Do Individuals with High Social Background graduate from more rewarding Fields of Study? Changing Patterns before and after the 'Bologna Process'

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Abstract

In this article we investigate whether, in Italy, social background is related to graduation from more rewarding fields of study and if horizontal inequalities in higher education changed before and after the 'Bologna process'. We analyse fields of study (FoS) as a categorical variable, as well as a quantitative variable measuring the expected returns in terms of probability of entering the upper classes (net of unemployment risks). We use five cross-sectional waves of the Italian Graduates Employment Survey (1998-2011) with more than 115,000 cases. Applying multinomial and fractional logistic regression models, we found that individuals from socio-economically advantaged backgrounds graduate from subjects that guarantee higher chances to enter the upper classes. Horizontal inequalities related to FoS of graduation grew over time, in line with the effectively maintained inequality thesis. A more pronounced increase in class-based inequalities occurred after the implementation of the 'Bologna process'. Unlike what was found in the US, a large part of the social background differentials are not due to high school record before entering higher education.

Highlights

- Changes in the relationship between social background and graduation from degree programs with higher occupational returns in Italy are investigated
- An increased association between social background and graduation from more rewarding fields of study is found
- The growth of horizontal inequalities is mainly due to socially stratified graduation patterns from the social sciences and medicine
- A more pronounced increase in class-based inequalities occurred after the implementation of the 'Bologna process'

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1 Introduction

In the second half of the twentieth century, a great expansion of higher education occurred, with a remarkable growth of access to tertiary education and in the number of graduates in the labor market. The social gradient in obtaining a tertiary degree also diminished over time in several countries (Koucký, Bartušek, & Kovařovic, 2007). Nevertheless, these trends have not necessarily translated into a reduction in social inequalities in occupational attainment. Educational competition hardly ends when a student enters higher education, mainly because the various types of available credential are not equally valued by students and employers (Davies & Guppy, 1997, p. 1418). Therefore, lower class students might have had access to degree programs with a weaker labor market value than upper class children (Shavit, Arum, & Gamoran, 2007; van de Werfhorst & Luijkx, 2010).

In line with this consideration, the main goal of this article is to investigate whether, in Italy, family background is related to graduation from programs with heterogeneous occupational value and whether changes in this relationship have occurred in a period of higher education expansion and institutional change. We are particularly interested in investigating the role of fields of study (FoS hereafter) attended in higher education in social stratification processes.

In this respect, FoS can be a vehicle of reproduction of social inequality if, at the same time, academic degrees are differently rewarded in the labor market and social background is positively associated with FoS. In relation to the former, research consistently reports that graduates from different FoS have heterogeneous occupational returns, both in the US (Daymont & Andrisani, 1984; James et al., 1989) and in Europe (Chevalier, 2011; Reimer, Noelke, & Kucel, 2008; van de Werfhorst,

2004). For Italy, graduates in the 'hard' sciences obtain better rewarded occupations in terms of earnings and occupational status and are less likely to be unemployed or overeducated compared to graduates in the 'soft' social sciences and humanities (Ballarino & Bratti, 2009).

Results on the relationship between social background and FoS are less homogeneous. Some studies found that children from the lower classes prefer technical and vocational fields, whereas those from a higher background are more likely to choose more prestigious and selective fields (Ayalon & Yogev, 2005; Berggren, 2008; Kivinen et al., 1991; Reimer & Pollak, 2010; Triventi, 2013a; van de Werfhorst & Kraaykamp, 2001). However, others did not find strong or generalized relationships between social background and discipline studied in higher education (Davies & Guppy, 1997; Goyette & Mullen, 2006; Leppel, Williams, & Waldauer, 2001).

Only a handful of studies were able to investigate changes over time in the relationship between social origin and FoS, and they also found heterogeneous results. Some studies reported no major changes in social inequalities in FoS destination in Germany and France in the 1980s and 1990s (Duru-Bellat, Kieffer, & Reimer, 2008; Reimer & Pollak, 2010), while others showed a declining effect of social background on graduation from remunerative FoS in Canada between 1995 and 2000, but a stable negligible association in the US (Zarifa, 2012). Recently, a study on Denmark reported instead evidence on increasing horizontal inequalities in higher education, but it examined both FoS and institutional selectivity at the same time (Thomsen 2015).

We contribute to this literature in several respects. Firstly, we analyze a country—Italy—in which evidence on the changing relationship between social background and FoS is relatively scarce. Since for a long time in Italian higher education there have been mainly long degree courses and low institutional differentiation, the main dimension of stratification is represented by FoS, which are characterized by different selectivity, prestige, workload, and institutionalized connections with the

labor market. Therefore it is interesting to examine whether and to what extent FoS constitutes a way of reproducing social inequality related to family background in a context with limited stratification among universities.

Secondly, we extend existing knowledge on changes over time in social inequalities in FoS, looking at graduates who received their degrees from the mid-1990s to the latter part of the 2000s. This is the first study examining how horizontal inequalities in higher education by social background have evolved in the transition between the old system of degree qualifications and the new system brought about by the Bologna Process, an important reform of higher education systems in Europe that shortened the length of degree programs and introduced vertical differentiation in degree courses.

Thirdly, we develop two types of statistical model that highlight different aspects of the relationship between social origin and FoS, thereby providing a more comprehensive investigation compared to most previous studies on this topic. In particular, we do not only analyze FoS as a categorical outcome, but we also rank FoS according to their expected occupational value. Some of the existing studies used average earnings of graduates from various degree programs to rank FoS, whereas we propose a new measure that ranks FoS on the basis of social class attainment, which we argue to be better suited in the case of tertiary graduates in Italy. Moreover, our indicator tries to tackle potential endogeneity of the returns due to the changing composition of graduates, using lagged values and the direct standardization method.

This article is organized as follows: in the next section we present the main features of the Italian context and its relevance for the topic under scrutiny; in the third section we discuss our theoretical framework, deriving a number of research hypotheses. Then, we present our research strategy, as well as the data, variables, and methods used (section 4). In the fifth section we discuss the empirical results and, in the last section, the conclusions are drawn.

2 The Italian Context: A Brief Description

Throughout the twentieth century, the Italian higher education system was a unitary or undifferentiated system (Shavit et al., 2007). All the institutions had the status of a university, with both teaching and research functions, and most universities were public. Only one type of degree was available, programs lasting four years with the exception of architecture, engineering, and chemistry (five years), and medicine (six years). From the end of the 1960s, everyone who had successfully completed any five-year high school program, regardless of the specific track (academic, technical, or vocational) followed, was allowed to enroll in any university program.

Nowadays, most programs have free access, while in a small number of cases entrance is restricted to students who have passed an admission test. Entry restrictions are imposed by the Italian Ministry of Education at national level for some key programs (architecture, veterinary science, medicine, and health-related programs), while universities are allowed to decide autonomously whether or not to establish entry tests for each specific program.

Compared to other industrialized countries, tuition fees used to be low general; however, after funding cuts and a slow process of decentralization of power from the state to universities, fees have sharply increased in recent years.[1] Only a small proportion of students receive a grant, which only covers part of the cost of study (but not living costs).

Within the broader European framework of the Bologna Process, in 2001 a three-level structure was implemented, comprising a first level degree (*Laurea triennale*, three years), a second level degree/Master's (*Laurea magistrale*, two years), followed by doctoral studies (*Dottorato di ricerca*, three

[1] For instance, according to MIUR (Italian Ministry of Education) data, from 2001 and 2007 average tuition fees per student increased by 41 percent in public universities (from 596 to 842 euros) and by 29 percent in private institutions (from 2,377 to 3,078 euros).

years). Moreover, the old system of examinations held every year or semester were replaced by the introduction of the European Credit Transfer System (ECTS). At the same time, a reduction in the time and effort required to obtain a university degree was observed (Boero & Staffolani, 2007).

The implementation of the Bologna Process has been accompanied by a dramatic growth in the number and variety of Bachelor and Master's programs, which was driven more by the interest of academic groups and less by labor market demands. Coupled with a high level of course fragmentation and a lack of professional university guidance services, this has led to increased complexity in student choice of academic pathway to pursue after high school.

The promise of the possibility of obtaining a tertiary degree in a shorter time compared to the past attracted non-traditional students into higher education (Cappellari & Lucifora, 2009) and a more structured organization of curricula was followed by a modest reduction in dropout rates (Argentin & Triventi, 2011). Figure 1 presents a synthetic picture of the expansion of Italian higher education, reporting the number and proportion of graduates, as well as the composition of old versus new degrees introduced by the Bologna Process.

[Figure 1 about here]

Similar to what has been experienced in other countries, the growth in the proportion of graduates was not followed by an upgrading of the occupational structure (Barone, 2012) and was accompanied by an increasingly precarious condition of the youth labor market (Barbieri & Scherer, 2009). This seems to have resulted in stronger competition among graduates entering the labor market and in credential inflation of university degrees from the 1990s onwards (Triventi et al., 2016). This,

however, occurred to a different degree in different disciplinary areas, in particular penalizing graduates from the humanities and social sciences (Ballarino & Bratti, 2009).

3 Theoretical Framework and Hypotheses

When analyzing social inequalities in FoS of graduation, one has to take into consideration that these might stem from different stages in the higher education experience. The most important are: i) enrolment at university (in particular, the transition from upper secondary education to higher education); ii) dropout from university, which eliminates a part of the initial pool of students enrolled in higher education; iii) changes between FoS during higher education. In Italy, dropout from higher education is overall an important phenomenon; moreover, a number of students graduate in a different field compared to the one they originally entered. However, the greater part of the inequalities in FoS in Italy are produced in the transition from upper secondary to tertiary education, while subsequent pathways are socially stratified in a quite similar fashion across disciplinary areas.[2] For this reason, in order to formulate research hypotheses on the association between social origin and FoS of graduation, we mainly rely on theoretical arguments that refer to the choice of degree program after upper secondary education.[3]

Several theories suggest that upper class children may have a higher propensity to enroll in degree subjects leading to higher status occupations. According to rational action theory (Boudon, 1974; Breen & Goldthorpe, 1997), lower class children may opt for the shorter and less demanding programs,

[2] Empirical evidence supporting this is available in the Online Supplementary Material—Annex I, in which data on a recent survey of high school leavers are used to examine the social stratification of enrolment, dropout, and changes of degree program across FoS.

[3] Notwithstanding, since we will look at the final outcome of a series of decisions and steps, one has to consider that the theoretical arguments reviewed in this section are intended to develop general expectations on the possible patterns in the results, and are not directly tested in the empirical section.

because this way they diminish their risk of dropout or delay in graduation. In Italy, these courses usually lead to lower occupational outcomes, especially in terms of class and job prestige attainment. In contrast, the choice of FoS for upper class children could be crucial in avoiding downward social mobility in relation to occupational attainment. If this holds true, students from socio-economically advantaged families would be more likely to choose those fields providing more chances to enter the upper classes.

According to Bourdieu (1979) and Bourdieu and Passeron (1990), the choice of degree subject is also affected by knowledge about higher education: since upper class children more often have highly educated parents, they also have more information about the prestige and economic pay-offs associated with different FoS, and so they have the appropriate knowhow to master the enrolment choice and to navigate the higher education landscape. University-educated parents may be more aware of the future occupational prospects associated with various fields for several reasons: a) a higher propensity to look for information about the returns of fields of study; b) better cultural knowledge to understand information on returns of FoS provided by newspapers, statistical reports, etc.; c) direct experience of career prospects in their occupation and related jobs; d) a network of highly educated friends that can complement their knowledge with information on other fields (Rivera, 2015).

Given the crucial relevance of the subject studied to subsequent occupational career, we expect a significant and positive effect of social background on graduation in degree subjects with higher expected occupational returns (hypothesis 1a).

Nevertheless, other theoretical arguments suggest that family background may be of minor importance in the choice of FoS. According to the life-course hypothesis (Müller & Karle, 1993), young people become increasingly independent from their parents as they grow older and they can have more autonomy in terms of choice when entering higher education. The differential social selection thesis (Mare, 1981) maintains that the effect of family background declines at later educational stages because

the process of social selection has already occurred in previous educational transitions. Only the highly motivated and more able lower class students decide to enroll at university and they are relatively similar in terms of these unobserved characteristics to upper class students who enter university. In the Italian case, there is still a strong social gradient in the transition to university in recent cohorts, and students from lower backgrounds are also more likely to drop out of higher education compared to those from advantaged backgrounds (Argentin & Triventi, 2011; Ballarino & Panichella, 2016), thereby making the population of graduates with lower background more positively selected on unobserved traits (motivations, ability, perseveration, etc.). This might induce elaboration of a contrasting hypothesis: the conditional association between social origin and field of graduation is negligible in Italy (hypothesis 1b).

One key aim of our research is to establish how the association between social background and FoS has changed in the last decade. The expansion of upper secondary and tertiary education in Italy has reduced the selectivity of higher education and increased the heterogeneity of graduates in terms of unmeasured ability and aspirations. Moreover, when a larger number of students attend higher education, possession of a tertiary degree may no longer be sufficient to ensure that the best occupational positions will be held, since employers may decide to consider additional 'signals', such as FoS (Gerber & Cheung, 2008) and the type of institution attended at secondary or tertiary level (Macmillan, Tyler, & Vignoles, 2014). Highly educated families are particularly concerned about this issue because, since a greater number of people can acquire a higher education degree, this qualification may no longer be sufficient to guarantee them a high-ranking social position and to avoid downward mobility (Breen & Goldthorpe, 1997). Thus it is reasonable to think that such families would try to maintain their offspring's advantages by adopting strategic choices in the school system, as suggested by the effectively maintained inequality thesis (Lucas, 2001). According to this argument, when an education level is attended by a relatively small share of people, the socioeconomically

advantaged use their advantage to secure that level of education. Once a given education level becomes widely attended, they seek the qualitative differences in that stage of education and use their advantage to secure quantitatively similar amounts of qualitatively better schooling. When a large share of individuals enters higher education, high status families will choose the best educational options within this level for their children in order to maintain their relative advantage. In the Italian context, this process could have been exacerbated by the increased 'flexibilization' of the youth labor market, which made the early occupational careers of recent graduates more difficult (Barbieri & Scherer, 2009), but to a different extent across disciplinary areas (Argentin & Triventi, 2011; Ballarino & Bratti, 2009). Considering that in the Italian educational system the prestige of the higher education institution is not a major driver of students' choices,[4] we therefore expect an increase over time in the association between social background and graduation from FoS with higher occupational value (hypothesis 2).

