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University Drop-out in Italy

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Abstract

This paper investigates the determinants of Italian university drop-out which is one of the main issues of the tertiary education system. We provide evidence at national level as we use longitudinal data drawn from the European Community Household Panel (ECHP) for Italy. We perform a survival analysis model and results indicate that family income does not appear to be associated with withdrawal, while it does matter parental education and family composition. In addition, after taking the probability of dropping out from university, we have defined the predicted hazard rate and survival time for some specific groups according to the set of covariates selected each time.

Keywords: university drop-out, parental background, household financial conditions, survival analysis.

JEL: I23, C41, J24

1. Introduction

Although the benefits associated with human capital are common knowledge, in Italy only a tiny fraction of the population achieves the highest level of education, only 60 students out of 1,000 aged between 20-29 obtained an undergraduate degree, while, by contrast, this value is about 77 in France and higher than 80 in UK and Denmark (Istat, 2009). In addition, apart from this bad performance in terms of higher education achievement, the Italian tertiary system is characterised by a consistent drop-out behaviour, especially during the first academic year. As a result college drop-out has become a serious and a growing concern in Italy, but empirical evidence on this issue is narrow and generally provided solely at university-level. The identification of the factors that influence college drop-out attrition has received an undivided attention over recent years. International researches into drop-out issues are definitely comprehensive in all aspects, thanks to the availability of different types of data and their nature. In contrast, although the existence of some work on university drop-out behaviour, Italian contributions are still limited on this topic, and the shortage of studies is mainly due to the fact that data are inadequate. Overall, it has been widely recognised that dropping out is a university issue as well as a complex social problem for which there is no simple solution. Focusing attention on fixing one part of the problem calls attention to the need for solutions to many other parts as well. The goal of this paper is hence to investigate in depth the major determinants which influence the decision of dropping out from university before completion. To investigate this topic we use sample of Italian undergraduates drawn from the European Community Household Panel (ECHP) over the period 1995-2001, that is before the implementation of the recent reform occurred in 2001¹. Many authors outline what are the most significant determinants which have a direct effect on non-completion: having low-ability/motivation, facing good market opportunities, and having low expectations of the payoff to graduation. Empirical evidence using Italian data highlights the importance of pre-academic performance, students' abilities and family characteristics (Checchi et al. 2000, Cingano and Cipollone 2001, 2007). As a matter of fact, a great interest has been addressed to parental background, particularly because it shapes the secondary education choice, which seems to be one of the most important factors responsible for college drop-out in Italy.

¹ A comprehensive description of the University education system in Italy is beyond the scope of this paper, for overviews, see Perotti, 2002 and Cappellari and Lucifora, 2009.

In this study we move a step forward in terms of the data used, because this is the first time that the Italian college drop-out phenomenon is analysed using longitudinal data² which are representative of Italian universities as a whole and not just one of them.

The work of Cingano and Cipollone (2001) attempt to explain college drop-out focusing attention on parental characteristics as we do, but our analysis differs from the previous one because of the statistical framework applied. Indeed, this paper is more related to the approach followed by Arulampalam et al. (2004), as they empirically implement a duration model as we do, since the nature of our data allows to use time-to-event analysis. In fact, it is well known that a suitable dataset should be obtained by a panel of individuals being repeatedly observed during their educational career³. As a consequence of the main findings related to Italian university attrition, our analysis is especially focused on the role that parental background plays in shaping higher educational attainment. The idea is to attempt and to extend our knowledge of withdrawal from college in Italy. Particular consideration is paid to whether or not parental background matters to succeed at university. The existence of other factors not related to the university degree schemes or the organisation itself, such as the education level achieved by students' parents, may help to understand in more detail the causes which lead students to leave university before completion.

The paper is organised as follows. Next section provides a description of the existing literature. Section III describes the data and the sample selection criteria. Section IV discusses the econometric approach. The subsequent section presents the results. The final section concludes.

2. Literature review

The empirical evidence on drop out, especially using US and UK data, is definitely extensive. Contrary to what the investment model of education says - students should leave if their forgone earnings and effort costs exceed the expected present value of benefits from an extra year -, empirical evidence about this issue demonstrates that there are several other aspects that affect even more the decision to withdraw from school. College attendance, dropout and behaviour of high school graduates are taken into account in the paper of Ahlburg et al. (2002) using data from the 1979 National Longitudinal Survey of Youth (NLSY79). Apart from the investigation of the main aspects that influence college completion and withdrawal from it, the authors focus their attention on the impact of delayed⁴ entrance on university performance and drop-out as well. Considering the following covariates: family background, personal characteristics, and local labour market conditions, they estimate, applying two bivariate discrete-time hazard models with competing risks,

² See the following paragraph for a detailed description of the data.

³ Cf. Checchi, 2002.

⁴ The authors consider also the event in which individuals may enrol at university not immediately after having achieved the high school diploma.

the effects of the mentioned determinants on the duration until college enrolment and on the duration of college attendance until exit. The main findings are: a) postponement between high school diploma and university enrolment reduces the chances of getting a degree; b) university enrolment and graduation is larger among high ability students; c) family background has significant effects upon college-going behaviour; d) an increase in tuition levels for public college reduces the probability of obtaining a four-year degree; e) a rise in dropouts and a reduction of the rate of students who graduate are the direct consequences of the higher rates of unemployment. In addition as attrition rates are recently used to measure college performance, much more attention has been given to finding the determinants of drop-out behaviour by several other researchers. Johnes and McNabb (2004) examine the drop-out phenomenon in the UK considering the reason that induce students to leave university before completion, they divide students into three groups: those who graduate, voluntary dropouts and involuntary dropouts. They consider also the impact of peer quality of universities, as it has been proved the existence of a positive relation between the institution and the ability's level of students. Results from *multinomial logit* model highlights that peer groups and the quality of university do impact on students' performance. In addition, living at home and attending a local university reduce the probability of college graduation, and this result may have a negative effect on university performance especially if the level of tuition increases. Similar model's specification has been implemented by Stratton et al. (2005) using the 1990-94 Beginning Postsecondary Survey data (BPS-90). They focus their analysis on the first academic year because this is the period during which most attrition occurs, further they separate individuals enrolled at university in three categories: persisters, dropouts and stopouts. The estimates of the *multinomial logit* model confirm the differences between dropouts and stopouts, in particular, they find that the type of financial aid has a differential impact on those two categories of students, besides the probability of dropping out is higher relative to stopping out for those receiving loans and lower for those receiving work-study aid compared to those with no aid. Montmarquette et al. (2000), using a longitudinal data set on student enrolments at the Université de Montréal and applying a *bivariate probit* model with selectivity bias, underline that drop-out behaviour is especially affected by age of individuals, since older students are more likely to leave university before completion than the youngest counterpart. Furthermore, in line with the literature review they find that part-time students are more exposed to drop-out than full-time students. Arulampalam et al. (2002) examine the drop-out phenomenon focusing their attention on the level of preparedness of full-time students enrolled at university over the 1984-85 and 1992-93 cohorts in the UK. In line with the empirical evidence, they aim at analysing the effects of prior qualifications on the probability of withdrawal. As a consequence, in this work they test the hypothesis that the

relationship between the probability of non-completion and the prior academic ranking of students might be U-shaped, so that students in the lower part of the performance distribution and those in the higher part are more likely to drop-out. The former because they are misguided and the latter because they transfer to a better university⁵. The estimates confirm their assumptions, especially strongest female students are more likely to leave university before completion for searching a new college with high quality's level. The same authors (2004) examine the probability of withdrawal of medical students in the UK since over the recent years this fact has becoming a serious concern. They find, as expected, that the pre-university qualifications, along with academic preparedness, do matter in terms of college success or failure, besides strongest students are especially less likely to drop-out of medical faculties. A comprehensive study on drop-out among students enrolled at Aarhus University in Denmark has been presented by Curry (2001). In this work he argues that the drop-out phenomenon is characterised by three losers, such as the students, the institution and society. Results highlight then that among the set of reasons why students withdraw the most relevant is related to the prior level of knowledge achieved. Finally, according to the fact that resources, in terms of time and money, are wasted once the student drops-out, Fielding et al. (1998) analyse this issue using an informative survey carried out at a number of colleges in the UK. Their starting point for the study is related to the high level of drop-out rates across those universities. The main findings underline the importance of distinguishing whether or not students drop-out completely or only partly from university, in order to evaluate the amount of resources devoted to enrolling on courses people who do not achieve any level of certificated outcome. Furthermore, they suggest that also the information about when the students withdraw is fundamental to the analysis of the cost-effectiveness of retention. In fact, if drop-out occurs very early in the courses it might involve that students are in a "shopping around" period before settling on their choices, instead there is a lot of concern about students who undertake the whole of an A-level programme and yet do not present themselves for the examination, because such behaviour implies that considerable teaching time and resources are expended on enrolments who do not achieve any paper qualification.

With regard to Italy, empirical evidence highlights the importance of pre-academic performance, students' abilities and family characteristics (Checchi et al. 2000, Cingano and Cipollone 2003, 2007). Checchi et al. (2000) examine academic performance of Italian students using both Bank of

⁵ It should be better to identify as stop-out students who move to another university , because they do not leave the whole university system.

