

## **The Determinants of University Grades: evidence from graduates of the University of Barcelona (Spain)**

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### **Abstract:**

We analyze the determinants of university students' grades on graduating from the University of Barcelona (Spain), by considering both the final results of all students and those recorded in the upper quantiles of the grade distributions. Particular attention is given to the functional form and to the collection of "unobservables". Empirical results show that students' *ability* is the cornerstone of their grades on graduation. Variables related to secondary education (such as having studied in a private religious school and the 1990 Education Act), course enrolment preferences and the peer effects of their high school contemporaries were also found to be relevant factors as were the mother's work status and the father's level of education. This is the first attempt in Spain to analyze university grades.

**JEL codes:** I21, D39

**Key words:** university grades, ability, peer effects

# **The Determinants of University Grades: evidence from graduates of the University of Barcelona (Spain)**

## **1. Introduction**

There is a general consensus that a poor skill base may constrain a country's economic growth and its ability to compete in the international market, especially given the growing importance attached to human capital in an economy that is becoming increasingly knowledge based. Countries, therefore, seek to improve their human capital by considering both the level (quantity) and the profitability (quality) of the education provided. Our analysis here focuses on students in higher education (university) and, more specifically, we examine the determinants of university students' grades on graduating, of importance, among other reasons, inasmuch as they reflect human capital acquisition at a time when young adults are on the point of permanent entry to the labour market (Betts and Morell, 1999; and Krueger, 1999). Furthermore, these results are an important element in the debate focused on the efficiency of public expenditure in education, as higher education is largely financed by the State.

We prefer to analyse the determinants of a university student's final grade rather than whether he/she graduated (though the latter might also serve as a proxy for human capital acquisition) because of a possible lack of correlation between academic achievement and academic knowledge (Greene, 2001). Notwithstanding, the debate over the most appropriate measure of education outcome still remains (Krueger, 1999).

To the best of our knowledge, this is the first study to examine the grades obtained by Spanish university students on graduating. In our analysis we consider a large number of individual characteristics as well as students' family background and peer effects, thereby incorporating most of the "unobservable" characteristics, and so hope to avoid any problems of endogeneity in the empirical analysis (see Altonji, Elder and Taber, 2005). Our study assesses the suitability of the regression technique for reducing the

uncertainty of the functional form in the distribution of the grades, while the application of simultaneous quantile regressions enables us to examine the distribution of grades.

The remainder of this paper is structured as follows. The next section shows the model used in analysing the determinants of graduation grades while section 3 summarises our survey characteristics and the econometric strategy adopted. Section 4 shows our empirical evidence and the final section contains a discussion of our overall findings.

## **2. Modelling the relationship between university grades, ability, schooling and other personal, family and peer effects**

The model considers the following aspects: a university student's graduation or final grades,  $G_i$  for each individual ( $i$ ), which depends on several  $k$  factors conditioning individual characteristics ( $X_{k,i}$ ) related to a student's personal, socioeconomic and family background. As we cannot gauge an individual's ability, we have created a proxy variable as follows. We know a student's university admission score (*Prueba de aptitud para el acceso universitario* - PAU grades), which is a weighted average of the national standardized examination that students sit in order to enrol at university and their high school record. However, PAU grades are probably not a perfect proxy for ability ( $A_i$ ). As Hansen, Heckman and Mullen (2004) claim, prior to university entrance, test grades are dependent on the quality of schooling which can reveal or transform ability. Therefore, we propose disentangling these schooling effects from PAU grades ( $P_i$ ) in order to compute a proxy of an individual's ability.

Thus, we obtained predictions of  $P_i$  - a measure of return on schooling - derived from the school type (vocational or general education; private or public), school location (Barcelona province or elsewhere), and socioeconomic and family characteristics. Our analysis also included the effects of each high school characteristic: our initial idea was to include fixed high school effects in the model; however, because of an endogeneity problem and so as to avoid overidentification, we considered the average grade obtained by those students ( $j$ ) from the same high school as individual ( $i$ ). By so doing, we were

able to include most of the unobservable characteristics (i.e. a school's neighbourhood and its tuition configuration) and to incorporate past peer effects within schooling effects (since to ignore history can have a considerable impact on peer estimation).

However, we were unable to measure the peer effects of all an individual's classmates since we could only consider individuals attending the same high school who enrolled at the University of Barcelona and terminated their degree course. However, Hanushek *et al.* (2003) conclude that the positive effect of peers remains roughly constant across the quantiles of the distribution of a school's grades, whereas the variance has no impact. Therefore, if we only consider the peer effects of those who eventually graduate, i.e. individuals likely to be within the same quantile, we are able to avoid the presence of unobservable peer effects.

Thus, equation (1) considers individual characteristics – personal, schooling and family – ( $X_{k,i}$ ) and high school peer effects ( $\bar{P}_{j,SHch}$ ) on  $P_i$  grades. Then, we can compute the residuals of regression of equation (1) which constitute the estimated ability ( $\hat{A}_i = P_i - \hat{P}_i$ ) of individuals, and which constitute a better proxy than PAU grades ( $P_i$ ). In this case, endogeneity is inevitably present since wealthier parents are more likely to be concerned about their children's high school grades and pay more attention to the kind of school they attend. Hence, we estimate undergraduate grades by two stage least squares regression (2SLS). A Hausman test shows inconsistency for OLS estimations. We consider robust standard errors and the generalized method of moment's technique due to the presence of heteroskedasticity.

$$P_i = \beta_0 + \beta_1 X_{k,i} + \bar{P}_{j,SHch} + \varepsilon_i \quad (1)$$

Students' academic behaviour at university is affected not only by their ability but also by that of their peers –see Gibbons and Telhaj (2005) for an excellent review of high school peer effects. Our proposal is to detect these influences starting from the dyad, constituting the smallest unit of analysis. Thus, the first stage is to define the groups (related to graduate networks). We followed Manski's (1993) proposal concerning the

moderate relation between the variables defining reference groups and those affecting outcomes in order to minimize errors when inferring groups. Therefore, our networks were defined according to parents' socioeconomic background variables. As such, our similarities are based on the following variables: parent's education, parent's labour characteristics, students attending public or private high schools, and general or vocational upper secondary education. In addition, networks contain students that share both the same faculty and the same date of starting their university studies. Hence, socioeconomic environments are included in the  $K$  networks ( $g_K$  containing  $n_K$  elements). Thus, our model of the determinants of university grades would be formally represented by equation (2), where the *ability* measure has been standardized.

$$G_i = \beta_0 + \beta_1 \hat{A}_i + \beta_2 X_{k,i} + \beta_3 \sum_{j=1}^{n_K} g_{ij,K} G_{j,K} + \zeta_i \quad (2)$$

$G_j$  represents the individual's ( $j$ ) graduation grade of  $i$  peers and  $\beta_3$  is the parameter that describes the peer effects. Likewise, this summand can be interpreted as the sum of the network grades. However, we first need to address the endogeneity of network membership, deriving from the fact that students select those with whom they associate. Previous studies have chosen to avoid the endogeneity problem by using random samples (Sacerdote, 2001 and Zimmerman, 2003). Thus, our previous criteria for generating networks is of great relevance, as the construction of the networks is based on variables that do not affect outcomes. A determining factor is the selection of adequate instrumental variables. Following Calvó-Armengol *et al.* (2005), our instruments correspond to deviations from the average whole peer effect where the instruments have zero average over each network component. Then, we use a two-step instrumental estimation –see equation (3).

$$G_i = \rho_K \hat{\varepsilon}_{i,K} + \alpha_K \sum_{j=1}^{n_K} g_{ij,K} G_{j,K} + \nu_i \quad (3)$$

where the  $\hat{\varepsilon}_{i,k}$  are the estimated residuals of the regression of  $\tilde{G}_K$  ( $\sum_{j=1}^{n_K} g_{ij,K} G_{j,K}$ ) on the set of exogenous variables in (3) and the instruments. So, if we do not reject  $H_0: \rho_K = 0$ , endogeneity is not a concern for our analysis. Hence, we can add the term  $\tilde{G}_K$  as an exogenous variable into (2).