We could also expect non-linear variations in horizontal inequalities over time. Indeed, enrolment growth occurred especially after the introduction of the new degree structure (Cappellari & Lucifora, 2009). Moreover, the proportion of dropouts also slightly decreased after the Bologna Process (Argentin & Triventi, 2011) and graduation on time increased in this period as well (Almalaurea, 2012). All these trends may have led to a growth in the number of graduates entering the labor market between 2004 and 2007. A second reason to expect a growth in horizontal inequalities after the university reform is the increased complexity in choice of academic discipline brought about by the proliferation of degree programs. In many cases, the promotion of such 'new' degree programs followed strategic marketing rules, such as the presentation of plans of study with appealing titles and overly

[4] Pisati (2002) and Ballarino and Bratti (2009) highlights the important role of fields of study in the stratification processes in the access to Italian universities. More recently, Vergolini and Zanini (2015) found that financial aid provided to high performing secondary school leavers from low-socio economic background influences the choice of field of study and geographical location of university, but not of the prestige of the institution attended. This is not surprising considering that in Italy there is no much differentiation between higher education institutions.

optimistic assessments of the potential occupational destinations related to these degrees. In this context, in line with Bourdieu's (1979) argument, it is likely that students from highly educated families can better manage the decisions required by the increasingly tangled university degree supply. Following these arguments, we therefore anticipate that the increase of inequalities is more pronounced in the transition between the old system and the new system following the Bologna Process (hypothesis 3a).

However, one has to bear in mind that the Bologna Process introduced a new vertical stratification of degree programs, distinguishing first level Bachelor degrees and second level Master's degrees, which are characterized by different occupational returns in the labor market (Almalaurea, 2007). It could be that this new form of vertical stratification is becoming more important, rendering social inequalities in FoS less salient, or at least not more relevant than in the past. If this is the case, we should observe stability or even a decline of in social inequalities in FoS of graduation between the cohorts who attended university under the old system and those who entered after the Bologna Process (hypothesis 3b).

Finally, following previous studies on the US case (Hearn, 1984, 1991), we are not only interested in the total effect of social background, but also in its direct effect once previous school achievement is accounted for. In the Italian case, two elements should be taken into account in this respect: final mark and tracking of upper secondary education. Final mark can be considered as a proxy for individual scholastic achievement and is therefore intended to measure the role of academic ability in the subsequent higher education pathways. Since some of the FoS with higher pay-offs are also more demanding and require a selective test to be passed before entrance, one might think that a large part of the putative advantage of high background children in graduating from more rewarding programs is due to their superior school achievement. A second important variable is the type of high school

attended,[5] because in Italy students are tracked from the ninth grade onwards. Given that tracking varies widely in standards, curricula, academic orientation, and teacher quality (Gambetta, 1987), and allocation to tracks is socially stratified (Ballarino & Panichella, 2016; Panichella & Triventi, 2014), a large part of the social background differentials in graduating from better rewarded fields may have already been produced as a result of the crucial choice of taking a certain academic track rather than attending technical/vocational schools. As a consequence, we expect that a part of the difference across social backgrounds will be accounted for by previous school track and marks (hypothesis 4).

4 Research Design

4.1 Analytical design

The focus of our research is the changing nexus between social background and FoS of graduation. We analyze it using data from five subsequent editions of the university graduates' survey conducted by the National Statistical Institute. We relied on this data source because it is the only one allowing us to examine the phenomena of our interest in a period that covers the years both before and after implementation of the Bologna Process in Italy.[6] The use of a graduate survey imposes limitations in the interpretation of findings in relation to individuals' decision making, since we only observe the final outcome of graduates' higher education pathways. However, this information is particularly relevant for social stratification processes, since we are able to look at the university degree with which graduates actually enter the labor market and that will affect their subsequent occupational career.

[5] It must be noted that in Italy the independent/private school sector is not very developed when compared to other countries (such as the US and UK), and there is no evidence that Italian state/public schools students are, all other things being equal, disadvantaged in the transition to university or in access to the labor market.

[6] Other datasets usually employed by stratification researchers in Italy are not suitable for our purpose. The ISTAT survey on high school leavers provides appropriate information on the first FoS attended only for two recent post-Bologna cohorts. The Italian Household Longitudinal Survey data do not cover recent cohorts of graduates after the Bologna Process and the ISTAT Multiscope survey does not provide any information on the FoS attended in higher education.

We examined our research questions using a two-step empirical strategy. In the first step, we analyzed FoS as a discrete categorical variable, employing a theoretically-oriented and meaningful (Lucas & Byrne, 2017) grouping of degree programs that takes into consideration previous research (e.g., Ballarino & Bratti, 2009; Bratti, 2006; Duru-Bellat et al., 2008; Reimer & Pollack, 2009) and the specific Italian context (Ballarino, 2006; Pisati, 2002). In the second part, we followed Lyons (1971) and Treiman and Terrell (1975), who proposed an effect-proportional scale of education based on the average occupational attainment of individuals for each qualification. The procedure involves computation of the mean of the outcome variable of interest for each category of the variable to be scaled (FoS in our case) and then assigning the mean scores as scale values. In our work, similar to that proposed by Davies and Guppy (1997) and Wilson and Lovin (1983), we assigned each FoS an estimate of its expected labor market value in order to create a hierarchical classification of degree subjects.

It is important to stress that focusing on graduation from the more rewarding FoS assumed neither that all individuals pursue the most lucrative studies nor that this criterion was at the base of students' choice of degree subject (Zarifa, 2012). It simply allowed us to rank academic disciplines on the basis of an external criterion (e.g., labor market potential value) which is central to social stratification processes and to analyze the relationship with social background in a parsimonious and meaningful way.

Compared to existing studies that looked at average earnings (Davies & Guppy, 1997; Zarifa, 2012),[7] we rely on early class attainment as a key measure to rank FoS. In particular, we use the probability of attaining an upper class position[8] three years after graduation. The rationale was threefold. First of all, it has been argued that social class is a better indicator of occupational attainment

[7] An exception is Wilson (1978), where FoS were ranked by their (perceived) probability of graduates entering into high level occupations.

[8] The 'upper class' category includes occupations belonging to classes I and II of the EGP classification—for instance, professionals, higher technicians, managers, administrators, and higher supervisors (Erikson & Goldthorpe, 1992). In this way, we considered prestigious occupations for which a remarkable investment in human capital is required.

compared to income or earnings because it is less volatile and is strongly associated with key indicators of socioeconomic advantage (Goldthorpe, 2013). Furthermore, since social class is related to longer term earnings and status prospects, it is better suited to an investigation of access to long-term advantages in the labor market compared to early wages, which instead reflect short-term outcomes. This was particularly relevant in our context because some degree subjects have postponed high returns, meaning lower economic returns in the short run but a steep growth curve over the course of a career. Finally, social class attained may be less affected by measurement error, especially in Italy, a country characterized by a rather large share of self-employed and some reluctance to declare earnings in surveys.

Since, in recent years, the labor market condition of university graduates has deteriorated relatively, we decided to weigh the indicator of the expected returns according to the probability of avoiding unemployment three years after graduation. This can be seen as a way of tackling the possibly varying uncertainty in labor market rewards over cohorts, which may be due to cyclical economic effects or to a heterogeneous effect of the economic crisis across academic disciplines.

The net expected returns outcome was computed by aggregating individual-level information from various editions of the ISTAT university graduate survey. More precisely, we estimated average values across combinations of groups of degree program (ten categories), cohort (five categories), gender, and macro-geographical areas (three categories) in order to account for heterogeneity in terms of occupational reward and to allow a degree of variability of the dependent variable.

One challenge is that the field-specific wages may not be exogenous to the composition of the group that attends them. One may ask, do higher background students enter the well rewarding fields more often if education expands, or do the fields become better rewarding if high background individuals start to enter them? To tackle this measurement issue and try to avoid endogeneity of the

response variables, we developed two adjustments. Firstly, for each cohort we used lagged values, computing the average occupational returns from the previous cohort of GES graduates. Secondly, the average estimates were computed by controlling for social origin and level of degree program (where appropriate) using direct standardization. The direct method of adjusting for differences among populations involves computing the overall proportions that would result if, instead of having different distributions of the stratifying variables, all FoS across cohorts had the same standard distribution. The standardized proportions are defined as a weighted average of the stratum-specific proportions, with the weights taken from the standard distribution (Rothman, 1986; StataCorp, 2015). In this way we accounted for the fact that family background could directly affect the labor market outcomes beyond the effect of educational degree. Moreover, we took into consideration the vertical stratification of degree programs introduced by the Bologna Process in more recent cohorts. If we had failed to take this into account, the occupational returns of FoS could have been biased. To our knowledge, this is the first time that such an adjustment has been done in this research stream.

4.2 Data and variables

We used data from the last five waves of the Italian Graduates Employment Survey (GES hereafter) carried out by the Italian Statistical Institute (ISTAT). GES collected information in 1998, 2001, 2004, 2007, and 2011 about graduates who had received their degrees three years before. With regard to the waves from 1998 to 2007, only students who graduated in the pre-Bologna Process system were selected, while for the last wave (2011), we considered graduates who had obtained a Bachelor's, a Master's or a unique cycle level degree in the post-reform system.[9] This means that the comparison between the fourth (graduated in 2004) and fifth cohorts

[9] Among the individuals interviewed in 2007, there were some students who earned their Bachelor's degree in the post-reform system. We decided to exclude them because they are a very select subsample/subpopulation. Indeed, some of them had enrolled at the university in 2001 and were able to take a degree in 2004, while other students, who

(graduated in 2007) indicated how social inequalities changed after the introduction of the new degree structure.

We used two dependent variables. The first measured FoS as a categorical variable composed of seven groups. The humanities field consists of arts and languages, whereas the social sciences include psychology, educational, social, and political sciences. The third group comprises graduates in law and the fourth those who received a degree in economics and statistics. The technical field includes the engineering, architecture, and agriculture degree programs,[10] while the science category consists of mathematics, physics, geology, chemistry, and biology. Graduates in medicine were classified in a separate category. We excluded health-related subjects leading to professions such as nursing, physiotherapy, and midwifery because they became part of the university system only after the implementation of the Bologna Process and their curricula are not comparable with those taught in the medical schools.[11]

The second dependent variable refers to the average occupational value of FoS, which is labelled net expected returns.[12] This outcome is computed by multiplying the average (adjusted) predicted *probability of entering the upper classes* by the average (adjusted) *probability of avoiding unemployment*, as described in the previous section.

The first independent variable is parental education, coded as follows: a) both parents with a university degree; b) at least one parent with a university degree; c) at least one parent with an

had earned a Bachelor's degree in 2004, exploited the chance to shift from the old system to the new. This means that the first group mainly constituted positively selected students, while the second was composed of negatively selected students, namely less skillful individuals who were not able to earn a degree under the old system.

[10] Including the agriculture degree programs in the science field does not change the results of the analyses.

[11] Additional exploratory analysis indicates that these vocationally-oriented programs in the recent cohorts are attended to a higher extent by students from medium-low social background and with medium-high previous academic performance.

[12] Following guidelines on the use of data provided by ISTAT, we used the weighted estimates to compute this indicator. However, no major differences between weighted and unweighted measures are in place.

upper secondary degree; and d) both parents with less than a lower secondary degree. We preferred to rely on the combination of the educational qualifications of both parents in order to better capture the educational constellation of the family of origin and to differentiate more precisely at the top the distribution of the graduates' social origins. We used as an additional indicator of family background the social class of origin, measured using an aggregated version of the classical EGP schema (Erikson & Goldthorpe, 1992) often employed in research in the Italian case. The four categories we were able to distinguish are: 1) service class; 2) white collar; 3) petty bourgeoisie; 4) working class.

The main control variables in the first model specification are sex and geographical area of residence (north, center, south, and the isles). A second set of models also control for high school track (lyceum, other humanistic schools, technical/vocational schools) and final mark in upper secondary education (ranging from 60 to 100). Length of degree program is also included as a control in the analyses on the net expected returns to take into account the possibly changing distribution of graduates from various social backgrounds across degree types.[13]

4.3 Methods

As described above (section 4.1), a two-step empirical strategy was followed. As the distribution of the dependent variables considered in the two steps differed, different statistical models were specified and estimated in each step.

