

DOES STUDENT EMPLOYMENT ACCOUNT FOR INEQUALITY IN
ACADEMIC OUTCOMES?
Evidence from Italian Higher Education

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Abstract

Previous research on Italian higher education showed that social origin affected students' academic progression and results in the 20th century. In this paper we examine the role of student employment – i.e. working during university – in the reproduction of social inequality in academic outcomes. In the first part, we review previous research results in the US, UK and Italy and discuss several competing hypotheses. In the second part, we use data from the Italian Longitudinal Household Survey (ILFI) to study a) the relation between student employment and academic outcomes; b) the relation between social origin and student employment, and c) the mediating effect of student employment in the relation between social origin and academic outcomes. Bivariate analysis and multinomial logistic regression models show that full-time students are more likely to graduate on time than working-students, but only high-intensity work has a detrimental effect on dropping out. Social origin affects the probability of being a high-intensity worker, but not the likelihood of being a low-intensity worker. Finally, results from a non-linear decomposition analysis suggest that the overall role of student employment in the reproduction of inequality in higher education is low, while the most important variable is the type of high-school attended (especially lyceum vs non-academic).

Keywords: student employment, academic outcomes, Italian Higher Education, social inequality.

1 Introduction

The relation between higher education and work has been extensively studied by sociologists and economists. While most of this research focuses on work *after* higher education, less attention has been devoted to the experience of working *during* higher education. Interest in this topic is growing in the United States and Great Britain because of the rising costs of attending higher education and a significant increase in student employment (Ehrenberg and Sherman 1987; NCES 1994; Horn and Malizio 1998). As suggested by Riggert *et al.* (2006), colleges and universities can no longer assume that the majority of students will be able to give their full-time attention to academic studies.

In Italy the topic has not been widely analysed despite its relevance. The importance of this issue relies on several considerations. First, employment during university studies is quite common, even if tuition fees are generally low and most students study in or close to their hometown, and therefore do not require additional funding for their studies (Rui Foundation 2005; CNVSU 2007). Second, there is not a formal distinction between full-time and part-time students and there are no part-time courses for adult learners and for workers. Therefore workers enrol in standard courses where they are expected to perform like standard students. Third, the amount of drop-outs and graduations behind schedule is very high and it has been rising quickly in the youngest cohorts (Triventi and Trivellato 2007; 2008). Fourth, still nowadays there are inequalities in the rates of university graduation among different social categories (Pisati 2002; Checchi *et al.* 2007; Triventi and Trivellato 2008). Thus it is interesting to understand whether and to what extent student employment affects the probability of dropping out and having a delayed graduation. Looking at the equity side, it is also important to determine whether social origin affects the decision to work during university studies. We believe that an estimate of the spread of student employment and the examination of its role within university careers allow to reach at least two important objectives: a better understanding of its role in the reproduction of inequality in educational outcomes, and the definition and implementation of adequate policies in tertiary education.

Our main research questions are as follows. Does student employment affect academic outcomes? Does social origin affect the probability of working during higher education studies? How much does student employment account for the relation between social origin and academic outcomes? The paper is organized as follows. In the next section we review the empirical literature on student employment in higher education; we focus on research conducted in the US and UK as well as in Italy. In the third section we outline some theoretical perspectives on this topic and present the competing hypotheses that can be derived from them. In the fourth section we describe the data, variables and methods adopted in the analysis and in the fifth section we present the research results. Finally, in the last section we discuss the main findings, drawing some conclusions.

2 Review of previous research results

2.1 *International empirical evidence*

While there is a vast literature on the determinants and effects of employment during high school – especially in the US (see for example, D’Amico 1984; Marsh 1991; McNeal 1995; 1997) – relative less attention has been devoted to examine the experience of working during higher education (Riggert *et al.* 2006). Most of the contributions in this field try to evaluate whether working during higher education affects different aspects of student performance or behaviour. The dependent variables in most empirical analyses are retention, drop out, re-enrolment, grade point average (GPA), time required to graduate, but also satisfaction, participation in campus activities, and involvement in social relations with professors and other students. Moreover, the economic literature pays attention to the long term consequences of student employment on post-college economic returns.

There is a great variability also in the type of independent variables used in the empirical analyses. Whereas some studies focus on the simple distinction between working and non working students, many others use more refined definitions. For example, some consider the intensity of work (weekly hours of employment), the specific type or nature of the job (term-time/semester versus summer jobs, on campus versus off campus jobs), while others explore also the reasons that lead students to seek work during their post-secondary studies.

The empirical literature on student employment has reached mixed and contradictory results, and most literature reviews have not been able to identify a clear pattern regarding the impact of student employment on academic outcomes (Lyons *et al.* 1986). Some studies suggest that employment negatively affects student academic performance, while others conclude that the impact of work is not detrimental to educational outcomes (Riggert *et al.* 2006)

Paton-Saltzberg and Lindsay (1993) analyze term-time work of university students in the UK and find an overall negative effect of employment on several indicators of academic performance. More recent results seem to confirm these findings. Humphrey (2006) notes that in his path analysis model term-time work directly and significantly affects end-of-year average grade and participation in university societies. Metcalf (2003), analyzing data on third year students from four UK universities, finds that working during the term negatively affects the quality of education and increases the difficulty of balancing employment and educational demands.

In the US context, some studies show that employment during post-secondary studies reduce persistence and retention, diminishing the propensity of re-enrolment and increasing the probability of drop out (Stern and Nakata 1991; Gleason 1993; Cuccaro and Almin 1997). In particular, some research identifies a relevant effect of intensity of work on retention (NCES 1994): increasing weekly hours of employment are related to increasing likelihood of dropping out from university both in 4-year colleges and 2-year community colleges (Ehrenberg e Sherman 1987). Other studies find that employment during postsecondary education negatively affects GPA, satisfaction for studies and participation in social activities (Astin 1993).

However, other research finds student employment does not impact negatively on academic outcomes (Volkwein *et al.* 1989) and cognitive development (Pascarella *et al.* 1994). For example, Horn and Malizio (1998) show that students who worked up to 15

hours per week had the lowest risk of dropping out, even when compared with non-working students. Analyses of the relation between student employment and average grades also present mixed results: in fact, some studies find a negative correlation but others find no or negligible correlation between the two variables (Ehrenberg and Sherman 1987; Volkwein et al. 1989; Canabal 1998; Barke et al. 2000; Furr and Elling 2000). Furthermore, the economic literature identifies a positive effect of working during university studies on post-college earnings (Stephenson 1981; Stern and Nakata 1991). Finally, Davis (1999) – adopting a lifelong learning perspective – suggested that part-time higher education is not to be considered negatively, because it raises the education opportunities of adult students.