Italy data and administrative data of State University of Milan and Bocconi University⁶. Their results confirm authors' expectation of the existence of a positive relationship between families' investment in education on behalf of their children and their talent. Their main findings are that household income does not have a direct effect on the probability of enrolment at university, whereas parental background definitely counts towards the degree achievement. Cingano and Cipollone (2007), using the sample of students who obtained a high school diploma in 2001 drawn from the ISTAT survey, investigate the factors that have direct effects on the withdrawal behaviour of Italian students. They mainly focus their analysis on parental background, local economic conditions and students' ability and they jointly evaluate the decision of enrolling at university and dropping out, controlling for selection into college, too. The major findings of their work can be summarised as follows: first, students who have a high-educated father are less liable to drop-out, whereas they do not find any significant effects on the probability of withdrawal from university for the level of education of grandparents and for the family size. Second, students' curriculum has a positive effect on the advancement of their academic career, in other words students with higher abilities face lower probability of non-completion. In addition, it is important the kind of high school attended, because they find that those who achieved a more academic oriented diploma increase their chances of getting a degree. Third, parents' occupation and their level of education do matter also during college enrolment. Finally, Cingano and Cipollone underline the role that local economic conditions exerts on university attrition, and they note that living in richer regions, especially in the north-east of Italy, reduces of about 6% the probability of attending university. This resulted from the greater job opportunities which characterised these areas. This negative relationship between unemployment rates and university dropout rates for Italy has been confirmed also by Di Pietro (2006). Becker (2001) draws a comparison between university enrolment behaviour in Italy and college behaviour in Germany, using ISTAT data for Italy and GSOEP data for Germany. Looking at the Italian results, he distinguishes among two categories, namely *misguided* - students who are ill-prepared to complete university – and *parking lot* - students who drop out as soon as they receive an interesting job offer, otherwise they will get a degree.

Cutillo and Di Pietro (2008), instead, using three waves drawn from the Italian survey "*Percorsi di Studio e di Lavoro dei Diplomati*" carried out by Istat, focus their attention mainly on the impact of the new tertiary education reform on lowering drop-out rates. Applying a decomposition method, in order to isolate students enrolled under the old regime from those under the new one, they find that *ceteris paribus* students enrolled in the "3+2" university programmes face a lower probability of

⁶ University of Milan is a public university in which there are several faculties, such as economics, law, political science and mathematics, whereas Bocconi University is a private institution in economics which is sited in Milan, too.

withdrawal than individuals enrolled at university before the introduction of the new regime. And this result holds also when the authors account for self-selection into university, underling that the new reform appears to lead to a decline in the probability of dropping out. However, the result obtained by Cutillo and Di Pietro (2008) is in sharp contrast to what Broccolini (2005) finds using a sample of students of the Economics Faculty of Marche Polytechnic University, since it appears that, despite the greater flexibility in the degree programme structure introduced by the recent tertiary education reform, the drop-out rate is still pretty high, besides about 20% of students enrolled at this university are inactive as they do not have passed any exam yet. Those results using the same data set, but a different econometric approach – propensity score techniques – have been confirmed by Bratti et al. (2010). Also Boero et al. (2005) estimate the probability of dropping out from university under the new regime, using administrative data of two Italian universities, namely University of Viterbo and of Cagliari. Again they find that even if the drop-out rates decrease they are still pretty high. Hence, the conclusion we may draw is that we need further research on this topic before being in a position to confirm that the university reform succeeds in lowering drop-out rate, since results related to all sample appear to have reached this goal, but on the other hand once we refer to some specific universities' situations estimates indicate that the withdrawal behaviour is still widespread. Using administrative data of students enrolled at the La Sapienza University of Rome in Economics and Business Belloc et al. (2010) find that it is definitely important to invest in pre-enrolment orientation programs in order to help high school leavers to make an informed choice and avoid withdrawing.

3. Data, sample selection criteria, and variables

3.1 The Data

The main data source for this analysis is the European Community Household Panel (ECHP), which was carried out by the Statistical Office of the European Community (Eurostat) at the European Union level and which contains information about demographics, labour force behaviour, income, health, education and training, housing, migration, satisfaction, etc. Hence, the ECHP data are collected by “National Data Collections Units” (NDUs), either National Statistical Institutes (NSIs) or research centres, depending on the country. In the first wave (1994) a sample of some 60,500 nationally representative households – i.e. approximately 130,000 adults aged 16 years and over – were interviewed in the twelve member states⁷. The total duration of the ECHP is 8 years, running

⁷ Austria joined the project in 1995, Finland in 1996, and Sweden in 1997. For the fourth wave of the ECHP, the original ECHP survey was discontinued in three countries, namely Germany, Luxembourg, and the United Kingdom. In these countries existing national panels were then used.

from 1994 to 2001⁸. Furthermore, the longitudinal design of the ECHP makes it possible to follow up and interview the same set of private households and individuals over several consecutive years. Thus, individuals who move or otherwise form or join new households are followed up at their new location. Children in the original sample become eligible for detailed personal interview as they attain the age of 16, and children born to sample women are automatically included as a part of the survey population. In this manner, the sample reflects demographic changes in the population and continues to remain representative of the population over time, except for losses due to sample attrition and households formed purely of new immigrants into the population. In addition, at any time the detailed survey covers all persons cohabiting with any of the original sample individuals in the same household, enabling those individuals to be studied in the context of their complete household. Apart from these characteristics, two other aspects contribute to making the ECHP data a unique source of information:

- i. Its multi-dimensional coverage of a range of topics simultaneously;
- ii. Standardised methodology and procedures yielding comparable information across countries.

The key advantage of using the ECHP data instead of other data sources is intrinsically related to its structure which provides an opportunity to reach our aim: the investigation of university drop-out. Having at our disposal information about university students over their academic career makes it possible to check when they drop out of university and to calculate the length of time spent at university, necessary for this type of enquiry – survival analysis. Since the main purpose is to study the drop-out phenomenon specifically in Italy, we consider only Italian components, and we exclude from our sample the first wave because all information about education is missing. The ECHP data are collected every year, so it is worth remembering that each interviewee answers the questions with reference to statistics which were asked the previous year.

We then use an auxiliary data source, the National Institute for Statistics (ISTAT), to obtain the unemployment rate, since such information is not available in the ECHP. We collect this variable for the period 1994 to 2000, with a lag of one year compared to the starting date of the panel we consider, because we are interested in building a picture of the labour market conditions at the time that students are deciding whether or not to leave it prematurely⁹, and we can also add another piece of information about the environment in which students take their decisions. The rate of unemployment variable varies by gender, age and the region where individuals live. The ISTAT

⁸ The last wave available in the ECHP survey is the eighth, since people were interviewed the last time in 2001. After this year no additional collection of data through the ECHP program was carried out.

⁹ The use of a lagged unemployment rate is then motivated by the definition of the duration variable.

statistics already include this information by gender, interval age and region; however, as the ECHP does not distinguish all Italian regions - there are eleven regions instead of twenty - we weighted every single rate using the identical criteria used by EUROSTAT to pool regions. Finally, each new unemployment rate has been weighted using the total population living in those regions in the same period, then attached to the set of variables available for each person.

3.2 Sample selection criteria

We restrict the age range under consideration as we are only interested in the behaviour of students who are more likely to be active in the academic activities. Consequently, we consider only individuals between 18 and 28 years old for whom it is possible to obtain information about their parents at least for one wave. We start the observation window at age 18 because in Italy high school completion does not occur, regarding the minimum time required, before the age of 18 or 19, and as we mentioned above, we keep in the sample only people for whom information is available about their parents. The last piece of information is of crucial importance to investigate the decision of dropping out of university, since we focus this analysis on the role played by parental background. In order to define the set of covariates, which can be applied on those analysis, we may bear in mind that in the ECHP there are no details about which kind of high school was attended, nor which university faculties, nor final grades and marks attained. Any estimations of personal human capital accumulation are related for each person to his/her specific parental background. In principle it has been quite easy finding information about parents for each student as at this age almost all the respondents are still living with their parents and secondly, for almost the entire cases of individuals who have formed a new household or moved out of their parental home it has been possible to recover parental information at least for one wave¹⁰. The final sample obtained comprises 1,544 people (whereof 728 males and 816 females).

3.3 Variables

Regarding the probability of dropping out of university, we look at year-to-year changes in the higher education status. The dependent variable is *failure* which assumes value 0 when students are still enrolled at university, and value 1 when they withdraw.

Human capital investment varies from person to person and because of that many researchers have been trying to establish what the main factors are that interfere with this type of choice. The existence of a positive correlation between earnings and education has been conclusively confirmed

¹⁰ Aassve et al. (2002): research might help to pinpoint the most popular reasons for leaving home and the different ages at which people take such a decision. Hence, in Italy in the early 1990s, 32% of young men had not left home by the age of 30. Moreover, they observe that Italian women tend to leave home and form a new household, especially when they get married.

over the years. Taking this relationship into account, it would be obvious to think that, if no other aspects affect educational achievement, each individual will decide to invest as much as possible in education. However, other factors can explain why not all people reach the same level of education. In particular, according to the literature, it is feasible to list them as family background, family income, quality of school environment and social local conditions. It would be perfect to have at our disposal a data set reporting all this information, but unfortunately in the ECHP, as mentioned before, although we surely have the great advantage of following people over several years and detecting changes, we do not have any information which might reveal students' abilities, like high school marks, university grades, etc., and we have to find ways of dealing with this lack. In default of these variables we exploit all the information available in the ECHP as fully as possible. We now go on to present the explanatory variables in more detail.

