THE EFFECT OF SCHOLARSHIPS ON UNIVERSITY PERSISTENCE: A CASE STUDY

Vanesa BERLANGA, Franciele CORTI, Eva PEREA

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The Effect of Scholarships on University Persistence: A Case Study

Vanesa BERLANGA[1], Franciele CORTI[2], Eva PEREA[3]

Abstract

As we enter the 21st century, the social dimension of Higher Education is one of the key elements in university policies. Among measures aimed at retaining students, scholarship and study grant policies help to ensure equality. In Spain, the establishment of the Study Aid Programme (PAE) for degree studies is an outstanding innovative initiative. This study is aimed at assessing the importance of the PAE as an economic factor in equity, access and academic performance in the first year at university. The data used is that available on all students who began degree studies at Abat Oliba CEU University from the 2009-10 academic years to the 2015-16 academic years. The results confirm that obtaining a scholarship becomes an incentive that influences key aspects for persistence, such as the degree of effort and educational commitment with positive results on students' performance.

Keywords: social dimension, equity, discriminant analysis, performance, grants and scholarships.

Introduction

The model of grants and scholarships forms part of university reforms implemented in the last few decades with the aim of establishing more inclusive and open organisations while also seeking to apply and ensure the compatibility of two key principles: equity and excellence. In Spain, this process has gone hand-in-hand with the creation of the European Higher Education Area (EHEA),

[1] Universitat Abat Oliba CEU, CEU Universities, Barcelona, SPAIN. E-mail: vberlangas@uao.es

[2] Universitat Abat Oliba CEU, CEU Universities, Barcelona, SPAIN. E-mail: fcorti@uao.es

[3] Universitat Abat Oliba CEU, CEU Universities, Barcelona, SPAIN. E-mail: epeream@uao.es

which supports the basic principles of change within the European Union. The social dimension of Higher Education is one of the essential elements in university policies today.

An OECD report published in 2012 noted the continuing existence of situations of discrimination regarding university access. This was due, in part, to the rigidity of admissions pathways and systems that might be perpetuating patterns of socio-economic exclusion by focusing exclusively on the results obtained in secondary education or entrance examinations. The report also noted situations of inequity in the retention of disadvantaged groups who, obviously, often have to overcome more and greater challenges in order to succeed in their studies than do their peers (OECD, 2012).

In Spain in recent years, we have seen important changes in the financing model for Spanish Universities (OECD, 2013). More specifically, following the approval of Royal Decree 922/2009, of May 29, a new scholarship structure was implemented in order to establish a study assistance model based on the criteria of equity and efficiency. The most significant measure was the introduction of a new aid model under the formula of the "salary scholarship", which represents an evolution and modernisation of what more fragmented compensatory scholarships have been until today. This salary scholarship entails full-time dedication to studies, made possible by providing the student with income that compensates them for their university costs. This new system of scholarships began to be applied progressively in the 2009-10 academic year with the aim that the model established will be fully in force and the current grant system completely abandoned by 2020.

Research carried out in recent decades is conclusive in this respect. Economic factors are one of the predictors of access to and choice of studies (Marjoribanks, 2004; Abu S-Saad, 2016). Many studies highlight the under-representation of students from low-income families at university (at international level, see the review by Cabrera, Pérez & López, 2014; Troiano & Elias, 2014, Troiano, Fachelli, Planes, Sànchez-Gelabert, Figueroa, Elias, Torrents & Daza, 2016). In Spain, the increase in university fees since the 2012-13 academic year and the reduction in grants, coupled with the impoverishment of many families due to the recession, points to coming changes in the social composition of the university. In addition, as Michavila (2013), Ariño (2014) and others have pointed out, territorial differences in fee policies generate substantial segmentation between autonomous communities, or regions, in Spain.

The data also calls into question outcome indicators, in the sense that students from more disadvantaged economic backgrounds present lower graduation rates and tend to take more time than initially planned to complete their studies (Crawford & Harris, 2008; Cabrera, Pérez & López, 2014; Gairín, Triado, Feixas, Figuera, Aparicio & Torrado, 2014). The causes of this may be due to an interaction between personal and contextual factors. The influence of previous academic background (that is, knowledge acquired and study management skills) explains the results

of some of these students, especially those who drop out for academic reasons (Cabrera, Burkum, La Nasa & Bibo, 2012; Figuera & Torrado, 2014; Hernández Armenteros & Pérez García, 2014; Figuera & Torrado, 2015b; Clar, Suriñach & Prujà, 2016). As a result of this data, many authors and reports have begun to insist on the need for an adequate system of financing and economic support to guarantee the principle of equity.

