Parental background and College drop out.

Evidence from Italy

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Abstract

Human capital accumulation is widely recognised as a crucial factor for economic and social policies in modern societies. Individual returns on schooling have been proved positive for most countries, both in terms of steeper age-earnings profiles and improved employment probability.
In Italy, although higher educational qualifications give more opportunity in the labour market, university drop out rate is high. In the Italian case college drop out rate particularly deserves attention for two reasons: it is the highest among OECD countries and has been persistent over the last thirty years.

In this paper the determinants of students' propensity to drop out of university are analysed using the Italian component of the European Community Household Panel (ECHP). The data set includes many variables related the family background, such as the educational qualifications of parents, marital status, family size but it does not contain any information about students abilities and faculties. The aim of this paper is evaluate the probability of being enrolled in university, of drop out and getting a degree, given a specific parental background. In this work I investigate the drop out phenomenon stressing the importance of parents' characteristics in order to observe if the intergenerational transmission does count in terms of positive university outcome. The analysis is carried out using the survival analysis approach, especially the discrete models, such as complementary log-log regression. I also apply independent competing risks model in which I look at different types of event and not only the exit from university before completion.

My analysis highlights the importance of the family background in the withdrawal decisions, students having parents with low education increase the probability of drop out of 50% compared to those who have graduate parents. I also find that students who live with just one parent (because they are widowed or divorced) have a fewer chances of getting a degree and, at the same time, being a member of small family reduces the rate of drop out. There is also evidence that drop out is higher during the first years of university, especially for male and worker students. The main and interesting result is related to the fact that the withdrawal decision, apart from students abilities (which are not available in this sample) as many authors have found, is deeply influenced by parental characteristics. This evidence shows how "poor" family environment affects the probability of enrolling in the university as well as the probability of drop out emphasizing that the family background transmission does matter in term of university performance and it is responsible for the persistent segregation in educational achievement.

Finally I discuss how the results might also constitute a valid integration of the tools available to Italian institutions, for gauging their reforms of the school system as a whole.

Keywords: university drop out, parental background, survival analysis, competing risks models.
JEL classification: J24

I. Introduction

In each country the distribution of the level of education achieved by the population is definitely one of the most important determinant keys of economic growth and of the competitiveness reached by the state itself. Moreover, the statistics confirm that highest educated people have greater job opportunities and consistent returns in terms of earnings. The average educational attainment in a country, and its distribution in the population have a role in explaining labour productivity performance over recent decades, for both developed and developing countries. Finally, increased access to education is typically related to an improvement in health, a reduction in fertility, longer life expectancy, a decline in crime rates (UNDP 2001).

Unless in many countries, and not only in the developing ones, the level of tertiary education is still pretty low: the percentage of people who are graduate, compare to the entire population, is not so high.

Even though in Italy the progress to ensure that all people obtain strong baseline qualifications (at upper secondary level) has been limited; with serious consequences for those who have not completed this level. Only 39% of women without upper secondary education are employed, compared with 61% of those with upper secondary and 79% of those with tertiary education. Taking into consideration the salary they find that women without upper secondary education earn only 84% of upper secondary graduates and little more than half of tertiary graduates (OECD, 2004).

Why does education matter more than ever? In the countries in which university attainment increased by more than 5 percentage points since 1995 (Australia, Austria, Belgium, Canada, Denmark, France, Iceland, Ireland, Japan, Korea, Spain and the UK) most have seen falling unemployment and rising earnings benefits. In Australia, Canada, Germany, Hungary, Ireland and the United Kingdom, the earnings benefit increased by between 6 and 14 percentage points between 1997 and 2001. For those reasons all the developed countries are stressing in their policies the importance of improving the education systems in order to increase the performance in the labour market of people highest educated.

The aim of this paper is focusing on studying the tertiary education achievement in Italy. The analysis is related to only this country because the percentage of people with a university degree is small and it has the highest level of drop out from university (about 60%) across the OECD countries.

Over the last few years in Italy the education system has been the current focus of public debate, the political institutions have set up projects to reform the school system by planning

education so that it combines both academic and technical knowledge. The purpose of this reform is to reduce the drop out rates, reducing the length of the degree schemes and enhancing the university student completion. According to the Bologna Declaration in 1999, the Italian university system, as many others in Europe, has been in the process of radical and ongoing reform. The plan of this convention is to harmonise the education system across all the countries involved and stressing the universities central role in the European cultural dimensions and their paramount importance as a way to promote citizens mobility and scientific knowledge.

The goal in this paper is to find out how much the parental background matters in the university achievement and if it does affect also the enrolment process. I address my attention to the intergenerational education transmission from parents to their children trying to find out the determinants which are influencing this phenomenon. The existence of other factors not related to the university degree schemes or to the university organisation itself, such as the parents level of education, will highlight the lack of any education reforms to fill this gap.

The paper proceeds as follows. In section II I present a literature review. In section III I describe the data I used to evaluate the drop out phenomenon in Italian universities. In section IV the evaluation methodology is discussed and section V presents the results. In the last one I offer some concluding remarks.