However, we believe, a peer effect still arises from the fact that some students come from the same high school and remain grouped at university. Thus, we also compute a peer global effect  $\tilde{G}_{HSch}$  ( $\sum_{j=1}^{n_K} g_{ij,HSch} G_{j,HSch}$ ) identified by considering those students who initiate university studies in the same year and faculty and share high school provenance. This methodology is also adopted in testing for endogeneity. Our evidence rejects the endogeneity problem. So, the last econometric model considers both kinds of peer effects – see equation (4).

$$G_i = \beta_0 + \beta_0 \hat{A}_i + \beta_0 X_{k,i} + \alpha_K \tilde{G}_K + \lambda_K \tilde{G}_{HSch} + \nu_i \quad (4)$$

### 3. Data and econometric strategy

The data correspond to the final grades obtained by students at the University of Barcelona for the period 1996-2003. We examined the impact of several factors on the academic performance of graduate students at this Spanish university. Hence, our sample strictly considered those people who completed a five-year (or more) university degree (known as *licenciados*). By so doing, we avoided including those individuals who did not obtain a final degree, given that we are not interested here in determining the reasons for student drop out. We considered 22,364 students in 14 of the largest faculties (we included 74.9% of all *licenciados* from the University of Barcelona). In this way, we were able to fulfil the recent demands to use a large sample size when analysing university grades (McNabb, Pal and Sloane, 2002; Smith and Naylor, 2005; and Horowitz and Spector, 2005). Moreover, from the degree courses considered, our

sample represented 45.9% of total graduates in Catalonia (the Spanish Autonomous Community from which over 90% of the University of Barcelona's graduates originate).

The dependent variable reflects a graduate's final grade, originally awarded on a scale from one to four. In the case of explanatory variables, we considered several personal and socioeconomic characteristics as well as family background. Among the former we included: gender, civil status, age when student entered university, *ability*, whether the student was born in Catalonia (as opposed to the rest of Spain or abroad), whether the student received secondary education in the Barcelona province or elsewhere in Catalonia, graduates or undergraduates from other university degrees, the preference number allocated to their choice in the application form (in Spain students are able to choose from among eight ranked preferences as to the degree course and university they want to attend), LOGSE (those students who enrolled at university after the 1990 Education Reform Act, known as the *Ley Orgánica de Ordenación General del Sistema Educativo*), and the labour situation (if in work and the type of labour contract). In the case of family background, we examined: level of education and labour characteristics of a student's parents, financial resources (if parents pay for all education expenses, or whether students receive a grant or are self-financing), type of accommodation (whether living with parents); in addition, we considered the kind of school graduates had attended (public or private, distinguishing between religious and non-religious), and the type of education received (general or vocational), given that in Spain these factors also reflect a family's socioeconomic background. Table 1 shows the dependent and independent variables considered together with a descriptive summary.

INSERT TABLE 1 AROUND HERE

From Table 1, it can be seen that the majority of students were female, born in Catalonia, single, had enrolled immediately on completing their upper secondary education (age 18), were studying their first preference enrolment choice, were non-active, and were financed by and living with their parents. As regards their high school background, they came primarily from public high schools, in general (or academic) education, located in the Barcelona province, and had enrolled before the introduction

of LOGSE. As for their parents, the fathers were mainly wage-earners, while the mothers were non-active. In addition, a majority of parents had completed less than lower secondary education.

The most interesting aspect concerning the dependent variable was that the mean grade fell 0.34 points (on a scale from 1 to 4) between high school and university. The standard deviation showed a similar fall. This raises a number of questions. Are university grades more homogenous? Does this hold for the whole distribution? The estimation of kernel density functions for both university and PAU grades enabled us to illustrate the shape of the distribution of the grades. We then proceeded to examine the evolution from high school to university according to high school type. Figure 1a shows the estimated Gaussian kernels for both grades. The distributions tend to homogenise around a lower value of 1.5. At the same time, grades that previously differentiated between performance at different types of school tended to disappear. Thus, university grades showed a lower degree of excellence when compared with upper secondary education grades and so cleverer upper secondary students tended to obtain significantly lower grades on graduating from university. A further question of interest concerns whether this evolution was stable over the whole period studied here. Figure 1b shows that stability was in fact a common feature, with the exception of 1996. For this reason, we were justified in not including a time-dummy variable in our regressions.

INSERT FIGURE 1 AROUND HERE

Additionally, and obviously, grades were truncated in the left tail. No values could occur below 1, whereas a grade of 4 was not very likely. Hence, our quantitative analysis needed to adopt a censored regression truncated in the left tail. However, because of missing values, grade 1 values disappeared. The distributions in Figure 1 show no normality and a skewed distribution and, therefore, a lognormal regression was recommended. However, Figure 2 displays no normality either in university grades or in its logarithm (corroborated by running a normality test). Likewise, we were able to confirm the presence of heteroskedasticity, mainly due to ability. Finally, no evidence of multicollinearity was recorded.

INSERT FIGURE 2 AROUND HERE

Hanushek (1979) stressed that different functional forms may yield very different predictions. A standard solution is to compute ordinary least squares (OLS) regression models without transformation - despite the skewness of the dependent grade variable, but to use a bootstrap procedure so as to obtain standard errors that are robust against the violation of normality and heteroskedasticity of the residuals. Other alternatives are possible including the use of a log transformation, the Box-Cox transformation or generalized linear models (GLM) –see Maning and Mullahy (2001); Deb and Burgess, (2003). The GLM avoids the bias correction caused by the necessary transformation of OLS results for a good interpretation of the coefficients. We estimated GLMs based on the Gamma density as these have been shown to present desirable properties. In order to compare the results derived from different econometric techniques, we computed the root mean square error (RMSE) for each one and, therefore, we evaluated the quality of our predictions. This was particularly important given the policy implications of our predictions.

Notwithstanding, a further kind of heterogeneity must be considered. The grade distributions varied markedly between faculties. So, it was decided to run estimates for each faculty. This allowed us to consider faculty heterogeneity reflecting a range of factors, such as the teacher-student ratio, variations in tuition, differences in teacher attributes, etc. However, for empirical reasons, these were grouped into six study types based on academic field (see Table 2). Figure 3 shows that the degree of skewness of the six fields was markedly different. Thus, for instance, a logarithmic transformation did not solve all distributions in the same degree. Likewise, a Box-Cox regression detected different parameters for the theta parameter on the left-hand side of the regression, even though, it is known that GLM performs better when skewed grades are dropped. However, in our opinion, the choice of the econometric method should consider the overall distribution of grades. Below, we consider the appliance of simultaneous quantile regressions for handling extreme values.

