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AlmaLaurea Working Papers - ISSN 2239-9453

ALMALAUREA WORKING PAPERS no. 70

January 2015

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STUDENTS' PERFORMANCES**

by

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SHOULD I STAY OR SHOULD I GO? DROPPING OUT FROM UNIVERSITY: AN EMPIRICAL ANALYSIS OF STUDENTS' PERFORMANCES

By

Roberto Zotti*

Abstract

A strong incentive for studying the dropout phenomenon in the context of Italian tertiary education, both from the positive standpoint and from the regulatory one, is because higher education institutions are evaluated and then financially supported also on the base of parameters such as the dropout rate, especially between the first and the second year. An econometric analysis of factors that affect the decision to drop out has been made, using administrative data on students enrolled in post-reform courses at University of Salerno in the academic year 2003/2004. Focusing on very detailed individual information, the database allows to take into account changes in university attendance decisions year by year and to provide a precise identification of the students who drop out. Moreover a non-selective entrance test score has also been taken into account in order to understand whether it could successfully predict and reduce dropout rates. Evidence that the pre-enrollment characteristics and performances play an important role on the students' decision to drop out has been found out. Moreover, the students' non-selective entrance test scores seem to be a good signal of the students' ability. They could well predict the student's future performances suggesting their use to improve the matching between students and their individual specific curricula.

Key-words: Probit estimation; Student drop-out (non-completion) probabilities; University performance; Selective entry test

JEL-Codes: I20; I21; I23.

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I. INTRODUCTION

The role of education has been widely discussed in the literature and empirical evidence of a positive relationship between quantitative (years of education) and qualitative (knowledge acquired during the years of education) education measures and earnings has been widely demonstrated¹. The education level achieved is closely related to the labour market participation. Specifically, individuals with a tertiary level of education have a greater chance of finding a job, a lower unemployment rate, a higher possibility of having a full time contract and earn more than those who do not have a university degree (OECD, 2011). However, as some analysis carried out by the OECD have showed², in many countries a substantial number of students enter in the higher education system and leave without at least a first tertiary degree. Even though dropping out does not always represent a failure of individuals or inefficiency of universities, a high dropout rate shows that the higher education system did not probably match the students' expectations and needs (OECD, 2008). In Italy the high dropout rate after the first year (as well as the high number of students who do not pass exams) has been considered, in the last two decades, one of the weaknesses of the higher education system (CNVSU, 2011). With the aim of, among others, increasing the participation and reducing the dropout rate in higher education, the Italian university system has been reformed in the last years³. Even though the number of entrants who do not enroll in the second year has been shrinking⁴ (16.7% in the academic year 2008/2009), the dropout rate at the end of the first year is still very high⁵.

According to the effort made in order to reduce the dropout rate, the Ministry of Education, Universities and Research, clearly considers a high dropout rate, particularly at the beginning of the career (between the first and the second year), as a signal of a system that does not work perfectly.

¹ See Angrist and Krueger (1991), Oreopoulos (2007), Acemoglu and Angrist (2001) for compulsory school; see Blundell, Sianesi and Dearden (2003), Kane & Rouse (1993); Card (1995), Conneely and Uusitalo (1997), for higher education. See Card (2001) for a survey on the econometric problems in estimating the return to schooling.

² See among others, OECD, Education at a Glance 2008, indicator A4.

³ The main higher education reform has been implemented by the Decree n. 509/99 (most of the Universities have actually implemented the reform in the academic years 2001/2002 and 2002/2003) abolished the system based on qualifications such as Diploma and Degree and introducing a new system based on three cycles. The goals that the new reform was supposed to reach were (CNVSU, DOC 07/2007) increase of the number of entrants, decrease of the dropout rates, and decrease of the time needed to complete the course of study and increase of the number of graduates.

⁴ It is not in the aim of the paper addressing the result of the reform. See, among others, Cappellari and Lucifora (2009), Di Pietro and Cuttillo (2008) for an analysis of the potential causality between the reforms implemented and the dropout phenomenon.

⁵ Specifically, considering the period from the academic year 2002-2003 to the academic year 2008-2009, on average 20.35% of entrants in the Italian tertiary education institutions in did not enroll in the second year (CNVSU, 2011). Considering the same time span, 18.02% of entrants in the Italian higher education system is considered inactive, meaning that those students did not acquired any credit during the first year at university.

Supported by the data, which suggest that the highest percentage of students drop out at the end of the first year (See XI report for a recent analysis of the condition of Italian University, CNVSU, 2011), the transition between the first and the second year has been strongly incentivized. This was also due to the higher education reform implemented by the Decree 509/1999 which shortened the duration of the degree (see Cammelli, 2010 to compare the graduates' performances under the old and the new system and Cammelli et al, 2011 for the transition path of graduates from the time they enrolled at the university until a few years after getting the degree. Following the evaluation system implementation the Italian higher education institutions have been through (see Appendix 1 for a summary of the historical and institutional steps towards autonomy and the evaluation of universities), investigating the dropout determinants has become very important due to the fact that higher education institutions started being evaluated and then financially supported also on the base of parameters such as the number of students who make the transition between the first and the second year⁶.

In this paper, the university student dropout determinants have been analyzed using individual administrative data on post-reform students enrolled in the University of Salerno in the academic year 2003/2004. The aim of the paper is to give additional contribution to the existent literature on the dropout phenomenon, focusing the attention on the transition from the first to the second year. I accurately identify the students who drop out, being able to separate permanent from temporary dropout (controlling for students who re-enroll in the University of Salerno after having temporarily left it) as well as transfer behaviors (controlling for students who re-enroll in another University). The analysis has been also implemented using the entry test as a dropout predictor to see whether universities can raise access standards based on this indicator in order to reduce dropout rates. The question I want to assess is that a non-selective admission process could provide useful information to separate high ability from low ability students and could be related to the students' academic performances. If that is the case, some important policy considerations could be addressed and dropout prevention could be done effectively through selection mechanism that ensure that only relatively high-ability students are admitted to university.

⁶ Specifically, among the different parameters the Ministry has been using in the educational process' evaluation, there is the share of students who drop out at the end of the first year, considering the number of students enrolled in the first year in the academic year $t/t+1$ who do not enroll in the second year in the academic year $t+1/t+2$ (Osservatorio, DOC 11/98), the percentage of students who drop out between the first and the second year, also considering the number of entrance students who did not have passed any exam in the first year (CNVSU, DOC 2/2001; Ministerial Decree 27 July 2000, n. 340; Ministerial Decree 23 April 2001, n. 96; Ministerial Decree 24 April 2002, n. 67), the share of students who enrolled in the second year in the academic year t having already obtained at least 50 credits in the academic year $t-1$ on the number on the entrance students in the academic year $t-1$ (Ministerial Decree 18 October 2007, n. 506; CNVSU, DOC 07/2009) and in general the dropout rate between the first and the second year (Ministerial Decree 31 October 2007, 544; CNVSU, DOC. 07/2007).

The rest of the paper is organized as follow. Section 2 examines some existing studies on higher education dropout, Section 3 presents a description of the data, Section 4 describes the empirical strategy and the dropout definition, Sections 5 summarizes the results and finally Section 6 looks at the conclusions and some policy implications.