II. Literature Review

In the last few years the educational attainment has been covered a central role in the social policies in many countries, especially in the European countries the debate is considerable important. All the governments are making an effort to harmonise the higher education systems in terms of compatibility and comparability with the specific purpose of reducing the time to get a degree, enhancing the programme's quality and facilitating the mobility across countries. Adoption of a system of easily readable and comparable degrees promotes citizens employability and, at the same time, the international competitiveness of the higher education system itself. However, despite this European process, each country has still to cope with its own problems, such as structures inefficiency, excessive duration of student academic career as well as drop out rates. Especially the last ones is the main problem in the Italian universities. However, the empirical evidence in Italy on university withdrawal is limited. The shortage of studies of this nature is due to the lack of data, particularly of data relating to the whole country, although several researches were carried out on education. Checchi et al. (2000), using administrative data on students enrolled in private and public universities in Italy and applying a formal model of educational investment, found out that the

family income does not affect the enrolment process to the university, whereas the parental background definitely counts towards the degree completion. Moreover, they discovered that being a member of richer families reduces the time to get a degree and the probability of drop out because those students have better chances in the labour market as a result of the family networking. Cingano and Cipollone (2003) studied then, using data drawn from the Italian National Statistical Institute, the drop out phenomenon among Italian students. The main results are that family background, especially parents' education level, are relevant in the withdrawal decision and as well as the type of high school attended. On the one hand the purpose of this paper is very close to mine since they tried to discover the determinants affecting Italian universities drop out, on the other hand the larger differences with my analysis are the statistical framework applied and the set of variables available, since I focus my attention particularly on parental background. Both those studies are carried out using data representative the Italian situation before the university reform has been implemented. Boero, Laureti and Naylor (2004) analysed the drop out rates and the university progression for students enrolled in the "short" degree schemes[1] using administrative data of two Italian universities. The results suggest that although the number of students enrolled has increased, the drop out rates is still consistent and only few students are able to complete their degree on time. This piece of work is useful because it highlights the impact of the university reform in Italy and at the same time it stresses the lack of it in the achievement of its goals.

Looking at other countries, there is an abundance of international empirical works on this topic. Arulampalam, Naylor and Smith (2002) estimated the probability of withdrawal of university during the first year. They examined the 1984-85 to 1992-93 cohorts of student enrolling full-time for a three or four-year course, and focused on the sensitivity of the probability of dropping out to the individual's prior qualifications in relation to those of the other students on their university course. They showed not only that weaker students are more likely to drop out, but also that the extent of the variation in previous qualifications within the student's university degree course influences the individual's probability of dropping out in a way that varies with the individual's own in-class rank. These authors then carried out a study of the drop out rate among first-year students of medical. They found that the probability of a student dropping out of medical school during his first year of study is influenced significantly by the subjects studied at A-level and by the grades achieved. There are also significant differences between the sexes, with males more likely to drop out. This analysis, apart from the fact that in the data I used there are no information about students' abilities, is the closest to mine since they applied similar econometric approaches[2].

[1] In 2001 was implemented in Italy the tertiary education reform, the main change was related to the new degree schemes, especially the short ones (3 years).
[2] Survival analysis methods.

Johnes and McNabb (2004) investigated which the main causes are related to the increase in the university drop out in England. They noticed that the expansion of higher education in the UK over the last decade has been accompanied by an increase in the rate at which students drop out of university without getting the degree. The main results they have obtained both support and augment the findings of earlier studies. The authors found that peer groups and the quality of the match between a university and the individual are important determinants of student retention. They also found that students who live at home and attend local university will lead to higher drop out rates. The previous result is important in terms of the current policy of widening access to university, especially because if students cannot bear university costs they will stay at home, but it will lead to higher withdrawal.

There is then a paper of Becker (2001) in which the author explains university enrolment behaviour and performance in Italy and Germany. He identified two different categories of students who drop out:

- Misguided: students are ill-prepared to obtain an academic degree;
- Parking lot: students drop out as soon as they get the first suitable job offer but obtain a degree in case they never get a job offer throughout their studies.

The paper of Eckstein and Wolpin (1999) is then useful because they highlighted the main causes that affect the drop out phenomenon when students are enrolled at high school and especially for the econometric approaches used in the analysis. Especially they found that working when attending school reduces educational attainment. One explanation suggested is related to the fact that students who work have less time for doing other activities, including studying. Also this work confirmed that family income and family background do matter in the drop out behaviour.

Taking into account all the previous results, in this analysis I address several questions about the drop out behaviour in the Italian universities:

- Does parental background matter in the university enrolment process?
- Which are the determinants affecting the drop out rates?
- Does parental background influence the drop out decisions?