In the first step, a set of multinomial logistic models were fitted in order to investigate whether social background influences FoS of graduation and, if so, how this has changed over time. Considering

[13] Additional sensitivity checks show that this control does not substantially alter the pattern of results.

that FoS is a discrete categorical variable assuming seven possible values, we modelled the odds, say η_{ij}, that student *i* falls in the field *j* (*j* =1, …, *J*-1) as opposed to a baseline field (*j* = *J*) as follows:[14]

$$\eta_{ij} = \frac{\pi_{ij}}{\pi_{iJ}} = \alpha_j + \beta_j \cdot ParEdu_i + \delta_j \cdot Cohort_i + \lambda_j \cdot (ParEdu \times Cohort)_i + \gamma_j \cdot w_i \qquad (1)$$

where α_j is a constant; β_j is the vector of coefficients (one per FoS category) of the main independent variable (parental education); δ_j are the regression coefficients of four dummy variables for the cohort; λ_j is an array of coefficients of the interaction of parental education and wave of interview; and γ_j is a vector of coefficients associated with individual socio-demographic characteristics (gender and geographical area). Results of the multinomial regression model were retrieved by log-likelihood maximization and are presented in the next section in form of predicted probabilities and average partial effects. Results in terms of odds ratios are presented in the Online Supplementary Material (Annex III).

In the second step, the relationship between social background and the expected occupational returns resulting from the FoS pursued was investigated through the use of fractional logistic regression models (Papke & Wooldridge, 1996). Such an approach is appropriate when the dependent variable to be modeled is bounded in an interval. In our case, we were interested in the aggregated expected probability of entering the upper classes according to FoS. As our outcome variable is a proportion bounded in the [0, 1] interval and has a finite number of boundary observations (i.e., 0s and 1s), the use

[14] This model specification was selected since it displayed a better fit with the data (log-likelihood, AIC, BIC) in comparison with more complex alternative specifications, in which track and marks also interact with cohort.

of fractional logistic models based on a quasi-likelihood estimation (McCullagh, 1983) ensured consistent and normally distributed estimates of the parameters of interest (Kieschnick & McCullough, 2003; Ramalho, Ramalho, & Murteira, 2009). The log-likelihood function of the model is as follows:

$$l_i(\theta) = y_i \log[G(x_i\theta)] + (1 - y_i) \log_i[1 - G(x_i\theta)] \quad (2)$$

where y_i is the fractional labor market outcome of interest; x_i is a set of covariates including FoS, our main independent variable of interest, social background and the other students' characteristics potentially affecting labor market outcomes described in the previous section; θ is the set of coefficients associated with the covariates; and *G* is the logistic function. It is worth noting that, for consistent parameter estimates, the fractional logistic approach we followed does not assume any distribution of the dependent variable, but only requires the conditional mean to be correctly specified. Under the (weak) assumption that the logistic function is appropriate for modeling labor market returns, our estimates are unbiased.

In order to test our hypotheses, we estimated two main model specifications fitted on data from all the five waves pooled together.[15] The first (Model 1) included one social background indicator, cohort of interview, their interaction, socio-demographic characteristics, and dummy variables for the length of degree program (long four–five year program, three year Bachelor's, two year Master's) as covariates. The second model specification (Model 2) also includes prior schooling variables, namely upper secondary school type and final mark. Whilst the first model was mainly used to examine trends in total

[15] All the models are presented graphically. See the Online Supplementary Materials for the tables with the estimated parameters (Annex II) and for the complete models (Annex IV).

horizontal social inequality in field of graduation, the second was employed to check whether school choices referred to secondary education levels and a proxy for ability accounted for different outcomes by social origin. Social background variables are included separately in the models in order to obtain respectively the total effect of parental education and of social class of origin.[16]

5 Results

5.1 Descriptives

In this section are presented some descriptive evidence on the main variables used in the analyses and the bivariate relationship between social origin and the occupational status of the FoS attended.

Table 1 reports the percentage of graduates by FoS in each of the five cohorts under scrutiny and shows a degree of heterogeneity in trends over time. While science degrees have remained overall fairly stable at around 10–12 percent, other fields have experienced more pronounced change. The most remarkable expansion occurred in the social sciences, whose share of students increased from 9 percent to 27 percent. A growth in the proportion of graduates occurred also in the technical field, from 12 percent to 19 percent. Conversely, other FoS have seen a reduction in the share of graduates: this is

[16] An alternative would be to include both variables at the same time. However, this would mean estimating the association between one social background indicator and the outcome while holding the other socioeconomic background factor constant. In our context, this might be not the best choice for two reasons. Firstly, as explicitly recognized by Lucas and Byrne (2017, p. 147), "EMI […] certainly makes no claim about the effect of one socioeconomic variable holding other socioeconomic variables constant. EMI asks whether socioeconomically advantaged and socioeconomically disadvantaged persons follow a diverging pathways pattern." Secondly, the two background indicators are empirically strongly related in our sample, thereby increasing the risk of extrapolating out of the region of 'common support' (Morgan & Winship, 2007). For instance, among those who have two university graduate parents, only 0.77 percent come from the working class and 0.59 percent from the petty bourgeoisie.

the case for the humanities (from 18 to 14 percent) and medicine (from seven to four percent), and, most prominently, for law (from 20 to 11 percent) and economics/statistics (from 22 to 14 percent).

[Table 1 about here]

Figure 2 displays the average net expected returns across time by FoS, which are obtained by weighting the expected average probability of attaining an upper class occupation by the likelihood of avoiding unemployment three years after graduation. In the cohorts graduating in the early ’90s, the occupational value was higher in the law and technical fields (engineering, architecture), followed by medicine and economics. Scientific, humanistic fields, and social sciences instead had lower net occupational returns. In most of the FoS, the net expected occupational returns slightly decreased over time, with the notable exception of medicine, in which they instead widely expanded over time, in particular in the second half of the ’90s.

[Figure 2 about here]

5.2 Analyses of FoS as a categorical outcome

Multinomial logistic regression with an interaction between social background and cohort was used to check whether social inequalities in the probability of graduating from various FoS changed between 1995 and 2007. Figures 3 and 4 report the predicted probabilities obtained from this model, presented according to graduates’ cohort and social background variables. Figures 5

and 6 report the corresponding average partial effects from the comparison between the more distant categories. Considering parental education, we contrast graduates whose parents did not attain more than lower secondary education and those with two university-educated parents; looking at social class of origin, we report the difference between working class and service class. The 95 percent confidence intervals are provided in order to take into consideration the uncertainty around the point estimates. Additional statistical tests were computed to assess if the differences in changes of inequalities over cohorts were statistically significant.

[Figure 3 about here]

[Figure 4 about here]

Overall, the results clearly show heterogeneity in the pattern of association between parental education and graduation from various FoS. The most notable changes involved social sciences and medicine. For both disciplines, the differences in graduation by social background in the 1995 cohort were pretty small, but they rose in the following cohorts, leading to an overall increase in social inequalities. The difference comparing the most distant categories enlarged from four to fifteen percentage points in the case of parental education and from two to ten percentage points in the case of social class of origin. On the one hand, the probability of graduating from the social sciences grew in all the social categories, but to a much larger extent among those with lower educated parents, and this occurred particularly in the transition to the new degrees systems. On the other hand, while the propensity to graduate in medicine for those with two university-educated parents remained almost constant during the whole period, it sharply declined among

those with lower and upper secondary educated parents. The result is an increase from one to five percentage points in the class-based differentials and from 0.6 to eight percentage points in education-based differentials. Two aspects of this trend should be noted. Firstly, it is a longer term trend that had already started in the 1998 cohort, before the Bologna Process. Secondly, since we know that the dropout rate in medicine programs is rather low—mainly due to the highly selective admission test—we can draw the conclusion that this increasing inequality is produced at entry and not during the course of higher education study. Unfortunately, we cannot establish if this is due to a lower propensity to apply for medical programs or to decreased chances of passing the selective entry test by these students.

[Figure 5 about here]

[Figure 6 about here]

A second group of fields—namely economics/statistics and law—is instead characterized by stable or declining inequalities. In particular, in the 1995 cohort, graduates with university-educated parents were much more likely to obtain a degree in law compared to those with lower secondary educated parents (.27 versus .16), but this gap began to reduce from the 2004 cohort onwards, arriving at six percentage points in the most recent cohort (.15 versus .09). Class-based differences instead stayed relatively stable across the whole period, around six to seven percentage points, when comparing the working and service class. In economics, the differences between social categories have been smaller and to the advantage of those coming from medium to low

educated families. However, the declining trend in graduation from this field was stronger among these students rather than among those with university-educated parents.

The differences by social background in the average probability of graduating from scientific disciplines are basically null (parental education) or relatively small (social class) and are also negligible when considering the humanities and the technical fields. While in the humanities and science no clear trend over time is visible, a small increase of the social background differentials in the last cohort of graduates can be seen in the technical field.

When looking at the second series of estimates obtained from models that control for scholastic achievement and track attendance in upper secondary education, we observe a reduction of the differences by social background. The qualitative pattern of results, however, remains fairly similar, with the exception of economics/statistics: here, the social origin differentials become not statistically significant or even reverse once we compare graduates with similar scholastic records. This means that while working class students are more likely to graduate from economics, when comparing students with similar academic performance and type of high school, service class students are more likely to obtain a degree from such disciplines.

5.3 Graduation from FoS with higher occupational value

In this section, we aim to answer the following questions. Do individuals with high social background graduate from more rewarding FoS? If so, has this relationship changed over time? Figure 7 reports the average gap in the net expected returns of FoS attended by graduates with different social origins derived from the fractional logit models. The first graph looks at the role of parental education using individuals with two university-educated parents as the reference category; the second graph focuses on social class of origin using graduates from the service class

as the reference category. In both graphs, the black dots/lines refer to the basic model specification, while grey dots/lines to the models that also include previous school track and school marks.

The pattern of advantage reflects a clear gradient, showing individuals with two university-educated parents (the omitted reference category) graduating from fields with the highest expected returns, followed by graduates whose parents attained no more than upper and lower secondary education. It is interesting to note that, in the last three cohorts, having two university-educated parents provides a small but statistically significant advantage over having only one university-educated parent. This suggests that when examining horizontal inequalities in higher education, it may be worthwhile relying on a more fine-grained categorization at the top of the distribution of social background.

[Figure 7 about here]

Overall, the association between social origin and the occupational value of the field attended increased over time. In other words, graduates with more advantaged backgrounds were increasingly able to obtain a degree from those disciplines characterized by better occupational returns.

Looking at the first graph in Figure 7 (panel A, first model specification), we see that while in the 1995 cohort those with less educated parents had a penalty of fewer than two percentage points, this almost tripled in twelve years, arriving at around six percentage points. Interestingly, the time trends do not show a visible discontinuity between the 2004 and 2007 cohorts, those marking the transition to the Bachelor's plus Master's structure. On the contrary, a progressive

enlargement of horizontal inequality by parental education occurred in the whole period covered by our study.

The results obtained on social class, reported in the second graph of Figure 7 (panel B), show a similar pattern, but with two peculiarities. In this case, too, the pattern of advantage goes in the expected direction, with graduates from the working class and the petty bourgeoisie attaining a degree in disciplines with lower net occupational rewards compared to those from the service class. The extent of the differences between the social classes is smaller than that found using parental education as the main independent variable,[17] a finding which resembles the evidence from research on social inequalities in final educational attainment in Italy (e.g., Triventi et al. 2016). The second peculiarity found using social class as a background indicator refers to the shape of the time trends. In this case, we do not observe a continuous expansion of horizontal inequalities, but instead a steady increase between the 1995 and 1998 cohorts, a relative stability in the following cohorts, and again a sharp growth between the cohorts who attended higher education just before and after the implementation of the Bologna Process (2007 vs. 2004 in our comparison). Even if we cannot estimate the causal impact of the reform with the data at hand, we can interpret this finding as a preliminary sign that the institutional transformations in the university courses brought by the Bologna Process might have had repercussions for the class-based horizontal inequalities in higher education destinations.

So far, we have commented on the results in terms of the total effect of social background. When considering the second series of estimates, we see that adjusting for the final mark in high school and the type of diploma contributes to reducing the magnitude of the average partial effects

[17] For instance, the difference between the service and working class in the 2007 cohort (the largest) amounts to slightly less than five percentage points.

associated with social origin. Even if a strict comparison is not possible, a visual inspection of the graphs suggests that prior scholastic record contributes to explain a little bit more about the gaps based on parental education compared to those related to social class of origin. However, the main finding—consistent across the two background variables—is that a conspicuous part of the horizontal inequalities in graduation from more rewarding FoS cannot be explained by the schooling experience before higher education.

6 Conclusions

In recent years, a reduction in the effect of social background on tertiary education attainment has occurred in several European countries. Although the improvement of educational opportunities for disadvantaged children is often interpreted as a democratization of the educational system, social stratification research suggests that this trend could have been negatively counterbalanced by the growth of horizontal inequalities (Ayalon & Yogev, 2005; Charles & Bradley, 2002).

We addressed this issue by analyzing horizontal inequalities in the Italian higher education system with a focus on the role of social background in relation to graduation from better rewarding FoS. Italy is an interesting case because of several concomitant dynamics occurring in the last fifteen years, including an increasing complexity in the choice of degree program as well as expanding graduation rates and credential inflation of university degrees among youths, which may have led to stronger competition among graduates in the labor market.

We found that in Italy parental education is associated with FoS of graduation, thus corroborating hypothesis 1a. Despite the comparatively small proportion of graduates in Italy and the relatively strong social selection that occurred in previous school stages, individuals with a higher social background were more likely to obtain a degree in disciplines characterized by higher expected occupational returns. In particular, individuals with highly educated parents and from the service class

were more likely to obtain a degree in law and medicine, two disciplines attached to the traditional system of prestigious liberal professions. Individuals from low backgrounds instead were much more likely to graduate from programs in the social sciences, which are less prestigious and are characterized by more uncertain labor market returns. Overall, the strength of the association is in some respects moderate; indeed, social background is not strongly associated with graduation from other fields, such as technical and scientific disciplines.