Relative little attention has been given to the examination of the detailed profiles of working students or to the analysis of the variables which affect the likelihood of being employed during tertiary studies. As a whole, the empirical literature identifies social class of origin, parents' education and place of residence as good predictors of working student condition. In most studies students from lower classes, with not well-educated parents, and residing with their families (not in campus or with other students) have the highest probability to be employed during tertiary education (Van Dyke and Little 2002; Metcalf 2003; Bozick 2007). The relation between gender and student employment is less clear: some studies find that there are no gender differences in the probability of working during the term, while other show a higher propensity among males, especially for regular jobs.

2.2 *Empirical evidence from Italy*

The literature on student employment within the Italian context is relatively limited. Although the number of students who work – full-time or part-time – during university studies is not negligible, scholars have seldom given attention to the quantitative aspects of this phenomenon. The most comprehensive studies on this topic were conducted in the late 1960s (Martinotti 1969) and in the mid 1980s (de Francesco and Trivellato 1985).

Martinotti (1969), using data from the National Institute of Statistics and data from a survey of students from five Italian universities, estimated that in the middle 1960s about 20% of the first-year students was employed and among them two thirds had a permanent job. This study showed that there was a great variability in the amount of working students in different fields of study. Their proportion was higher in Economics, Law, Political science and Literature than in Medicine and Engineering. The main reason for this heterogeneity was due to the different required standards (compulsory attendance to classes) and the opportunity to enter a job relevant to their field of study before graduation. Another finding was that the rate of employment continued to increase as students grew older: in fact, the proportion of working students was higher among graduates than first-year students, notwithstanding the greater amount of drop outs among students who were working. The research found that the proportion of working students was higher among males than females, but the difference was significant only as far as the high intensity work was concerned. Furthermore, the proportion of working students was higher among orphans or individuals who had only one parent, lower social classes students and among people who lived in rural areas. These findings were consistent with another result: working students were more likely to be found among individuals who attended technical and vocational schools than

among students from a lyceum. Finally, the research showed that working students had significantly higher probability of being behind schedule than full-time students, but the difference in average grades between the two groups was not high. In fact, the study found that it was not simply the condition of being a working student, but the intensity of the work that affects average grades.

In de Francesco e Trivellato (1985) a sample of students from the University of Milan was surveyed in the mid 1980s on topics such as life conditions, academic progression, school-related behaviour and employment status. The authors found that about one third of the students had a part-time or irregular job, and about 20% had a permanent and full-time job. The vast majority of the jobs were outside the university and took place during term time. Moreover, the study revealed that a non negligible proportion of students showed a willingness to work during university studies also if they were not actually working at the time of the survey. The research results confirmed most of the previous findings and, in particular, the relation between social origin and the likelihood of being employed during university studies. Students with lower social origins had a higher risk of being employed than students from upper classes or with well educated parents. Nevertheless, the authors suggested that the relation between social origins and work during university studies was more complex. Following Martinotti's reflections, they showed that the probability of being employed depends both on economic and cultural factors. On one hand, economic constraints can force lower class students to find a job in order to finance their studies; on the other hand, some parents may consider working during tertiary education valuable because it represents a preliminary experience in the labour market. Moreover, in some cases, students from upper classes may have the opportunity to work in their family's firm and by this way reach financial independence from their parents. The 'cultural attitude' hypothesis seems in part corroborated by another empirical finding: the proportion of working students was extremely low among teachers or professors' children, and relatively high among entrepreneurs' children and students from the petty bourgeoisie.

Finally, the authors showed that working students with high intensity jobs show a disproportionately higher likelihood of dropping out of university, being behind schedule or having a delayed graduation. This can be explained by looking at the amount of hours dedicated to attend classes and to study for examinations. The proportion of time given to tertiary studies was lower among high intensity workers than full-time students, while the difference between the low intensity workers and full-time students was not particularly significant.

3 Hypotheses

In this section we present the research goals, theoretical arguments and competitive hypotheses on the relation between student employment, social origin and academic outcomes. Our main research question is as follows: is employment during higher education a way of reproducing social inequality in academic outcomes? Our aim is to analyze whether and to what extent employment during university studies negatively affects academic results, increasing the probability of dropping out or delaying the time of graduation. At the same time, we focus on the relation between socioeconomic background and the probability of being a working student. If both relations exist and are quite strong, then we can conclude that student employment represents a way of reproducing social inequality in academic results between social classes. Even though

the literature on this topic is principally focused on empirical research, it is possible to identify some perspectives which formulate contrasting predictions on the relation between student employment, social origin and academic outcomes. We discuss these hypotheses and then we formulate our own hypotheses, also taking into account previous research results.

We can find two competing perspectives which offer predictions on the relation between student employment and academic results. On one hand, the «zero-sum approach» states that employment during university studies imposes constraints on the use of time: as the time of work increases, the time students can dedicate to study decreases. Thus, according to this perspective, there is a strong trade-off between study and employment. An hour spent to deliver pizzas, working in a call-center or in an office is an hour not spent studying, attending classes, preparing for examinations or sleeping. Furthermore, employment during higher education implies fewer opportunities of interaction with other students and professors, and reduces participation in extra-academic activities within the university. The small fraction of time spent in the academic environment and interacting with peers doesn't allow a complete identification with the «role of student» and this can imply a shift in individuals' priorities, making employment more important than academic persistence or success. Moreover, in many situations the simultaneous condition of worker and student involves overloading commitment, increasing psychological stress and anxiety for fear of academic failure. Hence, according to the zero-sum approach, student employment is associated with several conditions that render learning and academic progression more difficult, affect academic results negatively, and increase the risk of dropping out.

A sceptical view on the arguments of the zero-sum approach states that there is not necessarily a negative relation between student employment and overall academic results, for several reasons. First of all, the zero-sum hypothesis was elaborated to explain the relation between employment and school outcomes for high-school students. It seems less applicable to university students because they often have no compulsory classes, they spend less time in classroom and thus they have more flexibility in organizing their time. Second, it is not so obvious that an hour spent at work is an hour that the student doesn't dedicate to study; for example, a working student may decide to reduce his/her leisure time, maintaining the time he/she devotes to study nearly constant. If there is flexibility in planning the academic schedule, working students can choose less demanding courses or those that don't require classroom attendance to pass the final examination. Third, working students can be aware of the time constraints they face and this can be an incentive to organize their time more efficiently.

It is possible to identify a more specific hypothesis within this perspective: the «selection-to-work» hypothesis (Warren et al. 2000; Warren 2002). It argues that if we observe different academic results between working and nonworking students, they can be related not to the different engagement in employment, but to unobserved pre-existing differences between the two groups of students, such as ability and motivation. Working students can be systematically different from nonworking students: for example, they can show a higher propensity to work because they obtained poor grades in their previous career, or they consider academic success less important than other students do. Therefore, the poor performance of working students may reflect a process of academic disengagement that begins before the students enter the labor market. Bozick (2007) argues that this explanation can be put forward in the case of high-school students, but it seems less applicable to college students. This is because in the United

States the selection of the less motivated/able students takes place in the transition from upper-secondary to tertiary education. In the US most motivated and skilled students give up enrolling at college or university because of high tuition fees and their expected low probability of success.