II. RELATED LITERATURE

The problem of the students' attrition in higher education institutions is not related to a single aspect and, moreover, economic, sociological and psychological factors have to be taken into account. Students can leave the tertiary education system for different reasons as, among the others, a lack of social (i.e. participation in the university's activities) and academic (i.e. low grades) integration, a new information about different opportunities or about the abilities emerged after the enrollment, a mismatch with the quality standards required by the institution, financial problems, an evaluation on the opportunity cost of education or a wrong prediction about the returns from education in the job market. The relationship between the individuals' educational commitment and the individuals' institutional commitment has been studied. Based on Tinto's theoretical model (Tinto, 1975)⁷, empirical evidence suggesting that the students' social and academic integration with the higher education system (respectively institutional commitment and goal commitment) strongly influence the persistence in the university has been found (Pascarella and Chapman, 1983; Pascarella and Terenzini, 1980). Specifically, the role of universities' social and academic organization has been investigated (see Lee and Burkam, 2003 for evidence on high school dropout). Not surprisingly, evidence that the quality of universities influences the decision of dropping out has also been found (Astin, 1971). University quality does matter (Light and Strayer, 2000; see also Hanushek, Lavy and Hitomi, 2006 for the primary school environment). The higher is the university's teaching quality performance the lower is the student's propensity to drop out (Johnes and McNabb, 2004)⁸. As well as in a labour economics scenario⁹, whether or not the student drops out is related to the quality of the matching with the higher education institutions. Specifically, the relationship between the student ability and the quality of the universities has been taken in consideration. Low ability students have a higher probability of dropping out from high quality institutions than they have

⁷ Either a student is socially integrated in the university system but drop out (probably forcibly) due to lack of integration into the academic system (low grades) or on the other hand, a student who gets good grades and so is well integrated in the academic system, decides to drop out (probably voluntarily) for lacking a good integration in the academic system. According to the student motivation and academic ability and to the interaction with the social characteristic of universities, the individual decides whether stay or drop out from university.

⁸ See James, E. et al., 1989, about the relationship between school quality and future earnings and Card and Krueger, 1992, about the characteristics of US public schools and the education return.

⁹ The probability of being employed might depend on the quality of the matching between workers and firms.

from low quality institutions (Light and Strayer, 2000). Examining another aspect of the matching problem such as the integration within the university, evidence that students who attend the university in the same region as their parental home have higher probability than other to drop out has been found, since they are not very well integrated with their colleagues as much as other students (Johnes and McNabb, 2004). Based on Bean's theoretical model (Bean, 1980, 1982 (a))¹⁰, empirical evidence suggesting that the student attitudes, the level of integration with the university and external factors to the university environment (such as the family approval on the choice made, the encouragement of friends to continue the studies, the financial situation and the perceived opportunity of changing university) strongly influence the student decision of dropping out, has been found (Bean, 1982 (a); Bean 1982 (b), Bean e Vesper, 1990). Credit constraints might be strongly related to the decision of leaving the university, too. Students might not be able to finance the ex-ante optimal level of higher education (Carneiro and Heckman, 2005) or might even underestimate the future schooling returns in term of higher earnings (Kyelland, 2008).

Other factors which are linked to higher education students' persistence are family related; the family's socioeconomic status (Belloc, Maruotti and Petrella, 2009) and the parent's education seem to be inversely related to dropout (Cingano and Cipollone, 2007¹¹; D'Hombres, 2007¹²; Di Pietro and Cutillo, 2008¹³, Cappellari and Lucifora, 2009). Regarding the family cultural and economic capacity's role on the educational investment decision see also O'Higgins, D'Amato, Caroleo and Barone, 2007, for theoretical and empirical evidence on high school dropout. Students who persist in higher education seem to come from families in which a more open, supportive and less conflicting relationships have been build (Trent and Ruyle, 1965) and whose parents have greater and higher expectations for their children education (Hackman and Dysinger, 1970). Some factors are also high-school related and evidence of pre-college preparedness' importance has been found (Noel and Levitz, 1985; Fielding et al., 1998; Smith and Naylor, 2001); students with a higher probability of dropping out seem to come from vocational school (Cingano and Cipollone, 2007; Boero, Laureti and Naylor, 2005). The high school diploma score has been shown as an important predictor of persistence. Students with an higher diploma score are less likely to drop out¹⁴ (Di Pietro and Cutillo, 2008; Aina, 2010). Tertiary education persistence depends on work

¹⁰ The influence of external factors on the student attitudes, on enrolment and dropout decision have been taken into account, too. Not differently from the turnover in work organizations, organizational, personal and environmental variables are important predictors of student persistence in higher education institutions.

¹¹ Specifically the higher is the father's level of education the lower is the probability of dropping out.

¹² Specifically the higher is the father's level of education the lower is the probability of dropping out.

¹³ They have found evidence that individuals with more educated parents have a higher probability of enrolling in the university after the "3+2" reform and, conditional on it, they have a lower probability of dropping out.

¹⁴ Belloc, Maruotti and Petrella (2009) have found the opposite result. Students from an academic oriented secondary school (Lyceum) and students with a higher diploma score are more likely to drop out. The evidence that students with

commitments, too. Full time students have a lower probability of dropping out than part time students (Bean and Metzner, 1985; De Rome and Lewin, 1984). University grades can be seen as a reasonable form of reward in the academic system (Spady, 1970) and might be an important factor in predicting persistence in university (Astin, 1971). Finally, evidence that ability counts has been found. More able students have a lower probability of dropping out (De Rome and Lewin, 1984).

III. DATA

I use an administrative dataset on post-reform students enrolled at University of Salerno in the academic year 2003/2004 (Cohort 2003). Differently from data provided by national institutional survey (i.e. ISTAT), it allows to use individual information related to the pre-enrollment period and to take into account changes in university attendance decisions year by year, although it lacks of important information on family characteristics (i.e. parent's education and parent's job market participation). Data are collected for six years (until the academic year 2008/2009) and by that time students could have drop out, moved to another University, moved to another course or Faculty within the University of Salerno, got the graduation or being still enrolled. Included in the dataset are students who did not enroll in the university immediately having attended high school (differently from Di Pietro and Cutillo, 2008) and students who did not enter in the university for the first time (differently from Boero, Laureti and Nylor, 2005). The analysis is carried out on 6980 entrants (the number of students reduces to 4183 when I use information on the non-selective entrance test score) and gathers information about individuals' characteristics (gender, age, residence), educational background and pre-enrollment characteristics (type of high school attended, date of graduation, high school diploma score), households' financial conditions (family declared income) and general information about the university careers and performances (such as being a full or part time students, Faculty of enrollment, entry test scores).

IV. EMPIRICAL MODEL AND DROPOUT DEFINITION

The econometric model is the following:

$$y_{ij}^* = \alpha + X_{ij}\beta + \varepsilon_{ij} \quad (1)$$

a better educational background are more likely to drop out is explained, according to the authors, by the fact that more educated individuals prefer to change Faculty or leave the university in case they are not happy with the choice made or in case they face low performances at university.

where the observed values of y are outcomes for individual i enrolled in the faculty j . X represents a vector of exogenous variables, such as students' individual characteristics, student's educational background and pre-enrollment characteristic, financial conditions, enrollment information. β represents a set of parameters to estimate and finally ε is an error term. For the identification of the dropping out probability a Binomial Probit model has been used where $y = 1$ if the students drop out¹⁵ (firstly after the first year and then in the whole time) and $y = 0$ otherwise.

The aim of the empirical analysis is to have a better knowledge of the determinants that affect the dropout decision. In order to do that, a broader and more precise dropout definition rather than the formal one used by the Universities administration offices has been considered. I estimate (1) using the following dropout definition. A student drops out, in line with some previous research¹⁶, both when he/she officially withdraws from the university (the so called "rinunciatari") presenting a formal request to the student office, and when he/she does not renew the registration leaving the degree program in which had been enrolled. I assume that those who officially withdraw (i.e. students who make an official resignation) leave the higher education system entering in the job market and only a few of them, and this is the case I cannot control for, enrolled again in another university. It's also true, in fact, that sometimes when a student makes an official resignation (even paying a stamp duty), it is because a) has an interest in closing the career in Salerno and then enroll in another University, perhaps in a degree program where he/she has no interest in asking for the validation of credits already obtained and b) has interest in abandoning the studies undertaken to newly enroll in another course of study (at another university), with no obligation to pay the back taxes which may be due to the old University. Two other drop out definitions have also been taken into account. In one case a very narrow definition has been considered. A student drops out only when he/she officially withdraws from university presenting a formal request to the student office. According to the results obtained this definition does not perfectly represent the dropout phenomenon. Then, in the attempt of underline the transition between the I° and the II° year, a second dropout definition has been used. An individual has been considered a dropout student if he/she has not achieved any credit or passed any exam after the first year of enrollment. Even though the results are not far from the one obtained in the main analysis, this definition does not seem to represent the dropout phenomenon either. Failing to separate permanent from temporary dropout as well as transfer behaviors has often led institutional and state planners to overestimate substantially the extent of dropout from higher education (Tinto, 1975). Thus, in order to avoid to put together forms of leaving behavior different in their characteristic, students who do not renew

¹⁵ y_{ij}^* = registration not renewed.