INSERT TABLE 2 AROUND HERE

INSERT FIGURE 3 AROUND HERE

Thus, we estimated RMSE for each faculty group using four different regression techniques (the aforementioned OLS, OLS-Ln(y), GLM and Box-Cox). Table 3 shows the RMSE results for each econometric method. Overall techniques considered bootstrap methodology (5,000 replications) in order to capture robustness against the presence of non-normality and heteroskedasticity as well as the robust sandwich estimator. We can conclude that the logarithm transformation performed better than the rest.

INSERT TABLE 3 AROUND HERE

#### **4. Empirical evidence**

Table 4 shows the results on obtaining a proxy for the measurement of individual ability based on PAU grades. Our 2SLS regression considered as instruments the type of high school attended, the educational attainment of the parents and the employment status of both parents. The Hansen test showed no overidentification for these instruments. Our results showed that being female, studying in a province other than that of Barcelona, belonging to a LOGSE promotion and having a university grant had a positive impact on academic performance. However, a negative significant parameter was obtained for those who subsequently entered the labour market in order to finance their degree studies. In addition, students from academic, religious schools as well as those from vocational secondary (public or private) schools obtained higher undergraduate grades than students from public upper secondary schools. In both types of education (general and vocational), religious schools were found to perform better than the rest. Thus, our results confirm previous empirical evidence indicating that private schools tend to outperform their public counterparts (Hoffer, Greeley and Coleman, 1985; Behrman, Pollack and Taubman, 1995; and Evans and Schwab, 1995). However, it should be

noted that attendance of a private school was also determined by instrumental variables related to a student's socioeconomic background, which seemed to condition a better performance. Finally, the peer effects derived from the high school were also relevant and positive. Thus, classmates had a positive effect on the attainment of high school grades.

These results are of significance given the situation of education (competing public and private schools scenario) in Catalonia (45.4% of our sample was drawn from private schools). Notwithstanding, students attending private schools were also more likely to belong to families with higher income levels and to be more able (Epple, Figlio and Romano, 2004). However, secondary school attendance in Catalonia is not determined by a student's ability. Yet, no definitive conclusions should be drawn from our estimations for secondary education as our results suffer a sample selection bias given that we considered only those individuals attending the University of Barcelona (albeit that it has the highest attendance) and students who successfully graduated. However, predictions for the ability proxy can be obtained from these estimations, which was our initial purpose so as to include this factor as a determinant of university graduation grades.

INSERT TABLE 4 AROUND HERE

Table 5 shows the results of the determinants of university grades for the six discipline areas. For each group of faculties, the standardized individual ability measure was the most significant variable. We also included a quadratic term where the overall effect of both variables was an increasing function (the quadratic term though was only significant for business-economics and science). Thus, *ability* was the cornerstone of the grades of a student on graduating from university.

INSERT TABLE 5 AROUND HERE

The remaining variables were significant in different ways depending on the faculty group. Gender (being female) reduced grades on graduation in the humanities and

sciences (where the percentage of females and males was quite similar), while it increased grades in psychology (where 84.8% of students are female). Being married reduced grades in business-economics and psychology. Age was positively related to humanities, but negatively so for medicine and sciences. Not living with one's parents was only negatively significant for those studying law. University enrolment preferences (second and subsequent options) were negatively significant for all studies. In addition, enrolment on a course from another university degree (or faculty) had a positive impact in the case of business-economics. Finally, employment in the labour market was barely significant, though working more than ten hours a week had a negative impact on medical and science studies. In addition, having a permanent contract had a positive impact on science studies as it did for those who take up employment.

We also estimated the impact derived from the kind of upper secondary school attended by a university graduate. In the case of general studies, and compared to the public school sector, COU variables (*Curso de Orientación Universitaria*, a pre-university course studied at the end of general high school) showed a positive impact when studying in private religious schools for all the faculties, although the effect was greatest for humanities and science, whereas private non-religious schools only increased the grades on graduation in science studies. Students coming from public vocational schools obtained better grades in medical studies, while those coming from private religious schools performed better in business-economics and science studies. No impact was recorded for those that attended vocational private non-religious schools. Thus, our results confirm that the effects of schooling were greatest in secondary private schools, especially academic and religious schools.

In addition to the school typology, we also considered the LOGSE variable, the impact of which was mostly significant and positive (except for those taking medical studies where it was not significant). Thus, it appears that the government reform gave rise to higher graduation grades or a smoother process of adaptation to university studies. However, it may also have given rise to a lower level of academic requirements. We should not lose sight of the fact that these results are conditioned by the small sample

size of those graduating that would have been exposed to the contents and methods of LOGSE.

Students receiving university grants performed better in business-economics and humanities, while those who were self-financing (working students) obtained lower grades in science studies. In addition, living at some distance from the family residence had only a slightly negative impact. Unlike other countries, this was not a particularly important variable since Spanish students rarely move from their parents' home.

We obtained the following results regarding family background. When taking a student's parents' labour characteristics into account, we found that a father's labour conditions were not a significant factor in determining a student's grades. Only those with an unemployed parent and studying business-economics and science recorded lower grades. However, the mother's labour conditions were more important than those of the father. Thus, where the mother was an employer, a positive impact was recorded on a student's grades in law and humanities, while the same was true in humanities (though negative for science) where the mother was self-employed. In the case where the mother of a student was deceased, lower grades were recorded in law studies, though in the case of a deceased father no significant impact was recorded in any faculty group.

A further factor of interest was the effect of a student's parents' education on the university grades of the former, since there is a considerable body of evidence indicating that more educated parents (with at least upper secondary education) pay greater attention to the education of their children (see Haveman and Wolfe, 1995 for a survey of parental education and a child's attainment in education). However, is this effect still evident in tertiary education? A common belief is that parents are more concerned with seeing their children graduate than with their academic performance. And, our results would seem to uphold this belief. Thus, the fact that a father has a degree was only significant and positive in the case of students studying psychology, while fathers with studies below upper secondary education showed a negative significant relationship with those taking medical and science studies and a positive

relationship in the case of business-economics studies. Surprisingly, the mother's education was not significant for students in any faculty group. Thus, a father's education would seem to have a stronger effect than that of a mother's on a student's university grades. This absence of the effect of a mother's schooling on a graduate's grades is in line with Behrman and Rosenzweig's (2002) analysis of the determinants of a child's schooling attainment.

Finally, social peer-effects seem to be irrelevant (presenting a small positive effect on business-economics and a small negative effect on science studies), while secondary school peer-effects had a significant and negative effect on a graduate's grades in all the faculties considered. Thus, students who retained the same peers at university and high school performed worse in tertiary education.

Up to this juncture, we have addressed the average effects attributable to exogenous background variables, without questioning whether these effects were stable for the whole distribution. In short, does the variable significance still hold for the higher tails of the grades distribution? Quantile regressions enable us to detect differences in different parts of the distribution, and are more suitable than OLS estimations when normality is not guaranteed and when misspecification exists (Angrist, Chernozhukov and Fernández-Val, 2006). Simultaneous conditioned quantile regressions were estimated for quantiles at 50% (this regression corresponds to the median value, as opposed to the average value in OLS regressions), 75% and 90%. Standard errors were also computed using bootstrap methodology with 5,000 replications.