However, the Italian case seems to be different on this aspect because low tuition fees and high unemployment rates among the youngsters represent an incentive to enrol in university also for students with a weak scholastic background or without a strong motivation. In this perspective, some Italian commentators described the Italian university as a “parking lot”, in which both motivated and not strongly motivated students have the possibility to enrol. Since in the Italian educational system the selection of less skilled and motivated youngsters occurs not only in the transition from secondary to tertiary education but also after enrolment in university (as high drop out rates testify), the selection-to-work hypothesis may be pertinent in this institutional context. If this is the case, we would expect that the bivariate relation between student employment and academic outcomes virtually disappears when controlling for pre-existing differences between working and nonworking students.

Looking at the relation between social origin and the probability of being a working student, it is possible to identify two contrasting hypotheses that we’ve labelled WEC (Work due to Economic Constraints) and WFI (Work for Financial Independence) respectively. The first one claims that the condition of employment during higher education is mainly due to economic constraints and therefore it is more frequent among working class students. Students from families with low socioeconomic status have more difficulties than other people in facing the direct and indirect costs of education. Hence, they need to work to pay tuition fees, maintain themselves during the period of university attendance, and pay for their educational materials and living expenses, because their parents cannot pay for them and public grants, where available, are not sufficient to cover all the costs.

On the contrary the WFI hypothesis argues that in the case of the Italian system, the absence of formal barriers to university access and the low level of tuition fees in public universities make employment a strict necessity only for a minority of students, for instance adult learners. Thus economic constraints are far from being an explanation able to account for the high level of employment observed in most recent surveys (Rui Foundation 2005). According to this interpretation, the main reason for student employment is the personal desire of financial independence from the family of origin; working during university studies may be helpful to pay for education-related materials, but also for leisure time activities (hobbies, sport, cultural consumptions, etc.). Consequently, following this perspective, employment during university is not only frequent among working class students, but also among upper-middle classes students; hence, we should not observe an overall strong relation between social origin and student employment.

Finally, we can formulate our own hypotheses on the basis of the above described perspectives, but taking into account also previous research results and the peculiar characteristics of Italian higher education system. We suggest that it is not sensible to distinguish simply between working and nonworking students, because within the former category there is a great heterogeneity of conditions. However, it is both useful and necessary to create a simple typology to study antecedents and consequences of student employment. Therefore, following a common practice within the Italian research (Martinotti 1969; Istat 1976; de Francesco and Trivellato 1985; Rui Foundation

2005), we classify students in three groups: full-time students (or non-working students), low-intensity workers and high-intensity workers (see below for details). Even though the category of low-intensity workers remains unclear and heterogeneous, this simple classification accounts for an important differentiation within the working students population. Given this clarification, we think that the relations we are focusing on vary according to the level of work commitment. More precisely, considering the relation between student employment and academic outcomes, we expect that high-intensity workers are those with higher risks of dropping out or having a delayed graduation, while we would not expect that full-time students and low-intensity workers substantially differ in their academic outcomes. We also expect that working class students and those with low-educated parents have the higher probability of being a high-intensity worker, while we do not expect a different distribution of low-intensity workers across social classes.

4 Data, variables, methods

4.1 *The data*

The data was obtained from the first three waves of the Italian Longitudinal Household Survey (ILFI, *Indagine Longitudinale sulle Famiglie Italiane*), carried out in 1997, 1999 and 2001. In the first wave, respondents were asked to provide retrospective information; in the successive waves, information about those same respondents was updated, and retrospective data collected from first-time interviewees who entered the sample after the first wave. The ILFI was conducted on a representative sample of Italian men and women aged 18 or over and residing in Italy at the time of the interview. A stratified two-stage sample design was used. The 8,104 Italian municipalities taken as the PSUs were divided into 42 strata defined according to two variables: region and type of municipality (metropolitan, suburban, other). The 12 metropolitan municipalities were included in the sample with certainty as self-representing PSUs. Within each of the remaining 30 strata, a random sample of municipalities was extracted with probabilities proportional to the number of residents; a total of 248 municipalities were selected. After this, within each selected municipality a simple random sample of households was extracted, using the electoral register as the sampling frame; a total of 4,637 households were selected. Within each household, all individuals aged 18 or older were defined as eligible for interview. The analytical sample consisted of persons born between 1920 and 1975, who enrolled in university between 1938 and 1999 and were no longer enrolled at the moment of interview. The overall sample size is 1,900 cases. Because the ILFI is based on a complex sample design, the calculation of the uncertainty surrounding the estimates may be to some extent distorted. However, previous tests (Bernardi and Pisati 2002; Pisati and Schizzerotto 2004) have shown that the design effect tends to be fairly small (ranging in most cases from 0.8 to 1.2); therefore – following the common practice adopted by ILFI’s research team – we decided not to correct the estimates for the specific sample design.

4.2 Variables

The two principal variables employed in the analysis are «student employment» and «academic outcome». *Student employment* represents a categorization of people on the basis of their work-related behaviour during higher education and it is divided into three categories: full-time student, low-intensity worker and high-intensity worker. Full-time students are people who did not show any occupational episode during their university career; high-intensity workers are people who worked for at least 50% of their university career for more than 24 hours per week. Low-intensity students is a residual category including people other than full-time students and high-intensity workers.

As opposed to most studies in this field, our definition is not the result of a direct question to respondents about their average level of exposure to work during university studies. Instead, our variable has been built by analysing the sequence of occupational and educational episodes in a retrospective and longitudinal framework. The use of this kind of data and strategy presents an important advantage, but also some disadvantages. The benefit is the opportunity to classify students according to their work-related behaviour along their university career, including in the variable definition not only the weekly hours of employment but also the proportion of months in which a student has been involved in a job during his/her university studies. The main disadvantages are problems in recalling relevant information about the starting and ending times of educational and occupational episodes. We decided to exclude from the sample individuals born before 1920 in order to reduce this problem.

Academic outcome is a categorical variable articulated in three categories: drop out, regular graduation and delayed graduation. We consider drop outs and behind schedule graduations as key outcomes because previous studies (de Francesco and Trivellato 1977; Di Pietro 2004; Checchi et al. 2007; Cingano and Cipollone 2007; Triventi and Trivellato 2007; 2008) identified them as severe problems in Italian higher education. Students who enrolled at university, did not complete their studies and left university without obtaining a degree are classified as drop outs. Delayed graduation includes people who took longer to complete their degree than the prescribed duration of their course. The definition of delay which we adopt is less constraining than the 'official' one. Let fd be the formal duration of the programme (in years) and ad the years taken to complete the degree: then we consider a student x of field of study y to have graduated late if $ad_x > fd_y + 1$. Regular graduation is the residual category that includes people who are not drop outs nor late graduates.