¹⁶ See among others Boero, Laureti and Nylor (2005) and Belloc, Maruotti and Petrella (2009).

their registration but asked to move to another university (differently from the approach used in some previous research¹⁷) are not considered as dropouts. Moreover, students who do not renew their registration but are found to be enrolled in another Faculty of University of Salerno are not considered dropouts either. Specifically students are controlled by the administration student office through a personal ID. In this way it has been possible to check whether students from one cohort (in the case of the study the 2003 cohort) were enrolled again in one of the later cohorts (data up to the 2008 cohort are available). I have firstly analyzed the transition between the first and the second year and then the dropout in the whole period (6 years)¹⁸. Summary statistics and a description of the variables (with more information regarding the way they are constructed) are presented in the Appendix 2 (tables 3, 4, 5 and 6).

V. RESULTS

Estimates of equation (1) are presented in tables 1 and 2 below for the main covariates (and tables 7 and 8 in Appendix 3 for all the covariates). With regards to the individual characteristics, male students are found to be more likely to drop out than female students (Cingano e Cipollone, 2007). Age is also significant and positively correlated to the university leaving (). Students who have the residence far from the university are less likely to withdraw. The result is driven by the female regression considering the analysis distinguished by gender (see table 1, columns 3 and 4, residence variable does not have statistically significant effects for male entrants). Turning to the pre-enrollment experiences, in line with the main literature, I found that educational background is an important determinant of the dropping out decision. Relative to those who have obtained a Scientific lyceum, other things equal, having obtained a Technical and a Professional secondary school increases the probability of dropping out (see Checchi and Flabbi 2007 and Checchi et al. 2013 on the importance of the secondary school track chosen). Furthermore, high school diploma score is important too. Relative to those who have obtained a low diploma score (between 60 and 80), those who have obtained a medium-level score (between 81 and 92) and a high-level score (between 93 and 100) are less likely to drop out of the university (see Boero, Laureti and Naylor, 2005; Di Pietro and Cutillo, 2007 about the importance of high school final scores as important predictor of students' outcomes). Still considering the pre-enrollment characteristics, those who enroll in the university immediately after obtaining the high school diploma have a lower probability of dropping out (Belloc, Maruotti and Petrella, 2009).

¹⁷ See Belloc, Maruotti and Petrella (2009) where students transferred to another university are considered also dropout.

¹⁸ Thus considering first the students who officially leave the university after the first year or do not renew their subscription within the first year of the degree program and then students who leave university officially at any time of their studies and those who do not renew their enrolment in the years following the last registration recorded.

Table n. 1 - Estimates results (Main covariates) - Probit model marginal effects on the dropout between the I° and the II° year and on the dropout in the whole period considered (6 years) by gender– Cohort 2003

Main covariates	(1)	(2)	(3)		(4)	
	between the I and II year	whole period (6 years)	between the I and II year		whole period (6 years)	
			Males	Females	Males	Females
<i>Gender – Reference: females</i>						
Males	0.044*** (0.011)	0.056*** (0.012)				
Age	0.015*** (0.001)	0.027*** (0.002)	0.013*** (0.002)	0.016*** (0.002)	0.025*** (0.003)	0.031*** (-0.0003)
KM	-0.0002** (0.0001)	-0.0002* (0.0001)	-0.0001 (0.0002)	-0.0003** (0.0001)	-0.0001 (0.0002)	-0.0003* (0.0002)
<i>Type of maturità – Reference: Scientific Lyceum</i>						
Techninst	0.148*** (0.013)	0.148*** (0.014)	0.173*** (0.017)	0.119*** (0.022)	0.181*** (0.018)	0.104*** (0.023)
Profinst	0.153*** (0.018)	0.146*** (0.018)	0.237*** (0.029)	0.097*** (0.022)	0.194*** (0.027)	0.106*** (0.023)
<i>Diploma score – Reference: Score 6080</i>						
Score 8192	-0.076*** (0.010)	-0.112*** (0.013)	-0.092*** (0.016)	-0.066*** (0.014)	-0.122*** (0.019)	-0.103*** (0.017)
Score 93100	-0.095*** (0.011)	-0.171*** (0.013)	-0.118*** (0.018)	-0.081*** (0.014)	-0.209*** 0.216	-0.146*** (0.017)
<i>Family income – Reference: Famincome1</i>						
Famincome9	0.034* (0.020)	0.007 (0.022)	0.002 (0.028)	0.062** (0.029)	-0.003 (0.032)	0.014 (0.031)
Gaptime	-0.057*** (0.015)	-0.071*** (0.018)	-0.063*** (0.023)	-0.046** (0.020)	-0.045* (0.027)	-0.086*** (0.024)
Part-time	0.043** (0.021)	0.029 (0.024)	0.020 (0.027)	0.078** (0.033)	0.019 (0.032)	0.046 (0.038)
N. obs.	6980	6980	3272	3708	3272	3708
LR chi2	696.61	1039.61	370.17	353.87	500.73	539
Prob>chi2 (30)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Loglikelihood	-3331.2849	-4153.29	-1630.31	-1677.72	-1979.87	-2159.69
Pseudo R2	0.0947	0.0112	0.102	0.095	0.112	0.111

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard errors in parentheses

Regarding the students' financial conditions (specifically family declared income), those students with a high declared income¹⁹ are more likely to drop out only between the first and the second year (see also Boero, Laureti e Nylor, 2005; Belloc, Maruotti e Petrella, 2009). The results is driven by the female regression considering the analysis distinguished by gender (see table 1, columns 3 and 4). Being a full-time student is an important factor in the students' decision to drop out only considering the transition between the first and the second year. The results is driven by the female regression considering the analysis distinguished by gender (see table 1, columns 3 and 4). Other things equal, being a female part-time student increases the probability of dropping out relative to a

¹⁹ Specifically higher than €44.420,00.

female full time student between the first and the second year (see Aina, Baci e Casalone, 2009 for similar results).

The way universities select students can be used, among other factors, to predict their performances. Consequently, in table 2 below, I replicate the estimates using entrance test scores information in order to better understand whether they can provide useful information about students' future performances and outcomes at university. Entrants at University of Salerno have to go through a non-selective entrance test²⁰ before the formal enrollment. The student population being analyzed is different from that previously used because the outcome of these tests is not available for all the Faculties²¹

Table n. 2 - Estimates results (Main covariates) - Probit model marginal effects on the dropout between the I^o and the II^o year and on the dropout in the whole period considered (6 years) by gender– Cohort 2003