LNDURATA: this variable describes the logarithm of the number of years spent in university till completion, or until drop-out, for each student. The integer interval range is 1 to 10 - so ten is the maximum level that can be recorded, since we censored students' observations at age 28 -. We have no difficulty generating this variable for students of whom we are aware from the beginning of university, because for them we observe the passage from high school to university. In the previous case the duration variable at any time is equal to the age of the student in each year of enrolment at university minus the age at which this individual achieved high school diploma¹¹. On the other hand, for the remaining university students, for whom we do not have such information because they were included in the ECHP data after they had already enrolled at university, we consider the next assumption: we suppose that students start university immediately after completing high school at age 19. Clearly this hypothesis might appear extreme, but in fact it is not so, since Italian national statistics show that the average age of enrolment at university is 19, that is just after having completed high school. This statistic is confirmed also by my data, where the average university entry, where we observe the exact year of enrolment, is 18.72. As a consequence duration is calculated in the following way: for each wave, student's age minus 19 and then the result is increased by one because first academic year occurs at age 19. Close attention must be paid to the methods applied to define the length of this variable. Since changes in students' status are not detectable on a month-to-month basis, because data are collected only once per year, we stop counting the duration one year before the wave in which a student drops out or completes university.

¹¹ We are able to apply this criterion to 733 out of 1,544 persons.

FAMILY_INCOME: This variable enables us to analyse the role played by family income in human capital investment in higher education. Here we construct the family income as the total net income of the household divided by the OECD equivalence scale and then again divided by the 1993 consumer price indices so as to make them comparable across waves. We do not consider parents' salary as an indicator of financial condition because of the attrition related to this variable; more than 60% of the mothers and 20% of the fathers do not declare any salary, even if they are not housewives, unemployed or inactive. Underreporting is thus a real concern as a source of measurement error, especially in those kinds of variable where people tend to avoid reporting their true financial situation or they refuse to answer. As a result, family income should provide a fairly good measure of the level of resources the student can rely on when he/she is attending university. This variable in all regressions has been used as a dummy which describes the distribution of income in quartiles.

UNEMPLOYMENT_RATE: this is a regional rate which distinguishes gender and age and was obtained from National Statistics (ISTAT). Labour market conditions represent an additional set of information which can lead to a better understanding of higher students' behaviour.

However, due to the nature of this variable which provides, apart from the information about unemployment, also information relating to gender, regions and age, it might be possible that, including all those variables in each of our analysis, the results will suffer from the interactions between them. As a result, in order to verify whether the above problem does lead to some biases in our regressions or not, we repeat all of them excluding the rate of unemployment¹². In other words, throughout this procedure, we determine the sensitivity of the outcomes of an alternative to changes in its parameters. Finally, this robustness check highlights that results are not affected by those diverse specification' s models.

GENDER: this is a dummy variable which detects males if equal to 1 and females if equal to 0. Gender distinction functions to highlight the possible existence of differences within this category.

NUMBER OF COMPONENTS: We include this variable in the analysis because of the importance of underlining the differing family size. The aim is to check if family size can affect the probability of enrolling at university as well as the probability of dropping out. Also in this case, in the regression we use a dummy variable for the household comprising four people and another for the household bigger than the previous one. The base category is a family composed of three or fewer persons.

¹² Results are not reported for the sake of brevity but they are available upon request.

REGIONS: Italy is composed of twenty regions, but in the ECHP data they are grouped into eleven. In my regressions we make a further regrouping of them into four, to be more precise north-west, north-west, centre, and south.

MARITAL STATUS: We use just one dummy variable which includes divorced, separated and widowed. The base category is married. We consider this criterion for fathers as well as for mothers since we are interested in the evaluation of the conditions of a specific family on the human capital investment. We group all cases for which an individual lives with just one parent both from natural causes and otherwise, like divorce or separation because of the small number of such observations in each category. Moreover, in both situations one parent, in general the woman, can receive an amount of money from the other or the pension of a dead partner. In this way this grouping does not bias the analysis.

PARENTS' LEVELS OF EDUCATION: We use a dummy variable for each parent which contains only parents who have completed compulsory schooling. The base categories are high school diploma or university degree. This is a key variable in the analysis because it allows us to investigate in more depth the role of family background in human capital accumulation.

Table 1 reports a statistics summary of the explanatory variables we use in the analysis.

Finally, life-table - displaying survivor and hazard functions - is reported in table 2. Regarding the survivor function, this non-parametric approach shows the proportion of males and females who stay at university at each interval relative to the previous period. As it is noticeable, the distribution for both groups under consideration is very similar up to the legal length, which is four and five years. After that, females' survival declines more steeply compared to men, a result which may be due to the fact that women are more hard-working than males. As a consequence they are more likely than men to achieve a degree and on time too, then for this reason we observe a lower proportion of females immediately after the minimum length required for getting a degree. Figure 1 shows the plots of the Kaplan-Meier survivor function disaggregated by gender, as reported in the life-table. From the hazard function¹³ column we can observe that the risk of dropping out of university is almost equal for both males and females until the fifth interval, then it becomes larger for females for the same reason mentioned earlier. Figure 2 shows the plots of the hazard rate by gender.

4. Probability of withdrawal: duration model.

With regard the probability of dropping out from university we may take into account the most important theoretical models on this issue: the student integration model by Tinto (1975), by Bean

¹³ It is the probability of death (non-survival) at time $Y=y$, given survival up to time y .

(1980) and by Bean and Metzner (1985), wherein they have identified attrition especially as the result of a failed interaction between the student and the university. Tinto's theoretical model postulates that successful academic and social integration of the student into university determines persistence behaviour. Although the model considers abilities, skills and commitments, its major focus is the impact that the institution itself has on the withdrawal behaviours of its own students. On the contrary the model of Bean (1980) includes background variables, namely age, gender, high school performance, academic variables and environmental variables (labour market conditions, hours of employment, etc.). Finally, the subsequent conceptual model of non-traditional student attrition of Bean and Metzner (1985) places less emphasis on the institutional integration of the students, due to the characteristics of part-time study, and focuses more on the interaction of academic and environmental variables, and academic and psychological variables, such as stress, study habits, etc. However, the major limitation of those models, as Astin (1993) suggests, is related to the exclusion of the role of the peer group interaction, which turns to be an important aspect in explaining student involvement in university. As a result, in light of the above results, we may choose the best form specification on the strength of the data available in the sample. The econometric approach is based on survival analysis models. For this issue binary dependent regression models cannot be applied because the analysis is about modeling of time to event data. In addition they are not suitable as they do not handle aspects like censoring, time varying covariates¹⁴ and they do not account of the differences in time in which each individual is at risk of experiencing the event and we consider time that elapses for a student to drop out of university before completion. In this study the event of interest, university withdrawal, may occur at any particular instant in time, but data are provided in discrete intervals of time, which lead to use a discrete hazard model. Furthermore, it is remarkable to notice that the sample is random and composed by only university students observed until the spells end or till the end of the survey, as a consequence for some of them we do not observe the transition out of university. Observations for those who do not occur transition are right censored. In addition, we assume that process which gives rise to the censoring is independent of survival time. After having enrolled at university each student, at the end of every academic year, may decide whether to carry on his/her studies or to drop out of college before completion. Finally, we have to bear in mind that the individual's optimal choice is not to invest in further education if the marginal cost from this additional year exceeds the present value of the marginal benefits¹⁵. As a result we use a complementary logistic model (*cloglog*) where the dependent variable takes value 0 when individuals are still at university or have got a degree over

¹⁴ See Jenkins (2004)

¹⁵ Under no liquidity constraint, otherwise in the utility function must be embodied also this aspect.

the sample period and 1 when they drop out. Complementary log-log model specification for the hazard regression is consistent with a continuous time model and interval censored survival time data (Jenkins, 2004). Prentice and Gloeckler (1978) show the equivalence among interval censored discrete-time model and continuous time model with the proportional hazards assumption. As a consequence, it is possible to transform the coefficients of this analysis into hazard ratios, which facilitate interpretations of the regression results. This is due to the fact that “proportional hazards” entails that the duration profile of the hazard is the same for all the university students, where this profile is shifted upwards or downwards by the explanatory variables considered.

The hazard ratio is so given by:

$$HR = \frac{\chi(x = a)}{\chi(x = a - 1)} = \exp(\beta)$$

where χ is the continuous time hazard rate. This is the relative risk associated with a one unit change in the value of the corresponding explanatory variable, holding everything else constant.

Naturally it is questionable whether all students with the same set of observed covariates face the same expected hazard of dropping out of university. Due to the unobservable factors, it is reasonable to assume that there are some students who are more or less likely to exit from university. Ignoring unobserved heterogeneity can lead to various biases¹⁶. In this study, to overcome unobserved heterogeneity means that we have to consider in this regression differences in students’ abilities. Nevertheless, due to the structure of the data we cannot model unobserved heterogeneity since we do not have multiple spells as a student can experience transition only once over time. We then apply the cluster option in order to account for the specific characteristic of the rate of unemployment variable. In this manner individuals are aggregated according to how similar they are with regard to the gender, interval age and region.

5. Results: drop-out hazard ratios

The aim of this investigation has been to assess whether or not family characteristics influence success or failure of tertiary studies.

Table 3 presents coefficients, t statistics and hazard ratios of the drop-out probability. It contains three columns, the first for both males and females, the second for the male sub-sample and, the third for females. We conduct also separate analysis for male and female students as it appears that male and female drop-out behaviour is rather different.