Looking at trends over time, we found a growing association between social background and graduation from FoS with higher net occupational value, thus supporting our third hypothesis. In particular, this was mainly driven by the increased gap in the probability of graduating in medicine and the social sciences. Among the new cohorts, more graduates from less educated families opted for the less demanding but also poorly rewarding programs in the social and educational sciences. This was paralleled by a decreasing propensity to graduate in the more demanding but highly and increasingly rewarding programs in medicine.

When comparing inequalities in the cohorts of graduates who experienced higher education just before and after the implementation of the Bologna Process, two opposed results might be expected: a rapid increase in inequalities due to a sudden expansion of enrolment and more complex choice of degree program, or a stability/decline in horizontal inequality due to the emergence of a new form of vertical stratification in the educational supply (first versus second level courses). Our results point more toward the first of the two scenarios (hypothesis 4a), since we found that the association between social background indicators and the net occupational value of the FoS attended enlarged between the 2004 and 2007 cohorts. However, only in the case of social class of origin is a sudden increase in social inequality after the introduction of the new degree programs detected, whereas inequality based on parental education rose at a nearly constant pace during the whole period under scrutiny. With the data

at hand, it is not possible to investigate the specific processes behind these differences, but it would be important for future studies to address this issue further.

Finally, contrary to what was identified in previous studies in the US (Hearn, 1984, 1991) and the UK (Bratti, 2006), but similar to what was reported by Goyette and Mullen (2006), we found that most of the differences across social origins regarding the FoS of graduation are not accounted for by previous school track and marks in high school. In other words, while having followed an academic track and achieved high marks strongly increased the chances of graduating from the most rewarding subjects, these factors were far from being the only drivers of social inequalities in FoS of graduation. A large part of the inequalities in FoS of graduation is due to processes occurring after the attainment of upper secondary education. The relative importance of students' decisions at enrolment, regardless of their previous school achievement, could be exacerbated by the fact that only a minority of degree programs at undergraduate level require students to pass a selective entry test. Indeed, one of the fields in which the individual's scholastic record prior to higher education accounts for a larger part of the total social background difference is medicine, a discipline characterized by nationwide entry tests and a restricted number of seats each year.

An additional potential source of inequality in terms of graduating from specific FoS could be related to heterogeneous pathways across social groups subsequent to university enrolment. Among students from a low background who entered a potentially rewarding field, the need to work while studying at university, due to the scarcity of public support and the underdevelopment of student loans, might have made their academic progression and integration difficult, thus increasing their risk of dropout or decision to shift to a less demanding program. However, even if plausible on a theoretical level, the processes occurring after enrolment do not seem to play a prominent role in changing the socially stratified allocation of students to FoS, as suggested by our additional analyses on a recent

survey on high school leavers. Nonetheless, more research is also needed on this aspect, especially adopting a diachronic perspective.

In sum, our findings speak to two streams of social stratification research. The first is research on the effectively maintained inequality (Lucas, 2001) and the diversion theses (Brint & Karabel, 1987). In line with the predictions from these arguments, we found that students from higher social backgrounds are more likely to graduate from the most advantageous educational programs in higher education. Moreover, horizontal inequalities in graduation from various FoS have increased in a period of expansion of higher education. This is one of the first studies in which widening horizontal inequalities in higher education are identified. Such findings resemble the results of recent research that found support for the EMI thesis analyzing changes in horizontal stratification in upper secondary education in Italy (Guetto & Vergolini, 2017; Panichella & Triventi, 2014).

The second reference is the literature on the nominal versus positional value of educational credentials (Park & Shavit, 2016). Looking at overall educational attainment, it has been shown that differences according to social background tend to decline over time when analyzing the attainment of educational titles in nominal terms, but they are stable or even increase in some countries when the relative/changing value of the different educational qualifications is considered. Italy was found to be an exception to this pattern (Triventi et al., 2016), with social inequalities in education declining using both approaches. However, that study was unable to take horizontal stratification of education into account. Extending this research, we found evidence that the qualitative differentiation in higher education is a non-negligible factor for the reproduction of social inequalities among recent cohorts of graduates in Italy. Although students from disadvantaged backgrounds have more chance now than ever before to progress to tertiary education, what they end up studying at university does provide them with less advantageous occupations than those of their advantaged peers. One should not forget that this is only one of the ways by which upper class families try to maintain advantage for their offspring. Vertical

stratification of educational qualifications is still relevant in Italy, as attested, for instance, by the largely persisting gaps in transition rates from upper secondary to tertiary education (Argentin & Triventi, 2011). Furthermore, non-credentialist strategies of social reproduction through social networks, privileged access to the professions, and the transmission of the family business are particularly important in the Italian context, thus leading to a comparably strong direct effect of social origin on occupational outcomes (Bernardi & Ballarino, 2016), even among higher education graduates (Triventi, 2013b). Future research should develop a comprehensive approach to study how the various dimensions of stratification of higher education opportunities are interrelated and, possibly, investigate with more detailed data the concrete decisional processes adopted by students from various social origins in various stages of higher education experience.

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Figures

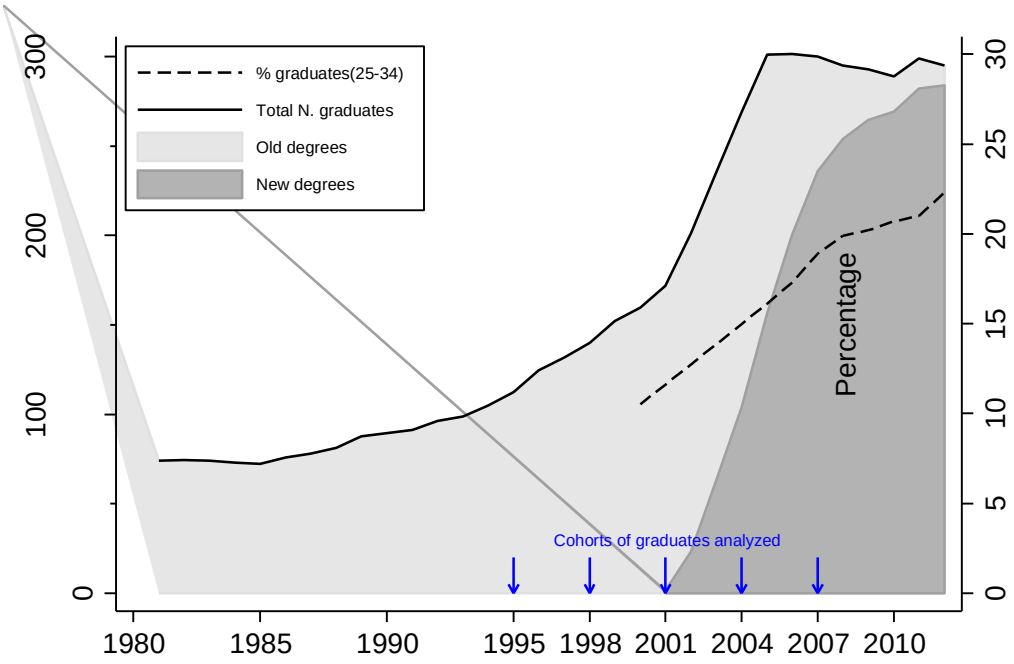

Fig. 1 – Indicators of expansion of tertiary education degrees in Italy, 1981-2012

Note: the absolute number of graduates provides a rough count of the total number of degrees awarded in each year. It may count twice the same graduate if s/he received a bachelor and a master degree in the time span covered by the data.

Sources: Anvur 2013 (number of degrees), Oecd online database (% of graduates)

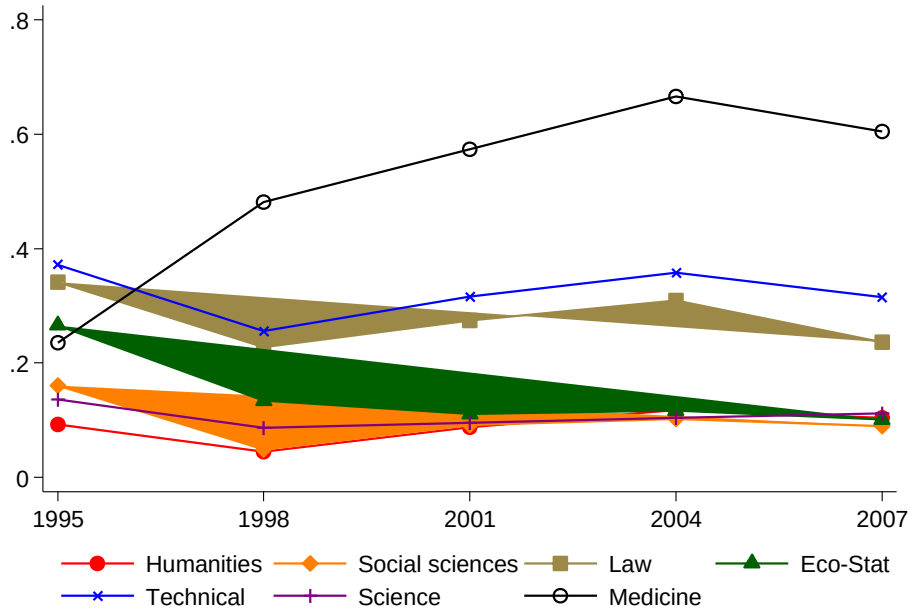

Fig. 2 – Net expected occupational value over time by field of study

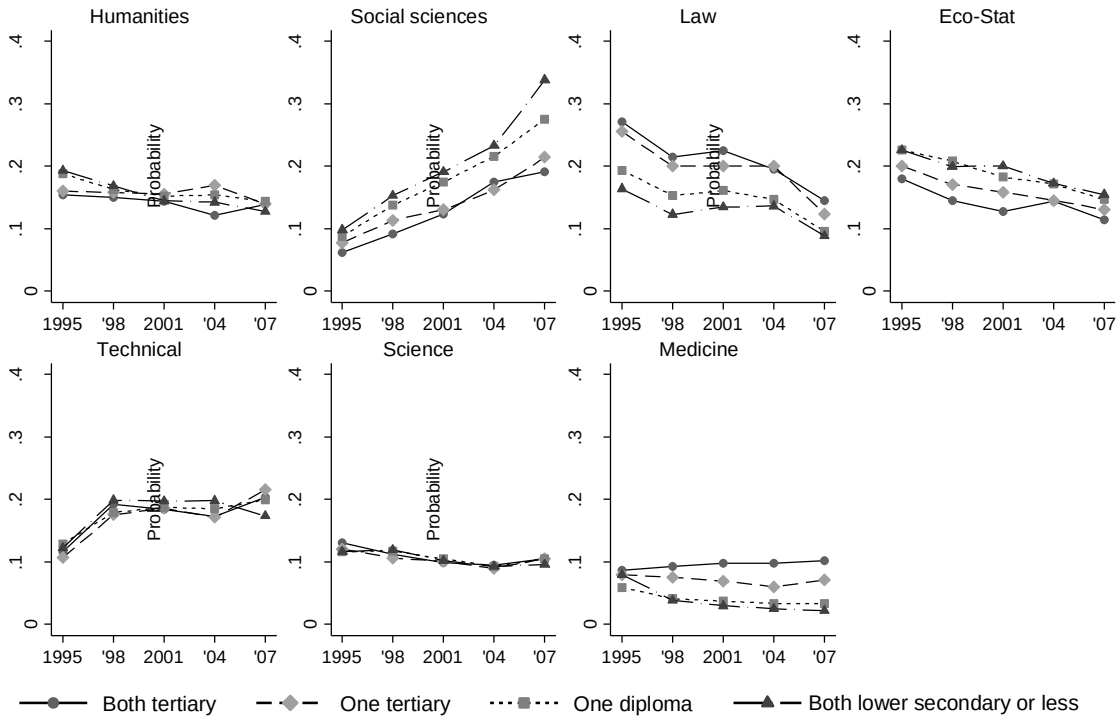

Fig. 3 – Multinomial logistic regression model: predictive margins of graduating in different fields of study according to year of graduation and parental education

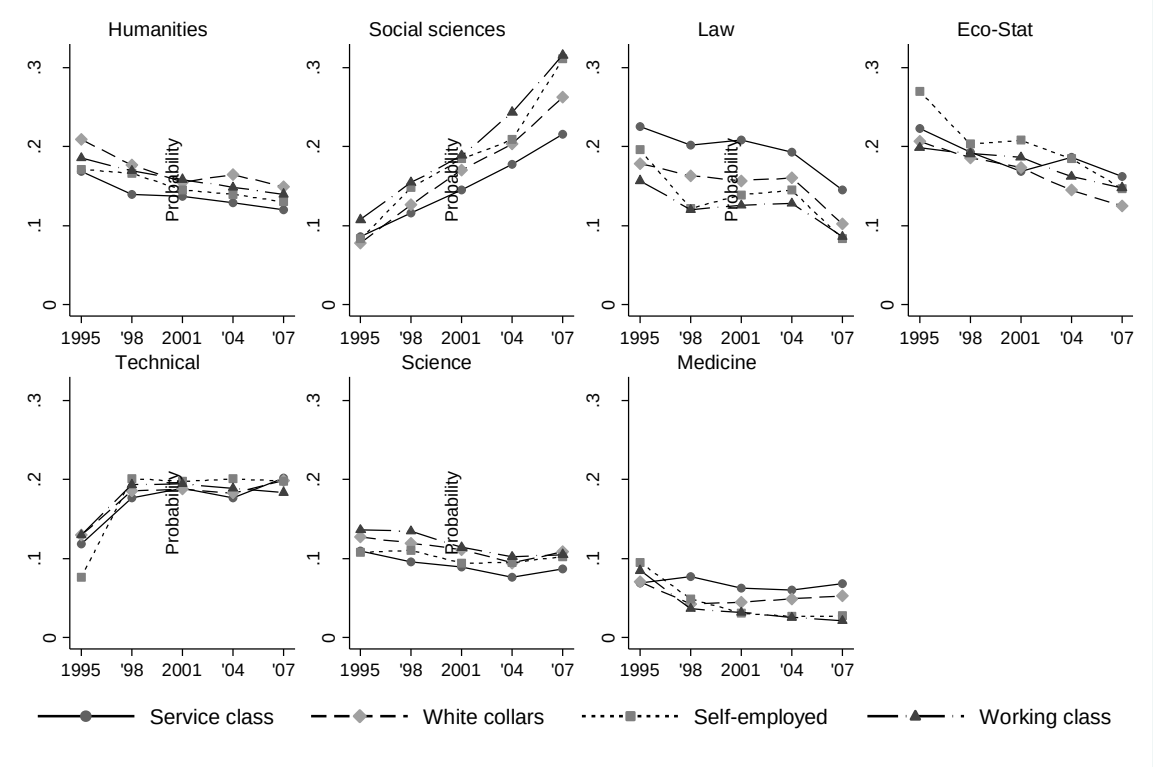

Fig. 4 – Multinomial logistic regression model: predictive margins of graduating in different fields of study according to year of graduation and social class of origin