We employed two variables of social origin in the analysis: social class and parents' education. *Social class* corresponds to the father's occupational class when the respondent was 14 years old. If the father was not present in the family at that time, the social origin is obtained from the occupational class of the mother or other major breadwinner. Social class has been operationalized according to the neo-weberian tradition of Erikson-Goldthorpe-Portocarero (EGP) class schema (Erikson and Goldthorpe 1992), which considers both the market situation and the work position of individuals. The variable is articulated in four categories: a) bourgeoisie (large/middle firms owners, managers and members of the arts or professions); b) white collars (non-manual workers of middle or middle-high qualification); c) petty bourgeoisie (self-employed in the primary, secondary or tertiary sector); d) working class (low level non-manual workers and manual workers employed in the primary, secondary and tertiary sector). *Parents education* is based on the highest educational level between the father

and the mother of the respondent and it consists of four categories: a) tertiary (university degree, master, Ph.D.); upper secondary (5-year high school diploma); lower secondary (lower secondary licence or 3-year high-school diploma); primary (elementary school or no degree). Control variables in the models are gender, birth cohort, geographical area, type of high-school diploma, high-school final mark, number of failures at high-school, enrolment age in university, and field of study. Table A1 in the Appendix provides descriptive statistics of independent, dependent and control variables.

4.3 Methods

The analysis consists of two parts. In the first part we study the relation between student employment and academic results, on one side, and between social origin and student employment, on the other side. We use both simple cross-tabulation and multinomial logistic regression models. In the first model the dependent variable is academic outcome (regular graduation, delayed graduation, drop out), the explanatory variable is student employment (full-time student, low-intensity worker, high-intensity worker) and the control variables are gender, birth cohort, geographical area, type of high-school diploma, high-school final mark, number of failures at high-school, enrolment age in university, and field of study. In the second model the dependent variable is student employment (full-time student, low-intensity worker, high-intensity worker), the explanatory variables are social class of origin and parents education, and control variables are gender, birth cohort and geographical area¹. Social researchers usually report logit coefficients or odds ratios and their level of statistical significance to present the results of their regression models. Even though this is a well-established tradition in sociological research, in this case we prefer to adopt another measure, the Average Partial Effect (Long 1997; Bartus 2005; 2008). Partial effects measure the amount of change in the expected value of the dependent variable y when the i th independent variable increases from $(x-u_{i1})$ to $(x-u_{i2})$ ²:

$$\Delta E(y | x_i, u_{i1}, u_{i2}) = \frac{F(\hat{\beta}x + \hat{\beta}_i u_{i1}) - F(\hat{\beta}x - \hat{\beta}_i u_{i2})}{u_{i1} + u_{i2}} \quad (1)$$

For dummy variables, partial effects are changes in the expected value of the dependent variable as the dummy variables increase from zero to one. From a computational point of view the procedure we used calculates partial changes for each observation in the sample using equation (1) and then calculates their sample average³ (Bartus 2008). Since interpretation of regression results usually involves interest in changes in probabilities or expected values, it would be natural to present results in terms of discrete partial changes. This way of communicating results is more accessible to the

¹ In order to avoid multicollinearity problem we estimate two separate models. In the first one we introduce social class as explanatory variable while in the second one parents' education. Both models have the same control variables.

² Equation (1) can be computed if the quantities u_{i1} and u_{i2} are defined as $u_{i1} = 1 - \bar{x}$ and $u_{i2} = \bar{x}$.

³ We use the user-written command «margeff» in Stata 10.0. For more detailed information on the method and computation strategy see Bartus (2005; 2008).

non-expert reader (King et al. 2000); furthermore, sometimes interpretation based on odds ratios can be misleading (Hellevik 1997; Davies et al. 1998).

The coefficient estimates of the multinomial logistic regression models provide an interesting overview of the relation between the variables under scrutiny. However, these separate models do not allow us to quantify how much of the difference in academic results between students with different social backgrounds can be explained by employment status during university. In other words, they do not allow us to quantify the extent to which the different distribution of working-students in different social classes contributes to the class gap in academic outcomes. In order to face this issue we developed the second part of the analysis and applied a non-linear decomposition technique elaborated by Fairlie (1999; 2005; 2006), which follows the principle of the Blinder-Oaxaca decomposition technique developed for linear regression models (Blinder 1973; Oaxaca 1973). Fairlie's method extends this approach to non-linear models; it allows the decomposition of inter-group differences in average predicted probabilities of a binary outcome into those due to different observable characteristics or "endowments" across groups and those due to different effects of characteristics or "coefficients" of groups. The decomposition for a nonlinear equation such as $Y = F(X\hat{\beta})$, can be written as:

$$\bar{Y}^W - \bar{Y}^B = \left[\sum_{i=1}^{N^W} \frac{F(X_i^W \hat{\beta}^W)}{N^W} - \sum_{i=1}^{N^B} \frac{F(X_i^B \hat{\beta}^W)}{N^B} \right] + \left[\sum_{i=1}^{N^B} \frac{F(X_i^B \hat{\beta}^W)}{N^B} - \sum_{i=1}^{N^B} \frac{F(X_i^B \hat{\beta}^B)}{N^B} \right] \quad (2)$$

where N^j is the sample size for category j of X independent variable. Suppose that W represents Working class and B represents Bourgeoisie, in this case the first term in the bracket is the part of the class gap that is due to group differences in the distribution of X (incidence of student employment in different social classes), and the second term represents the part due to differences in the group processes determining the level of Y (the differential impact of work on academic outcomes between social classes). The second term also includes the portion of the class gap due to group differences in unmeasurable or unobserved endowments⁴.

While the first term in brackets in equation (2) provides an estimate of the overall contribution of all independent variables to the gap of interest, the contribution of specific variables to the gap needs to be identified in an additional calculation. According to this calculation, the contribution of each variable to the gap is equal to the change in the average predicted probability from replacing the working class distribution with the bourgeoisie distribution of that variable, while holding the distributions of the other variables constant⁵. In order to apply the decomposition, Fairlie (2006) recommends using coefficient estimates from a «pooled model» to calculate average predicted probabilities for outcome Y for both groups under consideration. Next, a random subsample of the group with smaller N is drawn, equal to the size of the larger group. Each observation in the subsample and the larger sample is then separately ranked by the predicted probabilities and matched by their respective

⁴ One could also write the decomposition equation (2) using the bourgeoisie coefficients as weights for the first term in the decomposition and the bourgeoisie distributions of the independent variables as weights for the second term (see Fairlie 2006, 3).