In response to this debate, several authors have begun to call for fully validated data that permits a genuine debate on the effect of the scholarship as a factor of access to and persistence in the system and, therefore, as a key instrument of equity. These lines of action are still incipient in our country, but their results enable certain working hypotheses to be reached. Some of the studies refer to post-compulsory education. For instance, Mediavilla (2010) concludes that obtaining a scholarship has a positive effect on the educational level reached at age 19 years. Chen & Desjardins (2008) also note that investment in higher education gives students with low resources the opportunity for individual, social and economic growth. Other studies have shown that financial support has the effect of increasing responsibility and persistence (Johnson, 2006; Canton & Blom, 2010). We can also mention the study conducted by Río Ruiz & Jiménez Rodrigo (2014) with students who had obtained a scholarship subject to academic achievement. These authors note an increase in students who achieve the academic requirements for obtaining such scholarships. Moreover, the scholarship becomes, for some students, an incentive that influences such key variables as the degree of effort and educational commitment, with varying results according to trajectory and previous level of performance.

These studies also highlight the difficulties inherent in an academic life that depends on meeting the requirements that enable scholarships to be retained. Becoming scholarship students influences the attitudes and life and study strategies of these young people. It is noted that instrumental strategies predominate in the choice of studies, as they select courses in which they are sure to pass. The use of instrumental strategies is also prevalent in the way they plan and conduct their studies, as they aim to ensure the passes required to obtain the scholarship. All this may also affect scores and possibilities for more in-depth studies of subjects that are not required (Berlanga, Figuera & Pons, 2013; Río Ruiz & Jiménez Rodrigo, 2014).

Undoubtedly, the current debate about study assistance mechanisms that guarantee the objectives of equity requires longitudinal and contextualised studies to be conducted in order to explain the different realities. The objective of this article is to present the results of a broader study aimed at analysing the transition process in the first two years of university of a cohort of students who gained admission with scholarships. Specifically, the objective is to answer the questions: What variables improve university persistence in scholarship students? And what is the effectiveness of the scholarship in the transition at the end of the first year?

The purpose is to measure the relationship between studying with a scholarship and the proportion of cases that persist at university at the end of the first year.

The purpose of the research is to analyse the impact of the scholarship, as an economic factor, on persistence in the first year at university. To this end, efforts were made to identify those factors associated with persistence that exercise the most discriminatory power among the scholarship population at University Abat Oliba CEU through discriminant analysis. Applying discriminant analysis enables us to answer the following question: What discrimination power do the variables selected at the beginning of the course have in predicting the university persistence of scholarship students?

To attempt to analyse the extent to which these objectives are met, the data used is that available on all students who began degree studies at University Abat Oliba CEU from the 2009-10 academic year to the 2015-16 academic year.

Methodology

Procedure

Various private and public initiatives have led to the creation of private face-to-face universities in the autonomous community of Catalonia, although they are not financed by the Generalitat of Catalonia or by the State, but mainly by the students enrolled in them. These institutions of higher education grant degrees with the same validity as public universities, that is, university, official and approved, but are governed by their own rules of organization and operation.

Private universities began to appear in Catalonia in 1991. There are currently four private face-to-face universities: University Ramon Llull, promoted by the Private Foundation of Catalonia and University Ramon Llull, which groups previously existing private centers; the University of Vic, promoted by the City Council and entities of this population; the International University of Catalonia, promoted by the Catalan Family Foundation, next to Opus Dei and, finally, the University Abat Oliba CEU, promoted by the San Pablo CEU University Foundation. In addition to the universities mentioned, there are different university and non-university centers attached to these universities, but managed by private institutions. Some of these centers have been the origin of the current private universities, as in the case of the Universitat Abat Oliba CEU, which started its university activity being a center attached to the University of Barcelona.

The research carried out is part of a larger ex post facto descriptive-comparative study in which an analysis is made of data from the institutional database (the analysis tool) on new students taking a total of 11 degree subjects at University Abat Oliba CEU, from the 2009-10 academic year to the 2015-16 academic year.

The research included a discriminant analysis, conducted with the aim of identifying the factors that best discriminate the persistence of scholarship students

at University Abat Oliba CEU. In many studies, regardless of the area of knowledge involved, it is usual to need to identify the characteristics that differentiate certain groups of subjects or objects from others in order to enable future predictions to be made. Discriminant analysis is the appropriate statistical test to select which independent or predictive variables enable groups to be differentiated and determine which of these variables are necessary to achieve the best possible classification. Discriminant analysis also enables the quantification of the discrimination power of these variables according to whether a subject or object belongs to one group or another. For this reason, the technique is considered not only a classification test but also a test of dependence. In fact, the purpose of discriminant analysis is similar to that of logistic regression analysis; the difference is that it only allows quantitative variables (Torrado & Berlanga, 2013). Therefore, a discriminant function will be obtained for the population under study.