These results are shown in Tables 6a and 6b. The influence of ability increased in the upper quantiles in each faculty, while the quadratic term was also significant and positive in most of them. In addition, the effects of gender, not living with one's parents, the LOGSE students (with the exception of those studying humanities), university enrolment preferences and a mother's self-employed status also increased these effects for average grades. A father's education reduced these effects on a university student's grades in the case of psychology and humanities, whereas it increased them for business-economics and science. Likewise, religious private schools, both COU

(general) and vocational, increased their effects for science studies. Finally, secondary school peer-effects showed an increasing pattern across the quartiles for all faculties. No further changes were significant.

INSERT TABLES 6a and 6b AROUND HERE

## **5. Conclusions**

A number of conclusions can be drawn concerning the determining effects of personal, socioeconomic and family background characteristics on a student's university grades. In the case of a student's personal characteristics, his or her ability (obtained by excluding the effects of schooling from their pre-university grades) was found to be the main determinant of their grades on graduating. Other personal characteristics (including age, gender, marital and working status, and enrolment preferences) were also found to have an impact on these final grades, though the effect was not consistent across all faculties.

In the case of a student's secondary education characteristics, those coming from private schools were found to perform better (with those having attended religious schools recording the highest results) than those that attended state schools. Moreover, secondary school students educated after the introduction of the LOGSE reform in 1990 obtained higher results. These results show that students who received a private education reaped greater benefits from their prior schooling when enrolling at a public university and that the LOGSE reform had a positive effect on the attainment of university students (though it might be the case that the university has lowered its academic requirements over time). Finally, the peer effects derived from attending the same high school and faculty had a significant and negative impact on graduates' grades in all the faculties considered. This suggests that higher grades can be achieved by those who acquire new friends at university. Finally, a mother's work status and a father's level of education have an impact on a student's results, whereas a mother's level of education is not a determinant of a student's grades on graduating.

Spain has a high ratio of university students compared with the figures presented by other OECD economies. However, excellence has perhaps not been the main goal in tertiary education and, therefore, policymakers have not been overly concerned with improving university grades; notwithstanding, this is an aspect that should be considered in the future since arguably there are strong links between the grades of a country's graduates and future individual labour productivity, salaries and value added economic growth.

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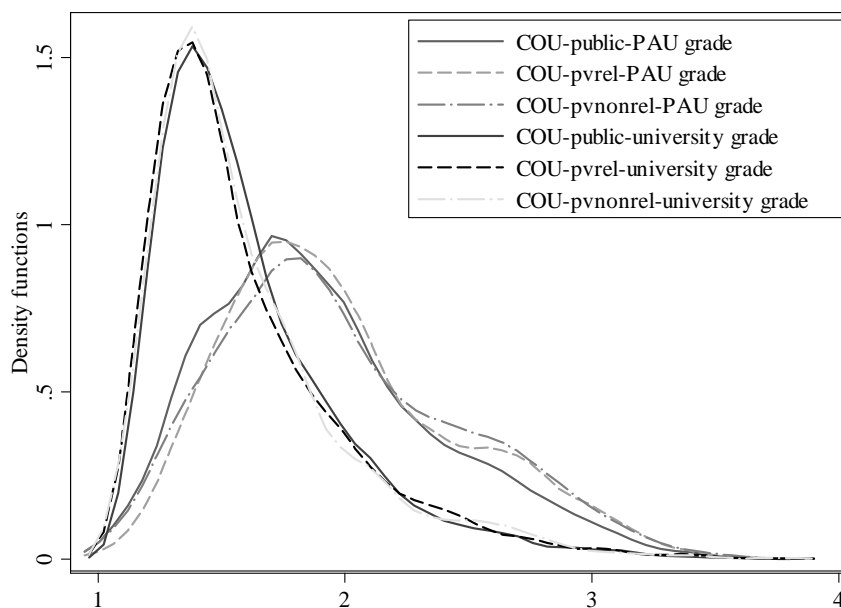
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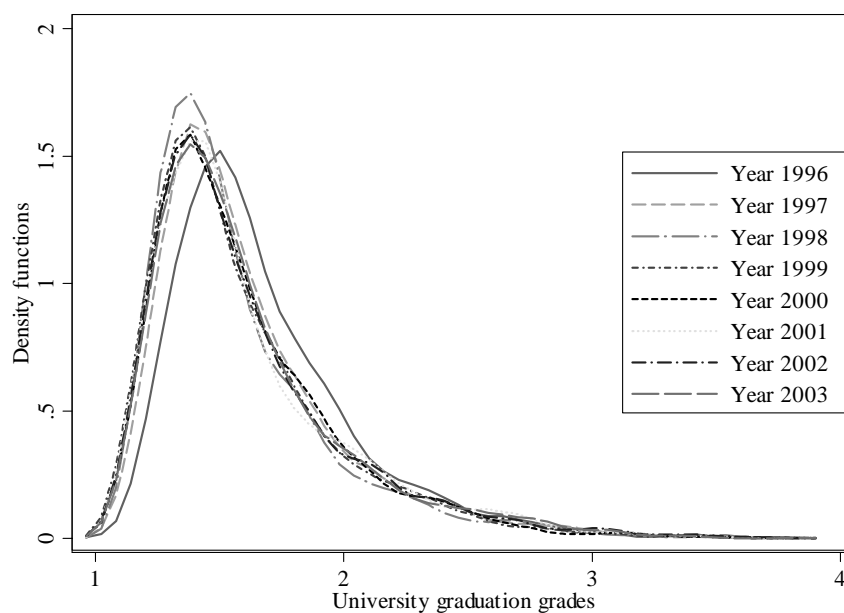
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**Figure 1 Kernel density functions for grades**

**1a. PAU versus university graduation grades by type of high school attended**



**1.b Evolution of university grades during the study period for all faculties**

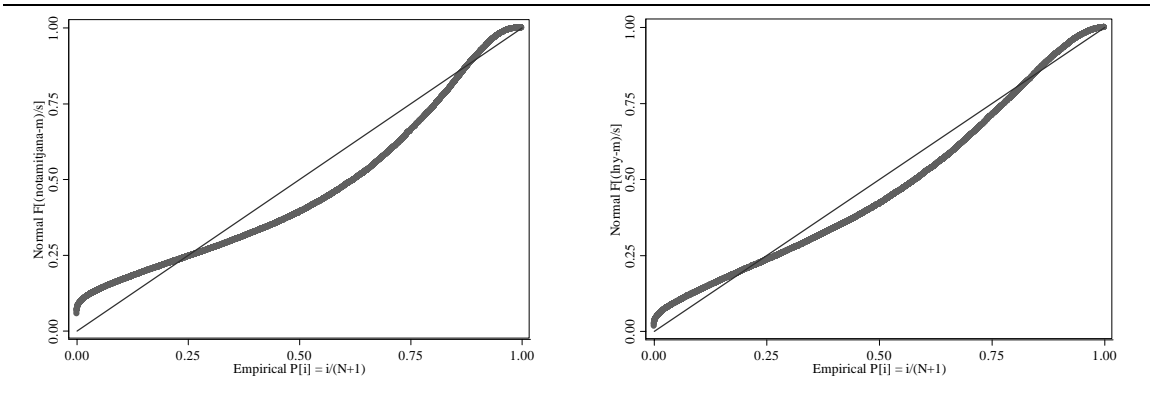


Notes: COU (*curso de orientación universitaria*) is a pre-university course constituting the last year of general upper secondary education; public (attended public school); pvrel (private religious); pvnonrel (private non-religious).