The aim of this paper is to try to exploiting all the information available in the data as fully as possible in order to find out if the parental background is really important either in terms of university choices, whether enrolling or not, either in terms of university completion. As far as we know from the previous studies, both international and national, in the educational achievement

does not count only students' abilities, but also the family background is relevant. The findings from this estimation, related in particular to the family information, are useful for the understanding of the drop out behaviour and moreover they can stress the inadequacy of the new reform in filling those gaps. If the drop out decisions are determined not only by students' abilities, but also by the parental background then all the social policies themselves are not sufficient to remove the segregation in the educational achievement and the persistence of intergenerational transmission.

III. Data

The data used in this analysis are drawn from the European Community Household Panel (ECHP). This survey is carried out by the Statistical Office of the European Union (Eurostat) at the European Union level and it contains information about demographics, labour force behaviour, income, health, education and training, housing, migration, satisfaction, etc. The survey began in 1994 and finished in 2001, there are now eight waves available. Moreover ECHP data are particularly well suited for my purpose because it is a representative sample of the population.

In this paper I used only the Italian component since my analysis is focusing in the university drop out rates in Italy but excluded the first wave because all education information are missed for that year. However, in the education variables there is no information about which kind of faculties university students are enrolled, which high school were attended, final grades, marks taken in each exam, legal length of university. Because of that lack the study is concentrated on analyzing the determinants of Italian university drop out using in particular variables that are central for understanding the parental background situation of each student, such as parents' education, parents' marital status, household income, family size. I relied on several criteria to select the sample for my study from the Italian survey as a whole. First, I checked all the cases about people who are enrolled in university with the purpose to remove all the inconsistencies[3]. Second, I kept in the sample only people between 18[4] and 28 years old who were living with their parents or at least with one of them and I came out with a sample of 4,739 people. Those observations were used for exploiting the probability of being enrolled in the university or being graduate taking into consideration their specific parental background. The idea is to verify whether or not the family interferes not just in terms of university performance but as well with the decision to continue the studies after the high school diploma. Referring then to all the observations available in the sample

[3] For e.g. there were some students declaring being enrolled in university in wave[_n] and then being enrolled in the high school in wave [_n+1], or someone who already got a degree being still a university student.
[4] In Italy students finish the high school when they are 18 or 19 years old.

among this age interval can stress even more the importance of the parents' characteristics at the moment of making a decision if attend or not the university. Third, I restricted the sample including only persons who were at least for one wave university students and I censored them when they were at the university more than 10 years. I censor spells at age 28 because beyond that age there is the possibility that people are just enrolled at the university without attending courses or passing exams. The purpose of this paper is to attempt the determinants in the drop out phenomenon among students, especially during the first years, and not between full time workers who are students just in their spare time which might bias the analysis.

The final sample is composed of 1,489 university students. Table 1 presents definitions and summary statistics for the variables I have used in this study. INCOME_FAM is a continuous variable describing the household financial situation. I end up using the total net income of the family instead of the parents' salary of each student because 61% of the mother declared of not receiving any salary, but only 46% of them are housewives, unemployed or inactive, and also the 22% of the fathers as well as the mothers are not receiving any wages, but only the 5% of them are unemployed or inactive. Underreporting is thus a real concern as a source of measurement error especially in those kind of variables in which people tend to avoid reporting their financial situation or they refuse to answer, it is then important to pay attention and trying to find out the more reliable variable. LNDURATA is a variable that shows the logarithm of the time spent in the university before completion or drop out. This variable is censored at 10 years, as mentioned before; the sample excluded all those cases that have a spell longer than that. The duration variable is equal the age of the university students in wave [_n] minus the age in wave [_n-1], if in the previous wave they were at the high school, otherwise the {[age of student -19]+1} if the first time in which students were interviewed was later their first academic year. This assumption might appear too strong but in fact it is not, because if I look at the Italian national statistics about the average age of people who enrolled in the university for the first time is 19 years old, and also in my sample the mean is 19.55, but if I excluded the outliers from it I obtain the same national result. The duration is calculating taking into account the length until the wave [_n] if a student in the wave [_n+1] experienced the transition out of the sample. In the same way I calculated the case in which in the wave [_n+1] a person is not anymore a university student because he/she got a degree and not because of the drop out. Moreover since the variable DURATA for more than half of the sample[5] is built using 19 years old as a started year at university, in the analysis the age of the students is omitted from the explanatory variables, for avoiding the collinearity problem between them. R_UNEMPLOY represents the rate of unemployment drawn from the Italian National Statistical

[5] Only for 746 students I observed the exact year of enrolment, for the other it is just imputed using the assumptions showed before.

Table 1 Variable definitions and Sample Characteristics.