Regarding the whole sample, the logarithm of the duration has negative and statistically significant effects on students’ drop-out rate. As expected, this result means that students drop out of

¹⁶ Cf. Jenkins (2004 – pg. 79-87)

university, especially during their first year, rather than in the following ones. In Italy, the drop-out rate, as mentioned earlier on, is a considerable problem, especially over the first academic year¹⁷, a situation that might be attributable to many aspects of the Italian university system. First, there is no access selection of students¹⁸, so that, after completing high school, regardless of which kind of diploma has been achieved by the individual, they can enrol at any faculty. Of course lack of knowledge combined with the mismatch problem - inadequate high school preparation relevant to the faculty chosen - may discourage students and lead them to leave university when they face the consequent difficulties. Furthermore, in general there are no strict rules for enrolment at university and the fees are affordable, at least in public university, since they are proportionate to family financial resources. In such situations, some individuals might decide to continue studying after achieving their diploma, even if they are only partly convinced, so that they then drop out as soon as they receive an interesting job offer or are in a tight spot. It is noticeable that men face a higher withdrawal probability than women, about 55% more. Again this result is not surprising for several reasons. Women are more devoted to studying than men, further, men are more likely to find a job while they are still enrolled at university and when this happens they might find working more convenient than studying. In addition, over the years taken into account in our sample, military service was still mandatory, as a result men had to do it before going to university or when they were already enrolled. As a result, in the latter situation this forced interruption of the studies might drive them to drop of college. The region of residence variable is not statistically significant at any level, although we can see that in general the probability of drop-out is higher for students who do not live in the north-east area, due possibly, as shown in the previous regression, to the fact that the number of matriculations is larger in all the other regions than in the base category – the north-east. The unemployment rate is statistically insignificant, so it is difficult to assess its role in exit probability from university. With regard to parental background and family characteristics, it is noticeable that living with single-parent father, because he is widowed, separated or divorced, has a positive effect on withdrawal probability, compared to those living with both parents. However, living with only the mother, who is a single parent for similar reasons, is not statistically significant. Family size is found to be relevant in the withdrawal process. This variable is statistically significant and reveals that a student from a family composed of four individuals has about 29% higher risk of dropping out than one living in a family with three persons or fewer. In addition we note that the drop-out hazard rate increases to 44%, relative to the base category, for students from

¹⁷ University drop-out rates have been around 20% in the recent years –source: Miur - Cnvsu (2005).

¹⁸ There are few universities in Italy that allow only a fixed number of matriculations each year, making a selection on the basis of a test.

families of five people or more. This result should be interpreted bearing in mind that being a member of a larger family is usually bound up with limited financial resources and poor cultural background in most cases. To support our evidence, we can instance recent studies on this issue, such as Hanushek (1992), in which he finds that achievement falls systematically with increased family size. The previous result is explained by: child spacing, quality and quantity of parental time – because private parental time for any child subtracts from the total time available to other children. The effects of household income are not easy to assess, since these variables are statistically insignificant, apart from the third income quartile which is statistically significant at the 10% level. The sign is positive for all the variables and regarding the third income quartile, it is shown that students have a 37% higher exit probability compared with those from the richest families. This result might be due to the fact that being upper-middle class may facilitate entry into the labour market, thanks to family and social networks, and thus avoiding university enrolment. Finally, parents' education does affect withdrawal probability, as both those variables are statistically significant. Having parents with only compulsory schooling reduces the chances of college completion by 50% if the father is poorly educated and 46% if the mother is less educated, compared to their counterparts with higher education. These results underline the importance of cultural family background to the enrolment process as well as to success in tertiary education. Concerning the regression analysing males separately, reported in column two, we notice the results are similar to those for the whole sample, apart from the variable which identifies region of residence and it is shown to be statistically significant and students living in central Italy have an exit probability 60% higher than individuals living in the north-east. With regard to the female sub-sample we may underline that many variables are statistically insignificant. The prior situation might be due to the narrow number of observations available once we account only for women sample and to the specific characteristics of women as well as to unobservable information, such as school performance and individual's abilities. In addition, because of the results just cited above for women, a likely explanation might be that results relating to the whole sample were highly dependent on the male sub-sample. To sum up, the results about the whole sample show that the most important determinants on drop-out probability seem to be gender, duration, family characteristics and parents' education, rather than region of residence, household income or level of unemployment. Exit probability, as already shown, is higher during the first academic year for reasons which we have mentioned. A further explanation for men relates to compulsory military service which can interrupt university studies. Moreover, it is necessary to underline the positive influence brought by parents through their level of education on the probability of completing university.

5.1 Predicted hazard and survivor functions.

In this section, after taking the probability of withdrawal from university before completion into account, we consider the derivation of the hazard and survivor functions for students enrolled at university with particular combinations of covariates. The method we have used to do this analysis is based on the within-sample predictions, which relies on the given information available in the data¹⁹ considered in the previous paragraph. Following a complementary log-log (*cloglog*) analysis carried out for the entire sample of university students, we have defined the predicted *cloglog* hazard rate and survival time for each person in our data, given his or her covariates and assigned the value t to the relevant time period. Hence, we have started to generate several different groups according to the set of covariates selected each time. On the strength of the characteristics taken into consideration, we specify the following groups:

- ✓ **Group 1:** male students living in the north of Italy with married and poorly educated²⁰ parents and in a larger family – four people or more-;
- ✓ **Group 2:** female students living in the north of Italy with married and poorly educated parents and in a larger family;
- ✓ **Group 3:** male students living in the south of Italy with married and poorly educated parents and in a larger family;
- ✓ **Group 4:** female students living in the south of Italy with married and poorly educated parents and in a larger family;
- ✓ **Group 5:** students living in the north of Italy with married and poorly educated parents and in a larger family;
- ✓ **Group 6:** students living in the south of Italy with married and poorly educated parents and in a larger family

Groups have been defined by using those covariates which have appeared to play an important role in the university drop-out process, and each graph is truncated at the maximum survival time in the data, which is ten years.

The predicted results have then been summarised graphically. Figure 3 plots the discrete predicted hazard rates for the first and second groups mentioned above. From the graph it is observable that, *ceteris paribus*, males have higher hazard rates in each period, and that as a result the transition rate out of university is larger for men than for women. Then figure 4 shows the predicted survivor

¹⁹ The predictions are facilitated by the fact that the data are already in person-year format, so covariate combinations and survival times are available in the data set (cf. Jenkins, 2001).

²⁰ Poorly educated means having completed only compulsory school, which in Italy is equal to the *scuola media inferiore* at most.

function for the same groups. From the results just discussed, it is clear that men have shorter survival times than women at all times. Especially during the transition from the first to the second academic year, males experience the highest withdrawal rate from university and again during the last years observed in the sample; by comparison the probability of women dropping out is less, particularly over the last years observed.

Figure 5 shows that men living in the south of Italy are more likely - *ceteris paribus* – than women to leave university before completion. The predicted survivor function in figure 6 for groups 3 and 4 shows the line representing men descending steeply, especially over the first four academic years. Conversely, the slope representing women is less steep, particularly after the fourth academic year, which remains nearly stable.

Subsequently we present some combinations of the aforementioned groups. Figure 7 plots the predicted hazard rates for men who have married and poorly educated parents and live in a larger family, but the two groups considered differ in where they live – the north or south of Italy. The graph shows that *ceteris paribus* the exit rate from university is higher for men who live in the south than for those living in the north. In other words, it means that the corresponding students living in the south have a greater probability of dropping out than those living in the north, especially during the first academic year. A similar distribution is shown for both the predicted hazard and the survivor functions for the females.

To sum up, it is possible to demonstrate that, apart from the region where people live, women have less probability of exit from university compared to men with the same set of covariates. Again this analysis confirms that gender is one of the main determinants of university withdrawal and of the number of years spent at university, since in general people are more likely to drop out of university during their first year. Then, when we plot in the same graph men or women with the same characteristics it is shown that where people live makes a difference, and especially living in the south increases *ceteris paribus* the chances of dropping out as compared with living in the north. Although, in the analysis, region has been found to have no statistically significant effects on university exit probability, figures 7 and 8, in which gender is disregarded, it is shown that also geographical area of residence impacts on the hazard rates and survivor function of individuals, increasing the drop-out rate of those living in the south of Italy.

6. Conclusions and remarks

We have presented an analysis of university drop-out among Italian students, using the ECHP panel data. It is the first time that panel data has been used for studying this phenomenon along with survival analysis approach. The ECHP has provided the opportunity to investigate this issue

because it includes information on college attainment for each student, such as progress or failure, since individuals have been observed for more than one year. A central role has been given to parental background and to family characteristics since the main objective of this work is to detect whether those determinants do matter in terms of tertiary education completion or not, as well as analyzing if intergenerational transmission persists over time.

We find that the determinants which most affect this phenomenon negatively are: larger family, less educated parents, and unmarried parents. The drop-out risk for students whose father has at most compulsory education is about 50% higher than those whose father has a degree. The drop-out hazard rate in the case of students with poorly educated mothers is about 46% greater than their counterparts. Family income does not seem to be associated with withdrawal, but it accounts for many of the decisions not to enrol at university rather in the first place.