Main covariates	(5)	(6)	(7)		(8)	
	between the I and II year	whole period (6 years)	between the I and II year		whole period (6 years)	
			Males	Females	Males	Females
<i>Gender – Reference: females</i>						
Males	0.051*** (0.014)	0.067*** 0.016				
Age	0.020*** (0.002)	0.035*** 0.004	0.020*** (0.0004)	0.024*** (0.004)	0.033*** (0.006)	0.043*** (0.0002)
KM	-0.0002* (0.0001)	-0.0004** (0.0002)	-0.00003 (0.0003)	-0.0004** (0.0002)	-0.0002 (0.0003)	-0.0006*** (0.0002)
<i>Type of maturità – Reference: Scientific Lyceum</i>						
Techninst	0.116*** (0.021)	0.096*** (0.020)	0.184*** (0.028)	0.095*** (0.025)	0.148*** (0.029)	0.050* (0.027)
Profinst	0.140*** (0.028)	0.105*** (0.022)	0.200*** (0.038)	0.071*** (0.024)	0.154*** (0.037)	0.076*** (0.027)
<i>Diploma score – Reference: Score 6080</i>						
Score 8192	-0.079*** (0.013)	-0.102*** (0.016)	-0.094*** (0.024)	-0.075*** (0.015)	-0.111*** (0.030)	-0.100*** (0.019)
Score 93100	-0.076*** (0.014)	-0.130*** (0.018)	-0.073** (0.031)	-0.077*** (0.016)	-0.135*** (0.037)	-0.128*** (0.020)
<i>Family income – Reference: Famincome1</i>						
Famincome9	0.047* (0.026)	-0.002 (0.028)	0.080* (0.046)	0.030 (0.031)	0.071 (0.048)	-0.029 (0.035)
Gaptime	-0.038* (0.020)	-0.071*** (0.0325)	-0.027 (0.034)	-0.033 (0.024)	-0.030 (0.042)	-0.085*** (0.032)
Part-time	0.047* 0.027	0.014 (0.031)	0.037 (0.039)	0.056 (0.038)	0.013 (0.045)	0.007 (0.044)
Test score	-0.034*** (0.005)	-0.047*** (0.007)	-0.050*** (0.010)	-0.024*** (0.007)	-0.059*** (0.012)	-0.040*** (0.008)
N. obs.	4183	4183	1516	2667	1516	2667
LR chi2	474.12	624.18	217.93	278.95	234.59	392.82
Prob>chi2 (30)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

²⁰ Non-selective entry tests (meaning the result of the test does not prevent the enrollment in the university) have been formally introduced by the Ministerial Decree 270/2004 (art. 6), aiming at preliminary evaluate students. The University of Salerno, as many other Italian Universities, has complied with this law by proposing a compulsory non-selective test, that is to say a test to which students have to participate, but whose results would not invalidate the student's entitlement to enroll. Students were admitted regardless of the score, albeit subject to a penalty in the form of specific additional course credits to be acquired by those receiving a test score below a certain threshold.

²¹ Faculty of Pharmacy, Law, Arts and Philosophy, Foreign Languages, Educational Science and Political Science are included.

Loglikelihood	-1875.93	-2449.22	-732.37	-1120.66	-918.07	-1513.37
Pseudo R2	0.1122	0.1130	0.129	0.110	0.113	0.114

** p<0.10, ** p<0.05, *** p<0.01*
Standard errors in parentheses

The estimates show that students who have obtained a higher test score have a lower probability of dropping out both between the I° and the II° year and in the whole 6 years period. Introducing the test score variable, although has reduced the population on which the analysis has been based, has not changed the main results related to the other factors influencing the dropping out phenomenon.

VI. CONCLUSIONS

The paper presents an analysis of factors that affect the decision to drop out from a tertiary education institution using administrative data on post-reform students enrolled in the University of Salerno in the academic year 2003/2004, in the attempt to provide further contribution to a better understanding of the retention phenomenon in higher education, even though the results concern a case of study. This might have important policy implications in the particular context of the post-reform tertiary education system in Italy, due to the fact that higher education institutions are evaluated and then financially supported also on the base of parameters and indicators, such as the dropout rate, especially between the first and the second year. One aspect of interest with respect to previous literature is that the analysis separates permanent from temporary dropout (I control for students who re-enroll in the University of Salerno after having temporarily left it) and identifies transfer behaviors (I control for students who re-enroll in another University). Another important aspect with respect to the previous literature is that the dropout phenomenon has been studied taking also into account the entrance test scores in order to understand whether universities could improve students performances and decrease dropout rates raising access standard and identifying students at high risk of underperforming and dropping out. Moreover, conventional dropout determinants such gender, age, residence, educational background and pre-enrollment characteristics, households' financial conditions and general information about the university careers such as being a full or part time students, have been taken into account.

A first key result of the paper is that I found, in line with the main literature, educational background and pre-enrollment characteristics having an important role in the decision to leave university. Having attended a vocational secondary education institution increases the student's attrition and the higher is the diploma score the lower is the probability of dropping out. According to the results obtained, well-trained students seem to be better integrated in the university system and there is a strong relationship between the secondary school choice and the parental background

(educational, cultural and financial) to be taken into account. Secondary school track chosen also represents a channel through which the family environment (consolidating the intergenerational correlation in the educational attainment) influences the level of education completed (Checchi et al. 2013, Carneiro and Heckman, 2005). Still in line with the main literature, I found evidence that female, younger and full time students and those who enrolled immediately after having attended high school are less likely to drop out. A second results is that I did not find a strong evidence that family socio-economic status (income) matters. The estimates only show that those students with a declared income higher than €44.420,00 (even though it's not strongly statistical significant) are more likely to drop out between the first and the second year. This result could be partially explained by the fact that students from high income families, dealing with a negative experience such as a wrong choice or a lack of social and academic integration during the first year, might tend more to drop out, due to their economic status that would facilitate them to leave university. It is also true that this result should be carefully interpreted, mostly because a good measure of family income was lacking. The tuition fees paid by the students have been used as a proxy for income although they might not accurately reflect the real level of their family income²². Moreover, the family income variable may suffer from a partial correlation either with the students' educational background or with their parents' educational level. It is also interesting to note that students who have the residence far from the university are less likely to withdraw. An explanation could be based on the students' motivation. Students who have the residence far from the university campus are highly motivated, considering either the cost of transport or the costs of renting a room. The interpretation of this result must also be considered with caution as it is not possible, according to the data used in the analysis, make a clear distinction (among those who have the residence far from the place the campus is located) between those who daily travel to reach the university and those who do not travel. The allocation of scholarships (i.e. houses next to the campus) cannot be taken into account either. The third key result suggests that students' non-selective entrance test scores appear to be positively related to the students' outcomes and specifically seem to be a good predictor of dropping out phenomenon. Students with a better entrance test performances have a lower probability of dropping out both between the first and the second year and in the whole time. Entrance test scores seem to add more and useful information to the pre-enrollment individual characteristics (type of diploma and diploma score) and seem to well identify students at high risk

²² It has to be considered that University Administration will automatically add students who did not submit any Income Tax Return to the highest fee range. But among these students, there might be some individuals who still have the right to pay a lower fee according to their family income, but did not submit the necessary documents (i.e. students who submitted Income Tax Return too late or forgot to submit it). Moreover the tax evasion problem cannot be taken into account.

of underperforming and dropping out. It follows that using the entrance test scores as a screening instrument in order to reduce dropouts might be effective.

Finally some policy implications and considerations. First, in spite of the limits due to the data constraints (parents' education cannot be taken into account), if dropout is due more to personal factors (family background and pre-enrollment individual characteristics) than to a real scarcity of education supplied, then evaluating universities on indicators such as the number of students who persist between the first and the second year might not guarantee objectivity in assessing the quality of the universities. Second, according to the empirical findings once the entrance test score have been taken into account, university can raise access standard based on this indicator in order to reduce dropout rates. Either the university could make the test more selective, with a minimum entrance level, avoiding to receive less money from the State due to the high dropout rate or the Ministry could implement entrance tests at national level so that, in the evaluation process, universities with a high dropout rate, net of the entrance tests, could be penalized. Regarding further research, more attention still has to be paid on the role of the entrance test and on its use as ability screening device. More representative (i.e. more faculties and universities) and detailed (i.e. selective and non-selective procedures) information has to be used. A deeper analysis is probably requested in order to better understand the way through which higher education institutions could take more advantages of the selection procedures and if they actually provide more information than the pre-enrollment individual characteristics.