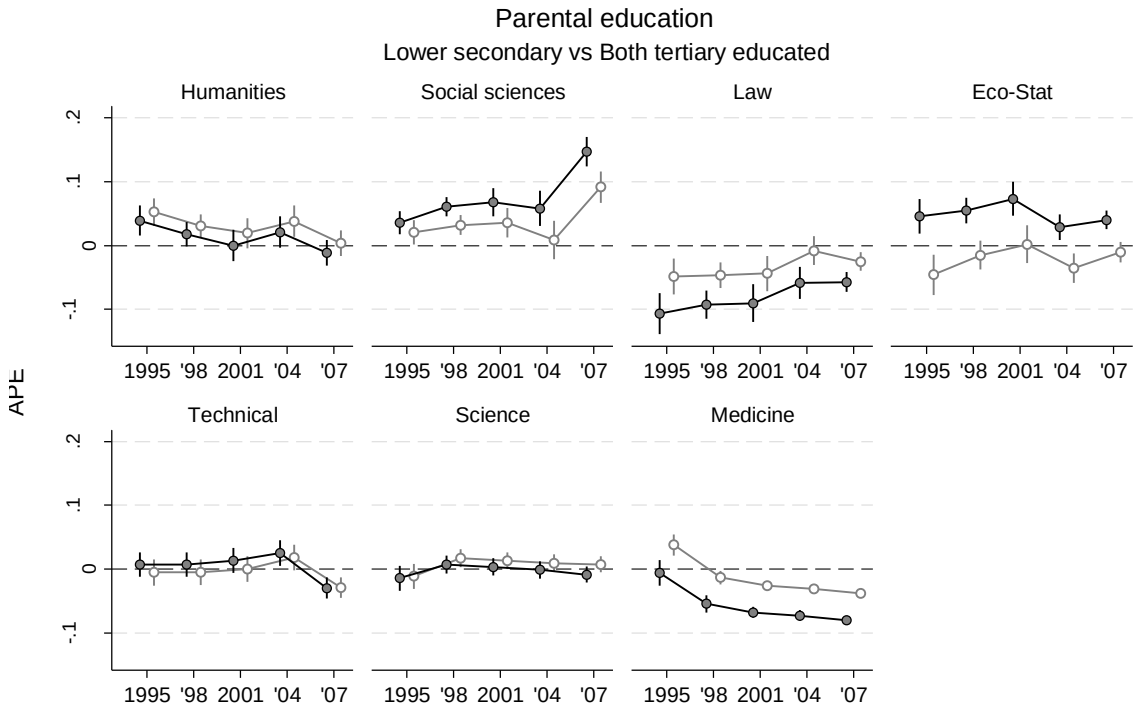

Fig. 5 – Multinomial logistic regression models: average partial effects of entering each field of study comparing individuals with both tertiary educated parents and with lowly educated parents

Note: filled dots represent total effects from Model 1, while hollow circles represent estimates from Model 2 that controls for high school track and marks.

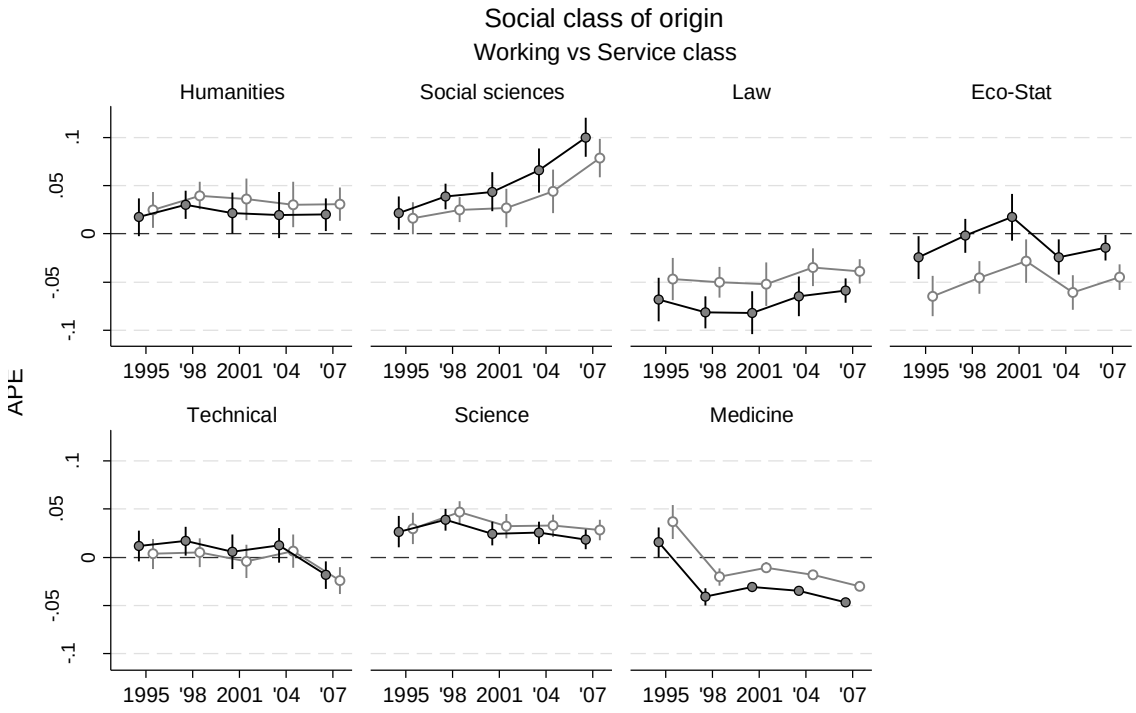

Fig. 6 – Multinomial logistic regression models: average partial effects of entering each field of study comparing individuals from the working class and from the service class

Note: filled dots represent total effects from Model 1, while hollow circles represent estimates from Model 2 that controls for high school track and marks.

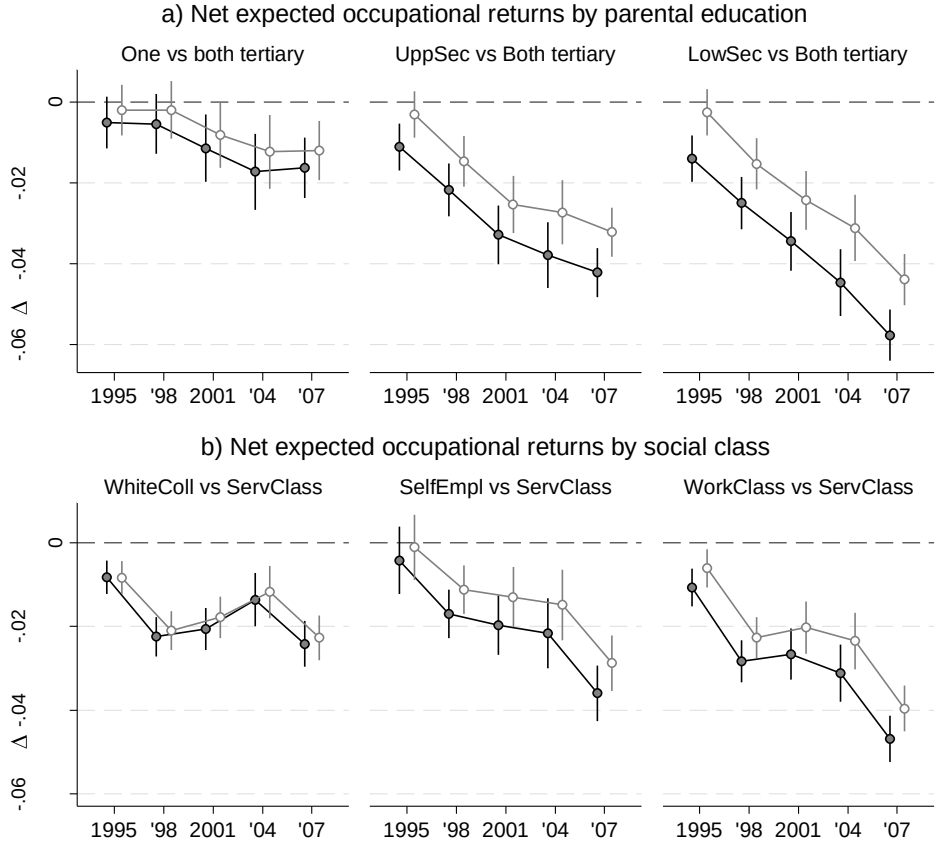

Fig. 7 – Fractional logit models: average partial effects (and 95% confidence intervals) of parental education (graph a) and social class (graph b) on the net expected occupational returns of fields of study of graduation

Note: filled dots represent total effects from Model 1, while hollow circles represent estimates from Model 2 that controls for high school track and marks.

Tables

Table 1 - Percentage of students/graduates by field of study

	1995	1998	2001	2004	2007	Total
Field of study						
Social sciences	8.6	13.5	16.9	21.1	27.3	19.0
Humanities	17.7	16.1	14.9	15.4	13.8	15.3
Law	20.0	15.2	16.2	15.8	10.8	15.0
Economics/Statistics	21.9	19.4	17.9	16.2	14.3	17.3
Technical	12.5	19.3	19.2	17.9	19.2	18.2
Science	11.8	11.6	10.2	9.3	10.2	10.4
Medicine	7.3	5.1	4.6	4.3	4.4	4.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
N	12,088	19,945	24,287	24,307	37,824	118,451

Note: weighted estimates on the final analytical sample

Supplementary material – Online

Annex I – Analysis on ISTAT high school leavers survey (2011 edition)

In order to justify the fact we mainly rely on theoretical arguments that refer to the choice of FoS in the transition from upper secondary to tertiary education, we provide evidence from the Survey on High School Leavers conducted by the Italian National Institute of Statistics (ISTAT) in 2011. This survey provides information on a random sample of high school leavers that obtained an upper secondary diploma in 2007, asking them retrospectively about their transition to university and higher education pathways. We use this survey only for the sensitivity checks because, unfortunately, the information needed for answering our questions is only available in the very recent editions of the survey, thereby impeding the investigation of changes in social inequalities before and after the implementation of the 'Bologna process' reform.

We provide three pieces of empirical evidence, which refer to social inequalities in: 1) dropout from university; 2) changes in FoS; 3) FoS of destination, using different definitions and analytical samples. The main independent variable is parental education (dominance criterion); FoS is

measured similarly to the variable used in the graduates' survey, with one exception: instead of medicine, here the broader category 'health' is included. In the cohort analysed, 64% of high school leavers enrolled in university within four years from their diploma; 14% of those who entered university dropped out (they are no longer enrolled at the moment of the interview and did not attain a degree). Among those who are still enrolled or attained a degree; 15% changed FoS compared to the one in which they initially enrolled. Around 95% of the students who entered university enrolled within one year from the diploma.

Dropouts

First, we have estimated a binomial logistic regression model to inspect the relationship between parental education and the probability of dropping−out from higher education without attaining a degree across various FoS. This is obtained by specifying an interaction between parental education and first FoS attended.

In figure A1 we report average partial effects (and 95% confidence intervals) on the risk of dropping out comparing students with university educated and lower educated parents. As we see, dropouts are socially stratified in all the FoS: those who have highly educated parents are less likely to dropout from higher education than those from lowly educated families. Even if there is some variation across fields, the confidence intervals around the point estimates are largely overlapped; additional statistical tests on the difference between the coefficients confirm that most of the comparisons produce not statistically significant results. Therefore, even if dropout appears to be socially stratified, the pattern is relatively similar across disciplinary areas, with only minor exceptions.

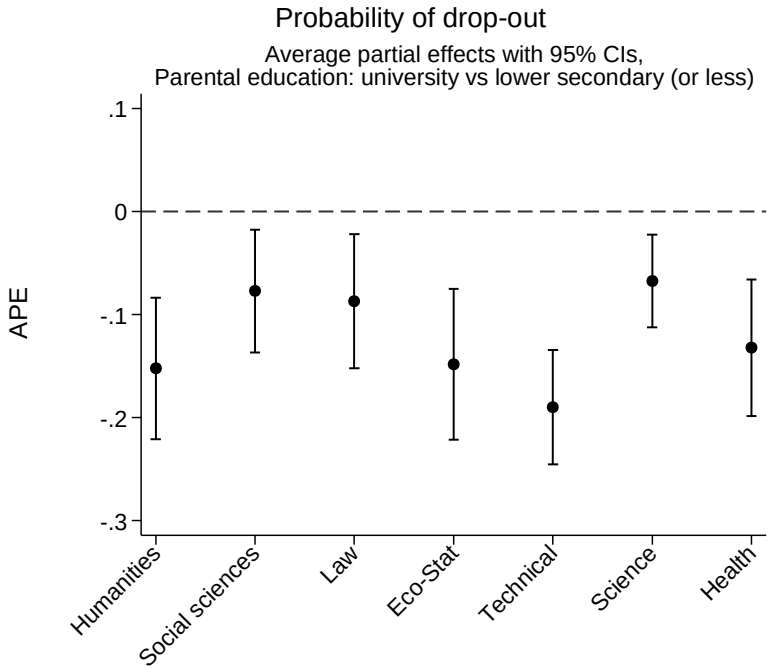

Fig A1 − Binomial logistic regression to predict the probability of dropping out among high−school leavers who enrolled university: average partial effects (and 95% confidence intervals) comparing individuals with university and lower secondary educated parents.
Note: control variables are sex and geographical area.
Source: authors' elaboration on data from the ISTAT Survey on the 2007 High School leavers (2011).