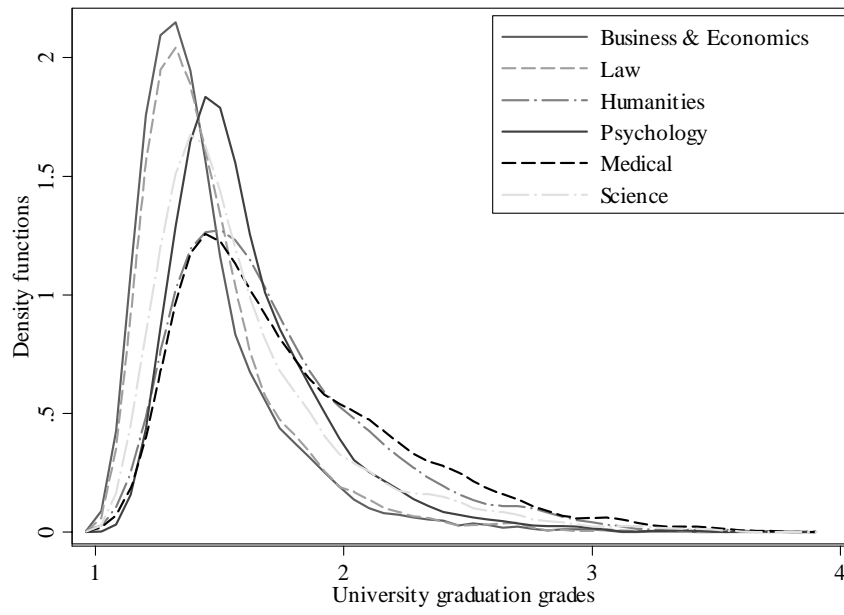
**Figure 2 Normal probability tests for dependent variable and its logarithm**

**2.a Dependent variable**

**2.b Ln(dependent variable)**



**Figure 3. Kernel density functions by faculty groups**



**Table 1. Summary statistics**

	Mean	Std. Dev.	Min	Max
University graduation (or final) grade (scale 1-4)	1.606	0.381	1	3.8
PAU grade (scale 5-10)	6.579	0.767	5	9.6
PAU grade (scale 1-4)	1.948	0.460	1	3.7
Gender (Female=1)	0.653	0.476	0	1
Foreigner (not Spaniard)	0.014	0.117	0	1
Spaniard (not from Catalonia)	0.042	0.201	0	1
High school in a Catalan province except Barcelona- Otherprov	0.084	0.277	0	1
Civil status (married=1)- Married	0.016	0.125	0	1
Age on starting university	18.758	1.667	15	46
Living with parents- Parents-house	0.893	0.242	0	1
Access from other university studies- Otheruniv	0.086	0.279	0	1
Pre-university course (COU) in public school- COUpublic	0.478	0.500	0	1
COU in private & religious school- COUpvrel	0.256	0.436	0	1
COU - private & non-religious- COUpvnonrel	0.117	0.322	0	1
Vocational ed.(VE), public school- VEpublic	0.067	0.251	0	1
VE, private & religious- VEpvrel	0.055	0.227	0	1
VE, private & non-religious- VEpvnonrel	0.026	0.160	0	1
LOGSE student- Logse	0.037	0.189	0	1
Financed by parents- Fipa	0.887	0.317	0	1
Financed with a grant- Grant	0.022	0.146	0	1
Financed by working- Fiworking	0.091	0.288	0	1
Father's educational level 1 (primary or less)- Faed1	0.363	0.481	0	1
Father's educational level 2 (lower secondary)- Faed2	0.199	0.399	0	1
Father's educational level 3 (upper secondary)- Faed3	0.276	0.446	0	1
Father's educational level 4 (university) - Faed4	0.162	0.368	0	1
Mother's educational level 1 (primary or less)- Moed1	0.449	0.497	0	1
Mother's educational level 2 (lower secondary)- Moed2	0.251	0.434	0	1
Mother's educational level 3 (upper secondary)- Moed3	0.223	0.416	0	1
Mother's educational level 4 (university) - Moed4	0.077	0.265	0	1
University first preference- Pref1	0.803	0.398	0	1
University second preference-Pref2	0.094	0.292	0	1
University further than second choice- Pref3	0.103	0.304	0	1
Working 10-20 hours a week- Work10	0.034	0.181	0	1
Working >20 hours a week- Work20	0.138	0.344	0	1
Unemployed	0.037	0.190	0	1
Worker with permanent contract- Permanent	0.054	0.226	0	1

Worker with eventual contract- Temporary	0.092	0.290	0	1
Father employer - Workfather1	0.154	0.361	0	1
Father self-employed - Workfather2	0.118	0.323	0	1
Father wage-earner - Workfather3	0.556	0.497	0	1
Father unemployed - Workfather4	0.053	0.224	0	1
Father non-active - Workfather5	0.075	0.263	0	1
Father deceased - Workfather6	0.032	0.177	0	1
Mother employer - Workmother1	0.050	0.218	0	1
Mother self-employed – Workmother2	0.057	0.231	0	1
Mother wage-earner – Workmother3	0.316	0.465	0	1
Mother unemployed – Workmother4	0.050	0.219	0	1
Mother non-active – Workmother5	0.499	0.500	0	1
Mother deceased – Workmother6	0.010	0.100	0	1

**Table 2. Grouped faculties and graduation grades**

<b>Code</b>	<b>Grouped faculties</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Sample size</b>
FAC1	Business Administration and Management, Economics	1.443	0.280	3,626
FAC2	Law	1.468	0.297	3,642
FAC3	Humanities (Catalan philology, Spanish philology, Geography, and History)	1.721	0.403	3,580
FAC4	Psychology	1.616	0.310	2,959
FAC5	Medical (Pharmacy and Medicine)	1.780	0.444	3,633
FAC6	Science (Biology, Physics, Mathematics, and Chemistry)	1.612	0.387	4,924

**Table 3. RMSE comparisons**

	<b>Business &amp; Economics FAC1</b>	<b>Law FAC2</b>	<b>Humanities FAC3</b>	<b>Psychology FAC4</b>	<b>Medical FAC5</b>	<b>Science FAC6</b>
OLS	0.258	0.255	0.328	0.295	0.380	0.332
OLS Ln(y)	0.161	0.160	0.184	0.169	0.199	0.188
GLM log-gamma	0.213	0.265	0.309	0.234	0.298	0.276
Boxcox regression	0.220	0.225	0.280	0.251	0.318	0.282