However, given the results of this analysis, further investigation of these topics is clearly necessary. One important issue is that the ECHP data do not include information about students' abilities, such as high school attended, faculties enrolled at, marks attained, etc, and it would be interesting taking these unobservables into account in the regression to avoid a misleading interpretation of the results. Another possible extension of the analysis would be to try to investigate carefully the existence of casual effects between university performance and parental background. As shown in this paper, parental background plays an important role in getting a degree, and the intergenerational transmission involved here cannot be changed by social policies directly, because no-one can choose his/her parents or family. So, on the one hand, this result highlights the fact that the last Italian university education reform introduced in 2001 is still unable on its own to remove entirely the main problems that affect the Italian tertiary system (e.g. high drop-out rates, excess to get a degree). In fact this reform does not even begin to address the question of inadequate parental background. As family environment clearly has a direct influence on the progression of children through the education system, improvement is not going to be achieved through a new set up of the whole university system and its courses. Ways need to found to deal with the familial problems, such as poorly educated parents, low income, etc. On the other hand this reform has been worth having increased the probability of enrolment at university, especially of "weaker students" who have especially been encouraged by the introduction of shorter degree course, and of individuals who face poor financial condition as well (Cappellari and Lucifora, 2008)

References

- Aassve, A., Billari, C. and Mazzucco, S. (2002), "A multilevel discrete-time duration model with selective attrition for household formation: a study of ECHP data.", mimeo.
- Ahlburg, D.A., McCall, B.P. and Na, I. (2002), "Time to dropout from college: a hazard model with endogenous waiting", Working Paper No. 0102, Industrial Relations Center, University of Minnesota.
- Aina, C. (2011), "The Determinants of Success and Failure of Italian University Students. Evidence from administrative data", *forthcoming Rivista Internazionale di Scienze Sociali*.
- Arulampalam, W., Naylor, R.A. and Smith, J.P. (2002), "Effects of in-class variation and student rank on the probability of withdrawal: cross-section and time-series analysis for UK university students", mimeo, University of Warwick.
- Arulampalam, W., Naylor, R.A. and Smith, J.P. (2003), "Factors affecting the probability of first-year medical student dropout in the UK: a logistic analysis for the entry cohorts of 1980-1992", Warwick Economic Research Papers No.618, University of Warwick.
- Arulampalam, W., Naylor, R.A. and Smith, J.P. (2004), "A hazard model of the probability of medical school drop-out in the UK, *Journal of Royal Statistics Society A*, 167, 157-178.
- Bean, J. P. (1980), "Dropouts and turnover: the synthesis and test of a casual model of student attrition", *Journal of Research in Higher Education*, 12, 155-187.
- Bean, J. P. and Metzner, B. S. (1985), "A conceptual model of non-traditional undergraduate student attrition", *Journal of Review of Education Research*, 55, 485-540.
- Belloc, F., Maruotti, A. and Petrella, L. (2010). "University drop-out: an Italian experience", *High Educ*, 60, 127-138.
- Boero, G., Laureti, T. and Naylor, R. (2005), "An econometric analysis of student withdrawal and progression in post reform Italian universities", Working Paper 2005-04 CRENOS.
- Brandolini, A. and Cipollone, P (2002), "Return to education in Italy: 1992-1997", mimeo.
- Bratti, M., Broccolini, C. and Staffolani, S. (2010), "Higher education reform, student's time at location and academic performance in Italy: Evidence from a Faculty of Economics", *Rivista di Politica Economica*, n.2, 275-304.
- Broccolini, C. (2005), "Una prima valutazione degli effetti della riforma universitaria: il caso dell'Università Politecnica delle Marche" Working Paper Università Politecnica delle Marche, n. 244.
- Cappellari, L. and Lucifora, C. (2009), "The "Bologna Process" and College Enrolment Decisions", *Labour Economics*, 16(6):638-647.
- Cecchi, D. et al. (2000), "College choice and academic performance", mimeo Department of Economics University of Milan Italy.

- Checchi, D. and Flabbi, L. (2005), “Intergenerational mobility and schooling decisions”, mimeo.
- Cingano, F. and Cipollone, F. (2003), “Determinants of university drop-out probability in Italy, Temi di discussione, Banca d’Italia.
- Cingano, F. and Cipollone, F. (2007), “University drop-out: the case of Italy”, Temi di discussione, Banca d’Italia.
- Cutillo, A. and Di Pietro, G. (2006), “The impact of supply side policies on university drop-out. The Italian experience”, paper presented at EALE 2006 conference.
- Dearden, L. et al. (2005), “Education subsidies and school drop-out rates”, IFS Working Paper No.WP05/11, The Institute for Fiscal Studies, London.
- Di Pietro, G. (2006). “Regional labour market conditions and university dropout rates. Evidence from Italy”, *Regional Studies* 40(6), 617-630.
- Dornbusch, R., Gentilini, A. and Giavazzi, F. (2000) “Italian labour force participation: disguised unemployment on campus” mimeo.
- Hanushek, E.A.(1992), “The trade off between child quantity and quality”, *The Journal of Political Economy*, 100, 84-117.
- Haveman, R. and Wolfe, B. (1995), “The determinants of children’s attainments: a review of methods and findings”, *Journal of Economic Literature*, 33, 1829-1878.
- Johnes, G., and McNabb, R. (2004), “Never give up on the good times: student attrition in the UK”, *Oxford Bulletin of Economics and Statistics*, 66, 23-47.
- ISTAT (2009), “Università e lavoro: statistiche per orientarsi”
- Jenkins, S.P. (2004), “Survival analysis”, mimeo, Institute for Social and Economic Research, University of Essex.
- Perotti, R. (2002), “The Italian university system: rules vs. incentives”, Unpublished manuscript, Bocconi University.
- Montmarquette, C., Mahseredjian, S. and Houle, R. (2000), “The determinants of university dropouts: a bivariate probability model with sample selection”, *Economics of Education Review*, 20, 475-484.
- Tinto, V. (1975), “Dropout from higher education: toward an empirical synthesis of the recent research”, *Journal of Review of Educational Research*, 45, 89-125.

APPENDIX A 1- Descriptive statistics

Table 1 Variable definitions and Sample Characteristics.

Variable Name	Definition	Mean
MALE	0 -1 dummy variable equals to one if student is male	.54
NUMBER OF COMPONENTS4	0 -1 dummy variable equals to one if student's family is composed by 4 people	.42
NUMBER OF COMPONENTS5+	0 -1 dummy variable equals to one if student's family is composed by 5 people or more	.35
SOUTH	0 -1 dummy variable equals to one if student lives in the South of Italy	.47
CENTRE	0 -1 dummy variable equals one if student lives in the Centre of Italy	.24
NORTH-WEST	0 -1 dummy variable equals to one if student lives in the -West of Italy	.15
R_UNEMPLOYMENT	lagged rate of unemployment by gender, region and age	25.73
FIRST_QUARTILE INCOME	natural logarithm of first quartile of equivalised family Income	.23
SECOND_QUARTILE INCOME	natural logarithm of second quartile of equivalised family Income	.29
THIRD_QUARTILE INCOME	natural logarithm of third quartile of equivalised family Income	.18
LOWSCHOOL_DAD	0 -1 dummy variable equals to one if student's father has a level of education lower than a high school diploma	.61
LOWSCHOOL_MUM	0 -1 dummy variable equals to one if student's mother has a level of education lower than a high school diploma	.70
LIVING WITH THE FATHER	0 -1 dummy variable equals to one if student's father is widowed, divorced or separated	.11
LIVING WITH THE MOTHER	0 -1 dummy variable equals to one if student's mother is widowed, divorced or separated	.11
LN DURATA	Logarithm of the number of years spent at the university	1.32
FAILURE	0 -1 dummy variable equals to one if a student drop from university before completion, 0 otherwise	0.59
UNI	0 -1 dummy variable equals to one if individual enrolled	.31

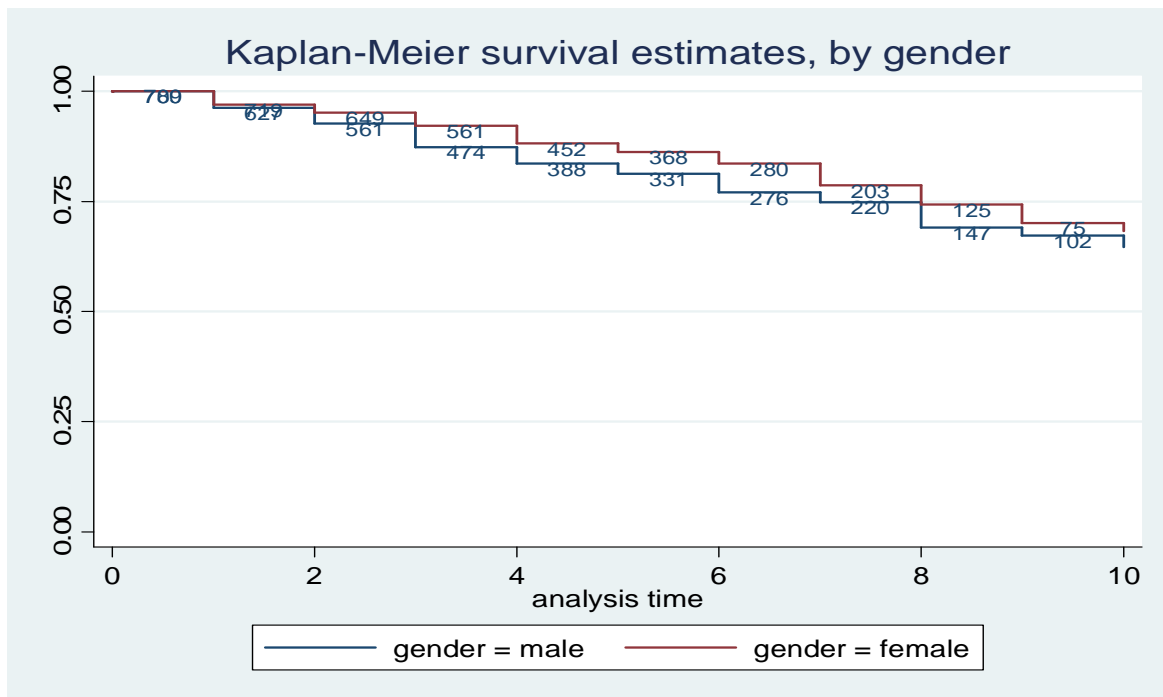
Note: Mean reported in the table is referred to the whole sample.