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APPENDIX 1

Institutional setting of the Italian higher education system: first steps towards autonomy and the evaluation of universities

Following the decentralization of decision-making power from the State to the universities (in the wake of the changes that had occurred in other European countries), the need to create an evaluation system that would have allowed to check, independently from the authority, the results obtained by higher education institutions, has come out. As a matter of fact, conferring a certain degree of autonomy to the university could have not been implemented without building a parallel evaluation system in order to monitor and to examine all the higher education institutions' activities and results. Through performance based systems (Albrecht and Ziderman, 1992; Johnstone, 1998; Johnes, 1992 and 1998, Sterlacchini and Latini, 1995) the activities related to the division of funding, the goals to be achieved and the indicators and benchmarks to use in order to measure correctly the results obtained, could have been, a priori, identified (Biggeri Scarpitti, 1998)²³. Partly due to the fact that historically the Italian universities have been characterized by a strong centralized system, many years have passed before the realization of both a decentralization of powers from the State to the universities and of the following attempts to set up an evaluation system²⁴. The first real steps towards a system that allows to give a certain degree of autonomy to the universities and, consequently, to evaluate their activities, have been moved in the late '80s and early '90s thanks to the Law 168/1989 and the Law 537/1993²⁵. The real turning point was actually made by the Law 168/1989²⁶. The Ministry of University and Scientific and Technological

²³ Among the other indicators the number of students who get the degree, time to get the degree and dropout rate have been strongly used.

²⁴ The Royal Decree 13 November 1859, n. 3725 (Casati Law) identified in the State the key element for education, considered education as the way to form the class of the future workers and did not grant any autonomy to the universities. A small step forward was made with the Royal Decrees 31 December 1922, n. 1679, 16 July 1923, n. 1753, 6 May 1923, n. 1054, 30 September 1923, n. 2102 and 1 October 1923, n. 2185 (Law Gentile, 1923) which, letting the universities change accordingly to the different needs of future students, introduced a certain degree of autonomy. The State had still the main control over universities, though. The Royal Decrees 20 June 1935, n. 107 and 28 November 1935, n. 2044 (De Vecchi Decrees), and Royal Decrees 4 giugno 1938, n. 1269 and 3 September 1938, n. 1652 (Bottai Decrees) reported the university system in the hands of the State by eliminating all the small steps towards autonomy made until then. Up to and during the seventies, the situation did not change very much. The idea was, by the centralized relationship between the State and the universities, to produce a unique model of education and to standardize, making them equivalent, the programs adopted by various universities in order to give the same legal value to the university degree (Poti and Reale, 2005).

²⁵ At the beginning of the '80s, in the attempt of giving a new form of organization to the universities, a step forward towards a certain degree of autonomy has been made thanks to Legislative Decree 382/80. The higher education institutions were defined as the main national research institutions (art. 63, comma 1), the possibility of creating departments in the universities as an organization of one or more research areas of uniform purposes and in order to promote and coordinate the activities' research has been established (art. 83, comma 1-2), the university professors career, through the introduction of the associate and ordinary status, has been modified (art. 1, comma 1) and the Phd program as a post graduate education level has been introduced (Art. 68).

²⁶ Law 9 May 1989, n. 168.

Research was introduced (art. 1, comma 1) as the main authority for governing the national research and university system. Moreover, the concept of universities' autonomy has been formally stated specifying that universities have teaching, scientific, organizational, financial and accounting autonomy through their own statutes and regulations (art. 6, comma 1). The higher education evaluation system, instead, has been properly introduced by the Law 537/1993²⁷. The funding allocated by the State to the universities were divided into three different chapters of the Ministry of University and Scientific and Technological Research (MURST) state budget²⁸. Specifically (art. 5, comma 3), it has also been stated that the ordinary financial fund (FFO) of the universities will then be divided into two parts; the first one determined by the historical information of university funding, and the second one (called re-balancing part)²⁹, determined according to various criteria established step by step by the Ministry. The Internal Evaluation Unit with the task of verifying, through comparative analysis of costs and returns, the proper management of public universities, their productivity in research and teaching and the overall success of their administration, has been introduced (art. 5, comma 22). Furthermore, in order to make an evaluation of universities' activities on national level and to ensure that it was done according to the degree of universities' virtuosity, the Permanent Observatory (later the National Committee for the Evaluation of the University system with Law 370/1999) has also been introduced (art. 5, comma 23)³⁰. Among its tasks was to work firstly on building an evaluation system and secondly on developing both quantitative and qualitative indicators to assess the higher education institutions' outcomes (CNVSU, DOC, 5/97). For the first time funding from the State to the universities depends on how virtuous are their activities and their results. Through an allocation of the resources in a less discretionary way and on the base of more objective parameters, the aim is to encourage universities, moved by the opportunity to attract more funding from the Ministry, to reach very high levels of quality. The work made by the National University System Evaluation Council (CNVSU) and by the Conference of Italian Universities Chancellors (CRUI) has led to the identification of a specific set of parameters in order to analyze the higher education's demand and offer, the educational process' results, research and teaching. Through those parameters the quality of

²⁷ Law 24 December 1993, n. 537.

²⁸ According to the Law 537/1993 (art. 5) the three different chapters are the following: a) the funding to finance ordinary universities, b) the funding for university building and large equipment, and finally c) the scientific background for the development planning of the university system.

²⁹ According to the Law 537/1993 (art. 5, comma 3) the readjustment share has to be determined on the basis of criteria determined by the Minister of University and Scientific and Technological Research, after the National University Council (CUN) and the Conference permanent Rectors (CRUI) have been consulted. The standards of production costs per student and the objectives of the research, the size and the environmental conditions of the university has to be taken into account.

³⁰ The Permanent Observatory, in collaboration with the CRUI and the CUN, must fill out evaluation of the results regarding the efficiency and productivity of research and training, also for the subsequent allocation of resources.

education was meant to increase by reducing the number of people who leave the University and by improving the academic performances in a way that students would acquire a number of credits and exams as close as possible to those theoretically obtainable in a given year and would get the degree in a time as close as possible to the one legally established by the degree course regulations.

Theoretically, through the parameters the Ministry has been using, there is the opportunity to objectively analyze the results achieved by Italian higher education institutions and to reward the best performing of them. The main issue is represented by the fact that the evaluation's objectivity can be at risk due the distorting effects that such indicators might have. The evaluation does not consider perfectly the fact the universities are located in different "markets" and it could suffer the difficulty in making the data of different higher education institutions comparable at national level. Moreover, a distorted allocation of the resources could be made due to the fact that universities, in order to receive more money, could forcedly reach the prearranged goals³¹.

³¹ In other words, the transition between the first and the second year could be favored.

APPENDIX 2

Description of the data and summary statistics

Some more information about the way student's residence and student's family income are measured has to be added. About the residence variable, the main literature usually refers to the student's residence in the city, province or region where the university is located. Given the geographical peculiarity of the province of Salerno relative to the other provinces of Campania and given the geographical position of the University of Salerno (the campus is located approximately 15 kilometers from the city of Salerno), the residence variable measures, for each student, the distance in kilometers of the student's residence from the university location³². About the family income variable, a good measure of family income was lacking. A measurement of the student's household economic situation (ISEE), which takes into account the household income, personal estate and number of members has been used as a proxy for income although it might not accurately reflect the real level of the family income. Specifically, according to the fees paid, the identification of a corresponding household income range under which students are graded has been made. For instance, students who belong to the first income bracket (students who have paid the lowest fee) are those which, according to the income tax returns, have an income ranging from € 0 to € 7,230.00. Students who belong to the second income bracket (students who have paid the second lowest fee) are those which, according to the income tax returns, have an income ranging from € 7,230.01 to € 11,360.00 and so on. See tables 3, 4, 5, 6 below for variables name, description and definitions.