Shifts of FoS

The second model we estimated is a binomial logistic regression on the probability of having changed field of study among those who entered university and at the moment of the interview are still enrolled or successfully attained a bachelor degree. As before, the model contains an interaction between parental education and first FoS attended. The results presented in figure A2 show that the effect of parental education on shifting FoS are generally rather small and in most of the cases they are not statistically different from zero at the 95% confidence level. Moreover, most of the confidence intervals pertaining to the effect of parental education in different disciplines are largely overlapped. This is another indirect hint that shifts between disciplines attended, while occurring to a certain extent, are not a major driving force of inequalities in FoS of destination.

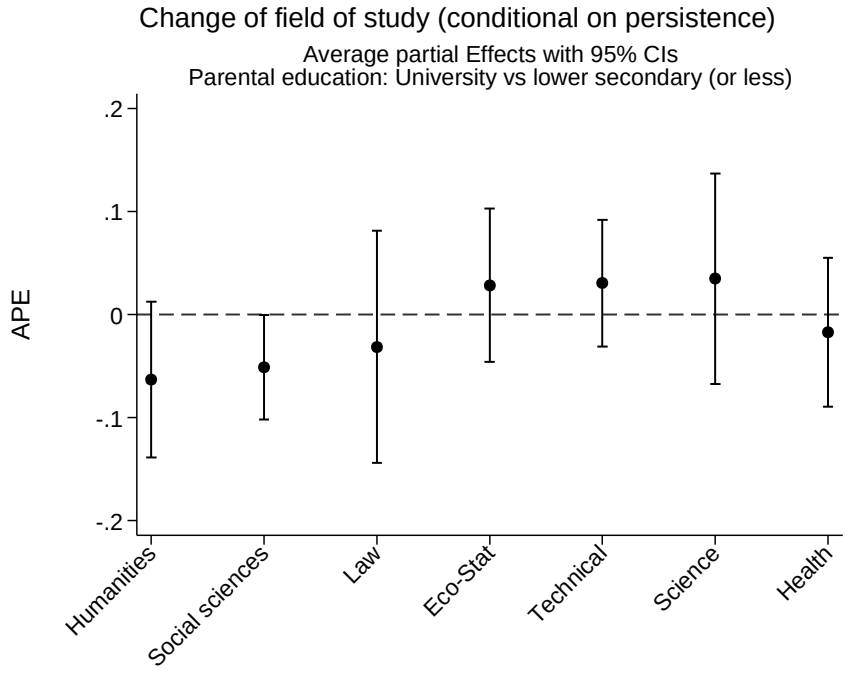

Fig A2 − Binomial logistic regression to predict the probability of changing field of study among high−school leavers who enrolled university and did not dropout: average partial effects (and 95% confidence intervals) comparing individuals with university and lower secondary educated parents.
Source: authors' elaboration on data from the ISTAT Survey on the 2007 High School leavers (2011).

Fos of destination

Finally, we analysed the association between parental education and FoS with multinomial logistic regression models, using three different definitions of FoS. In the first model, the first FoS selected in higher education is analysed; in the second model the outcome is the last FoS attended, for those who are still enrolled or attained a bachelor degree (FoS of destination, conditional model); the third model analyses FoS of destination including dropout as an additional outcome (FoS of destination, unconditional model). The results are presented in figure A3 in terms of average partial effects and 95% confidence intervals referring to the following comparisons: students with upper secondary versus lower educated parents (UppSec) and students with tertiary versus lower educated parents (Tertiary).

The main findings are in line with the results obtained on the graduates' survey, albeit the fact we are analysing partially different cohorts and measures. Individuals with highly educated parents are less likely to attend the social sciences and economics, whereas they are more likely to attend law. In this case, we do not observe significant differences on health because it comprises both medicine (which attracts upper class children to a higher extent) and vocational courses in allied disciplines (which attract students with a medium−low social background).

The key result for our robustness check is that the amount of social inequalities does not vary systematically and strongly according the three different definitions of the outcomes, since the 95% confidence intervals are largely overlapped. Additional ad hoc t−tests that check whether the difference between pairs of average partial effects is significant also support this conclusion.

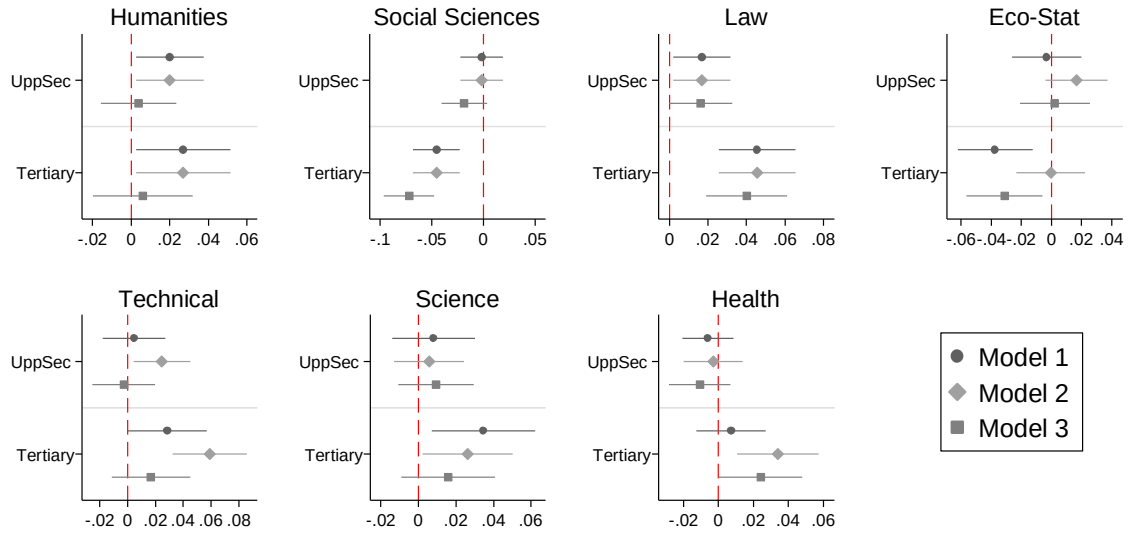

Fig A3 − Multinomial logistic regression to predict FoS of destination: average partial effects (and 95% confidence intervals) comparing individuals with university and lower secondary educated parents.
Note: Model 1: FoS at entry; Model 2: FoS of destination (conditional model); Model 3: FoS of destination (unconditional model).
Source: authors' elaboration on data from the ISTAT Survey on the 2007 High School leavers (2011).

Annex II – Estimates reported in figures presented in the main article

Descriptive statistics reported in Figure 2.

Table A1 − Net expected occupational value over time by field of study.

	1995	1998	2001	2004	2007
Humanities	0.092	0.045	0.088	0.118	0.104
Social sciences	0.161	0.049	0.091	0.102	0.090
Law	0.341	0.228	0.274	0.309	0.236
Economics & Statistics	0.266	0.134	0.111	0.117	0.101
Technical	0.372	0.256	0.316	0.358	0.315
Science	0.136	0.087	0.095	0.104	0.112
Medicine	0.235	0.481	0.574	0.666	0.605

Estimates reported in Figures 3−7

Table A2 − Estimates reported in Figure 3. Multinomial logit models: predictive margins of graduating in different fields of study according to year of graduation and parental education.

	Humanities		Social Sciences		Law		Eco−Stat		Technical		Science		Medicine	
	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.
Parental education−year of graduation														
Both tertiary−1995	0.154	0.011	0.062	0.008	0.271	0.015	0.180	0.012	0.116	0.009	0.130	0.009	0.086	0.009
Both tertiary−1998	0.151	0.008	0.092	0.006	0.215	0.010	0.145	0.009	0.192	0.009	0.112	0.006	0.093	0.006
Both tertiary−2001	0.145	0.011	0.123	0.009	0.225	0.014	0.127	0.011	0.184	0.009	0.099	0.006	0.098	0.004
Both tertiary−2004	0.121	0.010	0.175	0.012	0.195	0.011	0.144	0.009	0.173	0.009	0.094	0.006	0.098	0.004
Both tertiary−2007	0.139	0.009	0.191	0.009	0.146	0.007	0.115	0.006	0.203	0.007	0.105	0.005	0.102	0.003
One tertiary−1995	0.160	0.008	0.077	0.007	0.255	0.011	0.200	0.010	0.107	0.006	0.121	0.007	0.080	0.007
One tertiary−1998	0.158	0.007	0.114	0.006	0.200	0.008	0.171	0.008	0.176	0.007	0.106	0.005	0.075	0.005
One tertiary−2001	0.155	0.009	0.131	0.008	0.200	0.010	0.159	0.011	0.186	0.007	0.101	0.005	0.069	0.003
One tertiary−2004	0.170	0.016	0.162	0.009	0.201	0.010	0.146	0.007	0.171	0.007	0.090	0.005	0.060	0.003
One tertiary−2007	0.139	0.009	0.214	0.009	0.124	0.006	0.131	0.006	0.216	0.007	0.105	0.005	0.071	0.002
One diploma−1995	0.188	0.006	0.088	0.005	0.194	0.007	0.226	0.007	0.129	0.005	0.116	0.005	0.059	0.004
One diploma−1998	0.163	0.005	0.138	0.004	0.153	0.005	0.208	0.005	0.179	0.004	0.117	0.004	0.041	0.002
One diploma−2001	0.152	0.006	0.175	0.006	0.161	0.006	0.183	0.007	0.187	0.005	0.105	0.003	0.037	0.001
One diploma−2004	0.154	0.008	0.216	0.007	0.147	0.006	0.172	0.005	0.185	0.005	0.093	0.003	0.033	0.001
One diploma−2007	0.144	0.004	0.276	0.005	0.096	0.003	0.147	0.003	0.200	0.004	0.105	0.003	0.033	0.001
Both lower secondary or less−1995	0.193	0.006	0.098	0.005	0.164	0.006	0.226	0.007	0.123	0.005	0.116	0.004	0.080	0.005
Both lower secondary or less−1998	0.169	0.005	0.153	0.004	0.123	0.004	0.199	0.005	0.199	0.005	0.119	0.003	0.038	0.002
Both lower secondary or less−2001	0.145	0.006	0.191	0.006	0.135	0.006	0.201	0.007	0.197	0.005	0.102	0.003	0.030	0.001
Both lower secondary or less−2004	0.143	0.007	0.233	0.008	0.136	0.006	0.172	0.006	0.198	0.006	0.093	0.004	0.025	0.001
Both lower secondary or less−2007	0.128	0.005	0.338	0.007	0.088	0.003	0.155	0.004	0.174	0.004	0.096	0.003	0.022	0.001

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A3 − Estimates reported in Figure 4. Multinomial logit models: predictive margins of graduating in different fields of study according to year of graduation and parental social class.

	Humanities		Social Sciences		Law		Eco−Stat		Technical		Science		Medicine	
	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.	Prob.	S.E.
Parental education−year of graduation														
Service class−1995	0.169	0.005	0.086	0.004	0.225	0.006	0.223	0.006	0.118	0.004	0.110	0.004	0.069	0.004
Service class−1998	0.139	0.005	0.116	0.004	0.202	0.006	0.193	0.006	0.177	0.005	0.096	0.004	0.078	0.004
Service class−2001	0.137	0.006	0.145	0.006	0.208	0.008	0.169	0.007	0.189	0.005	0.089	0.003	0.063	0.002
Service class−2004	0.129	0.008	0.178	0.008	0.193	0.008	0.186	0.007	0.177	0.006	0.077	0.004	0.060	0.002
Service class−2007	0.120	0.007	0.215	0.007	0.145	0.005	0.162	0.005	0.202	0.006	0.087	0.004	0.068	0.002
White collars−1995	0.209	0.007	0.078	0.005	0.179	0.008	0.206	0.008	0.129	0.006	0.127	0.006	0.071	0.005
White collars−1998	0.177	0.005	0.127	0.004	0.163	0.005	0.186	0.006	0.186	0.005	0.120	0.004	0.042	0.003
White collars−2001	0.155	0.006	0.170	0.006	0.157	0.006	0.173	0.007	0.188	0.005	0.112	0.003	0.045	0.001
White collars−2004	0.165	0.009	0.203	0.007	0.160	0.006	0.145	0.005	0.183	0.005	0.094	0.003	0.049	0.001
White collars−2007	0.149	0.005	0.263	0.006	0.103	0.003	0.125	0.003	0.198	0.004	0.109	0.003	0.053	0.001
Self−employed−1995	0.171	0.018	0.083	0.014	0.196	0.022	0.270	0.022	0.076	0.012	0.108	0.014	0.095	0.015
Self−employed−1998	0.166	0.007	0.148	0.006	0.122	0.007	0.203	0.008	0.201	0.007	0.110	0.005	0.049	0.004
Self−employed−2001	0.145	0.010	0.185	0.010	0.139	0.010	0.208	0.013	0.198	0.008	0.094	0.006	0.031	0.002
Self−employed−2004	0.140	0.012	0.209	0.011	0.145	0.010	0.185	0.009	0.201	0.009	0.095	0.006	0.027	0.002
Self−employed−2007	0.130	0.007	0.311	0.010	0.083	0.005	0.147	0.006	0.198	0.007	0.103	0.005	0.027	0.001
Working class −1995	0.186	0.009	0.108	0.008	0.157	0.010	0.198	0.010	0.130	0.007	0.136	0.007	0.085	0.007
Working class−1998	0.170	0.006	0.155	0.005	0.120	0.005	0.191	0.006	0.193	0.005	0.134	0.005	0.036	0.003
Working class−2001	0.158	0.009	0.189	0.009	0.126	0.008	0.186	0.010	0.194	0.007	0.114	0.005	0.032	0.002
Working class−2004	0.149	0.009	0.244	0.009	0.129	0.007	0.162	0.006	0.189	0.006	0.102	0.005	0.025	0.001
Working class−2007	0.140	0.006	0.316	0.007	0.086	0.003	0.148	0.004	0.184	0.005	0.105	0.004	0.022	0.001

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A4 − Estimates reported in Figure 5. Multinomial logistic regression models: average partial effects and standard errors of entering each field of study versus social sciences comparing individuals with both tertiary educated parents and those with lowly educated parents.