From the methodological point of view, persisting or not was selected as the dependent variable, that is to say, a student who re-enrols for the same studies in the second year after beginning is considered "persistent". *Table 1* shows the independent variables included in the study, which correspond to those variables on which information is available.

Table 1. *Independent variables*

VARIABLES	ACRONYM
Academic entrance course	CUR
Holding a scholarship	BEC
Type of scholarship granted in first year	BEC1
Type of scholarship granted in second year	BEC2
Sex of student	SEX
Student's place of residence	LDR
Employment level of father	NOP
Employment level of mother	NOM
Level of studies of father	NEP
Level of studies of mother	NEM
University entrance pathway	VDA
PAU university entrance exam score	PAU
PAU university entrance exam sitting	CONPAU
Type of baccalaureate or vocational training centre	TIPCENT
Qualification or degree	GRAD
Subjects enrolled for in the first year	AM1
Subjects examined in the first year	AP1

Subjects passed in the first year	AA1
Performance rate in the first year	TR1
Success rate in the first year	TE1
Subjects enrolled for in the second year	AM2
Subjects examined in the second year	AP2
Subjects passed in the second year	AA2
Performance rate in the second year	TR2
Success rate in the second year	TE2
Persistence in the first year	PER1

Study population

The study population was formed by 1,954 university students, of whom 78 are new degree scholarship recipients from the cohorts between the 2019-10 and 2015-16 academic years at University Abat Oliba CEU. The cohort entering the University in the 2009-10 academic year was taken as a reference for the study due to the change in the Spanish scholarship system (this was the first year that so-called "salary scholarships" were implemented in Spain) and because it coincides with the academic year when the new PAE scholarship programme was established.

Data analysis

Version 24.0 of the IBM SPSS Statistics software package was used to process and analyse the data. Univariate descriptors were made of all the variables involved, as well as bivariate descriptors to explore the relationship between variables. Moreover, normality tests were made, as well as non-parametric contrast tests to determine the significance of the differences found, and a discriminant function was developed to identify the university persistence of the scholarship students. Since we had nominal, ordinal and scale variables, a classification was made of these variables before the discriminant analysis was applied in order to determine which variables were significant.

Results

The scholarship system

To situate our analysis correctly, it seems appropriate, first of all, to describe some of the characteristics that form the context of the scholarships awarded. In the 2009-10 academic year, 3 scholarships were awarded to undergraduate students at University Abat Oliba CEU, while in the 2015-16 academic year a total of

78 scholarships was reached for the last 7 academic years. This is a significant percentage, taking into account that the financial conditions that students must meet in order to apply for a scholarship are highly demanding (for assistance to be granted, family income and income threshold must be taken into account). Over last 7 years, a total of 78 scholarships or financial assistance packages have been awarded, that is to say, 4% of students (78 out of 1,954) have received grants to study degree courses, a significant percentage taking into account the profile of the university that is the subject of study.

The academic monitoring of scholarship students since the 2009-10 cohorts in their first two undergraduate years can help to shape differential situations among their non-scholarship peers and in relation to the different specific degree subjects for which they are enrolled. This is made possible by analysis of the academic records of the 1,954 students, and transitional typologies in the cohort and by degree subject were also analysed.

Moreover, the reference used to define the persistence rate presented in the higher education quality indicators is enrolment or failure to enrol for the following year. Based on this indicator, the persistence rate of first-year scholarship students in the study cohort at University Abat Oliba CEU is 87% - that is to say, 68 scholarship students out of a total of 78 re-enrolled for the same studies in the second year (Table 2). The rate is slightly higher than that for the general population (80%) and, therefore, it is hypothesised that the scholarship seems to fulfil its mission of helping scholarship students to devote greater dedication to their studies so that the scholarship is renewed in the following academic year.

Table 2. *Data on continuing and drop-out students after the first year*

	Non-scholarship students	Scholarship students	Total
Continuing	1,506 (80%)		1,574
Drop-outs	370 (20%)	10 (13%)	380
Total	1,876	78	1,954

From analysis of the data, distinguishing according to persistence and study qualification, it is deduced that, although there are no significant differences between the two groups (scholarship versus non-scholarship students), non-parametric Chi-Square comparison indicates that there are, on the other hand, significant differences between the non-scholarship population ($\chi 2 = 36.366$; gl = 18; p = 0.006), indicating that the higher persistence rate among non-scholarship students occurs in the following degree courses: Early Childhood Education + Primary Education, Marketing and Commercial Management, and Marketing and Commercial Management + Business Management *(Table 3)*.