⁵ See Fairlie (2006) for details.

rankings. Because the results of the decomposition depend on the subsample that is drawn, following Fairlie's suggestion we drew a large number of random subsamples (500) in order to achieve reliable results⁶.

5 Research results

This section presents the main results of the analysis and it consists of two parts. In the first part we analyse the relation between student employment and academic outcomes and the relation between social origin and student employment using both cross-tabulations and multinomial logistic regression models. In the second part we present the result of a non-linear decomposition of the differential drop out rate between groups of students with different social origins.

5.1 *The relation between social origin, student employment and academic outcomes*

In this section we analyze the relation between student employment and academic outcomes, from one side, and the relation between social origin and student employment, from the other side. If both relations exist and are significant we can deduce that student employment can be a way of reproducing social inequality in academic results. In the first part we present bivariate cross-tabulations and in the second part the results of multinomial logistic regression models which allow us to study the same relations controlling for potential confounding factors.

Table 1 shows the relation between student condition in terms of work experience and academic results in terms of final outcomes. The table shows that there is an evident association between student condition and academic results. In particular, the percentage of drop outs is higher among high-intensity workers (67%) than among full-time students (45%) and low-intensity workers (37%). High-intensity workers are also the most disadvantaged if we look at regular and delayed graduations. Only 8% of them have been able to graduate on time and around a quarter receives a degree several years after the prescribed timing. Moreover, table 1 shows that, contrary to our expectations, low-intensity workers perform better than full-time students if we look at retention rates. The proportion of drop outs is 45.5% among full-time students compared to 37.4% among low-intensity workers.

[table 1 about here]

We elaborated a multinomial logistic regression model to study the same relation, controlling for the effect of sociodemographic variables (sex, birth cohort, residence area, enrolment age), previous school career (type of diploma, high school final mark) and enrolment characteristics (enrolment age, field of study). Results are quite similar to the previous ones, but the intensity of the association is now lower. Low-intensity workers are more likely to have a delayed graduation than full-time students; the difference is significant and it is around 15 percentage points. However, low-intensity workers show a lower risk of dropping out than full-time students; the distance between the two groups is around 11 percentage points, ranging between 5 and 16 points. The

⁶ The decomposition was computed with the user written Stata program «fairlie» by Ben Jann (2006).

probability of graduating on time among different categories of students shows a clear pattern: the most advantaged are full-time students, followed by low-intensity workers and high-intensity workers.

[figure 1 about here]

To summarize, student employment seems to influence academic outcomes, but the intensity of the relation becomes weaker after controlling for sociodemographic and school related variables. This means that the bivariate relation between student condition and academic results is in part spurious and that a relevant piece of the difference in academic results between working and nonworking students can be ascribed to pre-existing differences in these two groups. This finding is consistent with the selection-to-work hypothesis, which puts forward the interpretation of a pre-existing difference in the propensity to work between the two categories. However, empirical results show that not all the difference in academic results is due to pre-existing differences and high-intensity employment is effectively related with a higher probability of dropping out.

The second step consists of analyzing the relation between social origin and student employment. This assessment is necessary if we want to draw some conclusions on the role of employment during higher education in the process of reproduction of social inequality in educational attainment. In other words, we have seen that student employment affects academic results but if the probability of being employed is independent from social class we cannot conclude that work while at university is a way of reproducing social inequalities. Cross-tabulations reported in table 2 show that the proportion of full-time students and high-intensity workers varies according to both social class of origin and parents level of education, with a slightly stronger variation in the latter. Not surprisingly, the proportion of full-time students is positively associated with social class of origin and parents education; while the proportion of high-intensity workers is negatively associated with social class of origin and parents education. However, the differences between the “extreme” categories in general do not exceed 10 percentage points. As expected, the rate of low-intensity workers shows a less clear, non-linear pattern of association with both social class and parents education.

[table 2 about here]

The results of multinomial logistic regression models predicting student employment as a function of social origin and other covariates (figure 2) are rather similar to those observed in table 2. First of all, there are no significant effects of social class and parents education on the probability of being a low-intensity worker. Second, working class and petty bourgeoisie children have lower probabilities of being a full-time student than bourgeoisie. The difference is around 10-12 percentage points but there is relevant uncertainty around the estimates: even though the estimates are significant, confidence intervals indicate a range between 3 and 19 percentage points. Similarly, the probability of being a full-time student are lower for students whose parents have lower secondary or primary education. The difference between these two groups and students whose parents have a tertiary degree is around 10 percentage points, but one sees large uncertainty around the estimates.

[figure 2 about here]

Finally, the graphs show that working class students have higher risk of being high-intensity workers than people from bourgeoisie, while there are not significant differences between middle classes and bourgeoisie. Students whose parents have primary or lower secondary degrees have a higher risk of working harder during university studies than students with well-educated parents, but the estimated difference (7 percentage points) is rounded by a large sample uncertainty. In sum, overall findings indicate that control variables in the model do not modify the main picture observed with bivariate analysis: cross-tabulation of social origin and student employment seem good enough to depict the story. Multivariate analyses show that there is some variation in student condition according to social class and parents education but in most of the cases the effect is not strong. These mixed results suggest the following interpretation. The WEC hypothesis seems in part corroborated by the fact that students with low socioeconomic background have higher probability of working with high intensity than students from upper classes and well-educated parents, all else being equal. Even though the relation between social origin and student condition is not so strong as one would expect from the WEC prediction.

5.2 *Non-linear decomposition of the drop out gap by social origin*

In this section we apply a non-linear decomposition technique in order to study the role of employment in the relation between social origin and academic outcomes. Since this method compares two groups of individuals, we dichotomized the social class and parents education variables. We divide our sample into upper-middle classes (bourgeoisie, white collars, petty bourgeoisie) versus working class, and students with high-educated parents (tertiary or upper secondary education) versus students with low-educated parents (lower secondary or primary education)⁷.

In table 3 the results of the non-linear decomposition of social origin gaps in drop out rates are presented. In specification one, the working class and low-educated parents samples respectively are used in order to calculate the coefficients which are the basis of the decomposition; in specification two, the pooled sample of these two groups is used. The results are based on the mean values of decompositions with 500 different subsamples. We elaborated two series of models: in the first one, the only variable entered in the analysis of decomposition is student employment, while in the second one we add further variables related to school and university career (high-school number of failures, final mark, type of diploma, higher education field of study). Table 3 shows that the raw class gap in drop out rates between working class and upper middle classes is 13.5 percentage points and only a small fraction of this gap is explained by student employment, about 7-8%. Student employment seems to account for a slightly higher proportion of the drop out gap between students with well-educated and low-educated parents (that is about 15 percentage points), but the explained part does not exceed 13%.