Table 2 - Descriptive survivor function by sex

Group	Interval	Total	Deaths	Survival	SE Survival	Hazard	SE Hazard
Males	1 2	2620	331	0.8737	0.0065	0.1349	0.0074
	2 3	2289	343	0.7427	0.0085	0.1620	0.0087
	3 4	1946	336	0.6145	0.0095	0.1890	0.0103
	4 5	1610	319	0.4927	0.0098	0.2199	0.0122
	5 6	1291	287	0.3832	0.0095	0.2501	0.0146
	6 7	1004	256	0.2855	0.0088	0.2922	0.0181
	7 8	748	240	0.1939	0.0077	0.3822	0.0242
	8 9	508	212	0.1130	0.0062	0.5274	0.0349
	9 10	296	170	0.0481	0.0042	0.8057	0.0566
	10 11	126	126	0.0000	.	2.0000	0.0000
Females	1 2	3011	402	0.8665	0.0062	0.1431	0.0071
	2 3	2609	423	0.7260	0.0081	0.1764	0.0085
	3 4	2186	418	0.5872	0.0090	0.2114	0.0103
	4 5	1768	401	0.4540	0.0091	0.2558	0.0127
	5 6	1367	345	0.3394	0.0086	0.2888	0.0154
	6 7	1022	300	0.2398	0.0078	0.3440	0.0196
	7 8	722	262	0.1528	0.0066	0.4433	0.0267
	8 9	460	214	0.0817	0.0050	0.6062	0.0395
	9 10	246	147	0.0329	0.0032	0.8522	0.0636
	10 11	99	99	0.0000	.	2.0000	0.0000

Note: Referring to the sample used for the probability of drop out of university, this table denotes the portion of students who is present in each interval group. Deaths reports the number of students for each group who disappeared from the survey. Finally, for each group there is the estimates of the survival function and of the hazard rates.

Figure 1 Kaplan-Meier survivor function by gender.



Note: Table reports portion of male and females that survive at each point in time considered.

Figure 2 Cumulative hazard function by gender

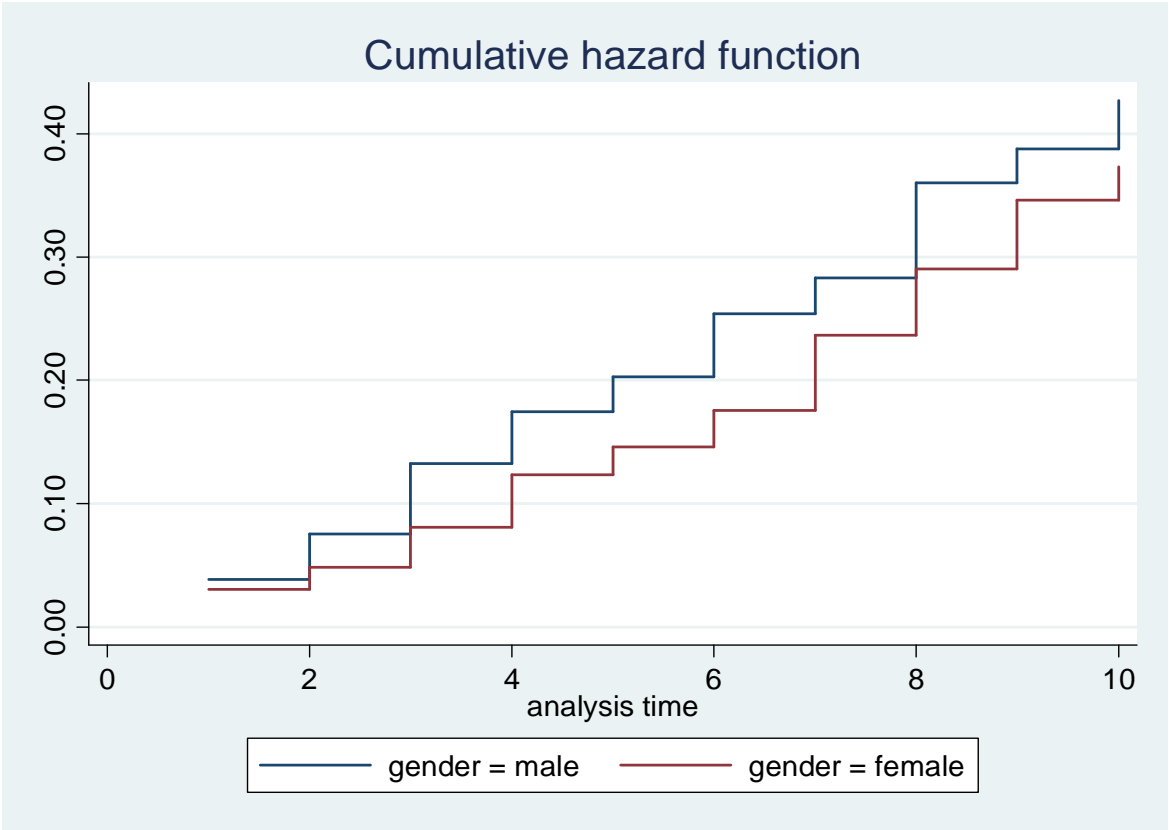


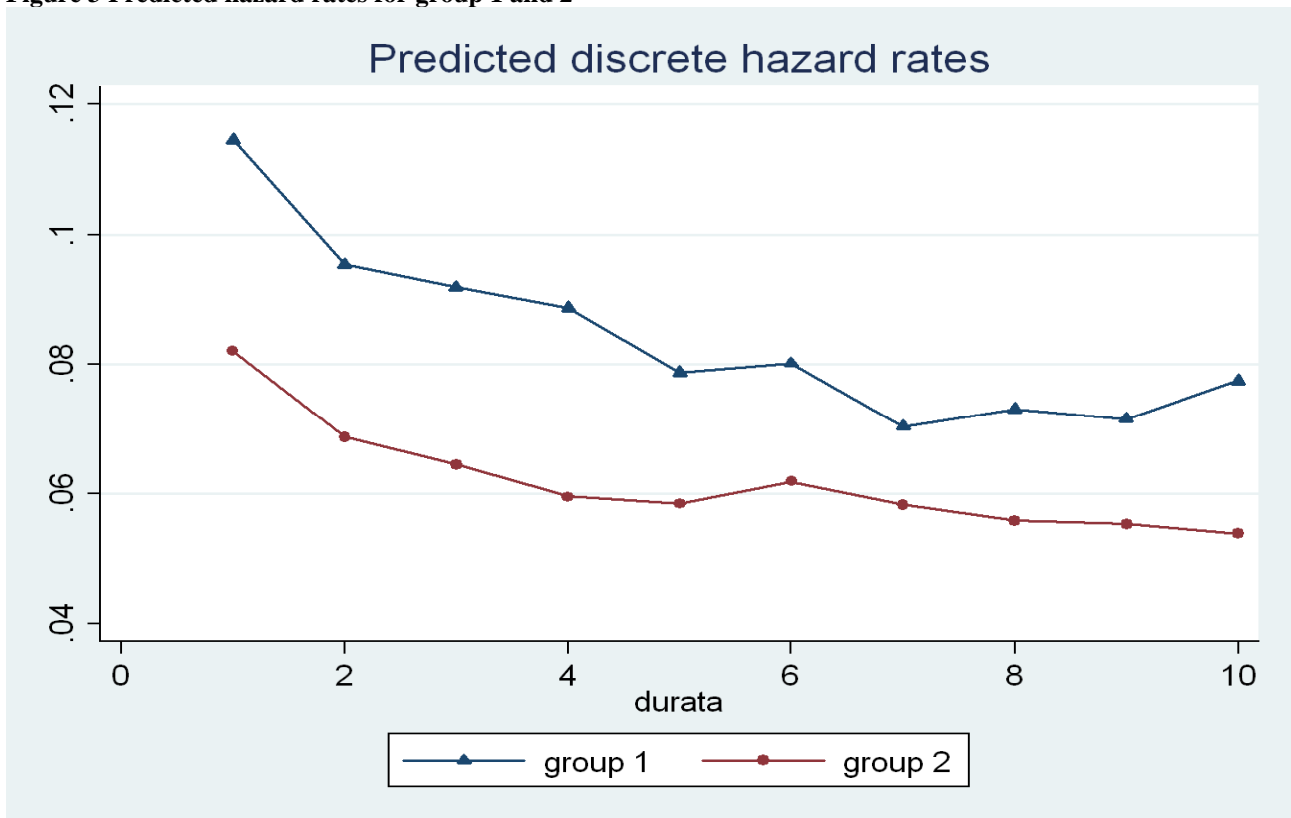
Table 3 - Probability of drop out of university before completion.