Table 3. *Data on continuing and drop-out students after the first year, distinguishing by degree subject*

Subject	Total number of new students	Total cohort N=1,954			
		SCHOLARSHIP N=78		NON-SCHOLARSHIP N=1,876	
		Enrolled 1st year	Continue 2nd year	Enrolled 1st year	Continue 2nd year
Criminology and Security	54	0	0	54	43
Law	313	11	10	302	216
Law + Political Sciences	19	1	1	18	14
Law + Criminology and Security	40	2	1	38	27
Law + Business Management	28	1	0	27	23
Business Management	166	7	5	159	130
Business Management + Economics and Management	54	0	0	54	39
Economics and Management	42	1	1	41	35
Early Childhood Education	74	3	3	71	58
Early Childhood Education + Primary Education	69	4	3	65	60 (87%)
Primary Education	138	5	5	133	112
Marketing and Commercial Management	120	4	3	116	104 (87%)
Marketing and Commercial Management + Business Management	21	0	0	21	19 (90%)
Marketing and Commercial Management + Advertising and Public Relations	35	1	1	34	26
Journalism	111	6	6	105	83
Journalism + Political Sciences	16	1	0	15	12

Psychology	465	21	19	444	359
Psychology + Criminology and Security	22	1	1	21	18
Advertising and Public Relations	167	9	9	158	128
Total UAO	1,954	78	68 (87%)	1,876	1,506 (80%)

Discriminant function analysis

The discriminant function, obtained as a linear combination of the explanatory variables in the discriminant analysis, enables classification of the individuals in the sample into the groups defined by the dependent variable through the establishment of a cut-off point for the scores calculated from the corresponding function (Torrado & Berlanga, 2013). In this case, this is a variable response with two modalities (they either persist or not in the degree subject they enrolled for). Accordingly, a single discriminant function is obtained. In the software used for the empirical study (IBM SPSS Statistics), various criteria can be considered in the selection of the variables included in the discriminant functions: Wilks' lambda, unexplained or residual variance, Mahalanobis distance, Rao's V and smallest F ratio (Ferrán, 2002). In this study, the minimisation criterion of Wilks' lambda was used to present the results.

The IBM SPSS Statistics software generates the parametric assumptions using Box's M test. The parametric assumptions demonstrate the value of the test and its transformation into an F statistic, as well as its significance. The result obtained from the test confirms that the variance-covariance matrices are different. It must be taken into account that the non-compliance of this parametric assumption is especially sensitive in large samples and in deviations from the multivariate normality of a certain variable.

Table 4. *Box's M test for the discriminant analysis of scholarship students*

Box's M test		7.634
F	Approx.	7.600
	gl1	1
	gl2	147382.860
	Sig.	.006
Testing the null hypothesis that the population covariance matrices are equal.		

After the first values are obtained from the analysis to evaluate the significance of the discriminant function (eigenvalue of 0.007; canonical correlation of 0.082), a first conclusion is drawn: there is a unique discriminant function that enables significant (sig. .000) classification of the subjects in the scholarship population into the two groups of persistence and drop-out (Tables 4 and 5). The Wilks value λ (0.993) indicates a second conclusion: although the discriminant function serves to predict group membership, undoubtedly not all the variables will be discriminant (Table 5). This value denotes certain similarities between the groups and, therefore, the influence of each of the variables on the discriminant function obtained should be studied. Consequently, the process recommended is to conduct the test with all the variables by selecting the option "use stepwise method" and later to eliminate the non-significant variables in the function.

Table 5. *Wilks' lambda and eigenvalue of discriminant analysis of scholarship students*

Eigenvalues					
Function		Eigenvalue	% variance	% accumulated	Canonical correlation
dimension	1	.007[a]	100.0	100.0	.082
a. The first canonical discriminant functions were used in the analysis.					
Wilks' lambda					
Contrast of functions		Wilks' lambda	Chi-Square	gl	Sig.
dimension	1	.993	12.644	6	.000

There follows a description of the steps followed in order to construct the discriminant function and, consequently, determine which independent variables among those initially considered are significant for the model. In the case of scholarship students who persist, only one variable is included: the first year performance rate. The footnotes in the tables indicate that the overall Wilks value λ, the F statistic to determine variables (input criterion) and as a statistic to exclude variables (output criterion) were used, and that the F level was insufficient to continue the calculations; in other words, not all the variables defined for the analysis were included (Table 6).