[table 3 about here]

⁷ We used also alternative dichotomizations, for example comparing bourgeoisie with working class or students with tertiary- and primary-educated parents but the results were substantially similar. We opted for the actual categorization because we can rely on a larger sample size when calculating the nonlinear decomposition with pooled coefficients.

If we introduce other variables in the decomposition equation there is a significant improvement in the total explained part of the social origin gaps: overall, the difference in the average values of the independent variables account for about 50% (46.1-53.1%) of the class gap and for about 65% (64.5-67.1%) of the parents education gap. Nonetheless, the proportion of the gaps explained by student employment decreases, becoming less than 5% for the class gap and less than 8% for the parents education gap. As we can easily see, in both specifications the independent variable which has the most relevant contribution to the social origin gap in drop out rates is the type of high school attended. It accounts for 43-51% of the raw gap between working class and upper-middle classes and for 40-44% of the gap between students with well-educated and low-educated parents. Finally, the high school final mark has no significant effect in the class gap, while it accounts for about 11-13% of the parents education gap.

6 Discussion and conclusion

Previous research has shown that the Italian university system as a whole works with low efficiency and that social inequalities persisted in enrolment, drop out and graduation rates for most of the 1900s. In this paper we have examined an aspect which could explain to a certain extent the overall low performance of Italian higher education and account for differential academic outcomes between students with different social backgrounds: student employment. Basically, we tried to answer the following question: Does working during university explain why working class students have lower performance than students from upper-middle classes? This issue is relevant both from an efficiency and equity point of view. From the first one, it is important to understand whether the overall low efficiency and productivity of the Italian higher education system in the 20th century can be explained – at least in part – by the relative large number of working students. From the equity side, it is interesting to understand whether and to what extent student employment contributed to the reproduction of social inequality in academic outcomes. The issue is also relevant from a lifelong learning point of view because a good deal of youngsters and a certain amount of adults enter higher education while they are already working, or consider accepting a job, should it become available. At first sight it seems good that workers have the opportunity of attending university courses, but is it a chance or a lure?

Thanks to the longitudinal data we used, we have been able to provide for the first time to our knowledge a unique description of the working experience of Italian students along their entire university career. It's important to bear in mind that our data refer to the second part of the last century, therefore the new waves of temporary agency work are not included and we refer mostly to traditional types of employment. Nevertheless, we believe that we have done a step forward in analyzing the role of employment within educational careers, even if much more should be known about the psychological and motivational dimensions – at different stages of the academic career – for people who study and work at the same time.

In the last part of this section we briefly summarize our most important findings and discuss some of their implications. Dealing with the first research question (do students who also work systematically reach poor results?) we have seen that, when considering academic outcomes, cross-tabulations show that different working conditions lead to different outcomes, but such differences get smaller when we control for personal traits

and previous school career. In particular, low-intensity workers seem not to fit in a systematic pattern: they are less likely to drop out in comparison with full-time students, virtually in the same position as far as graduation on time is concerned, more likely to graduate behind schedule. This pattern closely resembles our hypothesis, because we were expecting differences between non-working students and high-intensity workers and virtually no difference between full-time students and students with moderate workload. Thus, while high-intensity workers do reckon worse academic results, the rest of the bulk appear rather undifferentiated, with no systematic relation between working condition and academic performance. These results raise some puzzling questions. From the institutional point of view we might ask: which sort of university is the one where students can also work – albeit to a variable extent – without relevant consequences on their academic performance? Or, from the point of view of individuals, why are full-time students as likely to dropout and graduate behind schedule as their colleagues who are moderately involved in work?

Dealing with the second research question (does social origin affect student employment?), our results show that social origin affects to some extent the probability of being involved in high-intensity work; but in the case of low-intensity work social background does not make any difference. These findings are consistent with our hypothesis; however the relation between social origin and the high-intensity work condition is not as strong as expected and uncertainty around the estimates is quite large.

Finally, the third all-encompassing question: How much does student employment account for social inequality in academic results? Our answer is: very little. Focussing on the drop out rate as a typical outcome, we found that, other things being equal, it is the type of high school diploma (lyceum vs non-academic) which has the paramount influence. Needless to say, there is a strong association between high school type and social origin, therefore the action of social class is – albeit indirectly – there. But working during the university years *per se* has only in minimal part contributed to persistence of inequality during the second half of the past century. These findings suggest that, in order to fight social inequality in educational success, admitting everyone to university – with or without employment – is not enough; the proper lever consists in supporting attendance of lyceums by lower class promising teen-agers who would otherwise attend non-academic high schools, and would end up in difficulties once at university.

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Tables

Table 1 - Academic outcomes by student condition

	Academic outcome			Total	n
	Drop out	Regular graduation	Delayed graduation		
Full-time student	45.5	21.6	32.9	100.0	1037
Low intensity worker	37.4	19.6	43.0	100.0	444
High intensity worker	66.7	7.8	25.5	100.0	255
Total	46.5	19.1	34.4	100.0	1736

Table 2 - Student condition by social class of origin and parents' education.

	Student condition			Total	n
	Full-time student	Low-intensity worker	High-intensity worker		
<i>Social class</i>					
Bourgeoisie	68.2	21.7	10.1	100.0	318
White collars	64.1	24.8	11.2	100.0	420
Petty bourgeoisie	57.9	27.7	14.4	100.0	437
Working class	56.8	25.2	18.1	100.0	592
<i>Parents' education</i>					
Tertiary	68.6	22.4	9.0	100.0	322
Upper secondary	62.7	27.5	9.8	100.0	501
Lower secondary	58.4	25.0	16.7	100.0	461
Primary	56.8	24.4	18.8	100.0	516
Total	61.5	24.6	13.9	100.0	1869

Table 3 - Non-linear decomposition of social origin gap in drop out rates

Social class					Parents education				
<i>Specification</i>	working class coefficients	pooled coefficients	working class coefficients	pooled coefficients		working class coefficients	pooled coefficients	working class coefficients	pooled coefficients
Working class	0.553		0.556		Low-educated	0.529		0.540	
Upper-middle class	0.418		0.428		High-educated	0.384		0.385	
Social class gap	0.135		0.128		Parents education gap	0.144		0.155	
High school mark			-0.003 -2.4%	-0.004* -2.7%	High school mark			0.017*** 10.9%	0.020*** 12.7%
High-school failures			0.001 0.5%	0.001 0.7%	High-school failures			0.006** 4.0%	0.008*** 4.9%
High-school diploma			0.066*** 51.3%	0.055*** 42.8%	High-school diploma			0.068*** 43.7%	0.062*** 39.9%
Field of study			0.003 2.4%	0.001 0.9%	Field of study			0.001 0.6%	0.001 0.8%
Student employment	0.010** 7.4%	0.011*** 8.1%	0.002 1.3%	0.005* 4.2%	Student employment	0.019*** 13.2	0.016*** 11.1	0.012** 7.9%	0.010** 6.3%
Total explained	0.010 7.4%	0.011 8.1%	0.068 53.1%	0.059 46.1%	Total explained	0.019 13.2%	0.016 11.1%	0.104 67.1%	0.100 64.5%
N estimation sample	553	1641	473	1429		992	1673	796	1460

^a * p<0.05, ** p<0.01, *** p<0.001. Significance levels based on standard errors approximated by the «delta method», see Fairlie (2003; 2006).