Variable Name	Definition	Mean and Standard Deviation
MALE	0-1 dummy variable that equals one if student is male	.46 (.49)
LOOKJOB	0-1 dummy variable that equals one if student is working or wants a job	.22 (.23)
NCOMP4	0-1 dummy variable that equals one if student's family is composed by 4 people	.48 (.50)
NCOMP5+	0-1 dummy variable that equals one if student's family is composed by 5 people or more	.21 (.41)
SOUTH	0-1 dummy variable that equals one if student lives in the south of Italy	.50 (.50)
CENTER	0-1 dummy variable that equals one if student lives in the centre of Italy	.26 (.43)
NORTHWEST	0-1 dummy variable that equals one if student lives in the northwest of Italy	.13 (.34)
R_UNEMPLOY	lagged rate of unemployment by gender, region and age	27.53 (16.87)
INCOME_FAM	income of the family	36,663 26,298)
LOWSCH_DAD	0-1 dummy variable that equals one if student's father has a level of education lower than a high school diploma	.44 (.49)
LOWSCH_MUM	0-1 dummy variable that equals one if student's mother has a level of education lower than a high school diploma	.50 (.50)
STATUS_DAD	0-1 dummy variable that equals one if student's father is widowed, divorced or separated	.07 (.26)
STATUS_MUM	0-1 dummy variable that equals one if student's mother is widowed, divorced or separated	.07 (.26)
DURATA	number of years spent at the university	4,42 2,57
AGE	individual's age	23 2.83
AGESQ	individual's squared age	541.71 131,79
FAILURE	0-1 dummy variable that equals one if student drop out from university	.06 (.23)
UNI	0-1 dummy variable that equals one if individual enrolled in university or graduate	.31 (.46)

Office (ISTAT) by sex, age and region. The unemployment rates are weighted using the same classification group used in ECHP for the regions. Then this variable is lagged for avoiding the endogeneity problem; in each wave and for each student the rate of unemployment is linked using the reference category of the previous year. FAILURE is the dependent variable, it is a dummy variable and it has value 1 if students drop out from the university without getting a degree and 0 when they are still enrolled in the university or they got a degree. Again I consider people drop out from university in wave [_n] if a student in [_n+1] has not graduated and is not anymore in the university. In the sample people experienced the drop out as a maximum only once. The drop out rate is about 20%, it is 1/3 compared to the OECD drop out rate, this it is due to the fact that many people became part of the survey when they might have already left the university without having completed it.

Finally in table 2 there is the descriptive survivor function of university students, it is interesting to see that the composition of the sample is almost equidistributed between males (46%) and females (54%). The number of individuals who drop out from university is 303 and 54% of them are males. With regard to the gender composition, the survivor function shows that is higher the probability of staying at the university for women compare to men (about 5% more each year).

IV. Econometric Model

The model used for exploiting the probability of being a university student or being a graduate is the probit model:

$$y_{it}^{*} = X_{it}\beta + \varepsilon_{it}$$

where y_{it}^{*} is a dummy variable that is equal 1 when the individual "i" is at the university or already graduate at the time "t" and 0 otherwise. X_{it} is a vector of exogenous variables representing individual's personal characteristics (age, age squared, gender, region, and worker), socio-economic environment (rate of unemployment) and individual's family characteristics (parents' education, parents' marital status, family income and size). β is a vector of parameters to be estimated and ε_{it} the error term. With this model we estimate the probability of y_{it} given X_{it}

where

$$P(y_{it} \mid X_{it}) = \Phi X_{it}\beta \qquad \text{if } y_{it} = 0$$

$$P(y_{it} \mid X_{it}) = 1 - \Phi X_{it}\beta \qquad \text{if } y_{it} = 1$$

And Φ is the normal probability function.

The method used for estimating the withdrawal from university is the survival analysis. For this issue the binary dependent variable regression models cannot be applied because when the

analysis is about modeling of time to event data they are not suitable since they do not handle aspects like censoring or truncation, time varying covariates[6]. In this part I look at the time that elapses for a student to drop out from university without completed it. The data are censored in the sense that the event in which I am interested (drop out from university) has not occurred for some individuals for the periods they are observed. Let T denote the time spent in the university before drop out. The survivor function is

$$S(t)= 1 - F(t)= P\{T>t\}$$

The model applied to this analysis is the complementary logistic model (cloglog). The dependent variable takes the value 0 when individuals are still at university or are graduates and 1 when they drop out. The model fits the follow probability

$$P(y_{it} \neq 0| X_{it})= 1 -\exp\{-\exp(X_{it}\beta)\}$$

The hazard rate, for an individual "*i*", is given by

$$h_{ij} = \Pr[T_i \in [t_{j-1}, t_j) \mid T_j \geq t_{j-1}],$$

Which is the probability of drop out in the interval $[t_{j-1}, t_j)$**,** on condition of being university student at the time t_{j-1}.