The entire population of entrants considered in the analysis consists of 6980 students³³; the number of female students is higher (53%) than the number of male students (47%). In table 4 below the information about the total sample, the dropout after the first year sample, the total dropout sample and the inactive students sample divided by gender has been reported. In the academic year 2003/2004, 39% of registered students (new entrants) dropped out within 6 years. With regards to the dropout rate between the first and the second year, 22% of entrant students abandoned their studies within the first year. In both cases, in line with the national average data and with previous research, dropout rate is higher for male students than for female students (considering the total

³² In order to calculate that distance Google map has been used. Specifically the distance is considered as the best and fastest way, suggested by Google map, to reach the university campus.

³³ In the academic year 2003/2004 a total number of 6980 students are registered on which the dropout analysis has been based. Some 2734 students dropped out in the whole period analyzed (6 years). Among them, 1537 students left the university after the first year and 1197 students dropped in subsequent years. Of those who left in subsequent years, 421 students dropped out after the second year, 257 students dropped out after the third year, 212 students dropped out at the end of the fourth and finally some 307 students dropped out after the fifth year. Some 1728 students got the degree in the whole period considered.

dropout, 50.7% of the students are males and 49.3% are females and among those who do not make the transition between the first and the second year 51.8% are males and 48.2% are females)³⁴. Focusing on the transition between the first and the second year some 22.2% of entrant students did not get any credit or exams during the first year of enrollment and again the percentage of male students (55.3%) is higher than female students (44.7%).

Tables n. 5 and 6 below provides specific information about the distribution of the population analyzed specifically considering the total sample, the dropout after the first year sample and finally the total dropout sample.

Table n. 3 – Variable description

Variable name	Variable description	Variable definition	Reference
Gender	Gender	=1 if male	
Age	Age	Continuous variable	
Age ²	Age squared	Continuous variable	
KM	Residence distance from campus	Continuous variable	
KM ²	Residence distance from campus squared	Continuous variable	
Scientlyc	Scientific lyceum	=1 if Scientific lyceum	*
Classlyc	Classic lyceum	=1 if Classic lyceum	
Linglyc	Linguistic lyceum	=1 if Linguistic lyceum	
Techninst	Technical Inst.	=1 if Technical Inst.	
Profinst	Professional Inst.	=1 if Professional Inst.	
Otherinst	Other Inst.	=1 Other Inst.	
Score 6080	Diploma score between 60/100 and 80/100	=1 if diploma score between 60/100 and 80/100	*
Score 8192	Diploma score between 81/100 and 92/100	=1 if Diploma score between 81/100 and 92/100	
Score 93100	Diploma score between 93/100 and 100/100	=1 if Diploma score between 93/100 and 100/100	
Famincome1	from € 0 to € 7.230,00	=1 if belongs to bracket fee 1	*
Famincome2	from € 7.230,01 to € 11.360,00	=1 if belongs to bracket fee 2	
Famincome3	from € 11.360,01 to € 15.490,00	=1 if belongs to bracket fee 3	
Famincome4	da € 15.490,01 fino a € 18.590,00	=1 if belongs to bracket fee 4	
Famincome5	from € 18.590,01 to € 23.760,00	=1 if belongs to bracket fee 5	
Famincome6	from € 23.760,01 to € 28.920,00	=1 if belongs to bracket fee 6	
Famincome7	from € 28.920,01 to € 35.120,00	=1 if belongs to bracket fee 7	
Famincome8	from € 35.120,01 to € 44.420,00	=1 if belongs to bracket fee 8	
Famincome9	higher than € 44.420,00	=1 if belongs to bracket fee 9	
Gaptime	Enrolled in the year of the diploma	=1 if enrolled in the year of the diploma	
Part-time	Part-time student	=1 if part-time student	
Law	Law faculty	=1 if enrolled in Law faculty	
Economics	Economics faculty	=1 if enrolled in Economics faculty	*
Pharmacy	Pharmacy faculty	=1 if enrolled in Pharmacy faculty	
Engineering	Engineering faculty	=1 if enrolled in Engineering faculty	
Arts & Philos.	Arts & Philosophy faculty	=1 if enrolled in Arts & Philosophy faculty	
Languages	Languages faculty	=1 if enrolled in Languages faculty	
Educational Sc.	Educational Sciences faculty	=1 if enrolled in Educational Science faculty	
Math, Ph. & Sc.	Math, Physics & Natural Sc. Fac.	=1 if enrolled in Math, Phis. & Nat. Sc. faculty	
Political Sc.	Political Sciences faculty	=1 if enrolled in Political Sciences faculty	

³⁴ The dropout rate is higher for male students than for female students, unlike the gender composition of enrolled students is in favor of female students (53% of entrants are females and 47% are males).

Table n. 4 - Persistence indicators - University of Salerno academic year 2003-04

A.A. 2003/2004 Total	Entrants			Total dropout		
	Females	Males	Total	Females	Males	Total
Absolute value	3708	3272	6980	1346	1388	2734
% of the total	53	47		49.3	50.7	
% of entrants						39
% female/male entrants				19.2	19.8	

A.A. 2003/2004 Total	Dropout after the I° year			Inactive students		
	Females	Males	Total	Females	Males	Total
Absolute value	741	796	1537	694	858	1552
% of the total	48.2	51.8		44.7	55.3	
% of entrants			22			22.2
% female/male entrants	10.6	11.4		9.9	12.3	

Source – Author data processing

Table n. 5 - Summary statistics (1) – Total Sample, Dropout between the I° and II° year and Total Dropout

Covariates	Total Sample		Females		Males		Dropout between the I° and II° year		Females		Males		Total Dropout		Females		Males	
	M.	S. D.	M.	S.D.	M.	S.D.	M.	S.D.	M.	S.D.	M.	S.D.	M.	S.D.	M.	S.D.	M.	S.D.
<i>Individual characteristics</i>																		
Gender	.468	.499					.517	.499					.507	.500				
Age <=18	.103	.304	.100	.301	.105	.307	.061	.239	.067	.248	.057	.231	.067	.251	.071	.257	.064	.245
Age 19	.533	.498	.563	.496	.499	.500	.387	.487	.409	.491	.366	.481	.416	.493	.434	.495	.399	.489
Age 20	.122	.327	.118	.321	.129	.334	.144	.351	.132	.338	.156	.362	.148	.354	.149	.355	.145	.352
Age 21	.055	.228	.051	.221	.059	.235	.067	.248	.071	.257	.061	.240	.064	.244	.066	.247	.062	.242
Age>22	.187	.389	.168	.373	.208	.406	.341	.474	.321	.467	.360	.480	.305	.460	.280	.449	.330	.470
<i>Residence</i>																		
Km<=25	.459	.498	.446	.497	.474	.499	.440	.496	.430	.495	.448	.497	.444	.496	.440	.496	.445	.497
Km<=50	.284	.451	.284	.451	.283	.450	.295	.455	.310	.462	.279	.448	.291	.454	.295	.456	.289	.453
Km<=100	.179	.382	.182	.386	.174	.378	.195	.396	.190	.392	.201	.401	.190	.392	.184	.387	.196	.396
Km<=150	.048	.214	.057	.230	.039	.193	.036	.187	.037	.187	.037	.187	.042	.200	.048	.212	.037	.188
Km>150	.030	.171	.031	.173	.030	.169	.034	.180	.033	.177	.035	.184	.033	.179	.033	.177	.034	.180
<i>Faculties</i>																		
Economics	.161	.368	.140	.346	.188	.390	.149	.356	.108	.310	.189	.391	.137	.343	.103	.304	.170	.375
Pharmacy	.009	.092	.012	.113	.003	.060	.011	.107	.013	.115	.010	.099	.010	.102	.014	.118	.007	.084
Law	.150	.357	.160	.366	.140	.347	.153	.359	.146	.353	.158	.365	.200	.399	.208	.406	.190	.393
Engineering	.106	.307	.040	.197	.180	.383	.073	.258	.023	.149	.119	.322	.070	.256	.018	.132	.121	.327
Arts & Philos.	.221	.415	.280	.449	.156	.362	.213	.409	.274	.446	.156	.362	.198	.398	.242	.428	.155	.361
Languages	.056	.228	.088	.282	.020	.137	.050	.219	.080	.272	.022	.148	.054	.227	.088	.283	.021	.145
Educational Sc.	.102	.303	.177	.381	.019	.135	.149	.355	.260	.439	.044	.205	.130	.335	.232	.421	.030	.171
Maths, Ph. & N.S	.139	.345	.063	.243	.222	.416	.135	.342	.056	.228	.211	.408	.140	.346	.055	.228	.222	.415
Political Sc.	.056	.228	.040	.195	.072	.259	.067	.248	.040	.194	.091	.288	.061	.240	.040	.194	.084	.276

Notes: M. stands for mean and S.D. for Standard deviation.

