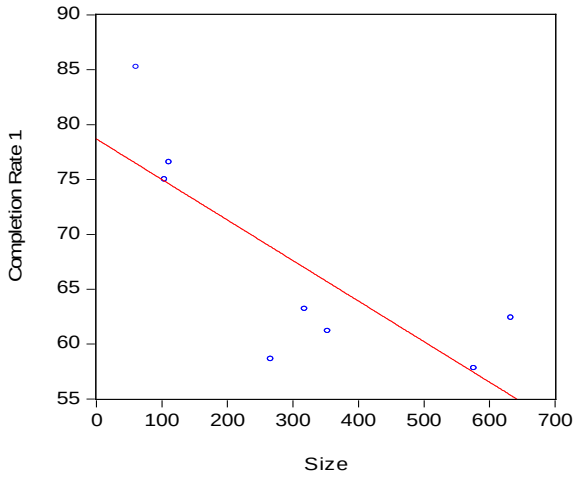
Department	Department Size (two year enrolments)	Departmental average of students' GPA	6-year completion rate 1 (all students)	6-year completion rate 2(general exams students)	Homogeneity Index
Economics	576	6,90	57,81	81,80	0,71
Business Administration	633	6,89	62,40	88,20	0,71
Accountancy and finance	353	7,01	61,19	90,00	0,68
Applied Informatics	266	7,47	58,65	90,20	0,65
Education and Social Policy	111	7,68	76,58	92,40	0,83
International and European Studies	318	7,71	63,21	85,50	0,74
Balkan and Slavonic Studies	104	7,43	75,00	92,00	0,82
Music Studies and Art	61	8,43	85,25	96,30	0,89

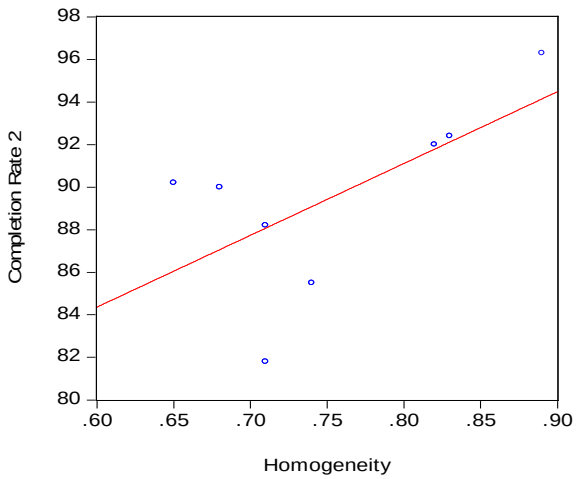
Two tentative conclusions can be drawn from this analysis. Firstly, the symptom of long duration of studies, the hallmark of our university system, seems to be an institutional effect. Department size and the degree of its homogeneity impact on students' completion rates within any timescale. Variations in six-year graduation rates between departments go in hand with the two attributes of the educational setting, size and composition. Although

these departmental characteristics may not be the only ones that explain variation in performance it is likely to be the most influential ones.

Figure 2: GPA vs Size, Completion vs Size and Homogeneity







Secondly, departments affect students' GPAs in two ways, directly, as an institutional (fixed) effect and indirectly, through their influence on the duration of studies. If our interpretation about the symptom of long duration of studies is correct then the indirect effect can be attributed to differences in the teaching conditions. Large departments are associated with large auditoriums presenting many problems: they are noisy, the pace of lectures is inflexible, the loss of students' concentration is frequent, involvement and asking of questions are discouraged, feeling of impersonal treatment is stronger, while the shortage of seats in early semesters is a very common phenomenon (Cartney and Rouse, 2006; Entwistle, 2005; Reimann, 2004; Shanahan et al, 1997). It is only the academically motivated minority that manages to achieve successful outcomes in such a teaching and learning environment (Biggs, 1996); the majority of students are demoralized, suspend participation, lose contact with the subject, and then face difficulties in passing the exams (Katsikas, 2010).

Alternatively, differences in the size of the departments may be conceived as the key factor behind their functioning as weak or strong communities of practice (Smith, 2009). In this perspective, long duration of studies may be associated with the decision of many students to suspend participation in the courses, that is, with a higher proportion of students positioning themselves as marginal members of the community (Wenger, 2006). Departments showing a good record on issues of prolonged student status may do so because they

manage to encourage greater identification on the part of students, thus increasing participation and effort.