The Wilks' lambda comparison procedure is a test to compare the averages of all discriminant functions in all groups. Thus, if the p-value is lower than 0.05, it is accepted that there are differences in behaviour between the averages of the groups (Torrado & Berlanga, 2013). Accordingly, the procedure conducts the test with all the functions before continuing by distributing the selected variables from those that are not.

Table 6. *Selection of discriminate analysis variables of scholarship students*

Step	Entered	Wilks' lambda								
						F exacta			
		Statistic	gl1	gl2	gl3	Statistic	gl1	gl2	Sig.
1	Course performance rate_1	.993	1	1	1893.000	12.690	1	1893.000	.000

Variables introduced/excluded[a,b,c,d]

At each step, the variable that minimises the overall Wilks' lambda is entered.

a. The maximum number of steps is 12.
B. The minimum partial F to enter is 3.84.
C. The maximum partial F to exit is 2.71.
D. The F level, tolerance or the VIN are insufficient to continue the calculations.

Focusing on the discriminant function, the table of standardised coefficients of the discriminant functions enables us to identify those variables with greater weight in the predictive model, which makes it possible to identify the resulting discriminant function. The estimated discriminant function contains, for the scholarship population, an independent variable whose weighting, untyped and standardised, and the statistics evaluating their individual significance, are shown in *Tables 5* and *7*.

Table 7. *Coefficients of the discriminant function of the student discriminant analysis*

Canonical discriminant function coefficients	
	Function
	1
Year one performance rate	3.211
(Constant)	-2.529
Untyped coefficients	

The discriminant function is determined by:

$D_1 = -2.529 + 3.211*Year\ one\ performance\ rate$

The predictive capacity of the discriminant function is evaluated from the classification matrix in which the observed values are recorded for the dependent variable and those estimated by the model. The final step in the analysis is the summary table of the classification of subjects based on applying the discriminant function obtained. The data indicates that 100% were correctly classified based on the performance rate. Therefore, first year performance rate is the most relevant and predictive variable of the phenomenon studied, university persistence among the scholarship population.

Conclusion

The results from this study show, firstly, that the persistence rates of students with scholarship are similar to those of students overall. This would seem to indicate, given that the economic conditions of these students are worse than the rest, that the scholarship helps to compensate for the difficulties encountered by students from low income families and is a powerful instrument for ensuring social equity. The argument to justify this conclusion lies in the fact that, in line with what most studies at the international level indicate, if these scholarships did not exist, in worse economic conditions, a lower persistence rate would be foreseeable. For this reason, some reports point to the need for an adequate financing system to guarantee the principle of equity in the university system (Egido Gálvez, Fernández Díaz & Galán, 2014; Ariño, 2014).

Moreover, the study focused on the search for those factors that best distinguish scholarship students that persist from those that do not, to better understand the relationship between the individual and academic characteristics of scholarship students most likely to persist in their first year at university. The factor identified as the most relevant here was a single variable: the performance rate. Therefore, we can affirm that the probability of scholarship students persisting in their studies increases as their performance rate rises, the high percentage of subjects passed in relation to those enrolled for. Students who sit and pass fewer subjects among those they enrol for and achieve less academic success are more likely to take the decision not to persist, dropping out from the course they enrolled for in their first year at university. In this respect, our results confirm the thesis put forward by Cabrera, Pérez & López (2014), that obtaining a scholarship becomes an incentive that has an influence on key factors in persistence, such as the amount of effort and educational commitment, with positive effects on performance level.

To date, few articles have focused on determining whether financial aid for students contributes to increasing the likelihood that students with less economic resources will stay on at university. Rather, the literature on this subject has been limited to determining the role of financial assistance on university admissions and on studying the role played by credit restrictions in decisions as to whether or not to enrol for higher education. In this sense, scholarships and grants should

be considered a key instrument for overcoming financial barriers and increasing the possibilities of access to higher education and continuity in their studies of social groups with the greatest financial difficulties.

However, the present worsening economic conditions in our country, coupled with rising university fees, raises the question as to how changes in scholarship policy may affect student performance. This study shows that granting a scholarship does not in itself guarantee greater dedication to studies that will lead to higher performance. All this would seem to indicate – although this issue requires future research – that the greater academic pressure generated by financial difficulties and the need to retain a scholarship decreases the incentive to obtain better scores as opposed to ensuring passes in a higher number of subjects. Taking into account that the EHEA requires students to play a more decisive role in their own academic performance (Martín et al., 2010), the importance of guidance measures provided, above all in the first year, becomes evident.

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