The likelihood contribution for a censored spell is given by

$$L_i = \prod_{k=1}^{j}(1-h_{ik}),$$

While the likelihood contribution for a completed spell is given by

$$L_i = \frac{h_{ij}}{1-h_{ij}}\prod_{k=1}^{j}(1-h_{ik}),$$

So the likelihood for the whole sample results being equal to

$$L = \prod_{i=1}^{n}[(\frac{h_{ij}}{1-h_{ij}})^{c_i}\prod_{k=1}^{j}(1-h_{ik})],$$

Which implies that

[6] See Jenkins (2004)

$$\log L = \sum_{i=1}^{n} c_i \log(\frac{h_{ij}}{1-h_{ij}}) + \sum_{i=1}^{n}\sum_{k=1}^{j} \log(1-h_{ik}),$$

Where c_i is 1 if the spell is completed, 0 otherwise. This expression has the same form of the likelihood for a common binary regression, where y_{ik} is equal to *1* when $c_i=1$ and T_i is included in the interval $[t_{j-1}, t_j)$ (Jenkins, 2004).

$$\log L = \sum_{i=1}^{n}\sum_{k=1}^{j} [y_{ik} \log h_{ij} + (1-y_{ik}) \log(1-h_{ik})]$$

The last part of the analysis is devoted to exploit the determinants affecting different destinations and not only the withdrawal itself, such as graduates and workers.

The assumption of independence in competing risks model makes the model easily estimable in the continuous framework, as the hazard rate for exiting the state is equal to the sum of the destination specific transition intensities. But when we consider a continuous survival process with data banded in groups things are different: along each interval more than one destination is possible. One way is to avoid relating the model to an underlying continuous process and to use a multinomial logistic regression (Jenkins, 2004; Greene, 2003). We define

$$h(y=1) = \frac{1}{1+e^{X\beta^{(2)}}+e^{X\beta^{(3)}}};$$

$$h(y=2) = \frac{e^{X\beta^{(2)}}}{1+e^{X\beta^{(2)}}+e^{X\beta^{(3)}}};$$

Where *y=1* if individual is graduate, *y=2* if individual drop out for a job.

V. Empirical results

1. Probability of being enrolled in the university or of getting a degree.

The first estimation shows in table 3 reported the probability of being enrolled in the university given a specific parental background. Before exploiting if family background does matter in terms of academic success or failure, I considered all the people in the sample between the ages

of 18 and 28[7] who were still leaving with their parents. The idea is to evaluate how much the parental background affects the decision of enrolling or not the university using all the observations available in the sample within this range. In this way it is possible to stress the greater importance of the family characteristics not only for the academic performance but also for the choice of going to the university itself. Taking into account only children who are still living with their parents it might happen that this analysis is biased whenever the individuals who left the cohabitation are significantly different from the remaining ones. However, considering between this intervals ages all the observations across the ECHP survey for Italy, less than 2% of the individuals are dropped. This result is in line with others researches, in which they confirmed that people leave the family cohabitation very late and in general when they get married, especially because of the shortage of cheap accommodation and the absence of unemployment benefits.[8]

The table reports the coefficients estimated, the t-statistics and the marginal effects. The sign of each coefficient underlines the effects of the explanatory variables on the probability of being enrolled in the university or having got a degree.[9] The covariates used in this regression are: age of children, their squared age, gender, geographical area where they live, if they have a job or they look for one, parents' level of education, parents' marital status, family size, rate of unemployment and household income. First of all I considered in the analysis all the sample and it is interesting to note that, as many other researches have found out, the probability of being graduate or enrolled in the university is lower (about 9%) for men relative to the females. Also the age has a positive and strongly effect; the probability of being a university student is 43% higher for older people compared to the evaluated average values of the independent variables. With regard to the regions where the individuals live this probability is about 7% higher for individuals who are resident in the center or south of Italy[10] compared to whom are living in the north-east. This result confirmed the national statistics about the distribution of students at university: in the north-east the percentage of people graduates or in the university is smaller as a consequence of better job opportunities, which enhancing the probability of working after having got the high school diploma. Moreover people who worked or they are looking for a job, are 49% more likely to choose to not continue their studies. This result, as Eckstein and Wolpin suggested (1999), may show the different preferences of the individuals, in particular who do not enroll in the university may have low motivation and not greater returns expectations from education in the labour market.

[7] I have taken into consideration only those people because they reflect exactly the same age distribution of the sample used for analysing the drop out rates.
[8] See Checchi, Ichino and Ristichini 1996.
[9] The dependent variable in the probit model is a dichotomy variable which takes value 1 when the person is graduated or enrolled in the university, 0 otherwise.
[10] I cannot say anything for North-West residents because the level of significance is small.

The main attention must be focused on the set of explanatory variables that represent the family background, such as parents' education, parents' status, family income and family size. Being a member of a larger family (at least five individuals) increases the probability of not going to university at about 8%. In addition the family income is significant and has a positive effect on the probability of being at the university, but the effect is very weak. The main attention has to be rewarded to the education level and the marital status of the parents. Individuals who have a father without a high school diploma have 16% less chances of being a university student. The same effect is found for the mother less educated. Also the fact of living with just one parent has a negative impact in the university choice behaviour. These results are definitely important because they highlight that the parental background has a central role during the process of choosing between continuing the studies or not and they revealed the preferences of less educated people who do not think that better and qualified educated persons can have better job opportunities, this is why they are more unlikely to go on to study.