It is unfortunate that our data set does not contain information on rates of absenteeism. It is only in the last three years that university institutions in Greece started to be concerned with the issue of Quality Assurance in Education and collect relevant data. Access to this data, however, remains highly problematic. There exists no authorized agency in Greece, similar for example to Higher Education Funding Council in England, which collects information on students' individual records and accords partner status to other research bodies. Perhaps this is the reason why the majority of studies conducted so far in Greece contain information from single institutions.

The direct department effect on grades, on the other hand, is so strong that, at the institutional level, results in overturning the positive association observed between entry scores and grades inside departments. We have already noted that large differences in the correlation coefficient between entry scores and grades when applied to aggregate and single courses respectively are usually taken as an indication of differences in the grading standards. Given however the strong association between department size and departmental mean-GPA it is hard to believe that grading standards fluctuate also in line with department size. In this sense the reasonable conclusion to draw is that the direct effect records, probably, differences in the quality of teaching. The breadth of our data is not sufficient to allow a definite conclusion in this regard.

7. Conclusions

This study has been concerned with the determinants of grade outcomes in the context of university studies in Greece. Its focus was on the influence exercised by students' family background on academic performance after controlling for a number of individual and institutional characteristics. In this respect we examined the relevance of three variables: parental education, family residence, and students' status defined as working and non-working students. Family residence was specified in a way to capture the effect of differences in the private cost of studies. The empirical findings suggest that none of these variables discriminate against one or the other group of students; degree-grades do not demonstrate differences neither between working and non-working students nor between students of different educational background or between students inflicted by unequal cost of studies.

This study discussed also the effect of the duration of studies on students' grades. To find out what lies behind this odd symptom is of paramount importance in order to take policy action. If, for example, students delay the acquisition of their degrees because they need to work alongside studying then the correct policy to apply is not to place time restrictions on the length of studies. Instead, we have to look for what causes the fall of grades of students that prolong studies. The most likely reason for the low performance of working students might be their inability to attend lectures and classes. Thus

changes in curriculum design and timetable issues should rank high in the list of an informed policy action. It is only under such an institutional framework that we can perceive long duration of studies as a society's price for social justice and equal opportunities for all. As it is, the system does not seem to be helpful to the working students.

If, instead, long duration of studies and the associated with it fall in grades are not caused by students' involvement in work then both effects have to be placed on a different ground; their relationship must be seen largely as co-relational rather than as causal. The tests applied in this study support the conclusion that the time required by a student to complete studies is relevant only for the students engaged in full-time jobs. In our sample, these students represent 31% of the working students or 11% of the registered. For the rest of students however, that is non-working or working in part-time jobs, representing 89% of all registered students, time-to-degree is irrelevant to status. Instead there seems to be some substantive, though of limited breadth, evidence that both symptoms, long duration of studies and falling grades, are caused by ill-functioning institutions. The evidence from our institution indicates that the two most popular indices of performance, namely degree grades and completion rates within timescales, appear to be in close association to the educational setting. Department size and the degree of its homogeneity correlate strongly with both measures of performance. In the light of this evidence we can arrive at the conclusion that the responsibility for the prolonged student status lies primarily with institutions.

This is an important conclusion in two respects. Firstly, it seems to absolve students and university teachers for the quality of studies. Secondly, institutions themselves may not be responsible for the quality of education either; for, the number of entrants through general examinations and the number of additional registrations from other modes in each department are both centrally decided.

There is a lot of truth in the above conclusion. The increase in both categories of entrants has been a fundamental policy option made in the past. Spending per student, however, remained low, and it is today at €5,000PPP against a €7,664PPP OECD average (OECD, 2007), although, it must be noted, public spending in the tertiary sector over the last decade increased faster than spending in other sectors (ELIAMEP, 2006). The combination of mass studies, then, and of limited resources must be at the heart of an explanation for the quality of university studies in Greece.

However, increasing the resources spent on higher education will not, automatically, improve quality. Institutional reforms and changes in the mindsets of all implicated parts are also very important. For a long time the system has been in a state of equilibrium that demands low levels of effort from both teachers and students. Articulated with this equilibrium are also economic interests, political compromises, teaching practices, social perceptions and personal outlooks that render the system intractable. Students, for example, object to any institutional change on grounds of equality and

justice that is as an attempt of governments to move away from commitments to equity and public supply of education. In face of the private cost implied by studying in public institutions, the social class benefited from public education, and the cost involved in the preparation for the university entry exams the arguments about equality of opportunities and 'free' public education sound erroneous (Antoninis and Tsakloglou, 2001; Psacharopoulos and Papakonstantinou, 2005; Tsakloglou and Choletzas, 2005). In effect the insistence on the status quo as a means of safeguarding the demand for equal opportunities for all amounts to destroying the opportunities of all.

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