Variable	Males+Females			Males			Females		
	Coeff.		Haz.Ratios	Coeff.		Haz.Ratios	T	Haz.Ratios	
Lndurata	-.1704	**	.8433	-.2797	***	.7560		-.0461	.9549
Male	.4374	***	1.5487						
North- West	.2038		1.2840	.0974		1.0986		.2055	1.2282
Centre	.2339		1.4425	.4726	**	1.6042		-.0475	.9536
South	.1261		1.1343	.2790		1.3218		.0326	1.0331
Lowschool_dad	.4060	**	1.5008	.3674	**	1.4439	*	.4355	1.5458
Lowschool_mum	.3759	**	1.4563	.3544	**	1.4254		.4208	1.5232
Living with the father	.7365		2.0887	.9202		2.5098		.5752	1.7774
Living with the mother	-.0153		.9848	-.3066		.7359		.1558	1.1686
Number of components4	.2500	*	1.2840	.3770	**	1.4579		.1048	1.1105
Number of components5+	.3664	**	1.4425	.4090	*	1.0943	*	.3273	1.3872
R_unemployment	.0051		1.0051	.0006		1.0006		.0066	1.0066
First quartile_income	.2252		1.2526	.3171		1.3731		.1066	1.1125
Second quartile_income	.1819		1.1995	.2041		1.2264		.1218	1.1295
Third quartile_income	.3117	*	1.3657	.1283		1.1368	*	.4685	1.5976
Constant	-.3.9646	***	.0189	-3.4501		.0317		-3.9893	.0185

Note: This table reports the effects of each explanatory variables on the probability of withdrawal from university. The first column shows results for the entire sample, the second only for males and the last one for females. Regression has been run taking into account that respect the rate of unemployment observations are independent, but not necessary across groups (rate of unemployment varies by sex, regions and age), so in order to deal with this aspect we use the cluster's option.

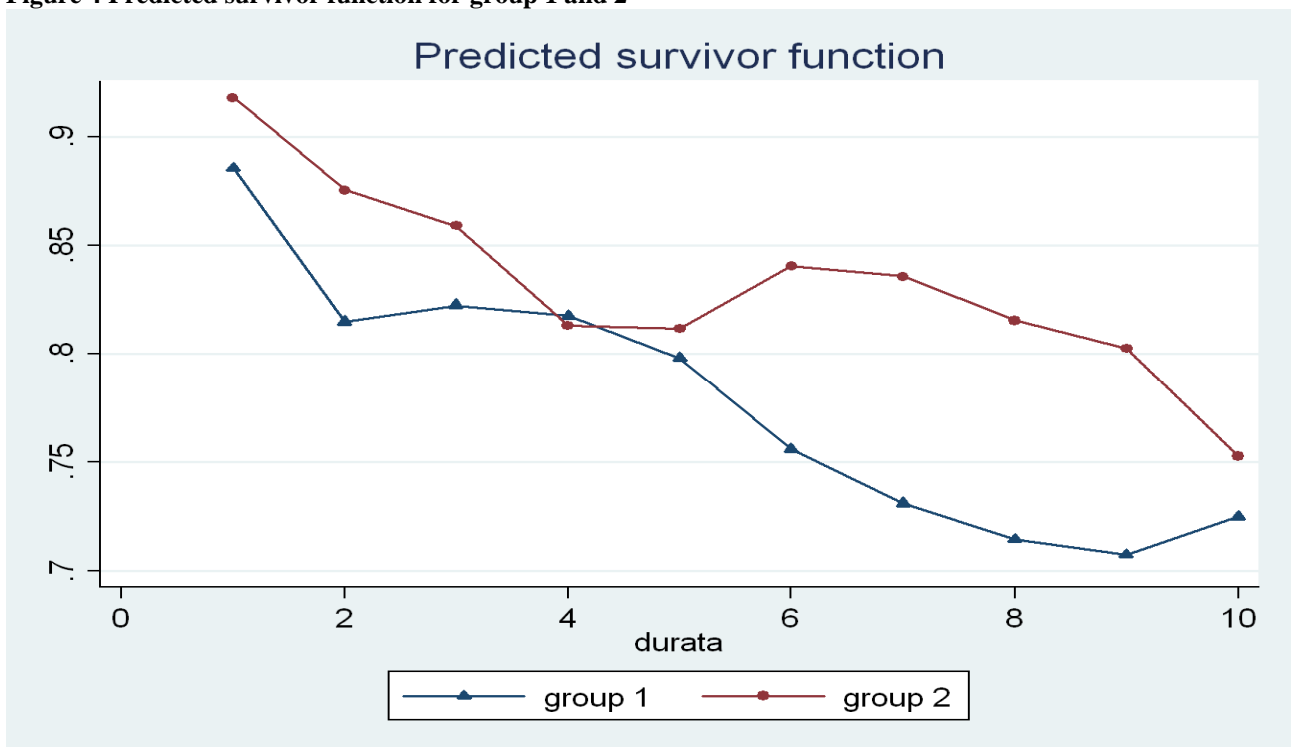
Excluded categories: female, North-East, graduate father, graduate mother, single father, single mother, less than 3 individuals, richest families.

Figure 3 Predicted hazard rates for group 1 and 2



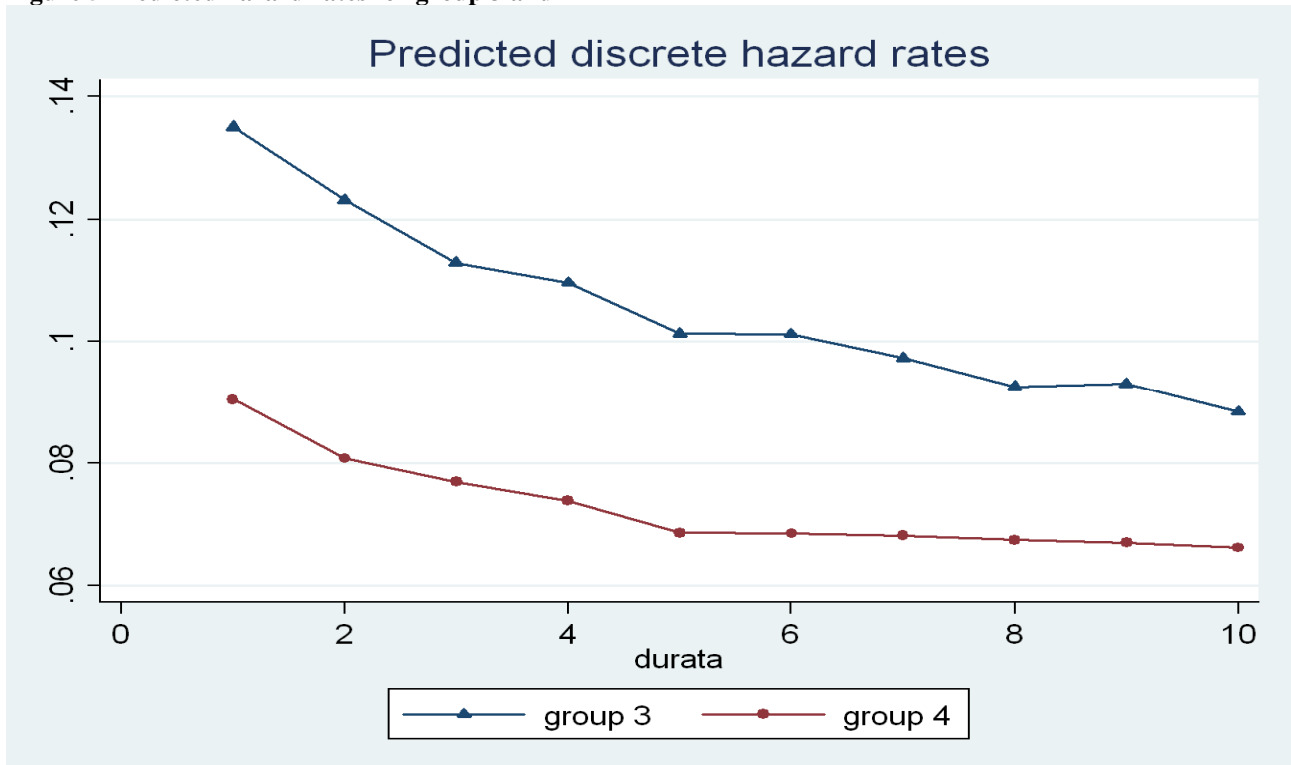
Note: group 1 composed by: males students who are living in the North of Italy with married and low-educated parents and in larger family. Group 2: females students who are living in the North of Italy with married and low-educated parents and in larger family.