In column two and three of table 3 there are the estimates of the probit regression considering only men and in the latter only women, so it is possible to separate the impact of gender selection on the others covariates. The marginal effects for both these sub samples are almost the same as I found using the entire sample. The larger differences are related to the geographical regions and to the parents' marital status. For male it is interesting to note that the north-west coefficient is significant, the sign is negative and the probability of not being in university is even lower with regard to people who live in the north-east of Italy. Males who live then with only the mother have a double probability of not going to university compared to the overall sample. Looking at the female's results then it is important to make a remark to the regions, all the coefficient are significant and the signs are positive suggesting that, even if there is a selection in the sample between males and females, women are more likely to enrolled to university compared to them who live in the north-east Italy, in line with the main Italian statistics. On the other hand only living with the father affects the enrolment choice in negative**.**

2. Probability of drop out from the university.

The second step of this analysis is to look at the probability that a student drops out from the university before the completion. The set of covariates in the regressions here are the same I used in the previous section, except the age of the individuals that it is not applied because this one is

replaced with the duration variable[11]. As I mentioned before[12], this variable is defined taking into account the age of people, for that reason age is not included.

In the table 4 the estimated coefficients, the t-statistics and the hazard ratios are reported. In the first column there are the results about all the university students in the sample living with their parents, in the second only males and in the third females.

With regard to the first column it is interesting to note that the logarithm of the duration variable is negative and strictly significant, this it means that students are more likely to leave university during the first years instead of later. This result confirms what happen in the Italian universities, where the highest drops out rates are observed especially in the first academic year. The withdrawal probability then is for male students 54% higher than the female counterpart. Another interesting result it is related to the "lookjob" variable, which is in line with the results found by Becker(2001). Students who have a job or who would like to have one, so they are looking for it, are more likely to experience the drop out than other who are just students. The probability of drop out for them is 45% higher than a non-worker student, this result highlights the lack of the enrolment process in the university because everybody can decide to attend the university as there are no barriers, such as for example minimum mark in the final high school exam, besides the students have a higher preference for the job instead of the academia. Again, and not surprisingly, the family background does matter also in terms of the university performance; individuals who live with parents less educated have smaller probability (about 50%) to get a degree. Living with just one parent reduces even more the probability of completion the university, in particular cohabiting just with the father increases the probability of drop out at the 94%. The latest results confirm that the structure of the family as well as the level of the education influence the academic performance and even if students who have this "poor" family background enrolled in the university then they have to deal with this situation also later, because it definitely affects also their academic career.

In column two and three there are the results using the sub sample of the male and then of the females. For the male students it is interesting to note that the signs of the coefficients are the same of the previous regression but the level of significance is slightly different. Male students are more likely to drop out when they are working and the probability is increased of 40% respect to the result of the overall sample. For the female sub sample the regression confirms the result of the all sample, especially for the parents' level of education, despite this most of the coefficients are not significant at 5% level anymore.

[11] This variable shows the number of year spent in the university for all the period each student is observed in the survey.
[12] See data section.

3. Multinomial regression

The last step of this analysis is to look at the reasons why individuals leave the university. I split the sample in three categories, where two of them corresponding to the possible destinations:

i. Graduates: all the students who got a degree;
ii. Workers: university students who drop out before completion because they found a job;
iii. Other drops students: censoring group.

The analysis at this stage is carried out using a multinomial logit in which I take into consideration the different types of events mentioned before. In table 4 in the first column there are the results for the graduate students, not all the coefficients are significant this it might be due to the composition of the sample and to its size. In general students who spend long time at the university, live in a small and richer family are more likely to get a degree. The parental background affects the university completion, especially living with only the father or having a mother with a low level of education in the negative way. The variable "rate of unemployment"[13] suggests that when this rate is higher it is more likely that students finish university.

In the second column then there are the results of the destination "drop out for a job". Individuals leave university for going to work especially when they are males, have parents with low education and larger family. It is less unlikely that students who drop get a job if they live in the south of Italy.

VI. Conclusions and remarks

In this paper, using ECHP data, I focused my analysis on three issues:

- Probability of being enrolled in university or graduate;
- Determinants of the drop out rates;
- Different states of exit from university (graduate or getting a job).

About the first question I found that in the decision's process of enrolling or not to the university the parental background it does matter. On the whole sample between the ages 18 to 28 I figured out that living with parents who have as a maximum the compulsory level of education and in larger family reduce the probability of going to university as well as cohabiting with only one parent. Furthermore the household financial situation affects the enrolment; this result may due to the fact that higher income is more likely belong to people who have a tertiary

[13] Significant at 10% confidential interval.

education, for that reason maybe they give a considerable importance to the education as they are conscious that it offers better job opportunities.

With regards to the drop out rates, I found that the determinants which affect this phenomenon are: looking for a job, larger family, less educated parents, not married parents. The income is not relevant for the withdrawal. It is important to stress how the "poor" parental background influences the university completion underlying that the family environment counts and it should be taken into account deeply when we study success or failure in the university.