	Year	Model 1		Model 2	
		APE	S.E.	APE	S.E.
Humanities	1995	0.039***	0.012	0.053***	0.011
	1998	0.018*	0.010	0.031***	0.009
	2001	0.000	0.012	0.019	0.012
	2004	0.021*	0.013	0.038***	0.013
	2007	−0.012	0.010	0.003	0.010
Social sciences	1995	0.036***	0.009	0.021**	0.010
	1998	0.061***	0.008	0.032***	0.008
	2001	0.068***	0.011	0.036***	0.012
	2004	0.058***	0.014	0.009	0.015
	2007	0.147***	0.012	0.092***	0.013
Law	1995	−0.107***	0.016	−0.048***	0.014
	1998	−0.092***	0.011	−0.046***	0.010
	2001	−0.090***	0.015	−0.044***	0.014
	2004	−0.058***	0.013	−0.008	0.012
	2007	−0.057***	0.008	−0.025***	0.007
Eco−Stat	1995	0.046***	0.014	−0.046***	0.016
	1998	0.055***	0.010	−0.015	0.012
	2001	0.073***	0.013	0.002	0.015
	2004	0.029**	0.010	−0.035***	0.012
	2007	0.040***	0.007	−0.010	0.008
Technical	1995	0.007	0.010	−0.006	0.010
	1998	0.007	0.010	−0.005	0.010
	2001	0.013	0.010	0.000	0.010
	2004	0.025**	0.010	0.018*	0.010
	2007	−0.030***	0.008	−0.029***	0.008
Science	1995	−0.014	0.010	−0.011	0.010
	1998	0.007	0.007	0.017**	0.007
	2001	0.003	0.007	0.013*	0.007
	2004	−0.002	0.007	0.009	0.007
	2007	−0.009	0.006	0.007	0.006
Medicine	1995	−0.006	0.010	0.038***	0.009
	1998	−0.055***	0.007	−0.014**	0.005
	2001	−0.068***	0.004	−0.027***	0.004
	2004	−0.073***	0.004	−0.031***	0.003
	2007	−0.080***	0.003	−0.038***	0.003

Table A5 − Estimates reported in Figure 6. Multinomial logistic regression models: average partial effects and standard errors of entering each field of study versus social sciences comparing individuals from the working class and those from the service class.

	Year	Model 1		Model 2	
		APE	S.E.	APE	S.E.
Humanities	1995	0.017*	0.010	0.025*	0.009
	1998	0.030***	0.008	0.040***	0.007
	2001	0.022**	0.011	0.036***	0.011
	2004	0.020	0.012	0.030**	0.012
	2007	0.020**	0.009	0.031***	0.009
Social sciences	1995	0.022**	0.009	0.016**	0.008
	1998	0.039***	0.007	0.025***	0.007
	2001	0.044***	0.010	0.027**	0.010
	2004	0.066***	0.012	0.044***	0.012
	2007	0.100***	0.010	0.079***	0.010
Law	1995	−0.068***	0.011	−0.047***	0.011
	1998	−0.082***	0.008	−0.050***	0.008
	2001	−0.082***	0.011	−0.052***	0.012
	2004	−0.065***	0.010	−0.035***	0.010
	2007	−0.059***	0.006	−0.039***	0.006
Eco−Stat	1995	−0.025**	0.011	−0.065***	0.011
	1998	−0.002	0.009	−0.045***	0.009
	2001	0.017	0.012	−0.028**	0.012
	2004	−0.024**	0.009	−0.061***	0.009
	2007	−0.014**	0.007	−0.045***	0.007
Technical	1995	0.012	0.008	0.003	0.008
	1998	0.017**	0.008	0.005	0.008
	2001	0.006	0.009	−0.004	0.009
	2004	0.013	0.009	0.006	0.009
	2007	−0.018**	0.007	−0.024***	0.007
Science	1995	0.027***	0.008	0.030***	0.008
	1998	0.039***	0.006	0.047***	0.006
	2001	0.025***	0.006	0.033***	0.006
	2004	0.026***	0.006	0.033***	0.006
	2007	0.018***	0.005	0.028***	0.005
Medicine	1995	0.016*	0.008	0.037***	0.009
	1998	−0.041***	0.005	−0.020***	0.005
	2001	−0.031***	0.003	−0.011***	0.003
	2004	−0.035***	0.002	−0.018***	0.002
	2007	−0.047***	0.002	−0.030***	0.002

Table A6 − Estimates reported in Figure 7 (panel a). Fractional logit models: average partial effects and standard errors of parental education on the net expected occupational returns of field of study attended.

	Year	Model 1		Model 2	
		APE	S.E.	APE	S.E.
One vs Both tertiary	1995	−0.005	0.003	−0.002	0.003
	1998	−0.005	0.004	−0.002	0.004
	2001	−0.011***	0.004	−0.008**	0.004
	2004	−0.017***	0.005	−0.012***	0.005
	2007	−0.016***	0.004	−0.012***	0.004
Upper Secondary vs Both tertiary	1995	−0.011***	0.003	−0.003	0.003
	1998	−0.022***	0.003	−0.015***	0.003
	2001	−0.033***	0.004	−0.025***	0.004
	2004	−0.038***	0.004	−0.027***	0.004
	2007	−0.042***	0.003	−0.032***	0.003
Lower Secondary vs Both tertiary	1995	−0.014***	0.003	−0.003	0.003
	1998	−0.025***	0.003	−0.015***	0.003
	2001	−0.034***	0.004	−0.024***	0.004
	2004	−0.045***	0.004	−0.031***	0.004
	2007	−0.058***	0.003	−0.044***	0.003

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A7 − Estimates reported in Figure 7 (panel b). Fractional logit models: average partial effects and standard errors of parental social class on the net expected occupational returns of field of study attended.

	Year	Model 1		Model 2	
		APE	S.E.	APE	S.E.
White collars vs Service class	1995	−0.008***	0.002	−0.008***	0.002
	1998	−0.022***	0.002	−0.021***	0.002
	2001	−0.021***	0.003	−0.018***	0.003
	2004	−0.014***	0.003	−0.012***	0.003
	2007	−0.024***	0.003	−0.023***	0.003
Self−employed vs Service class	1995	−0.004	0.004	−0.001	0.004
	1998	−0.017***	0.003	−0.011***	0.003
	2001	−0.020***	0.004	−0.013***	0.004
	2004	−0.022***	0.004	−0.015***	0.004
	2007	−0.036***	0.003	−0.029***	0.003
Working class vs Service class	1995	−0.011***	0.002	−0.006***	0.002
	1998	−0.028***	0.003	−0.023***	0.003
	2001	−0.027***	0.003	−0.020***	0.003
	2004	−0.031***	0.003	−0.023***	0.003
	2007	−0.047***	0.003	−0.040***	0.003

Note: *** p<0.01, ** p<0.05, * p<0.1

Annex III – Estimates from multinomial logit in terms of predicted odds ratios

In figures A4 and A5 we present the results from the multinomial logistic regression using odds−ratios. The choice of social sciences as the baseline category for the FoS was carefully made in order to take into consideration the fact that the multinomial model (like other probabilistic choice models) relies on the validity of the Independence from Irrelevant Alternatives (IIA) assumption. Although tests to check the validity of the IIA have been proposed in the past, their limitations have been highlighted more than once in the literature (McFadden, Train, and Tye 1981). As suggested by McFadden (1974), we opted for a theoretical analysis of the Italian HE system since we believed that adding a new FoS or changing the characteristics of the fields already considered would not affect the relative odds computed with respect to the social sciences category.

We computed appropriate odds ratios pertaining to the interaction effect between social background and cohort of graduation, following the procedure suggested by Buis (2010). Selected results from this computation are reported in figure A4 and A5 below, which shows the odds of attaining a degree in each FoS rather than doing so in the social sciences. In the first figure we compare graduates with parents who had graduated from tertiary education and those who did not attain more than lower secondary education; in the second figure we compare individuals from the service class with those from the working class.

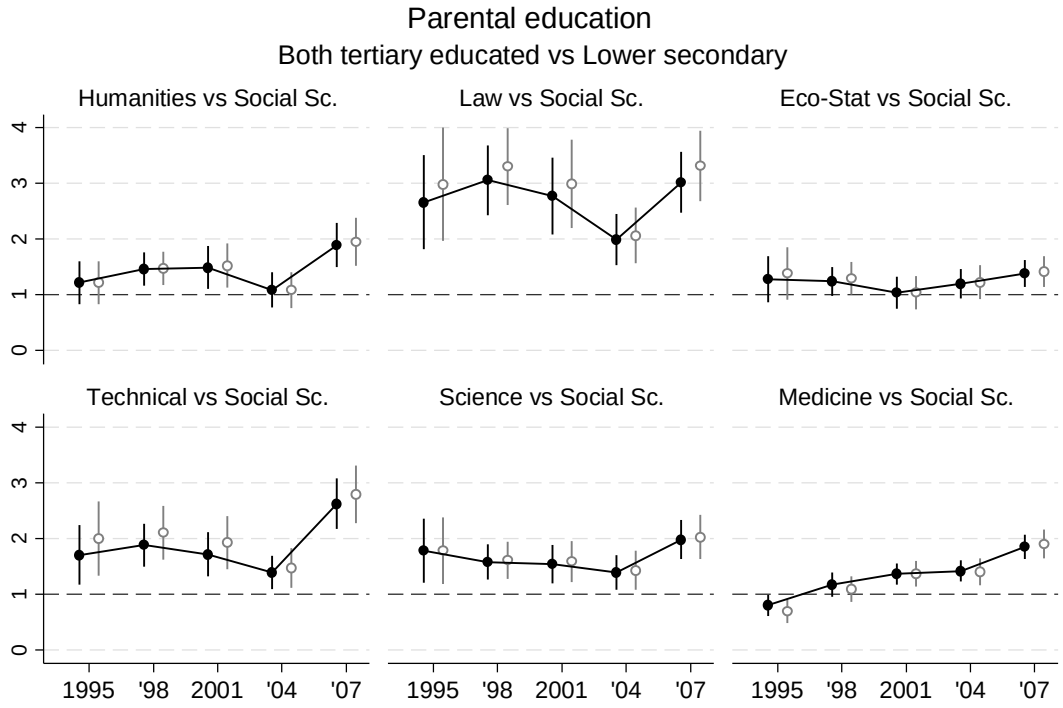

Fig. A4 − Multinomial logistic regression models: predicted odds ratios of entering each field of study versus social sciences comparing individuals with both tertiary educated parents and those with lowly educated parents.

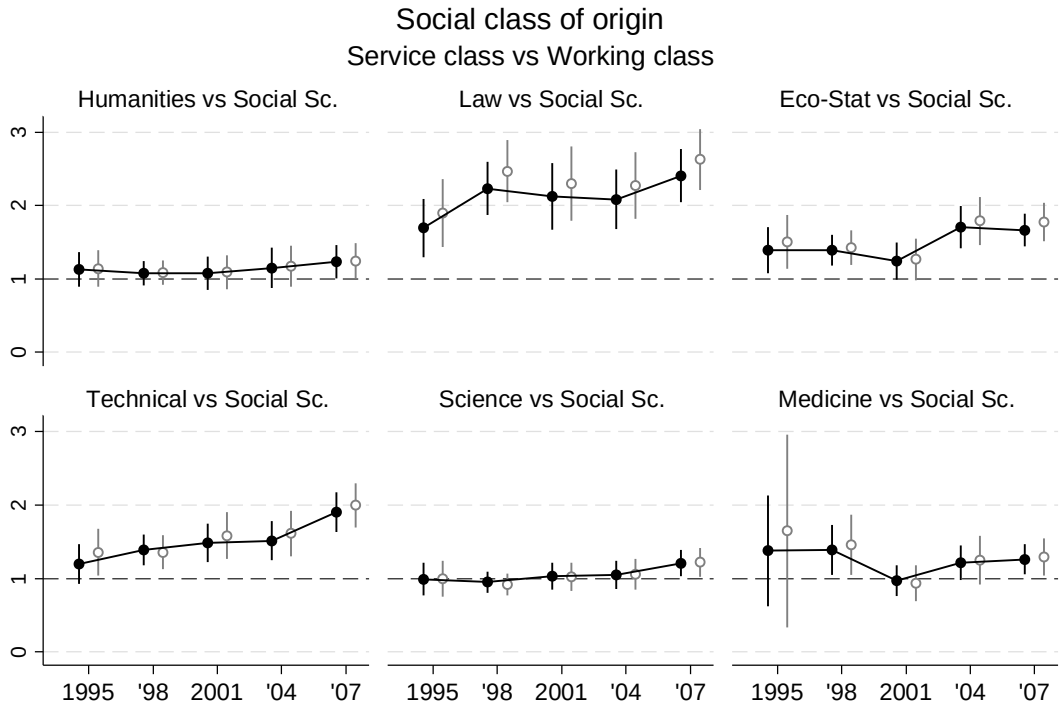

Fig. A5 − Multinomial logistic regression models: predicted odds ratios of entering each field of study versus social sciences comparing individuals from the service class and the working class.