Table n. 6 - Summary statistics (2) – Total Sample, Dropout between the I° and II° year and Total Dropout

Variabili	Total Sample		Females		Males		Dropout between the I° and II° year		Females		Males		Total Dropout		Females		Males	
	M.	S.D.	M.	S.D.	M.	S.D.	M.	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
<i>Income</i>																		
famincome1	.127	.332	.146	.352	.107	.307	.137	.343	.149	.355	.125	.331	.143	.350	.164	.371	.121	.327
famincome2	.121	.326	.144	.351	.096	.293	.121	.326	.151	.358	.092	.290	.120	.325	.148	.354	.096	.293
famincome3	.160	.366	.174	.378	.144	.351	.157	.363	.164	.371	.150	.355	.153	.360	.168	.373	.139	.346
famincome4	.105	.307	.103	.304	.108	.311	.102	.303	.110	.312	.096	.295	.103	.304	.100	.300	.105	.307
famincome5	.134	.341	.124	.330	.145	.352	.126	.331	.106	.308	.143	.350	.130	.336	.116	.319	.145	.351
famincome6	.090	.285	.080	.270	.100	.300	.089	.284	.077	.266	.100	.299	.085	.278	.073	.261	.096	.293
famincome7	.090	.285	.081	.273	.099	.297	.087	.281	.077	.266	.096	.294	.086	.279	.074	.262	.096	.294
famincome8	.051	.220	.048	.214	.054	.226	.046	.211	.039	.194	.054	.226	.050	.218	.047	.211	.054	.226
famincome9	.122	.327	.100	.300	.147	.353	.135	.342	.126	.333	.144	.351	.130	.336	.110	.313	.148	.355
<i>Maturità type</i>																		
Scientific Lyceum	.296	.456	.247	.431	.350	.477	.179	.382	.161	.368	.194	.395	.224	.416	.193	.394	.254	.435
Classic Lyceum	.103	.304	.130	.336	.074	.261	.063	.243	.077	.266	.050	.218	.080	.271	.100	.299	.061	.239
Ling. Lyceum	.046	.209	.078	.267	.010	.099	.036	.187	.062	.241	.013	.111	.037	.186	.062	.241	.010	.103
Techn. Inst.	.313	.463	.220	.414	.419	.493	.400	.489	.266	.442	.524	.499	.373	.483	.249	.432	.493	.500
Profess. Inst.	.170	.375	.220	.414	.112	.315	.227	.419	.288	.452	.170	.376	.201	.400	.267	.442	.138	.343
Other Inst.	.072	.258	.105	.306	.035	.184	.096	.294	.146	.353	.049	.215	.085	.279	.12	.333	.044	.206
<i>Diploma score</i>																		
Score 60-80	.566	.495	.489	.499	.653	.475	.712	.452	.637	.481	.783	.412	.695	.460	.621	.485	.767	.422
Score 81-92	.223	.416	.246	.430	.197	.397	.164	.370	.189	.391	.140	.347	.180	.383	.204	.402	.155	.362
Score 93-100	.211	.408	.265	.441	.150	.356	.124	.329	.174	.379	.077	.266	.125	.330	.175	.379	.078	.266
<i>Other information</i>																		
Gaptime	.841	.365	.836	.370	.847	.359	.711	.453	.695	.460	.726	.446	.750	.432	.731	.443	.768	.422
Part-time	.058	.234	.044	.206	.073	.261	.099	.299	.082	.275	.115	.319	.084	.277	.063	.244	.103	.305

Notes: M. stands for mean and S.D. for Standard deviation.

APPENDIX 3 – Estimates results (all covariates)

Table n. 7 - Estimated marginal effects from the Probit model (all covariates)

All covariates	(1)	(2)	(3)		(4)	
	Dropout between the I and II year	Dropout in the whole period (6 years)	Dropout between the I and II year Males	Dropout between the I and II year Females	Dropout in the whole period (6 years) Males Females	
<i>Gender – Reference: Females</i>						
Males	0.044*** (0.011)	0.056*** (0.012)				
Age	0.015*** (0.001)	0.027*** (0.002)	0.013*** (0.002)	0.016*** (0.002)	0.025*** (0.003)	0.031*** (-0.0003)
KM	-0.0002** (0.0001)	-0.0002* (0.0001)	-0.0001 (0.0002)	-0.0003** (0.0001)	-0.0001 (0.0002)	-0.0003* (0.0002)
<i>Type of maturità – Reference: Scientific Lyceum</i>						
Classlyc	0.0008 (0.019)	-0.008 (0.020)	0.022 (0.032)	-0.022 (0.022)	0.006 (0.033)	-0.031 (0.025)
Linglyc	0.065** (0.029)	0.018 (0.029)	0.181** (0.084)	0.030 (0.030)	0.134* (0.081)	-0.020 (0.032)
Techninst	0.148*** (0.013)	0.148*** (0.014)	0.173*** (0.017)	0.119*** (0.022)	0.181*** (0.018)	0.104*** (0.023)
Profinst	0.153*** (0.018)	0.146*** (0.018)	0.237*** (0.029)	0.097*** (0.022)	0.194*** (0.027)	0.106*** (0.023)
Otherinst	0.152*** (0.024)	0.131*** (0.024)	0.140*** (0.046)	0.130*** (0.029)	0.136*** (0.045)	0.106*** (0.029)
<i>Diploma score – Reference: Score 6080</i>						
Score 8192	-0.076*** (0.010)	-0.112*** (0.013)	-0.092*** (0.016)	-0.066*** (0.014)	-0.122*** (0.019)	-0.103*** (0.017)
Score 93100	-0.095*** (0.011)	-0.171*** (0.013)	-0.118*** (0.018)	-0.081*** (0.014)	-0.209*** (0.216)	-0.146*** (0.017)
<i>Family income – Reference: Famincome1</i>						
Famincome2	-0.0003 (0.018)	-0.026 (0.021)	-0.037 (0.028)	0.024 (0.024)	-0.050 (0.034)	-0.012 (0.026)
Famincome3	-0.002 (0.017)	-0.036* (0.019)	-0.016 (0.027)	0.007 (0.022)	-0.054* (0.031)	-0.024 (0.025)
Famincome4	-0.0004 (0.019)	-0.028 (0.021)	-0.035 (0.028)	0.028 (0.026)	-0.034 (0.033)	-0.026 (0.028)
Famincome5	-0.020 (0.017)	-0.051** (0.020)	-0.024 (0.026)	-0.022 (0.023)	-0.041 (0.031)	-0.064** (0.026)
Famincome6	0.005 (0.020)	-0.039* (0.023)	-0.014 (0.029)	0.023 (0.029)	-0.051 (0.034)	-0.032 (0.031)
Famincome7	-0.007 (0.020)	-0.048** (0.022)	-0.024 (0.029)	0.002 (0.027)	-0.053 (0.034)	-0.048 (0.031)
Famincome8	-0.006 (0.024)	-0.017 (0.028)	0.007 (0.037)	-0.024 (0.032)	-0.006 (0.042)	-0.027 (0.037)
Famincome9	0.034* (0.020)	0.007 (0.022)	0.002 (0.028)	0.062** (0.029)	-0.003 (0.032)	0.014 (0.031)
Gaptime	-0.057*** (0.015)	-0.071*** (0.018)	-0.063*** (0.023)	-0.046** (0.020)	-0.045* (0.027)	-0.086*** (0.024)
<i>Faculties – Reference Economics</i>						
Pharmacy	0.050 (0.055)	0.083 (0.061)	0.313** (0.145)	0.002 (0.057)	0.345*** (0.130)	0.037 (0.068)
Law	0.038** (0.018)	0.210*** (0.020)	0.047* (0.026)	0.042 (0.026)	0.205*** (0.028)	0.219*** (0.028)
Engineering	-0.016 (0.019)	-0.020 (0.022)	-0.026 (0.023)	0.033 (0.044)	-0.016 (0.027)	-0.025 (0.046)
Art & Philosophy	0.021 (0.016)	0.030* (0.018)	0.002 (0.024)	0.042* (0.023)	0.034 (0.028)	0.029 (0.025)
Languages	0.052* (0.027)	0.133*** (0.029)	0.048 (0.055)	0.069** (0.033)	0.092 (0.060)	0.147*** (0.035)
Educational Sciences	0.081*** (0.022)	0.111*** (0.024)	0.190*** (0.064)	0.087*** (0.027)	0.147** (0.065)	0.113*** (0.030)
Maths, Phis. & Nat Sc.	-0.001 (0.017)	0.034 (0.020)	-0.009 (0.022)	0.026 (0.032)	0.037 (0.025)	0.029 (0.036)
Political Sciences	0.010 (0.023)	0.033 (0.027)	0.024 (0.031)	-0.005 (0.036)	0.048 (0.035)	0.017 (0.043)
Part-time	0.043** (0.021)	0.029 (0.024)	0.020 (0.027)	0.078** (0.033)	0.019 (0.032)	0.046 (0.038)
N. obs.	6980	6980	3272	3708	3272	3708
LR chi2	696.61	1039.61	370.17	353.87	500.73	539
Prob>chi2 (30)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Loglikelihood	-3331.2849	-4153.29	-1630.31	-1677.72	-1979.87	-2159.69
Pseudo R2	0.0947	0.0112	0.102	0.095	0.112	0.111