Figure 4 Predicted survivor function for group 1 and 2



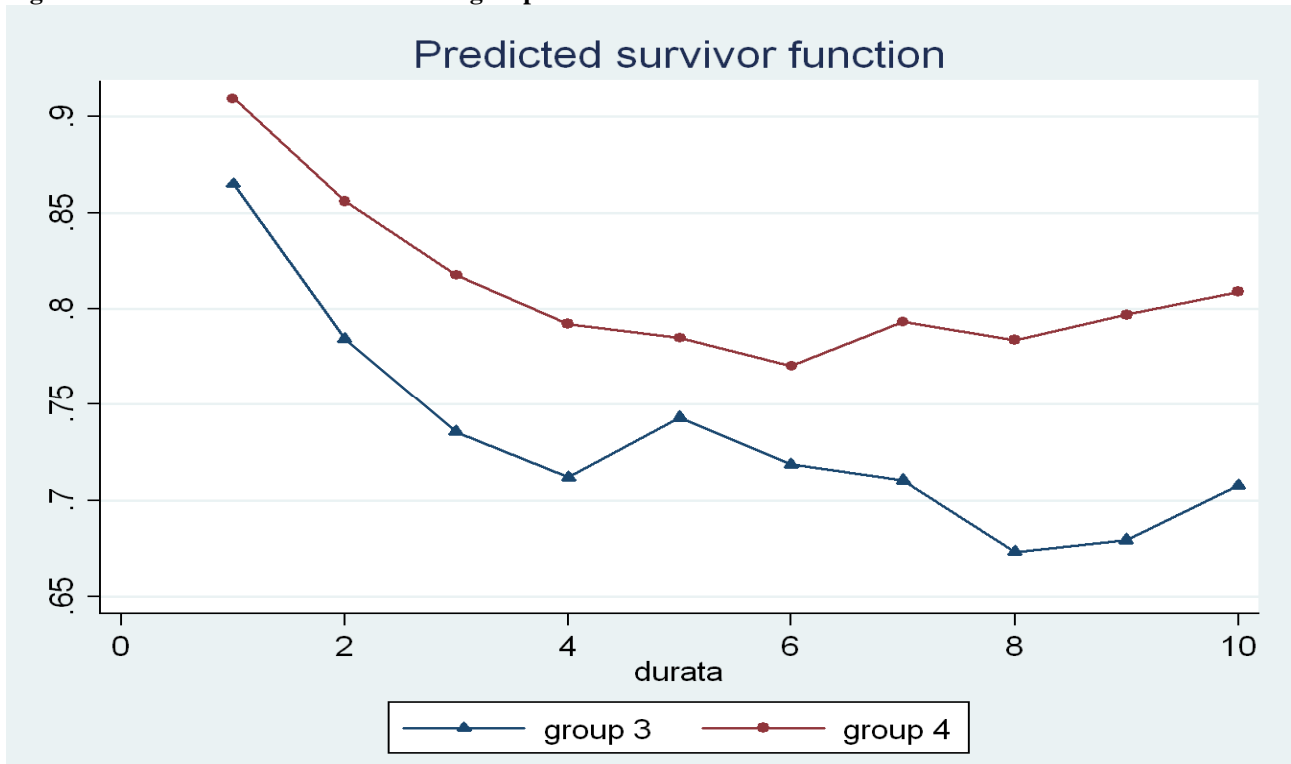
Note: group 1 composed by: males students who are living in the North of Italy with married and low-educated parents and in larger family. Group 2: females students who are living in the North of Italy with married and low-educated parents and in larger family.

Figure 5 Predicted hazard rates for group 3 and 4



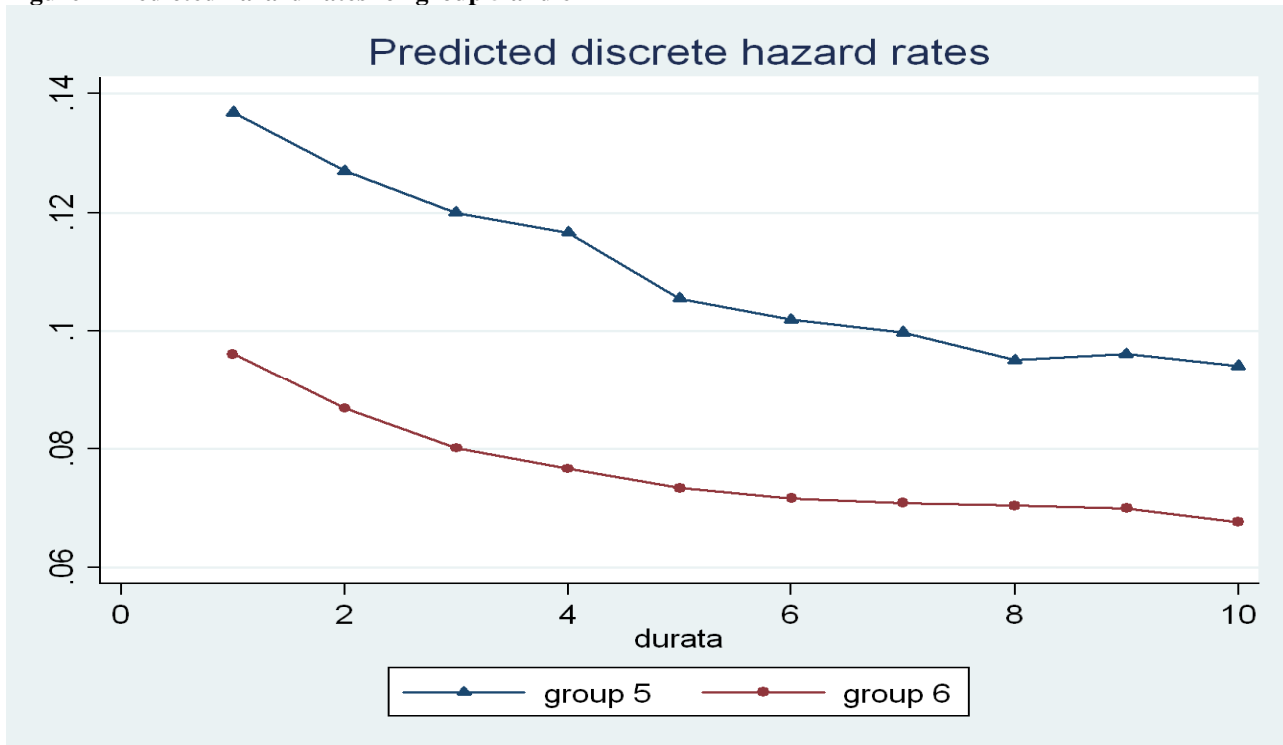
Note: group 3 is composed by: males students who are living in the South of Italy with married and low-educated parents and in larger family. Group 4: females students who are living in the South of Italy with married and low-educated parents and in larger family

Figure 6 Predicted survivor function for group 3 and 4



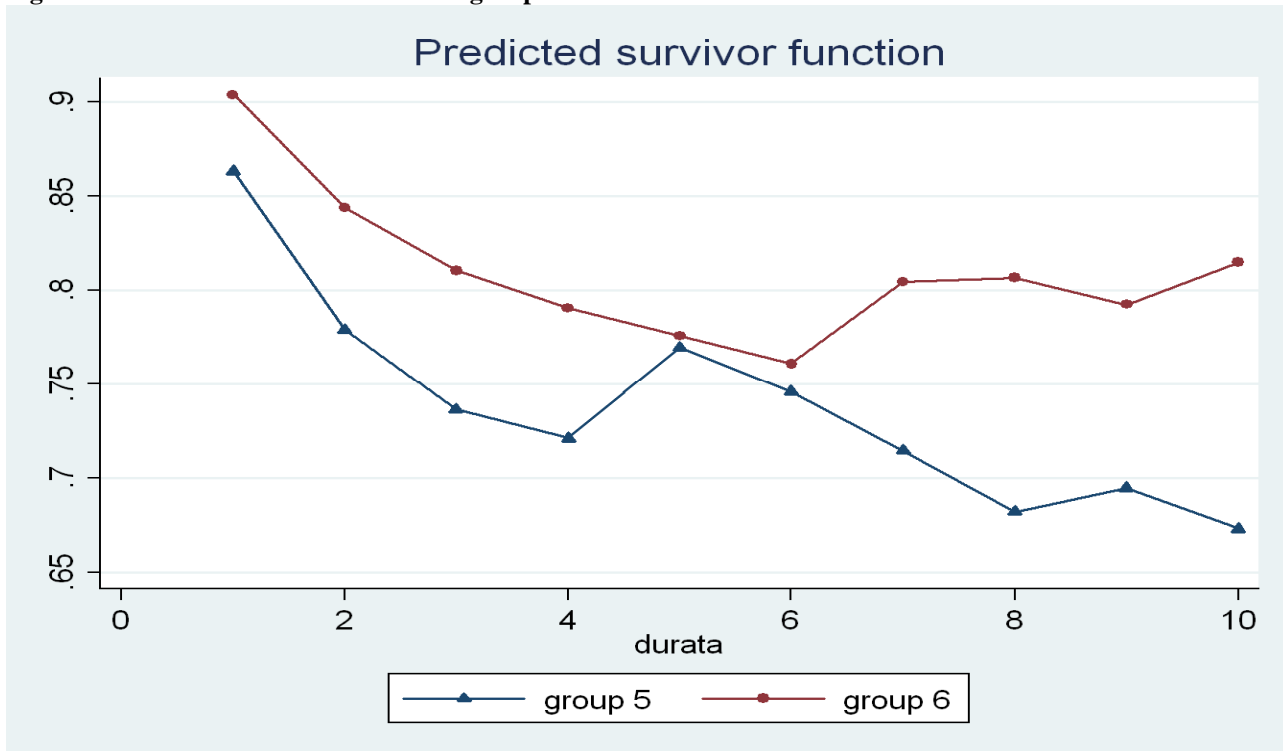
Note: group 3 is composed by: males students who are living in the South of Italy with married and low-educated parents and in larger family. Group 4: females students who are living in the South of Italy with married and low-educated parents and in larger family

Figure 7 Predicted hazard rates for group 5 and 6



Note: group 5 is composed by: students who are living in the North of Italy with married and low-educated parents and in larger family. Group 6: students who are living in the South of Italy with married and low-educated parents and in larger family

Figure 8 Predicted survivor function for group 5 and 6



Note: group 5 is composed by: students who are living in the North of Italy with married and low-educated parents and in larger family. Group 6: students who are living in the South of Italy with married and low-educated parents and in larger family