**Table 4 Results for the ln (PAU grades): robust & GMM**

COUpvrel	0.136 <sup>a</sup>
COUpvnonrel	0.071
VEpublic	0.030 <sup>b</sup>
VEpvrel	0.061 <sup>a</sup>
VEpvnonrel	0.045 <sup>a</sup>
Gender	0.021 <sup>a</sup>
Spaniard	0.014 <sup>b</sup>
Otherprov	0.072 <sup>a</sup>
LOGSE	0.101 <sup>a</sup>
Deceased-father	-0.011
Deceased-mother	0.001
Grant	0.021 <sup>b</sup>
Fiworking	-0.025 <sup>a</sup>
Same high school peers	0.587 <sup>a</sup>
Constant	0.669 <sup>a</sup>
N	6882
Hansen J	0.307
$\chi^2$ P-value	0.959
RMSE	0.12

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at 1, 5 and 10% respectively

**Table 5. Results for ln(y) robust standard errors and bootstrap procedure**

	<b>Bus. &amp;Econ FAC1</b>	<b>Law FAC2</b>	<b>Humanities FAC3</b>	<b>Psychology FAC4</b>	<b>Medical FAC5</b>	<b>Science FAC6</b>
Ability	0.057 <sup>a</sup>	0.038 <sup>a</sup>	0.080 <sup>a</sup>	0.036 <sup>a</sup>	0.047 <sup>a</sup>	0.043 <sup>a</sup>
Squared ability	0.024 <sup>a</sup>	0.012	0.010	0.010	0.004	0.017 <sup>a</sup>
Gender	-0.002	0.010	-0.032 <sup>a</sup>	0.035 <sup>b</sup>	-0.008	-0.035 <sup>a</sup>
Foreigner	-0.002	0.019	0.065	0.095 <sup>c</sup>	0.041	0.084
Spaniard	-0.006	0.024	0.001	-0.005	0.022	-0.048
Married	-0.084 <sup>c</sup>	0.026	0.039	-0.171 <sup>c</sup>	0.033	-0.057
Age	-0.003	0.003	0.006 <sup>b</sup>	-0.002	-0.032 <sup>b</sup>	-0.017 <sup>c</sup>
No-Parents-house	-0.020	-0.035 <sup>c</sup>	0.015	0.014	-0.029	-0.009
Otheruniv	0.059 <sup>a</sup>	-0.020	0.013	0.086	0.045	-0.020
COUpvrel	0.031 <sup>c</sup>	0.029 <sup>b</sup>	0.083 <sup>a</sup>	0.042 <sup>b</sup>	0.042 <sup>b</sup>	0.088 <sup>a</sup>
COUpvnonrel	-0.006	0.008	0.025	0.022	0.024	0.058 <sup>a</sup>
VEpublic	0.097	0.032	0.027	0.027	0.055 <sup>c</sup>	0.021
VEpvrel	0.059 <sup>c</sup>	0.024	0.032	-0.004	0.012	0.079 <sup>a</sup>
VEpvnonrel	-0.066	0.019	-0.009	0.041	-0.005	0.001
LOGSE	0.107 <sup>a</sup>	0.155 <sup>a</sup>	0.045 <sup>b</sup>	0.048 <sup>c</sup>	-0.029	0.112 <sup>a</sup>
Grant	0.107 <sup>b</sup>	-0.011	0.076 <sup>c</sup>	0.003	-0.031	-0.017
Fiworking	-0.014	0.024	-0.031	-0.019	-0.016	-0.089 <sup>b</sup>
Faed1	0.035 <sup>b</sup>	-0.008	0.022	0.022	-0.041 <sup>c</sup>	-0.032 <sup>c</sup>
Faed2	0.030 <sup>c</sup>	-0.007	0.002	0.022	-0.048 <sup>b</sup>	0.007
Faed4	-0.004	0.019	0.017	0.050 <sup>b</sup>	-0.010	-0.026
Moed1	-0.023	0.004	-0.020	0.004	0.022	-0.022
Moed2	0.003	0.001	0.022	0.012	0.006	-0.023
Moed4	-0.011	-0.011	0.017	-0.005	0.012	-0.007
Pref2	-0.039 <sup>b</sup>	-0.033 <sup>a</sup>	-0.051 <sup>a</sup>	-0.010	0.012	-0.031 <sup>c</sup>
Pref3	-0.027	-0.051 <sup>a</sup>	-0.077 <sup>a</sup>	-0.036 <sup>c</sup>	-0.069 <sup>c</sup>	-0.072 <sup>a</sup>
Work10	-0.041	-0.029	-0.027	0.019	-0.094 <sup>c</sup>	-0.026
Work20	0.003	-0.014	-0.012	0.002	-0.063	-0.038 <sup>c</sup>
Unemployed	-0.023	-0.016	0.009	0.030	0.071	-0.021
Permanent	-0.005	-0.022	0.031	0.052	0.001	0.106 <sup>a</sup>
Temporary	0.031	0.005	0.018	-0.008	0.012	0.093 <sup>a</sup>
Workfather1	-0.010	0.012	-0.008	-0.022	-0.003	-0.005
Workfather2	0.005	-0.002	-0.001	-0.002	0.031	0.015
Workfather4	-0.039 <sup>c</sup>	-0.004	-0.024	-0.024	0.046	-0.066 <sup>c</sup>
Workfather5	-0.031	0.016	-0.009	-0.003	0.040	-0.045
Workfather6	0.032	-0.026	-0.008	-0.041	-0.049	-0.051
Workmother1	-0.037	0.055 <sup>a</sup>	0.065 <sup>b</sup>	0.003	0.025	-0.013
Workmother2	-0.026	0.022	0.076 <sup>a</sup>	-0.022	0.037	-0.064 <sup>b</sup>
Workmother4	-0.018	-0.021	0.034	0.021	0.012	-0.017
Workmother5	-0.007	-0.006	0.029 <sup>b</sup>	-0.001	0.006	-0.024
Workmother6	-0.003	-0.097 <sup>a</sup>	0.110	0.008	0.233	-0.001
Peer-social effects	-0.005 <sup>b</sup>	0.001	0.000	-0.001	0.003	0.007 <sup>a</sup>
Peer-same school	-0.112 <sup>a</sup>	-0.074 <sup>a</sup>	-0.091 <sup>a</sup>	-0.074 <sup>a</sup>	-0.048 <sup>a</sup>	-0.081 <sup>a</sup>
Constant	0.399 <sup>a</sup>	0.295 <sup>a</sup>	0.403 <sup>a</sup>	0.440 <sup>a</sup>	1.115 <sup>a</sup>	0.779 <sup>a</sup>
N	974	1504	1251	904	886	996
Wald $\chi^2$	208.34	208.04	346.24	122.37	122.29	310.52
R <sup>2</sup>	0.213	0.119	0.223	0.117	0.116	0.219

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at 1, 5 and 10% respectively