Annex IV –Complete regression models

Complete models for Figures 3−7

Table A8 − Complete model for estimates reported in Figures 3 and 5. Logit parameters and robust standard error.

	Humanities vs Social Sciences		Law vs Social Sciences		Eco−Stat vs Social Sciences		Technical vs Social Sciences		Science vs Social Sciences		Medicine vs Social Sciences	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Parental education (Ref.: Both tertiary)												
One tertiary	−0.171	0.186	−0.277	0.181	−0.114	0.184	−0.310*	0.190	−0.293	0.184	−0.297	0.214
One diploma	−0.148	0.167	−0.692***	0.164	−0.123	0.166	−0.248	0.170	−0.466**	0.165	−0.725***	0.196
Both lower secondary or less	−0.231	0.164	−0.973***	0.162	−0.238	0.163	−0.414**	0.167	−0.578***	0.162	−0.542**	0.189
Year of graduation (Ref.: 1995)												
1998	−0.427**	0.179	−0.623***	0.172	−0.596***	0.179	0.146	0.177	−0.535***	0.174	−0.312	0.199
2001	−0.756***	0.193	−0.872***	0.183	−1.021***	0.196	−0.203	0.182	−0.960***	0.179	−0.557***	0.194
2004	−1.279***	0.197	−1.367***	0.179	−1.251***	0.182	−0.617***	0.180	−1.354***	0.179	−0.902***	0.193
2007	−1.232***	0.177	−1.754***	0.165	−1.567***	0.170	−0.542**	0.168	−1.342***	0.167	−0.959	0.183
Parental education*year												
One tertiary*1998	0.013	0.221	−0.008	0.214	0.067	0.221	−0.003	0.221	0.021	0.217	−0.127	0.250
One tertiary*2001	0.185	0.239	0.103	0.229	0.278	0.245	0.266	0.228	0.258	0.224	−0.109	0.242
One tertiary*2004	0.588**	0.261	0.377*	0.224	0.191	0.225	0.355	0.228	0.316	0.225	−0.121	0.241
One tertiary*2007	0.056	0.225	−0.022	0.208	0.137	0.211	0.261	0.212	0.183	0.210	−0.176	0.229
One diploma*1998	−0.176	0.198	−0.061	0.193	0.079	0.197	−0.236	0.197	0.102	0.194	−0.501**	0.231
One diploma*2001	−0.149	0.213	0.002	0.206	0.134	0.215	−0.081	0.202	0.176	0.199	−0.591**	0.221
One diploma*2004	0.177	0.220	0.185	0.201	0.083	0.200	0.094	0.201	0.231	0.200	−0.576**	0.220
One diploma*2007	−0.182	0.195	−0.100	0.186	−0.004	0.187	−0.152	0.187	0.099	0.186	−0.770***	0.209
Both lower secondary or less*1998	−0.164	0.195	−0.105	0.192	0.050	0.195	−0.063	0.194	0.126	0.191	−0.859***	0.225
Both lower secondary or less*2001	−0.212	0.211	0.012	0.205	0.258	0.214	0.057	0.200	0.174	0.197	−1.093***	0.215
Both lower secondary or less*2004	0.104	0.219	0.320	0.202	0.132	0.199	0.262	0.200	0.273	0.199	−1.121***	0.215
Both lower secondary or less*2007	−0.417**	0.196	−0.115	0.185	−0.053	0.186	−0.353	0.186	−0.093	0.185	−1.593***	0.205
Sex (Ref.: Female)												
Male	−0.715***	0.034	0.489***	0.031	0.945	0.029	1.836***	0.028	0.482***	0.028	0.523***	0.031
Geographic area of residence (Ref.: North)												
Center	−0.052	0.047	0.124**	0.041	−0.207	0.038	−0.411***	0.036	−0.218***	0.037	−0.049	0.040
South and Islands	0.143***	0.036	0.659***	0.034	0.028	0.031	−0.178***	0.030	0.092**	0.031	0.347***	0.034
Constant	1.046***	0.153	1.039***	0.148	0.712	0.151	−0.193	0.154	0.591***	0.149	0.036	0.173
Pseudo−R^2 = 0.0541												
N = 118,451												

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A9 − Complete model for estimates reported in Figures 4 and 6. Logit parameters and robust standard error.

	Humanities vs Social Sciences		Law vs Social Sciences		Eco−Stat vs Social Sciences		Technical vs Social Sciences		Science vs Social Sciences		Medicine vs Social Sciences	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Parental education (Ref.: Service class)												
White collars	0.316***	0.101	−0.142	0.107	0.011	0.103	0.174	0.108	0.240**	0.105	0.110	0.129
Self−employed	0.053	0.220	−0.112	0.227	0.214	0.212	−0.426*	0.252	0.008	0.229	0.341	0.257
Working class	−0.124	0.110	−0.593***	0.119	−0.347***	0.112	−0.137	0.117	−0.010	0.113	−0.028	0.138
Year of graduation (Ref.: 1995)												
1998	−0.499***	0.081	−0.401***	0.080	−0.424***	0.079	0.143*	0.081	−0.426***	0.082	−0.179*	0.097
2001	−0.742***	0.089	−0.597***	0.085	−0.782***	0.087	−0.018	0.082	−0.719***	0.083	−0.612***	0.089
2004	−1.002***	0.106	−0.878***	0.089	−0.891***	0.084	−0.295***	0.088	−1.076***	0.091	−0.864***	0.092
2007	−1.269***	0.094	−1.358***	0.081	−1.218***	0.077	−0.345***	0.080	−1.147***	0.084	−0.931***	0.086
Parental education*year												
White collars *1998	−0.165	0.126	−0.169	0.131	−0.146	0.127	−0.228*	0.130	−0.112	0.129	−0.818***	0.161
White collars *2001	−0.346**	0.135	−0.309**	0.136	−0.154	0.135	−0.352**	0.130	−0.183	0.129	−0.620***	0.147
White collars *2004	−0.199	0.156	−0.190	0.139	−0.413***	0.131	−0.302**	0.135	−0.176	0.137	−0.456***	0.149
White collars *2007	−0.289**	0.134	−0.420**	0.129	−0.489***	0.123	−0.426***	0.126	−0.224*	0.128	−0.574***	0.142
Self−employed *1998	−0.125	0.237	−0.649**	0.246	−0.410*	0.229	0.311	0.265	−0.111	0.245	−1.053***	0.281
Self−employed *2001	−0.235	0.251	−0.539**	0.256	−0.249	0.242	0.233	0.270	−0.194	0.251	−1.296***	0.276
Self−employed *2004	−0.138	0.264	−0.344	0.255	−0.385*	0.235	0.396	0.272	0.039	0.254	−1.319***	0.275
Self−employed *2007	−0.330	0.245	−0.826***	0.245	−0.698***	0.227	0.008	0.264	−0.215	0.246	−1.636***	0.269
Working class *1998	0.034	0.135	−0.226	0.144	0.040	0.135	−0.071	0.138	0.058	0.136	−1.024***	0.173
Working class *2001	0.011	0.154	−0.184	0.161	0.174	0.152	−0.107	0.146	−0.013	0.144	−0.921***	0.164
Working class *2004	−0.044	0.164	−0.144	0.155	−0.120	0.142	−0.130	0.146	−0.024	0.147	−1.160***	0.161
Working class *2007	−0.092	0.144	−0.330***	0.141	−0.155	0.131	−0.388**	0.135	−0.192	0.136	−1.527***	0.154
Sex (Ref.: Female)												
Male	−0.714***	0.035	0.496***	0.031	0.944***	0.029	1.839***	0.028	0.489***	0.028	0.546***	0.031
Geographic area of residence (Ref.: (North)												
Center	−0.036	0.047	0.175***	0.041	−0.192***	0.038	−0.391***	0.036	−0.198***	0.037	0.029	0.039
South and Islands	0.132***	0.037	0.691***	0.034	0.042	0.032	−0.173***	0.030	0.086**	0.031	0.394***	0.034
Constant	0.810***	0.060	0.498***	0.061	0.594***	0.059	−0.509***	0.062	0.086	0.061	−0.550***	0.074
Pseudo−R^2 = 0.0524												
N = 117,547												

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A10 − Complete models for estimates reported in Figure 7 (panel a). Logit parameters and robust standard errors.

	Model 1		Model 2	
	Coeff.	S.E.	Coeff.	S.E.
Parental education (Ref.: Both tertiary)				
One tertiary	−0.030	0.019	−0.012	0.019
One diploma	−0.066***	0.017	−0.019	0.018
Both lower secondary or less	−0.084***	0.017	−0.016	0.018
Year of graduation (Ref.: 1995)				
1998	−0.420***	0.027	−0.422***	0.027
2001	−0.152***	0.026	−0.148***	0.026
2004	0.015	0.026	0.009	0.026
2007	0.156***	0.023	0.163***	0.023
*Parental education*year*				
One tertiary*1998	−0.011	0.034	−0.003	0.034
One tertiary*2001	−0.045	0.034	−0.042	0.034
One tertiary*2004	−0.073**	0.034	−0.063*	0.034
One tertiary*2007	−0.060**	0.029	−0.056*	0.029
One diploma*1998	−0.105***	0.031	−0.099***	0.031
One diploma*2001	−0.156***	0.030	−0.156***	0.030
One diploma*2004	−0.168***	0.030	−0.153***	0.030
One diploma*2007	−0.177***	0.025	−0.169***	0.025
Both lower secondary or less*1998	−0.115***	0.031	−0.108***	0.031
Both lower secondary or less*2001	−0.150***	0.030	−0.151***	0.030
Both lower secondary or less*2004	−0.196***	0.031	−0.182***	0.031
Both lower secondary or less*2007	−0.257***	0.025	−0.245***	0.025
Sex (Ref.: Female)				
Male	0.745***	0.006	0.700***	0.007
Geographic area of residence (Ref.: (North)				
Center	0.050***	0.008	0.034***	0.008
South and Islands	0.123***	0.007	0.108***	0.007
Type of degree (Ref.: Unique−cycle)				
Master	−0.396***	0.014	−0.419***	0.014
Bachelor	−0.972***	0.012	−0.946***	0.012
High school track (Ref. Technical/vocational school)				
Scientific lyceum			0.058***	0.008
Classical lyceum			0.127***	0.010
Humanistic schools			−0.410***	0.012
High school mark			0.005***	0.000
Constant	−1.538***	0.016	−1.808***	0.029
	Deviance = 80191.2 N = 118,451		Deviance = 78391.6 N = 118,451	

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A11 − Complete models for estimates reported in Figure 7 (panel b). Logit parameters and robust standard errors.

	Model 1		Model 2	
	Coeff.	S.E.	Coeff.	S.E.
Parental education (Ref.: Service class)				
White collars	−0.050***	0.012	−0.051***	0.012
Self−employed	−0.026	0.025	−0.007	0.024
Working class	−0.065***	0.014	−0.037***	0.014
Year of graduation (Ref.: 1995)				
1998	−0.392***	0.016	−0.404***	0.016
2001	−0.190***	0.015	−0.200***	0.015
2004	−0.046**	0.017	−0.059***	0.017
2007	0.134***	0.016	0.130***	0.016
*Parental education*year*				
White collars *1998	−0.128***	0.023	−0.118***	0.022
White collars *2001	−0.093***	0.022	−0.073***	0.021
White collars *2004	−0.035	0.024	−0.024	0.023
White collars *2007	−0.090***	0.020	−0.081***	0.020
Self−employed *1998	−0.107***	0.034	−0.081**	0.034
Self−employed *2001	−0.110***	0.035	−0.083**	0.035
Self−employed *2004	−0.112***	0.037	−0.088**	0.037
Self−employed *2007	−0.186***	0.032	−0.163***	0.031
Working class *1998	−0.164***	0.025	−0.146***	0.025
Working class *2001	−0.121***	0.026	−0.105***	0.026
Working class *2004	−0.136***	0.027	−0.115***	0.026
Working class *2007	−0.216***	0.022	−0.200***	0.022
Sex (Ref.: Female)				
Male	0.748***	0.006	0.704***	0.007
Geographic area of residence (Ref.: (North)				
Center	0.063***	0.008	0.043***	0.008
South and Islands	0.133***	0.007	0.116***	0.007
Type of degree (Ref.: Unique−cycle)				
Master	−0.387***	0.014	−0.415***	0.014
Bachelor	−0.982***	0.012	−0.949***	0.012
High school track (Ref. Technical/vocational school)				
Scientific lyceum			0.074***	0.008
Classical lyceum			0.152***	0.009
Humanistic schools			−0.404***	0.012
High school mark			0.006***	0.000
Constant	−1.581***	0.008	−1.856***	0.024
	Deviance = 79805.8 N = 117,547		Deviance = 77822.4 N = 117,547	

Note: *** p<0.01, ** p<0.05, * p<0.1

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