Finally, in the last analysis I look at two possible destinations, such as degree and job instead of only the drop out itself. I discovered that the graduates are characterized by long duration, high educated and married parents, on the other hand students, who leave because they got a job, have less educated and not married parents, larger family and they do not live in the south of Italy.

However, looking at the several findings highlight from my analysis until now it is strictly necessary to investigate on these topics further. One important issue is related to the lack of this data, as I mentioned before in the ECHP data I do not have any information about students' abilities, such as high school attended, faculties enrolled, marks, etc, so it must be taken into account the unobservables in the regression using the unobserved heterogeneity for avoiding a misleading interpretation of the results. Up to now it was not possible to implement the unobserved heterogeneity as the model with frailty does not converge, this situation might be due because the shortage of the waves in which each individual is observed as well as the small size of the sample. I am aware that the presence of unobserved heterogeneity attenuates the proportionate response of the hazard to variation in each regressor at any survival time[14].

Another step of the analysis could be to try to investigate carefully the existence of casual effects between university performance and parental background. If the parental background has a central role in getting a degree the social policies cannot directly change this situation or modifying the intergenerational transmission. In this case it means that also the Italian university education reform is unable to remove the main problems that affect the universities (e.g. high rates of drop out, long time to get a degree). Boero, Laureti and Naylor (2004) using data after this reform they already found the inefficiency of it to fill those gaps, since the number of people who complete the university in 3 years is very limited and the rate of drop out is still limited. More researches in this direction might be also helpful to the policy maker for improving the policies.

[14] See Lancaster, chapter 4, 1990.

References

Arulampalam Wiji, Naylor Robin & Smith Jeremy (2002), “Effects of in-class variation and student rank on the probability of withdrawal: cross section and time-series analysis for UK university students”, University of Warwick.

Arulampalam Wiji, Naylor Robin & Smith Jeremy (2003), “A hazard model of the probability of medical school drop out in the UK”, Journal of Royal Statistic Society, pp157-178.

Becker S. Gary, (1993), “Human Capital”, The University of Chicago Press.

Bertola Giuseppe & Checchi Daniele (2002), "Sorting and Private Education in Italy”, C.E.P.R. Discussion Papers 3198.

Brunello Giorgio & Cappellari Lorenzo, (2005), “The labour market effects of Alma Mater: evidence from Italy”, IZA Discussion paper 1562.

Cappellari Lorenzo (2003), “The Effects of high school choices on academic performance and early labour market outcomes” Departmental Working Papers.

Cappellari Lorenzo & Jenkins Stephen (2003) “Multivariate probit regression using maximum likelihood”, ISER, University of Essex.

Checchi Daniele **(**2003), “The Italian educational system family background and social stratification” Paper presented for the ISAE conference on Monitoring Italy.

Checchi Daniele (2002), “Formazione e percorsi lavorativi dei laureati dell’Università degli Studi di Milano,"Departemental Working Papers” 14. Department of Economics University of Milan - Italy.

Conley Dalton and Glauber Rebecca, (2005), “Parental educational investment and children’s academic risk: estimates of the impact of sibship size and birth order from exogenous variation in fertility”, NBER working paper series, No 11302.

Cramer J.S. and Ridder G., (1991), “Pooling states in the multinomial logit model”, Journal of Econometrics, Vol. 47, 267-272.

Eckstein Zvi and Wolpin Kenneth, (1999), “Why youths drop out of high school the impact of preferences, opportunities, and abilities”, Econometrica, Vol.67, No 6, 1295-1339.

Greene, W. “Econometric Analysis” 5th Edition. Prentice-Hall, 2003

Hanushek Eric, (1992), “The trade-off between child quantity and quality”, The Journal of Political Economy, Vol. 100, No 1, 84-117.

Haveman Robert and Wolfe Barbara, (1995), “ The determinants of children’s attainments: a review of methods and findings”, Journal of Economic Literature, Vol.33, 1829-1878.

Jappelli Tullio & Checchi Daniele (2003), "School Choice and Quality”, CSEF Working Papers 91.

Jenkins Stephen (2004), “Survival analysis” Preliminary draft.

Jenkins Stephen (1995), “Easy estimation for discrete-time duration models” *Oxford Bulletin of Economics and Statistics*, n. 57

Lancaster Tony (1990), *The Econometric Analysis of Transition Data*. Cambridge University Press, Cambridge.

Peracchi Franco, (2002), “ The european community household panel: a review”, Empirical Economics, Vol.27, 63-90.

Stock Wendy & Siegfried John, (2001), “So you want to earn a Ph.D in economics: how much do you think you’ll make?”, Economic Inquiry, Vol.39, No 2, 320-335.

Verbeek Marno, (2004), “A guide to modern econometrics”, John Wiley & Sons, Ltd.

APPENDIX

Table 2 Descriptive survivor function by sex.