**Table 6a Results for ln(y): quantiles with robust standard errors and bootstrap procedure**

	FAC1			FAC2			FAC3		
	Q50	Q75	Q90	Q50	Q75	Q90	Q50	Q75	Q90
Ability	0.061 <sup>a</sup>	0.071 <sup>a</sup>	0.066 <sup>b</sup>	0.050 <sup>a</sup>	0.050 <sup>a</sup>	0.052 <sup>a</sup>	0.089 <sup>a</sup>	0.082 <sup>a</sup>	0.085 <sup>a</sup>
Squared ability	0.024 <sup>a</sup>	0.027 <sup>a</sup>	0.020	0.022 <sup>a</sup>	0.031 <sup>a</sup>	0.028 <sup>b</sup>	0.012 <sup>c</sup>	0.012	0.016
Gender	-0.007	-0.013	0.008	0.008	-0.013	-0.002	-0.039 <sup>a</sup>	-0.039 <sup>b</sup>	-0.022
Foreigner	0.002	0.011	-0.067	0.020	0.000	0.043	0.068	0.168	0.133
Spaniard	-0.010	-0.037	0.032	-0.004	0.024	0.123 <sup>c</sup>	0.006	0.037	0.067
Married	-0.111 <sup>c</sup>	-0.080	-0.144	0.056	0.024	-0.014	0.001	-0.012	0.064
Age	-0.007	-0.007	-0.009	0.006	0.005	0.003	0.007	0.008 <sup>c</sup>	0.012 <sup>b</sup>
No-Parents-house	-0.026	-0.016	-0.051	-0.038 <sup>b</sup>	-0.075 <sup>a</sup>	-0.073	0.008	0.021	0.018
Otheruniv	0.062 <sup>b</sup>	0.128 <sup>a</sup>	0.100	-0.031	-0.051	-0.094 <sup>b</sup>	0.015	0.041	0.042
COUpvrel	0.034 <sup>c</sup>	0.029	0.007	0.024 <sup>c</sup>	0.015	0.023	0.085 <sup>a</sup>	0.070 <sup>b</sup>	0.089 <sup>b</sup>
COUpvnonrel	-0.003	-0.017	-0.061	0.004	0.007	0.005	0.013	-0.006	0.076
VEpublic	0.094	0.193 <sup>c</sup>	0.255 <sup>b</sup>	0.057 <sup>b</sup>	0.035	0.040	0.009	0.031	0.030
VEpvrel	0.050	0.084	0.050	0.006	0.022	0.053	0.023	0.004	0.039
VEpvnonrel	-0.064	-0.092	-0.100	0.024	-0.038	0.064	-0.012	-0.023	-0.040
LOGSE	0.083 <sup>a</sup>	0.141 <sup>a</sup>	0.121 <sup>b</sup>	0.106 <sup>c</sup>	0.173 <sup>a</sup>	0.093	0.028	0.066	0.038
Grant	0.116	0.112 <sup>b</sup>	0.080	-0.035	-0.014	0.081	0.069	0.113 <sup>c</sup>	0.120 <sup>b</sup>
Fiworking	0.003	-0.045	-0.054	0.013	0.020	0.079	-0.019	-0.036	-0.041
Faed1	0.037 <sup>c</sup>	0.051 <sup>b</sup>	0.029	-0.012	-0.016	-0.011	0.038 <sup>c</sup>	0.023	-0.016
Faed2	0.020	0.024	0.081 <sup>b</sup>	-0.016	-0.007	0.032	0.016	0.018	-0.009
Faed4	-0.003	0.019	0.011	0.014	0.025	0.075 <sup>c</sup>	0.037	-0.003	0.042
Moed1	-0.024	-0.029	-0.013	0.009	0.020	-0.030	-0.020	-0.024	0.024
Moed2	0.012	0.010	-0.024	-0.002	0.011	-0.029	0.028	0.039	0.040
Moed4	0.022	-0.050	-0.119 <sup>c</sup>	-0.025	-0.029	-0.059	0.043	0.050	-0.041
Pref2	-0.024	-0.045 <sup>c</sup>	-0.092 <sup>b</sup>	-0.022	-0.042 <sup>b</sup>	-0.099 <sup>a</sup>	-0.043 <sup>c</sup>	-0.050	-0.088 <sup>a</sup>
Pref3	-0.025	-0.050	-0.106 <sup>c</sup>	-0.037 <sup>a</sup>	-0.066 <sup>a</sup>	-0.139 <sup>a</sup>	-0.074 <sup>a</sup>	-0.113 <sup>a</sup>	-0.126 <sup>a</sup>
Work10	-0.066	-0.083	-0.006	-0.025	-0.045	-0.046	-0.018	0.005	-0.108
Work20	-0.017	-0.018	0.037	-0.002	-0.014	-0.081 <sup>b</sup>	0.019	0.001	-0.091
Unemployed	-0.023	0.043	0.079	-0.041 <sup>c</sup>	-0.009	-0.007	0.006	-0.007	0.032
Permanent	0.007	-0.013	-0.011	-0.029	-0.019	-0.051	0.032	0.049	0.106

Temporary	0.043	0.062	-0.026	-0.005	-0.004	0.045	-0.003	0.025	0.103
Workfather1	-0.015	-0.012	0.014	0.013	0.045 <sup>c</sup>	-0.003	0.007	-0.032	-0.036
Workfather2	0.002	0.010	-0.005	0.004	0.027	-0.036	-0.007	-0.007	0.043
Workfather4	-0.005	-0.033	-0.116 <sup>b</sup>	0.018	-0.027	-0.019	-0.006	-0.005	-0.049
Workfather5	-0.002	-0.031	-0.018	0.020	0.006	-0.016	0.000	-0.045	-0.011
Workfather6	-0.008	0.094	0.116	-0.015	-0.003	-0.052	-0.017	-0.058	-0.011
Workmother1	-0.039	-0.024	-0.120 <sup>b</sup>	0.050 <sup>b</sup>	0.052	0.033	0.032	0.047	0.098
Workmother2	-0.024	0.001	-0.083	0.030	0.017	0.002	0.044	0.073	0.114 <sup>b</sup>
Workmother4	-0.006	0.000	-0.045	-0.033 <sup>c</sup>	-0.071 <sup>b</sup>	-0.017	0.010	0.027	0.049
Workmother5	-0.004	-0.005	-0.039	-0.010	-0.025	0.002	0.015	0.034	0.048 <sup>c</sup>
Workmother6	-0.008	-0.017	-0.072	-0.074 <sup>c</sup>	-0.072	-0.143 <sup>b</sup>	0.044	0.142	0.084
Peer-social effects	-0.005 <sup>c</sup>	-0.007 <sup>b</sup>	-0.009 <sup>c</sup>	0.001	0.003 <sup>c</sup>	0.000	0.000	-0.002	-0.003
Peer-same school	-0.088 <sup>a</sup>	-0.098 <sup>a</sup>	-0.124 <sup>a</sup>	-0.061 <sup>a</sup>	-0.086 <sup>a</sup>	-0.119 <sup>a</sup>	-0.107 <sup>a</sup>	-0.112 <sup>a</sup>	-0.094 <sup>b</sup>
Constant	0.433 <sup>a</sup>	0.543 <sup>a</sup>	0.792 <sup>a</sup>	0.215 <sup>a</sup>	0.353 <sup>a</sup>	0.572 <sup>a</sup>	0.385 <sup>a</sup>	0.495 <sup>a</sup>	0.509 <sup>a</sup>
N		974			1504			1251	
.50 Ps- R <sup>2</sup>		0.108			0.073			0.139	
.75 Ps- R <sup>2</sup>		0.168			0.102			0.151	
.90 Ps- R <sup>2</sup>		0.193			0.136			0.170	

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at 1, 5 and 10% respectively