Figures

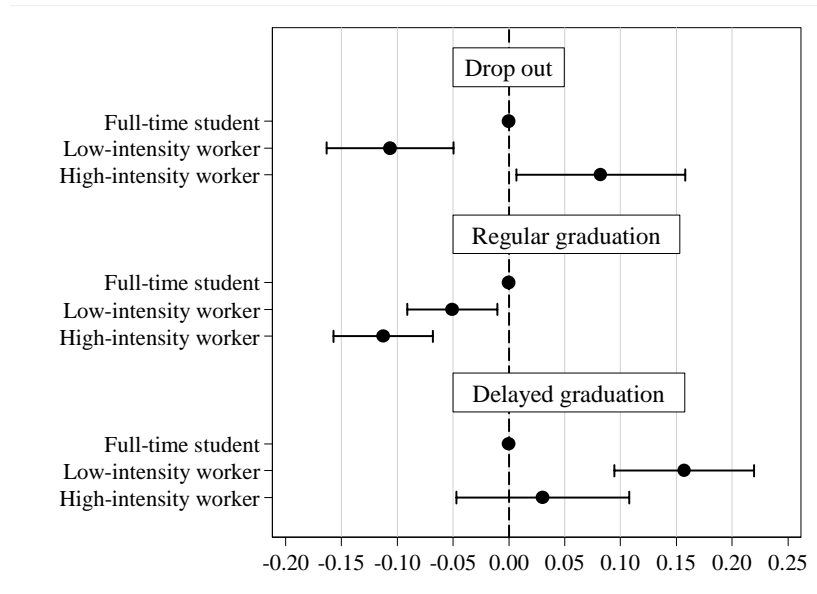


Figure 1– Estimates of Average Partial Effects of student employment on academic outcomes and 95% confidence intervals from multinomial logistic regression.

^a Control variables are sex, birth cohort, residence area, social class of origin, type of high school diploma, high school final grades, higher education field of study, age at enrolment (see Appendix).

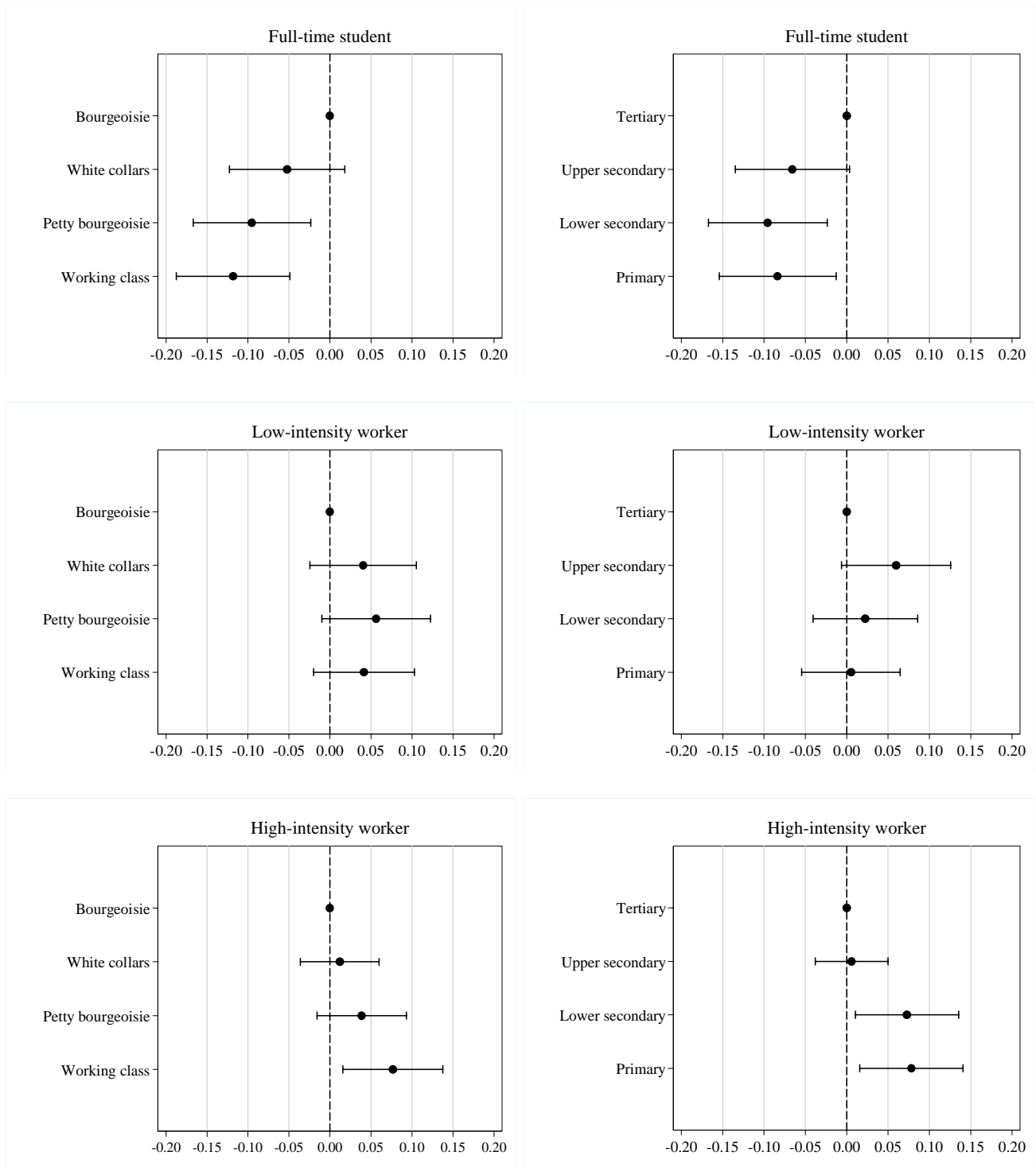


Figure 2 – Average Partial Effects (APE) of social origin on student condition and 95% confidence intervals from multinomial logistic regression models.

^a Control variables are sex, residence area, birth cohort (see Appendix).