Durata	Survivor Function		Total		Failure	
	Males	Females	Males	Females	Males	Females
1	0.9600	0.9683	338	408	28	25
2	0.9247	0.9521	318	399	23	12
3	0.8717	0.9212	312	404	32	21
4	0.8330	0.8814	284	375	21	24
5	0.8092	0.8618	258	311	11	10
6	0.7671	0.8359	237	274	17	11
7	0.7473	0.7844	208	226	7	17
8	0.6919	0.7413	179	176	16	11
9	0.6729	0.6994	128	116	4	7
10	0.6463	0.6808	101	75	4	2

Table 3 Probability of being enrolled to the university or being graduate.

Variable	Males+Females Coefficient	T	Marginal Effects	Males Coefficient	t	Marginal Effects	Females Coefficient	t	Marginal Effects
Age	1.343	17.87	.430	1.345	12.51	.371	1.37	12.91	.497
Agesq	-.027	-16.61	-.008	-.027	-11.55	-.007	-.028	-12.06	-.009
Male	-.296	-11.95	-.095						
Lookjob	-1.466	-54.96	-.489	-1.564	-40.57	-.488	-1.381	-36.996	-.488
Northwest	.061	1.36	.019	-.135	-2.06	-.036	.238	3.79	.088
Center	.185	4.36	.061	-.002	-0.03	-.001	.372	6.24	.139
South	.245	5.14	.079	.224	2.84	.062	.263	4.15	.095
Lowschool_dad	-.484	-17.43	-.159	-.517	-13.19	-.150	-.449	-11.35	-.164
Lowschool_mum	-.511	-18.27	-.173	-.546	-13.75	-.164	-.474	-11.96	-.176
Status_dad	-.529	-4.63	-.143	-.453	-2.62	-.105	-.566	-3.74	-.179
Status_mum	-.154	-1.35	-.047	-.347	-2.04	-.084	-.019	-0.12	-.007
Ncomp4	.007	0.25	.002	.055	1.31	.015	-.029	-0.70	-.011
Ncomp5+	-.259	-7.41	-.079	-.261	-5.24	-.068	-.244	-4.92	-.085
R_unemployment	-.002	-1.90	-.001	-.003	-1.19	-.001	-.002	-1.37	-.001
Income_family	.042	2.92	.013	.033	1.64	.009	.045	2.28	.016
Cons	-15.873	-18.10		-16.027	-12.79		16.349	-13.16	

Table 4 Probability of drop out from university before completion.

	Males+Females			Males			Females		
Variable	Coefficient	t	Hazard Ratios	Coefficient	t	Hazard Ratios	Coefficient	T	Hazard Ratios
Lndurata	-.279	-3.41	1.322	-.389	-3.50	0.677	-.166	-1.33	0.847
Male	.432	3.55	1.540						
Lookjob	.899	7.38	2.457	.864	5.14	2.372	.934	5.23	2.544
Northwest	.109	0.41	1.115	.011	0.03	1.011	.136	0.37	1.146
Center	.306	1.30	1.358	.546	1.68	1.727	.046	0.13	1.047
South	.127	0.50	1.135	.282	0.73	1.326	.056	0.16	1.058
Lowschool_dad	.400	2.80	1.493	.369	1.89	1.447	.409	1.95	1.505
Lowschool_mum	.368	2.55	1.445	.396	1.99	1.486	.387	1.84	1.473
Status_dad	1.080	2.27	2.945	1.472	1.94	4.357	.783	1.21	2.188
Status_mum	-.448	-0.91	1,566	-1.087	-1.36	0.337	-.035	-0.05	1.415
Ncomp4	.253	1.68	1.288	.368	1.77	1.445	.102	0.46	1.107
Ncomp5+	.435	2.45	1.544	.468	1.86	1.596	.399	1.58	1.491
R_unemployment	.007	1.62	1,007	.003	0.36	1.003	.009	1.60	1.008
Income_family	.075	0.75	1.077	.021	0.17	1.021	.175	1.07	1.191
Cons	-4.781	-4.19	0,008	-3.723	-2.56	0,024	-5.877	-3.19	0.003

Table 5 Probability of being graduates or workers when students leave university.

	Graduates		Workers	
Variable	Coefficient	t	Coefficient	t
Lndurata	3.326	11.50	.055	0.34
Male	.079	0.42	.472	2.10
Lookjob	.235	1.33	1.623	7.44
Northwest	-.082	-0.26	.207	0.55
Center	-.144	-0.47	-.037	-0.10
South	-.288	-0.77	-.674	-1.52
Lowschool_dad	.292	1.47	.470	1.85
Lowschool_mum	-.241	-1.20	.629	2.41
Status_dad	-1.077	-1.29	.864	0.91
Status_mum	.713	0.89	.133	0.14
Ncomp4	-.221	-1.11	.143	0.53
Ncomp5+	-.386	-1.60	.629	1.99
R_unemployment	.015	1.76	.011	1.21
Income_family	.323	2.10	.386	1.86
Cons	-12.409	-6.84	-9.854	-4.18