**Table 6b Results for ln(y): quantiles with robust standard errors and bootstrap procedure**

	FAC4			FAC5			FAC6		
	Q50	Q75	Q90	Q50	Q75	Q90	Q50	Q75	Q90
Ability	0.031 <sup>a</sup>	0.031 <sup>b</sup>	0.041 <sup>b</sup>	0.069 <sup>a</sup>	0.041 <sup>c</sup>	0.008	0.047 <sup>a</sup>	0.049 <sup>a</sup>	0.047 <sup>b</sup>
Squared ability	0.015 <sup>c</sup>	0.011	0.035 <sup>c</sup>	0.001	0.001	0.002	0.012	0.025 <sup>a</sup>	0.028 <sup>b</sup>
Gender	0.034 <sup>c</sup>	0.048 <sup>c</sup>	0.019	-0.009	-0.040	-0.041	-0.039 <sup>b</sup>	-0.043 <sup>b</sup>	-0.052 <sup>c</sup>
Foreigner	0.117 <sup>c</sup>	0.105	0.102	0.059	0.115	0.006	0.122 <sup>c</sup>	0.133 <sup>b</sup>	0.072
Spaniard	-0.049	-0.009	0.072	0.088	0.047	-0.030	-0.041	-0.034	-0.048
Married	-0.096	-0.230	-0.368 <sup>c</sup>	0.058	0.016	0.043	-0.033	-0.101	-0.188 <sup>c</sup>
Age	-0.003	-0.001	0.004	-0.032	-0.036 <sup>c</sup>	-0.037 <sup>c</sup>	-0.013	-0.031 <sup>b</sup>	-0.032
No-Parents-house	0.017	0.034	0.048	-0.016	-0.044	-0.030	-0.007	0.006	0.042
Otheruniv	0.091 <sup>b</sup>	0.123 <sup>b</sup>	0.119 <sup>c</sup>	0.108	0.034	-0.067	-0.015	0.018	-0.008
COUpvrel	0.046 <sup>c</sup>	0.033	0.063	0.039	0.030	0.005	0.117 <sup>a</sup>	0.119 <sup>a</sup>	0.098 <sup>a</sup>
COUpvnonrel	0.023	0.007	0.024	0.005	0.040	0.032	0.075 <sup>a</sup>	0.052	0.051
VEpublic	0.040	0.026	0.036	0.038	0.038	0.044	0.017	0.061	0.041
VEpvrel	0.002	-0.052	-0.051	0.001	0.007	0.022	0.080 <sup>c</sup>	0.137 <sup>b</sup>	0.176 <sup>a</sup>
VEpvnonrel	0.038	0.030	0.042	0.039	-0.041	-0.054	0.003	0.042	-0.077
LOGSE	0.055 <sup>c</sup>	0.020	0.049	0.010	-0.042	-0.065	0.118 <sup>a</sup>	0.066	0.144 <sup>c</sup>
Grant	-0.026	0.015	0.078	-0.034	0.043	-0.046	-0.047	-0.030	-0.100
Fiworking	-0.033	-0.020	0.004	-0.001	-0.081	-0.031	-0.054	-0.108	-0.099
Faed1	0.004	0.023	0.070	-0.078 <sup>b</sup>	-0.065 <sup>c</sup>	0.003	-0.021	-0.070 <sup>c</sup>	-0.111 <sup>a</sup>
Faed2	0.013	0.041	0.086 <sup>c</sup>	-0.042	-0.049	-0.049	0.003	0.018	0.002
Faed4	0.069 <sup>a</sup>	0.059 <sup>c</sup>	0.070	-0.028	0.019	0.018	-0.040	-0.032	-0.036
Moed1	0.009	0.025	-0.006	0.029	0.040	0.059	-0.045	-0.011	0.037
Moed2	0.025	0.030	-0.010	-0.008	0.016	0.055	-0.047 <sup>c</sup>	-0.021	0.022
Moed4	0.004	-0.010	-0.066	0.037	-0.020	0.009	0.003	-0.018	0.030
Pref2	-0.011	-0.001	-0.010	-0.028	0.129	0.032	-0.034	-0.056	-0.036
Pref3	-0.053 <sup>b</sup>	-0.049	-0.040	-0.070	-0.138 <sup>c</sup>	-0.134 <sup>c</sup>	-0.064 <sup>b</sup>	-0.076 <sup>b</sup>	-0.119 <sup>b</sup>
Work10	-0.027	-0.012	0.119	-0.050	-0.101	-0.135	-0.017	0.010	0.002
Work20	0.013	-0.037	0.027	-0.056	-0.016	-0.052	-0.034	-0.074 <sup>c</sup>	-0.077
Unemployed	0.015	0.021	0.173	0.140 <sup>b</sup>	-0.091	-0.325 <sup>b</sup>	-0.018	0.016	0.019
Permanent	0.072	0.098	0.054	-0.047	-0.017	-0.086	0.048	0.215 <sup>b</sup>	0.198 <sup>c</sup>

Temporary	0.022	-0.003	-0.104	-0.012	0.039	0.016	0.022	0.123 <sup>c</sup>	0.143 <sup>c</sup>
Workfather1	-0.031	-0.005	-0.006	-0.015	-0.030	-0.015	-0.010	0.028	-0.041
Workfather2	0.018	-0.006	0.006	0.039	0.016	0.034	0.009	0.024	0.003
Workfather4	-0.023	-0.055	-0.042	0.033	0.013	0.059	-0.061	-0.047	-0.085
Workfather5	0.017	-0.006	-0.030	0.034	0.042	0.065	-0.038	-0.049	-0.073
Workfather6	-0.030	-0.024	-0.110	-0.031	-0.084	-0.068	-0.085	-0.038	-0.015
Workmother1	0.035	-0.049	-0.116 <sup>b</sup>	0.011	-0.029	-0.004	-0.020	-0.042	-0.039
Workmother2	-0.018	-0.072	-0.097	0.034	0.018	0.035	-0.071 <sup>c</sup>	-0.080 <sup>c</sup>	-0.142 <sup>b</sup>
Workmother4	0.035	0.039	0.066	-0.013	0.001	0.046	0.011	-0.055	-0.122 <sup>b</sup>
Workmother5	0.011	-0.007	-0.051	0.010	0.011	0.013	-0.009	-0.029	-0.040
Workmother6	0.105	-0.015	-0.188	0.088	0.280 <sup>c</sup>	0.135	0.049	-0.080	-0.178 <sup>b</sup>
Peer-social effects	0.001	-0.004	-0.004	0.001	-0.001	0.006	0.005	0.009	0.021 <sup>b</sup>
Peer-same school	-0.063 <sup>a</sup>	-0.090 <sup>a</sup>	-0.095 <sup>a</sup>	-0.055 <sup>b</sup>	-0.077 <sup>a</sup>	-0.064 <sup>c</sup>	-0.075 <sup>a</sup>	-0.095 <sup>a</sup>	-0.073 <sup>b</sup>
Constant	0.402 <sup>a</sup>	0.514 <sup>a</sup>	0.568 <sup>a</sup>	1.117 <sup>b</sup>	1.397 <sup>a</sup>	1.514 <sup>a</sup>	0.692 <sup>a</sup>	1.139 <sup>a</sup>	1.280 <sup>a</sup>
N		904			886			996	
.50 Ps- R <sup>2</sup>		0.082			0.089			0.130	
.75 Ps- R <sup>2</sup>		0.081			0.070			0.151	
.90 Ps- R <sup>2</sup>		0.088			0.077			0.183	

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at 1, 5 and 10% respectively