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Standard errors in parentheses

Table n. 8 - Estimated marginal effects from the Probit model (all covariates) – Test score

All covariates	(5)	(6)	(7)		(8)	
	Dropout between the I and II year	Dropout in the whole period (6 years)	Dropout between the I and II year		Dropout in the whole period (6 years)	
			Males	Females	Males	Females
<i>Gender – Reference: females</i>						
Males	0.051*** (0.014)	0.067*** (0.016)				
Age	0.020*** (0.002)	0.035*** (0.004)	0.020*** (0.0004)	0.024*** (0.004)	0.033*** (0.006)	0.043*** (0.0002)
KM	-0.0002* (0.0001)	-0.0004** (0.0002)	-0.00003 (0.0003)	-0.0004** (0.0002)	-0.0002 (0.0003)	-0.0006*** (0.0002)
<i>Type of maturità – Reference: Scientific Lyceum</i>						
Classlyc	-0.008 (0.022)	-0.014 (0.024)	0.013 (0.041)	-0.028 (0.025)	0.028 (0.043)	-0.045 (0.029)
Linglyc	0.072** (0.033)	0.010 (0.033)	0.139 (0.101)	0.045 (0.034)	0.026 (0.104)	-0.010 (0.035)
Techninst	0.135*** (0.019)	0.096*** (0.020)	0.184*** (0.028)	0.095*** (0.025)	0.148*** (0.029)	0.050* (0.027)
Profinst	0.116*** (0.021)	0.105*** (0.022)	0.200*** (0.038)	0.071*** (0.024)	0.154*** (0.037)	0.076*** (0.027)
Otherinst	0.140*** (0.028)	0.090*** (0.029)	0.119* (0.061)	0.120*** (0.032)	0.072*** (0.063)	0.074** (0.033)
<i>Diploma score – Reference: Score 6080</i>						
Score 8192	-0.079*** (0.013)	-0.102*** (0.016)	-0.094*** (0.024)	-0.075*** (0.015)	-0.111*** (0.030)	-0.100*** (0.019)
Score 93100	-0.076*** (0.014)	-0.130*** (0.018)	-0.073** (0.031)	-0.077*** (0.016)	-0.135*** (0.037)	-0.128*** (0.020)
<i>Family income – Reference: Famincome1</i>						
Famincome2	-0.002 (0.022)	-0.022 (0.026)	-0.011 (0.044)	0.002 (0.025)	0.040 (0.052)	-0.044 (0.029)
Famincome3	0.012 (0.022)	-0.008 (0.025)	0.049 (0.044)	-0.001 (0.024)	0.045 (0.048)	-0.026 (0.029)
Famincome4	0.019 (0.024)	-0.017 (0.028)	0.015 (0.045)	0.028 (0.029)	0.034 (0.051)	-0.036 (0.032)
Famincome5	-0.012 (0.022)	-0.023 (0.026)	0.030 (0.043)	-0.030 (0.024)	0.088* (0.048)	-0.074** (0.029)
Famincome6	0.002 (0.026)	-0.062* (0.029)	0.014 (0.047)	0.004 (0.031)	-0.028 (0.052)	-0.066* (0.034)
Famincome7	-0.017 (0.025)	-0.041 (0.029)	0.0002 (0.046)	-0.024 (0.029)	0.016 (0.052)	-0.059* (0.035)
Famincome8	-0.001 (0.031)	-0.021 (0.036)	0.099 (0.061)	-0.060* (0.033)	0.072 (0.064)	-0.063 (0.042)
Famincome9	0.047* (0.026)	-0.002 (0.028)	0.080* (0.046)	0.030 (0.031)	0.071 (0.048)	-0.029 (0.035)
Gaptime	-0.038* (0.020)	-0.071*** (0.025)	-0.027 (0.034)	-0.033 (0.024)	-0.030 (0.042)	-0.085*** (0.032)
<i>Faculties – Reference Economics</i>						
Pharmacy	-0.032 (0.057)	0.014 (0.074)	0.178 (0.195)	-0.052 (0.056)	0.219 (0.194)	-0.008 (0.078)
Law	0.042** (0.019)	0.216*** (0.022)	0.057* (0.029)	0.040 (0.027)	0.216*** (0.032)	0.216*** (0.031)
Art & Philosophy	0.025 (0.018)	0.025 (0.021)	-0.005 (0.028)	0.047* (0.025)	0.026 (0.032)	0.022 (0.028)
Languages	0.027 (0.029)	0.102*** (0.033)	0.072 (0.066)	0.024 (0.034)	0.108 (0.071)	0.096** (0.039)
Educational Science	0.098*** (0.026)	0.127*** (0.028)	0.193** (0.077)	0.088*** (0.030)	0.138* (0.079)	0.114*** (0.034)
Political Science	-0.012 (0.026)	-0.009 (0.032)	-0.004 (0.037)	-0.025 (0.041)	0.028 (0.044)	-0.071 (0.049)
Part-time	0.047* (0.027)	0.007 (0.031)	0.037 (0.039)	0.056 (0.038)	0.013 (0.045)	0.007 (0.044)
Test score	-0.034*** (0.005)	-0.047*** (0.007)	-0.050*** (0.010)	-0.024*** (0.007)	-0.059*** (0.012)	-0.040*** (0.008)
N. obs.	4183	4183	1516	2667	1516	2667
LR chi2	474.12	624.18	217.93	278.95	234.59	392.82
Prob>chi2 (30)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Loglikelihood	-1875.93	-2449.22	-732.37	-1120.66	-918.07	-1513.37
Pseudo R2	0.1122	0.1130	0.129	0.110	0.113	0.114

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; Standard error in parentheses