Appendix

Table A1 – Descriptive statistics

	%		%
<i>Student employment</i>		<i>Academic outcome</i>	
Full-time student	61.5	Drop out	46.7
Low intensity worker	24.6	Regular graduation	19.2
High intensity worker	13.9	Delayed graduation	34.3
<i>Social class</i>		<i>Parents education</i>	
Bourgeoisie	17.8	Tertiary	17.8
White collars	24.1	Upper secondary	27.7
Petty Bourgeoisie	24.7	Lower secondary	25.9
Working class	33.4	Primary	28.5
<i>Residence area</i>		<i>Field of study</i>	
North-West	26.9	Science-Medicine-Engineering	31.6
North-East	9.2	Economics and statistics	14.5
	18.1	Social sciences and foreign languages	20.3
Centre		Law	12.4
South	34.0	Humanities	21.2
Isles	11.8		
<i>Birth cohort</i>		<i>High-school diploma</i>	
1920-40	9.8	Lyceum	46.6
1941-54	24.0	Teacher training, arts and foreign languages	16.6
1955-65	28.2	Technical and vocational	36.8
1966-75	38.0		
<i>Gender</i>		<i>High-school failures</i>	
Male	50.3	Zero	85.0
Female	49.7	One	12.1
		Two or more	2.9
		<i>High school mark (mean)</i>	7.6

Table A2 - Multinomial logistic regression predicting academic outcomes in function of student employment and other control variables: average partial effects (A.P.E.) and standard errors (S.E.).

	Drop out		Regular graduation		Delayed graduation	
	A.P.E.	S.E.	A.P.E.	S.E.	A.P.E.	S.E.
<i>Student condition</i> (Ref.: Full-time student)						
Low-intensity student	-0.106	0.029	-0.051	0.021	0.157	0.032
High-intensity student	0.082	0.038	-0.113	0.023	0.030	0.039
<i>Social class</i> (Ref.: Bourgeoisie)						
White collars	-0.034	0.037	-0.031	0.028	0.066	0.039
Petty Bourgeoisie	-0.011	0.038	-0.071	0.025	0.082	0.040
Working class	0.036	0.037	-0.067	0.024	0.031	0.037
<i>Gender</i> (Ref.: Male)						
Female	-0.011	0.026	-0.014	0.020	0.025	0.027
<i>Residence area</i> (Ref.: North-West)						
North-East	0.062	0.046	-0.062	0.028	0.000	0.046
Centre	-0.028	0.036	-0.019	0.024	0.047	0.037
South	0.043	0.031	-0.054	0.020	0.011	0.031
Isles	0.046	0.043	-0.066	0.025	0.020	0.044
<i>Birth cohort</i> (Ref.: 1920-40)						
1941-54	-0.025	0.047	0.042	0.047	-0.017	0.048
1955-65	0.106	0.049	-0.117	0.030	0.012	0.048
1966-75	0.088	0.051	-0.172	0.021	0.084	0.052
<i>Field of study</i> (Ref.: Science-Medicine-Engineering)						
Economics and statistics	0.005	0.039	-0.050	0.029	0.045	0.041
Social sciences and foreign languages	-0.034	0.035	-0.023	0.028	0.057	0.037
Law	0.103	0.040	-0.049	0.027	-0.054	0.038
Humanities	0.016	0.037	0.002	0.029	-0.018	0.037
<i>High-school diploma</i> (Ref.: <i>Liceum</i>)						
Teacher training, arts and foreign languages	0.185	0.040	-0.048	0.029	-0.137	0.037
Technical and vocational	0.279	0.030	-0.108	0.017	-0.171	0.027
High-school mark	-0.105	0.010	0.051	0.008	0.054	0.010
Enrolment age	0,032	0,022	-0,004	0,017	-0,028	0,027
Enrolment age (square)	0,000	0,000	0,000	0,000	0,000	0,001

N.=1426

LR chi2(44) =431.03; Prob > chi2= 0.0000;

Log likelihood = -1243.7557; Pseudo R2 = 0.1477

Table A3 - Multinomial logistic regression predicting student employment in function of social class and other control variables: average partial effects (A.P.E.) and standard errors (SE).

	Full-time student		Low-intensity worker		High-intensity worker	
	A.P.E.	S.E.	A.P.E.	S.E.	A.P.E.	S.E.
<i>Social class</i> (Ref.: Bourgeoisie)						
White collars	-0.052	0.036	0.040	0.033	0.012	0.025
Petty Bourgeoisie	-0.095	0.037	0.056	0.034	0.039	0.028
Working class	-0.118	0.035	0.041	0.031	0.077	0.031
<i>Gender</i> (Ref.: Male)						
Female	0.017	0.023	0.023	0.021	-0.040	0.015
<i>Residence area</i> (Ref.: North-West)						
North-East	-0.046	0.043	0.018	0.037	0.027	0.032
Centre	0.111	0.030	-0.067	0.026	-0.045	0.020
South	0.106	0.027	-0.084	0.022	-0.022	0.019
Isles	0.139	0.034	-0.116	0.026	-0.023	0.025
<i>Birth cohort</i> (Ref.: 1920-40)						
1941-54	0.008	0.045	0.011	0.043	-0.019	0.033
1955-65	0.108	0.043	-0.082	0.036	-0.026	0.031
1966-75	0.224	0.036	-0.137	0.030	-0.088	0.021

N. = 1762

LR chi2(22)=130.29; Prob > chi2= 0.0000; Pseudo R2= 0.0400; Log likelihood = -1564.753

Table A4 - Multinomial logistic regression predicting student employment in function of parents education and other control variables: average partial effects (A.P.E.) and standard errors (SE).

	Full-time student		Low-intensity worker		High-intensity worker	
	A.P.E.	S.E.	A.P.E.	S.E.	A.P.E.	S.E.
<i>Parents education</i> (Ref.: Tertiary)						
Upper secondary	-0.066	0.035	0.060	0.034	0.006	0.022
Lower secondary	-0.095	0.037	0.023	0.032	0.073	0.032
Primary	-0.083	0.036	0.005	0.030	0.078	0.032
<i>Gender</i> (Ref.: Male)						
Female	0.019	0.022	0.020	0.021	-0.038	0.015
<i>Residence area</i> (Ref.: North-West)						
North-East	-0.052	0.043	0.028	0.038	0.023	0.032
Centre	0.102	0.031	-0.059	0.026	-0.043	0.020
South	0.096	0.027	-0.077	0.022	-0.019	0.019
Isles	0.142	0.033	-0.110	0.026	-0.032	0.023
<i>Birth cohort</i> (Ref.: 1920-40)						
1941-54	0.007	0.045	0.010	0.043	-0.017	0.032
1955-65	0.108	0.042	-0.085	0.036	-0.023	0.030
1966-75	0.224	0.036	-0.145	0.029	-0.079	0.022

N.=1797

LR chi2(22)=137.14; Prob>chi2=0.0000; Prob>chi2=0.0000; Pseudo R2=0.0413; Log likelihood = -1591.9765